

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: P348966

Luminaire Tested: **ARCH-N-PA1-60-830-24VDC-T2U**

Issue Date: 3/3/2020



**Test Information**

Test Method: LM-79-08  
Report Number: P348966  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1908-474-1)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: STREETWORKS  
Catalog Number: ARCH-N-PA1-60-830-24VDC-T2U  
Description: ARCHEON ROADWAY AND AREA LUMINAIRE  
(1) 80 CRI, 3000K, 1160mA LIGHT ENGINE WITH 16 LEDS AND  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 6062 lumens  
Efficiency: N/A  
Efficacy: 102.7 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.75' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B2 - U0 - G2

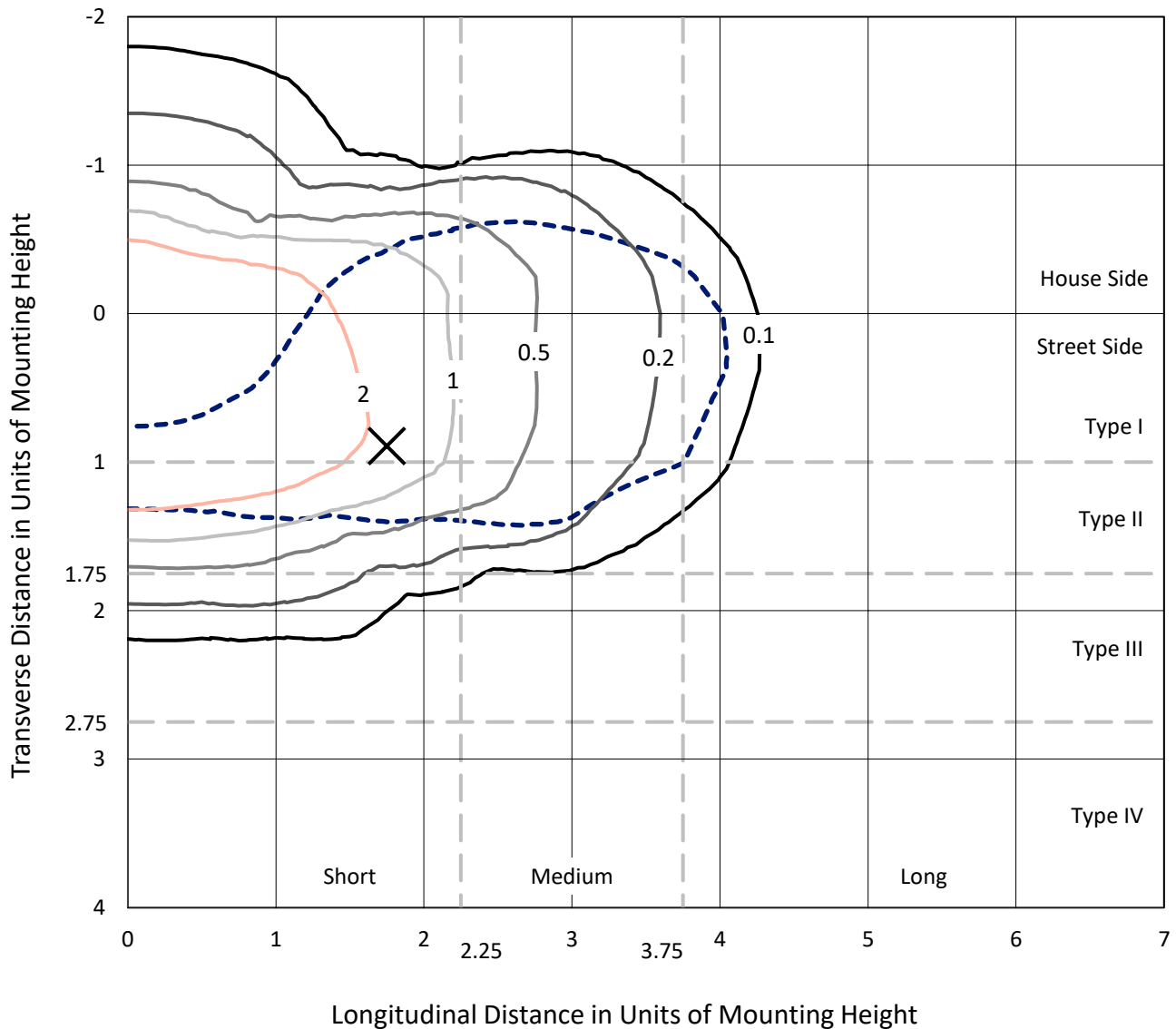
Input Watts (W): 59  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 25 FT

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## Iso-Footcandle Lines of Horizontal Illumination

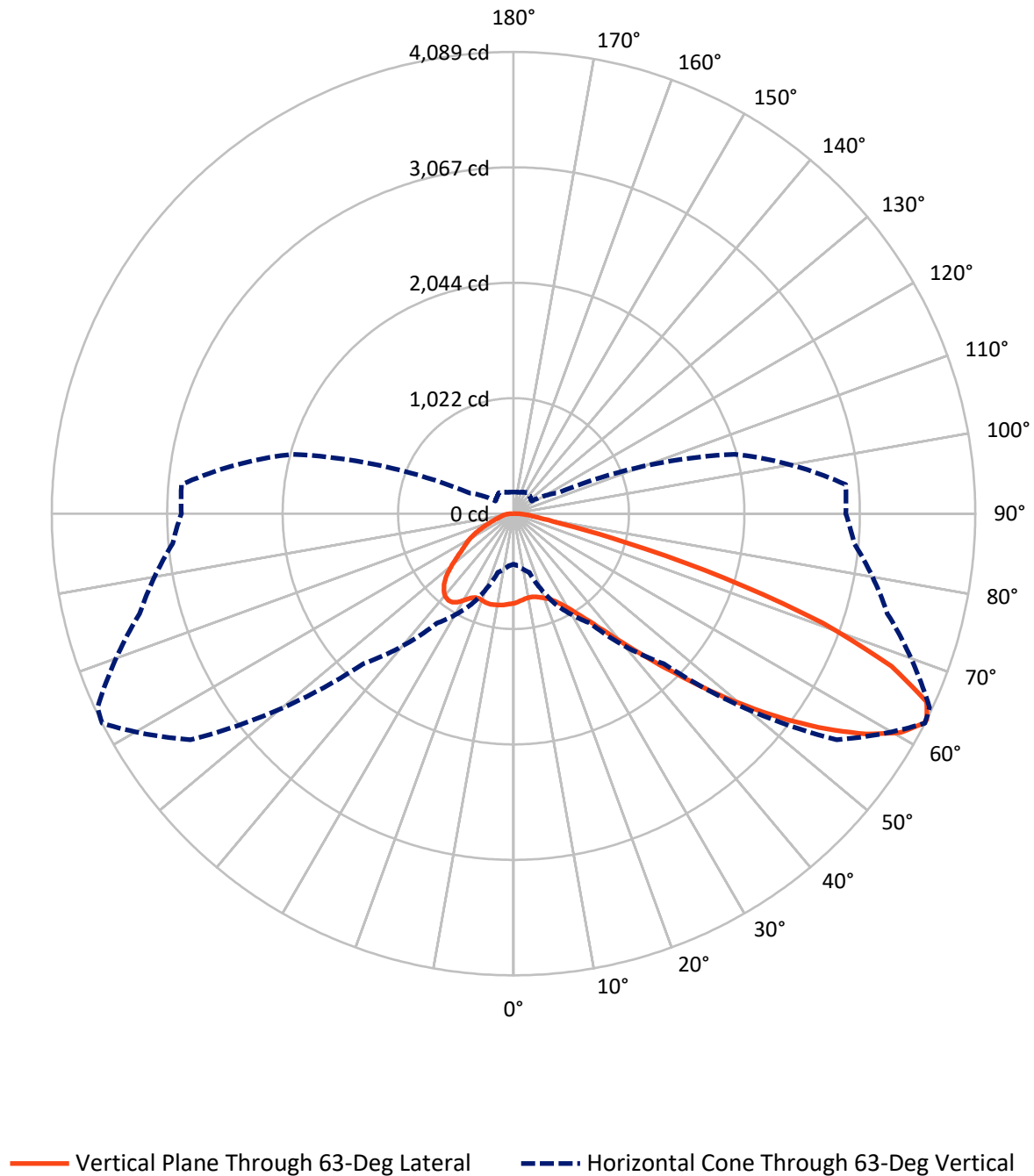
× Max cd  
 - - - 1/2 Max cd



Based on 15 foot mounting height. Maximum calculated value = 4.7 fc  
 Type II - Short - N/A

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CATALOG NUMBER: ARCH-N-PA1-60-830-24VDC-T2U

## Luminous Intensity Polar Plot



REPORT NUMBER: P348966

CATALOG NUMBER: ARCH-N-PA1-60-830-24VDC-T2U

**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 1730.6   | 0.0    | 1730.6 |
|                    | % Fixture | 28.5     | 0.0    | 28.5   |
| <b>Street Side</b> | Lumens    | 4331.4   | 0.0    | 4331.4 |
|                    | % Fixture | 71.5     | 0.0    | 71.5   |
| <b>Total</b>       | Lumens    | 6062.0   | 0.0    | 6062.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**Coefficient of Utilization**

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 75.3   | 1.2       |
| 10°-20°   | 222.2  | 3.7       |
| 20°-30°   | 390.2  | 6.4       |
| 30°-40°   | 657.8  | 10.9      |
| 40°-50°   | 1152.3 | 19.0      |
| 50°-60°   | 1489.3 | 24.6      |
| 60°-70°   | 1289.1 | 21.3      |
| 70°-80°   | 669.2  | 11.0      |
| 80°-90°   | 116.6  | 1.9       |
| 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°    | 6062.0 | 100.0     |
| 0°-180°   | 6062.0 | 100.0     |



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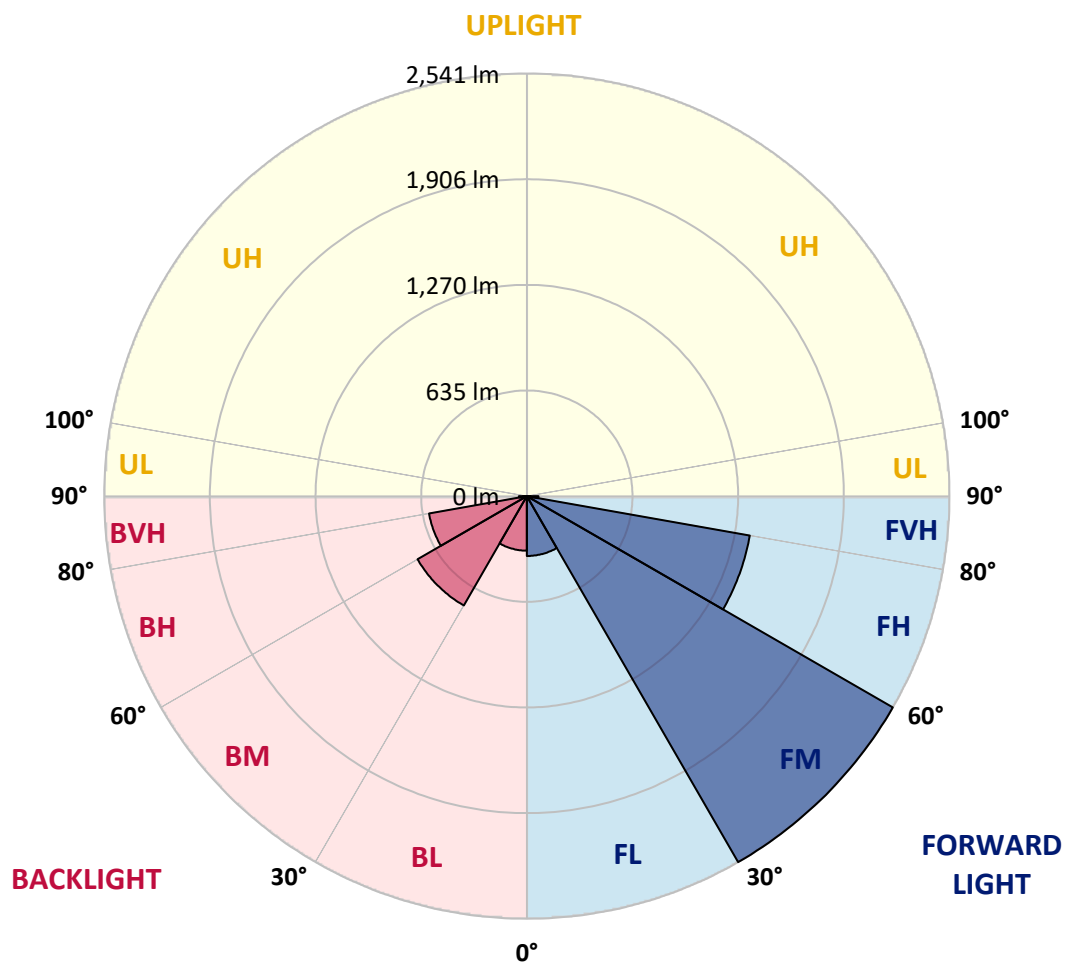
CATALOG NUMBER: ARCH-N-PA1-60-830-24VDC-T2U

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 359.9  | 5.9       |                         |      |         |
| FM   | (30°-60°)   | 2540.7 | 41.9      |                         |      |         |
| FH   | (60°-80°)   | 1361.4 | 22.5      |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 69.5   | 1.1       |                         |      | G1/100  |
| BL   | (0°-30°)    | 327.8  | 5.4       | B1/500                  |      |         |
| BM   | (30°-60°)   | 758.6  | 12.5      | B1/1000                 |      |         |
| BH   | (60°-80°)   | 597.0  | 9.8       | B2/1000                 |      | G2/1000 |
| BVH  | (80°-90°)   | 47.2   | 0.8       |                         |      | G1/100  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B2-U0-G2**

Type II Short



REPORT NUMBER: P348966

CATALOG NUMBER: ARCH-N-PA1-60-830-24VDC-T2U

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 63°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 793.7  | 793.7  | 793.7  | 793.7  | 793.7  | 793.7  | 793.7  | 793.7  | 793.7  | 793.7  | 793.7  |
| 2.5°  | 775.0  | 772.7  | 776.7  | 778.4  | 777.8  | 781.2  | 781.2  | 781.8  | 781.8  | 784.6  | 787.5  |
| 5°    | 752.3  | 751.1  | 755.1  | 758.0  | 760.2  | 765.3  | 768.7  | 770.4  | 772.1  | 776.1  | 782.9  |
| 7.5°  | 730.7  | 729.0  | 734.7  | 737.0  | 740.4  | 747.7  | 755.7  | 760.2  | 762.5  | 771.0  | 780.6  |
| 10°   | 713.1  | 712.6  | 717.1  | 719.4  | 723.3  | 734.1  | 745.5  | 755.1  | 756.8  | 768.2  | 777.2  |
| 12.5° | 704.6  | 703.5  | 708.6  | 711.4  | 718.2  | 731.3  | 744.3  | 756.2  | 759.1  | 772.1  | 780.1  |
| 15°   | 711.4  | 712.6  | 717.1  | 717.7  | 725.6  | 739.2  | 754.0  | 765.9  | 768.7  | 781.8  | 787.5  |
| 17.5° | 743.8  | 743.2  | 746.0  | 744.9  | 747.7  | 754.5  | 770.4  | 780.1  | 783.5  | 793.1  | 797.7  |
| 20°   | 802.2  | 800.5  | 802.8  | 795.4  | 782.9  | 779.5  | 789.2  | 799.9  | 801.1  | 806.7  | 803.9  |
| 22.5° | 891.3  | 893.0  | 887.9  | 869.1  | 839.1  | 824.9  | 818.7  | 822.1  | 826.0  | 825.5  | 817.0  |
| 25°   | 1007.6 | 1013.2 | 1003.6 | 970.7  | 920.2  | 887.3  | 864.6  | 859.5  | 862.3  | 854.4  | 841.3  |
| 27.5° | 1160.2 | 1164.7 | 1143.7 | 1092.7 | 1024.6 | 975.8  | 930.4  | 912.8  | 912.8  | 895.8  | 872.0  |
| 30°   | 1328.1 | 1331.0 | 1297.5 | 1232.8 | 1153.9 | 1081.3 | 1014.4 | 980.3  | 977.5  | 944.0  | 906.6  |
| 32.5° | 1532.4 | 1524.4 | 1484.7 | 1404.7 | 1305.4 | 1205.6 | 1119.3 | 1067.7 | 1062.0 | 1011.5 | 963.9  |
| 35°   | 1796.2 | 1796.2 | 1713.9 | 1622.6 | 1501.7 | 1374.6 | 1261.2 | 1181.2 | 1175.5 | 1118.2 | 1056.4 |
| 37.5° | 2082.7 | 2081.5 | 2007.2 | 1881.3 | 1736.6 | 1581.1 | 1429.7 | 1329.8 | 1316.8 | 1255.5 | 1186.3 |
| 40°   | 2368.0 | 2358.4 | 2298.2 | 2178.5 | 2024.2 | 1846.7 | 1637.9 | 1521.6 | 1515.3 | 1428.0 | 1341.2 |
| 42.5° | 2576.8 | 2567.7 | 2539.4 | 2459.4 | 2357.8 | 2229.6 | 1908.5 | 1751.3 | 1742.3 | 1632.2 | 1526.1 |
| 45°   | 2692.0 | 2678.9 | 2675.0 | 2676.1 | 2687.4 | 2686.9 | 2242.7 | 2023.1 | 1991.3 | 1863.7 | 1722.4 |
| 47.5° | 2665.9 | 2635.2 | 2676.1 | 2781.0 | 2957.5 | 3073.2 | 2631.8 | 2345.9 | 2286.9 | 2104.2 | 1931.8 |
| 50°   | 2455.4 | 2440.6 | 2528.0 | 2741.9 | 3104.4 | 3376.2 | 3060.2 | 2681.2 | 2597.8 | 2331.7 | 2129.8 |
| 52.5° | 2086.1 | 2114.4 | 2222.2 | 2526.3 | 3077.8 | 3559.4 | 3449.4 | 3029.5 | 2913.8 | 2548.4 | 2301.7 |
| 55°   | 1660.6 | 1696.3 | 1848.4 | 2170.6 | 2831.0 | 3561.7 | 3730.2 | 3367.1 | 3263.8 | 2772.5 | 2477.5 |
| 57.5° | 1208.4 | 1258.9 | 1449.0 | 1744.5 | 2398.1 | 3318.3 | 3868.6 | 3683.1 | 3565.1 | 2993.2 | 2649.4 |
| 60°   | 759.1  | 794.8  | 1001.9 | 1344.6 | 1833.0 | 2781.0 | 3834.0 | 3936.1 | 3838.5 | 3201.4 | 2845.7 |
| 62.5° | 489.0  | 506.1  | 595.7  | 959.9  | 1278.2 | 2039.5 | 3578.1 | 4081.4 | 4039.4 | 3391.5 | 2993.8 |
| 63°   | 448.2  | 462.9  | 539.5  | 887.3  | 1185.2 | 1879.0 | 3491.9 | 4088.7 | 4063.8 | 3427.2 | 3028.4 |
| 65°   | 320.5  | 336.4  | 376.1  | 609.9  | 874.8  | 1260.6 | 2992.1 | 4020.1 | 4047.9 | 3486.8 | 3075.5 |
| 67.5° | 253.0  | 258.1  | 276.3  | 370.5  | 620.7  | 716.0  | 2013.5 | 3609.9 | 3731.9 | 3423.3 | 3005.7 |
| 70°   | 226.4  | 230.3  | 250.8  | 284.2  | 469.7  | 464.1  | 1050.1 | 2902.5 | 3154.9 | 3206.5 | 2829.8 |
| 72.5° | 197.4  | 200.3  | 225.2  | 267.8  | 358.6  | 354.6  | 456.7  | 1951.6 | 2258.5 | 2809.4 | 2586.5 |
| 75°   | 163.4  | 166.2  | 187.2  | 237.7  | 303.5  | 280.3  | 285.9  | 1020.1 | 1294.6 | 2202.4 | 2268.2 |
| 77.5° | 134.5  | 136.2  | 153.7  | 191.2  | 267.2  | 216.2  | 221.3  | 428.9  | 629.2  | 1501.2 | 1791.1 |
| 80°   | 97.6   | 98.1   | 114.6  | 145.2  | 204.2  | 195.2  | 164.5  | 233.7  | 285.4  | 822.6  | 1126.7 |
| 82.5° | 68.1   | 68.6   | 85.7   | 101.6  | 140.7  | 194.6  | 119.7  | 156.6  | 171.3  | 379.0  | 501.5  |
| 85°   | 47.7   | 46.5   | 58.4   | 66.9   | 89.1   | 118.0  | 91.3   | 100.4  | 106.1  | 164.0  | 135.0  |
| 87.5° | 21.0   | 20.4   | 32.9   | 35.7   | 44.8   | 54.5   | 72.6   | 52.8   | 56.2   | 79.4   | 42.5   |
| 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: P348966

CATALOG NUMBER: ARCH-N-PA1-60-830-24VDC-T2U

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|--------|--------|--------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 793.7  | 793.7  | 793.7  | 793.7  | 793.7 | 793.7 | 793.7 | 793.7 | 793.7 | 793.7 | 793.7 |
| 2.5°  | 788.0  | 790.3  | 793.7  | 798.8  | 802.8 | 804.5 | 807.9 | 808.4 | 813.5 | 809.0 | 809.6 |
| 5°    | 786.9  | 789.7  | 797.1  | 806.2  | 812.4 | 817.0 | 825.5 | 828.3 | 833.4 | 831.1 | 830.6 |
| 7.5°  | 785.2  | 790.3  | 801.1  | 814.1  | 823.8 | 831.1 | 839.1 | 844.2 | 849.3 | 848.2 | 847.0 |
| 10°   | 782.9  | 789.2  | 804.5  | 817.5  | 831.1 | 839.1 | 844.8 | 845.3 | 847.0 | 845.9 | 843.1 |
| 12.5° | 784.6  | 791.4  | 809.0  | 822.1  | 836.2 | 841.9 | 840.2 | 831.7 | 824.3 | 818.1 | 817.0 |
| 15°   | 790.3  | 798.2  | 814.7  | 826.6  | 837.9 | 834.5 | 824.3 | 805.6 | 792.0 | 784.0 | 784.6 |
| 17.5° | 796.0  | 802.8  | 815.3  | 824.9  | 830.6 | 820.4 | 804.5 | 788.6 | 782.3 | 776.1 | 775.0 |
| 20°   | 801.1  | 802.2  | 810.1  | 818.7  | 818.1 | 810.1 | 795.4 | 776.1 | 763.6 | 753.4 | 754.0 |
| 22.5° | 809.0  | 804.5  | 805.0  | 810.1  | 816.4 | 809.0 | 774.4 | 740.9 | 722.2 | 710.3 | 709.7 |
| 25°   | 827.2  | 817.5  | 808.4  | 811.3  | 835.1 | 788.0 | 729.6 | 685.9 | 669.4 | 658.7 | 659.8 |
| 27.5° | 852.1  | 839.1  | 820.9  | 836.2  | 849.3 | 746.6 | 665.5 | 620.7 | 609.3 | 598.0 | 600.8 |
| 30°   | 879.4  | 860.6  | 838.5  | 890.1  | 833.4 | 680.8 | 586.1 | 545.2 | 535.0 | 524.2 | 526.5 |
| 32.5° | 928.2  | 900.4  | 871.4  | 954.8  | 796.5 | 600.8 | 502.7 | 465.8 | 459.0 | 452.2 | 452.7 |
| 35°   | 1009.3 | 976.4  | 945.2  | 1004.2 | 748.9 | 517.4 | 427.8 | 401.7 | 396.0 | 388.1 | 388.1 |
| 37.5° | 1129.0 | 1077.4 | 1060.9 | 1030.3 | 683.6 | 439.7 | 372.7 | 355.1 | 343.2 | 332.5 | 332.5 |
| 40°   | 1268.0 | 1206.7 | 1193.7 | 1038.2 | 598.5 | 375.0 | 334.2 | 318.8 | 303.0 | 287.1 | 288.2 |
| 42.5° | 1437.0 | 1354.2 | 1324.1 | 1027.4 | 495.3 | 333.6 | 306.9 | 289.3 | 274.0 | 260.4 | 258.1 |
| 45°   | 1627.7 | 1522.7 | 1446.7 | 996.2  | 401.7 | 308.1 | 289.3 | 268.3 | 249.1 | 237.1 | 234.9 |
| 47.5° | 1822.3 | 1705.4 | 1555.0 | 933.8  | 335.9 | 289.9 | 277.4 | 247.9 | 234.3 | 226.4 | 225.2 |
| 50°   | 2008.3 | 1886.4 | 1644.7 | 835.7  | 297.8 | 276.9 | 259.8 | 238.3 | 226.9 | 220.1 | 219.6 |
| 52.5° | 2173.4 | 2058.3 | 1720.1 | 734.1  | 272.3 | 266.1 | 251.9 | 233.7 | 221.8 | 215.6 | 214.5 |
| 55°   | 2330.6 | 2232.4 | 1795.0 | 643.4  | 250.2 | 247.9 | 247.9 | 229.2 | 216.2 | 210.5 | 209.3 |
| 57.5° | 2503.1 | 2430.4 | 1870.5 | 577.0  | 230.3 | 234.9 | 242.8 | 224.1 | 209.9 | 204.8 | 204.2 |
| 60°   | 2702.2 | 2659.6 | 1949.9 | 518.5  | 212.7 | 220.7 | 235.4 | 217.3 | 202.5 | 198.6 | 197.4 |
| 62.5° | 2905.9 | 2907.0 | 2018.6 | 448.2  | 198.0 | 209.9 | 226.9 | 211.0 | 195.7 | 192.9 | 192.3 |
| 63°   | 2941.6 | 2951.8 | 2028.2 | 432.9  | 194.6 | 207.6 | 224.7 | 208.8 | 194.0 | 191.2 | 190.6 |
| 65°   | 3029.5 | 3074.4 | 2036.1 | 368.2  | 182.1 | 199.1 | 216.2 | 201.4 | 186.7 | 186.1 | 184.9 |
| 67.5° | 3008.5 | 3081.7 | 1986.8 | 288.8  | 167.9 | 187.2 | 204.2 | 190.6 | 177.6 | 177.6 | 175.3 |
| 70°   | 2852.0 | 2899.6 | 1835.3 | 223.0  | 157.2 | 174.7 | 190.1 | 179.3 | 165.7 | 166.8 | 162.3 |
| 72.5° | 2612.0 | 2559.8 | 1509.7 | 174.2  | 144.1 | 160.6 | 173.6 | 164.5 | 152.6 | 151.5 | 146.4 |
| 75°   | 2260.2 | 2088.3 | 1081.3 | 140.7  | 128.2 | 141.8 | 155.4 | 148.6 | 137.9 | 131.6 | 130.5 |
| 77.5° | 1722.4 | 1482.4 | 647.9  | 119.1  | 114.6 | 125.9 | 134.5 | 129.4 | 120.8 | 113.5 | 114.0 |
| 80°   | 1025.7 | 855.0  | 292.2  | 101.0  | 99.3  | 107.8 | 114.6 | 110.6 | 105.0 | 95.9  | 93.6  |
| 82.5° | 415.3  | 330.8  | 131.1  | 81.7   | 84.0  | 90.2  | 96.4  | 93.0  | 88.5  | 86.2  | 73.2  |
| 85°   | 107.8  | 103.8  | 76.6   | 61.3   | 64.7  | 67.5  | 76.0  | 76.0  | 72.1  | 59.0  | 54.5  |
| 87.5° | 30.6   | 40.8   | 42.5   | 38.6   | 43.7  | 44.3  | 52.8  | 52.8  | 53.9  | 36.3  | 32.9  |
| 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            |

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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 3000K 4-step quadrangle

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### Photopic Flux vs. Wavelength



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| 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              |           |                  |                  |

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### Scotopic Flux vs. Wavelength



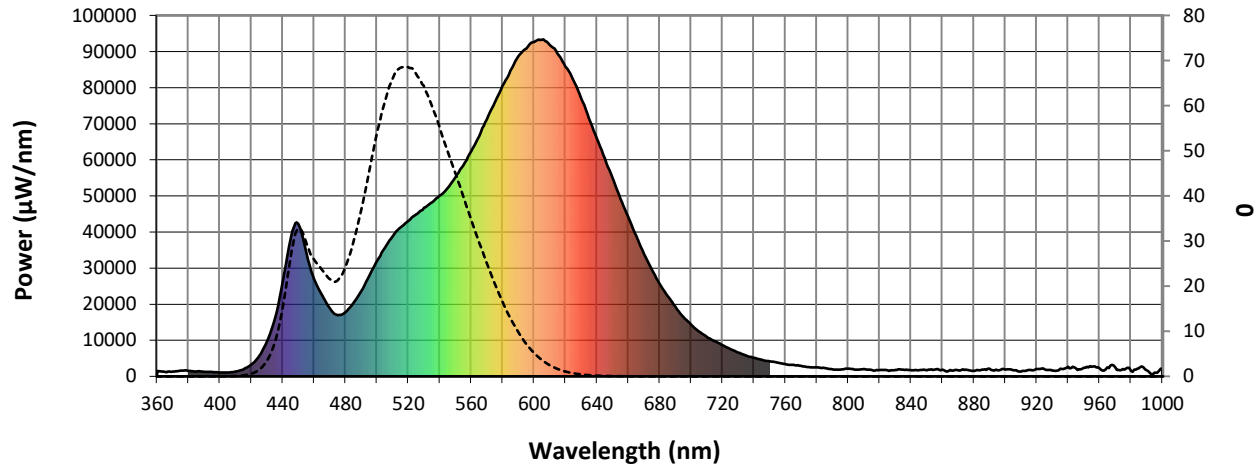
Scotopic Lumens: 6076.4

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              |           |                  |                  |

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### Melanopic Flux vs. Wavelength


**Melanopic Lumens: 2300.1**
**M/P: 0.51**

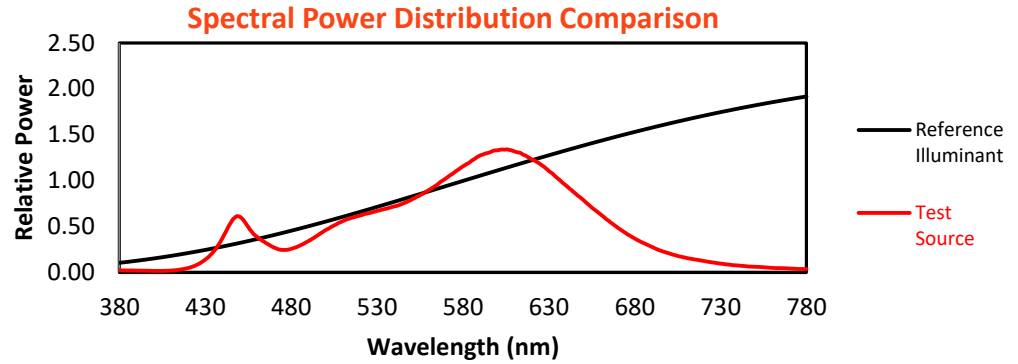
| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 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              |           |                  |                  |

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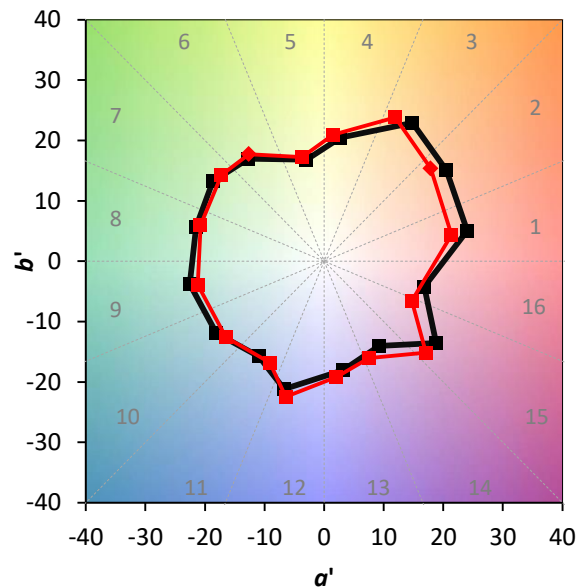
TM-30-18

### 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)