

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: P348882

Luminaire Tested: **ARCH-N-PA1-60-740-24VDC-T4W-HSS**

Issue Date: 3/3/2020



**Test Information**

Test Method: LM-79-08  
Report Number: P348882  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-19)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: STREETWORKS  
Catalog Number: ARCH-N-PA1-60-740-24VDC-T4W-HSS  
Description: ARCHEON ROADWAY AND AREA LUMINAIRE  
(1) 70 CRI, 4000K, 1160mA LIGHT ENGINE WITH 16 LEDS AND  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 5412 lumens  
Efficiency: N/A  
Efficacy: 91.7 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.75' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B1 - U0 - G2

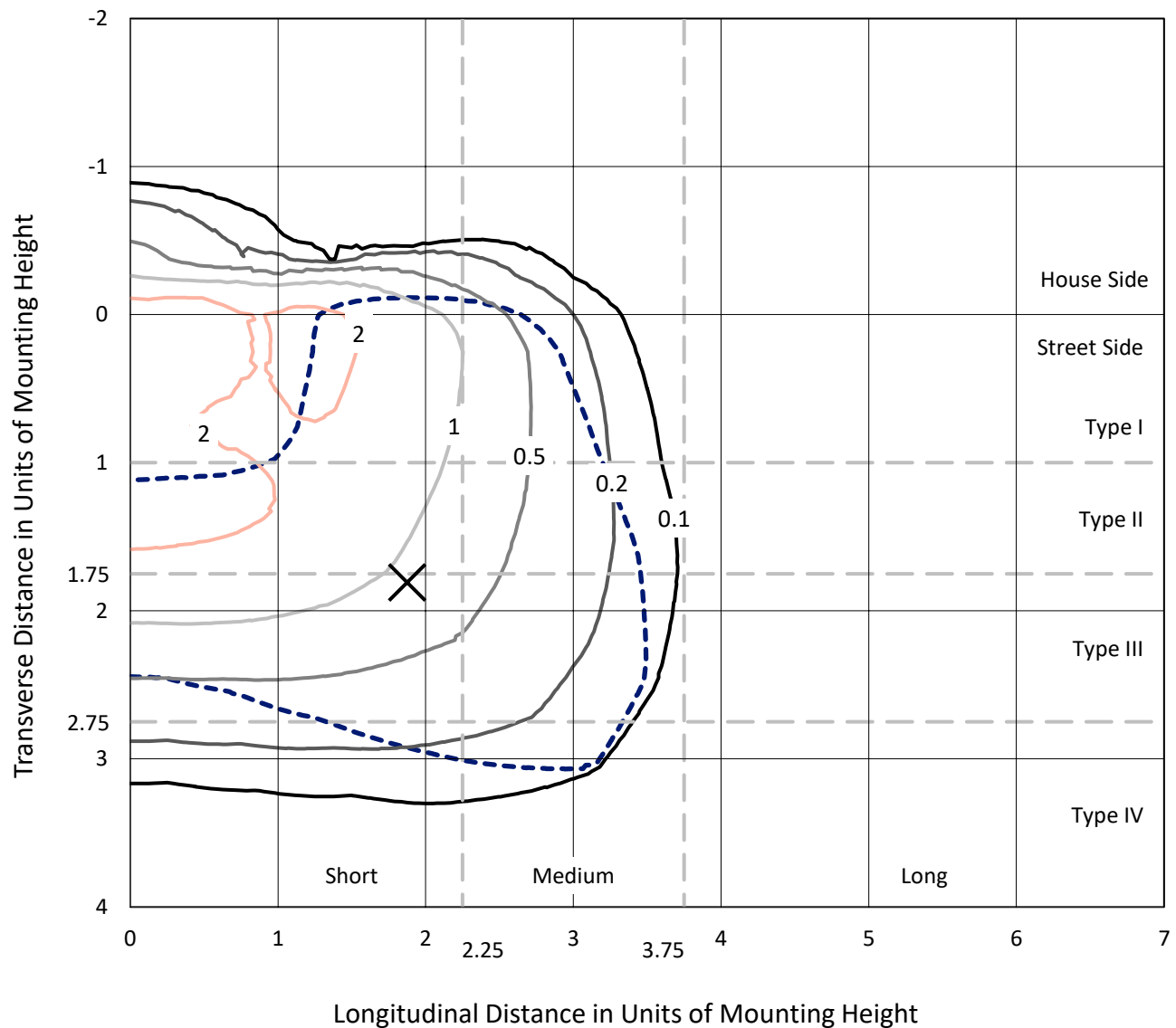
Input Watts (W): 59  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 25 FT

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## Iso-Footcandle Lines of Horizontal Illumination

× Max cd  
 - - - 1/2 Max cd

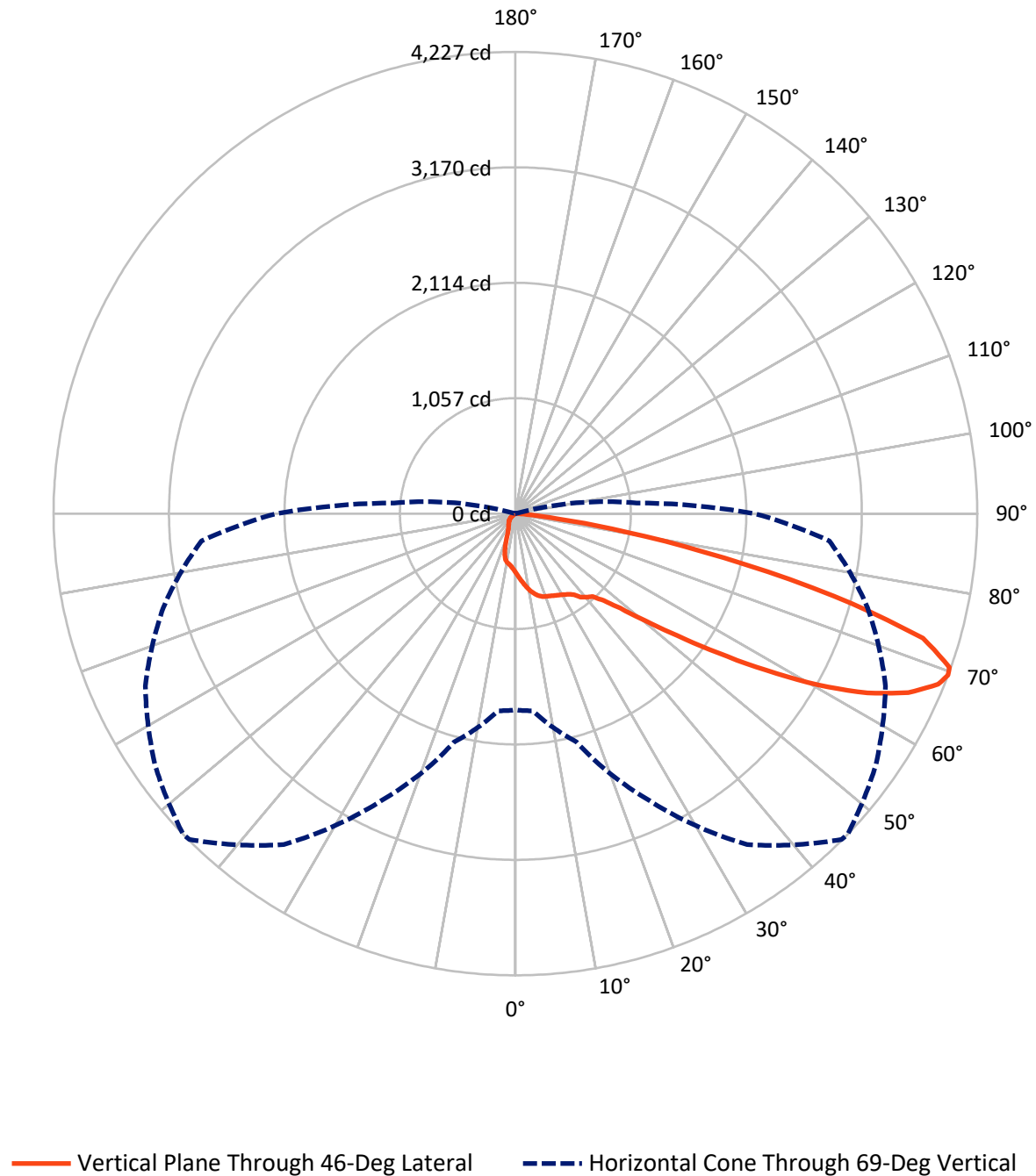


Based on 15 foot mounting height. Maximum calculated value = 3.5 fc  
 Type IV - Short - N/A

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CATALOG NUMBER: ARCH-N-PA1-60-740-24VDC-T4W-HSS

## Luminous Intensity Polar Plot



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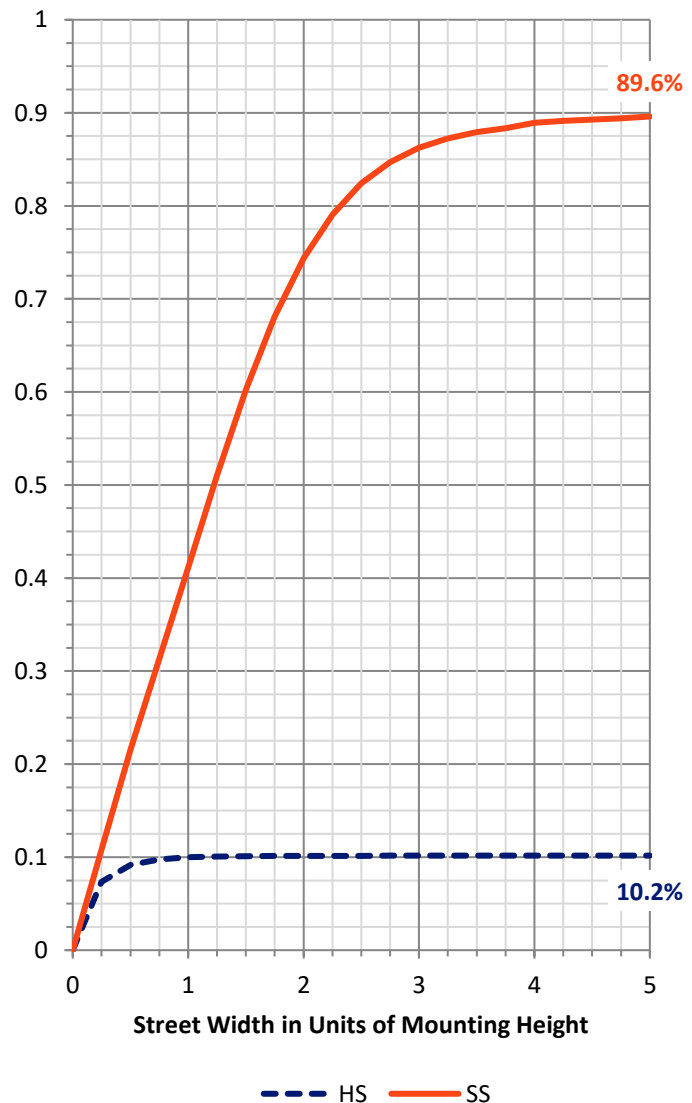
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 555.4    | 0.0    | 555.4  |
|                    | % Fixture | 10.3     | 0.0    | 10.3   |
| <b>Street Side</b> | Lumens    | 4856.6   | 0.0    | 4856.6 |
|                    | % Fixture | 89.7     | 0.0    | 89.7   |
| <b>Total</b>       | Lumens    | 5412.0   | 0.0    | 5412.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**Coefficient of Utilization**

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 54.0   | 1.0       |
| 10°-20°   | 163.7  | 3.0       |
| 20°-30°   | 257.5  | 4.8       |
| 30°-40°   | 369.3  | 6.8       |
| 40°-50°   | 638.3  | 11.8      |
| 50°-60°   | 1260.9 | 23.3      |
| 60°-70°   | 1762.2 | 32.6      |
| 70°-80°   | 851.4  | 15.7      |
| 80°-90°   | 54.7   | 1.0       |
| 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°    | 5412.0 | 100.0     |
| 0°-180°   | 5412.0 | 100.0     |



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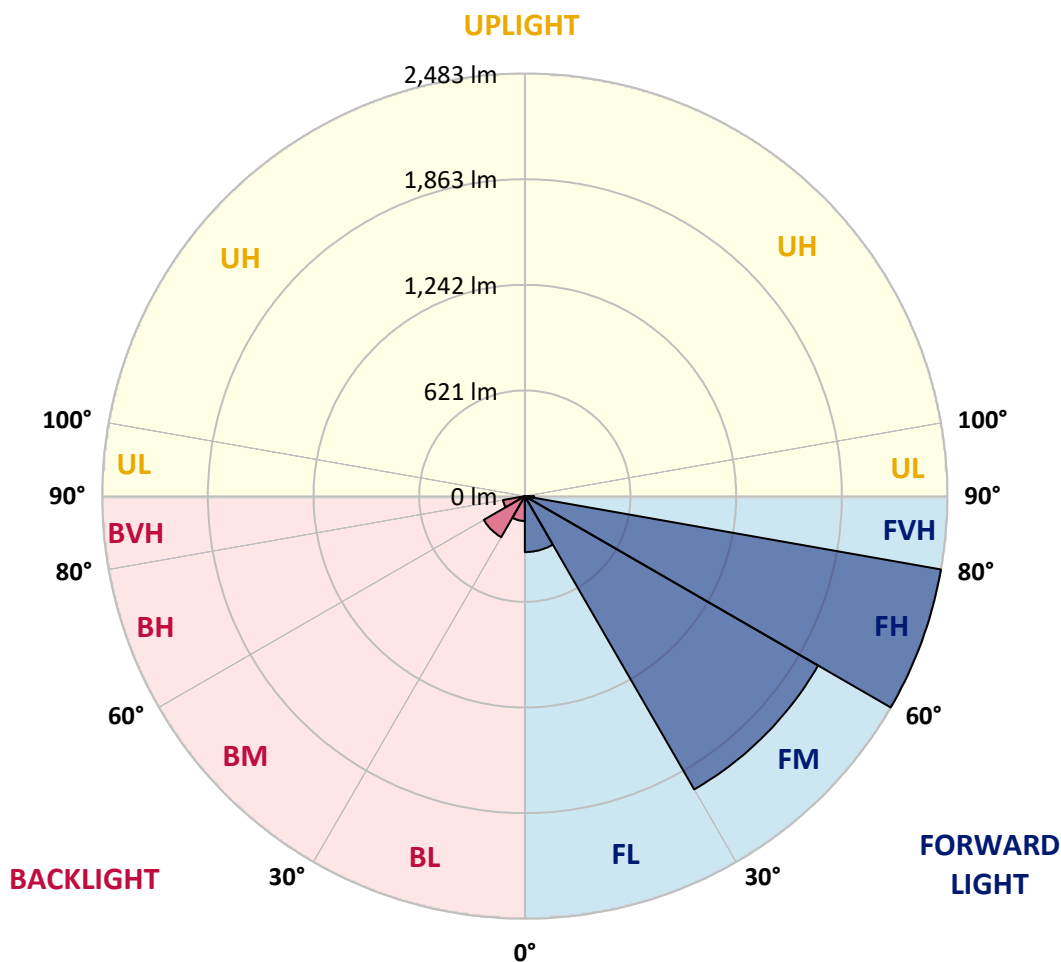
CATALOG NUMBER: ARCH-N-PA1-60-740-24VDC-T4W-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 328.8  | 6.1       |                         |      |         |
| FM   | (30°-60°)   | 1990.1 | 36.8      |                         |      |         |
| FH   | (60°-80°)   | 2483.4 | 45.9      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 54.3   | 1.0       |                         |      | G1/100  |
| BL   | (0°-30°)    | 146.4  | 2.7       | B1/500                  |      |         |
| BM   | (30°-60°)   | 278.3  | 5.1       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 130.2  | 2.4       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 0.5    | 0.0       |                         |      | G0/10   |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B1-U0-G2**

Type IV Short





REPORT NUMBER: P348882

CATALOG NUMBER: ARCH-N-PA1-60-740-24VDC-T4W-HSS

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 46°    | 55°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 542.3  | 542.3  | 542.3  | 542.3  | 542.3  | 542.3  | 542.3  | 542.3  | 542.3  | 542.3  | 542.3  |
| 2.5°  | 602.4  | 601.6  | 598.1  | 596.6  | 587.9  | 582.9  | 580.8  | 574.5  | 565.4  | 556.2  | 546.1  |
| 5°    | 670.9  | 670.7  | 664.1  | 657.7  | 641.5  | 626.3  | 623.5  | 608.7  | 588.2  | 568.9  | 549.6  |
| 7.5°  | 740.9  | 737.6  | 731.1  | 718.9  | 695.3  | 670.9  | 668.6  | 647.8  | 618.6  | 590.7  | 563.1  |
| 10°   | 800.3  | 798.3  | 789.7  | 771.1  | 743.5  | 715.8  | 713.0  | 687.4  | 654.4  | 620.2  | 584.9  |
| 12.5° | 846.5  | 845.0  | 833.6  | 810.5  | 781.0  | 752.4  | 748.6  | 725.7  | 690.5  | 652.1  | 610.5  |
| 15°   | 874.7  | 873.9  | 860.0  | 835.3  | 806.4  | 781.5  | 778.2  | 758.2  | 725.5  | 685.4  | 638.4  |
| 17.5° | 881.3  | 881.5  | 867.1  | 842.2  | 818.3  | 800.6  | 798.0  | 782.8  | 755.4  | 715.6  | 666.3  |
| 20°   | 866.6  | 869.6  | 856.7  | 835.1  | 820.4  | 811.0  | 809.0  | 799.8  | 776.7  | 739.2  | 688.7  |
| 22.5° | 845.7  | 847.3  | 838.4  | 823.9  | 817.8  | 819.6  | 818.6  | 813.5  | 794.0  | 759.5  | 710.8  |
| 25°   | 833.1  | 833.1  | 827.7  | 815.6  | 819.6  | 830.5  | 830.8  | 829.8  | 814.3  | 784.3  | 737.6  |
| 27.5° | 832.6  | 831.0  | 824.9  | 815.8  | 827.0  | 843.7  | 844.7  | 851.6  | 841.9  | 814.5  | 771.1  |
| 30°   | 852.9  | 851.1  | 838.1  | 826.2  | 840.4  | 858.4  | 861.0  | 875.9  | 871.1  | 847.3  | 808.4  |
| 32.5° | 900.3  | 894.0  | 865.3  | 845.7  | 856.4  | 878.0  | 881.3  | 905.1  | 912.7  | 887.6  | 844.5  |
| 35°   | 965.3  | 945.2  | 903.9  | 882.8  | 883.8  | 906.4  | 909.4  | 944.5  | 967.0  | 924.7  | 872.4  |
| 37.5° | 1054.8 | 1044.9 | 977.7  | 921.4  | 925.9  | 960.2  | 969.1  | 1007.1 | 1000.8 | 945.0  | 904.1  |
| 40°   | 1251.2 | 1235.8 | 1164.2 | 1029.5 | 966.3  | 1003.8 | 1006.6 | 1026.9 | 1027.4 | 990.9  | 970.1  |
| 42.5° | 1518.7 | 1512.3 | 1437.0 | 1225.6 | 1045.7 | 1033.0 | 1038.1 | 1072.3 | 1110.7 | 1087.8 | 1086.8 |
| 45°   | 1814.8 | 1811.5 | 1731.6 | 1486.0 | 1206.3 | 1128.7 | 1135.0 | 1180.9 | 1254.3 | 1259.4 | 1291.6 |
| 47.5° | 2053.1 | 2051.6 | 2005.6 | 1776.5 | 1452.2 | 1290.8 | 1292.9 | 1341.6 | 1470.5 | 1534.2 | 1585.7 |
| 50°   | 2270.3 | 2277.7 | 2241.4 | 2090.9 | 1787.2 | 1544.8 | 1540.0 | 1572.5 | 1779.5 | 1883.8 | 1947.8 |
| 52.5° | 2572.3 | 2582.7 | 2480.9 | 2384.2 | 2138.6 | 1860.0 | 1856.2 | 1890.2 | 2151.0 | 2229.2 | 2240.6 |
| 55°   | 2838.9 | 2821.2 | 2740.7 | 2712.8 | 2567.2 | 2249.2 | 2248.2 | 2278.2 | 2510.3 | 2543.6 | 2564.6 |
| 57.5° | 2956.7 | 2949.8 | 2988.7 | 3052.6 | 3016.1 | 2709.3 | 2707.0 | 2684.2 | 2831.8 | 2835.4 | 2900.1 |
| 60°   | 3031.0 | 3039.4 | 3158.4 | 3355.6 | 3446.7 | 3204.3 | 3189.6 | 3050.3 | 3138.9 | 3131.0 | 3200.3 |
| 62.5° | 2975.2 | 2991.7 | 3205.9 | 3534.5 | 3768.9 | 3636.5 | 3615.7 | 3385.8 | 3401.3 | 3374.1 | 3438.6 |
| 65°   | 2678.8 | 2704.5 | 3055.4 | 3500.7 | 3928.8 | 3974.2 | 3953.2 | 3681.9 | 3609.6 | 3564.9 | 3529.1 |
| 67.5° | 2175.1 | 2190.4 | 2556.8 | 3207.1 | 3856.7 | 4175.7 | 4171.4 | 3941.5 | 3766.9 | 3532.7 | 3255.1 |
| 69°   | 1797.6 | 1812.5 | 2165.2 | 2898.1 | 3698.1 | 4218.8 | 4227.2 | 4024.7 | 3737.0 | 3336.8 | 2884.1 |
| 70°   | 1522.5 | 1538.5 | 1867.1 | 2633.2 | 3514.2 | 4198.8 | 4213.8 | 4016.9 | 3651.2 | 3110.0 | 2558.6 |
| 72.5° | 798.5  | 812.3  | 1149.5 | 1814.1 | 2864.8 | 3855.5 | 3900.9 | 3677.3 | 3095.0 | 2258.6 | 1512.9 |
| 75°   | 251.0  | 258.8  | 448.9  | 948.3  | 1961.5 | 2997.8 | 3008.2 | 2884.6 | 2197.7 | 1242.4 | 630.1  |
| 77.5° | 95.7   | 93.4   | 149.5  | 349.4  | 991.7  | 1887.6 | 1951.3 | 1802.6 | 1153.3 | 439.2  | 145.4  |
| 80°   | 51.5   | 51.8   | 77.6   | 144.6  | 424.3  | 970.1  | 1023.9 | 873.7  | 409.8  | 137.0  | 33.5   |
| 82.5° | 22.3   | 23.3   | 43.6   | 76.6   | 194.9  | 357.8  | 384.7  | 320.2  | 156.6  | 92.1   | 12.4   |
| 85°   | 4.8    | 5.3    | 21.1   | 41.6   | 79.4   | 100.5  | 105.3  | 103.8  | 99.7   | 71.6   | 4.8    |
| 87.5° | 0.0    | 0.0    | 9.4    | 15.0   | 20.0   | 22.8   | 20.0   | 26.1   | 55.1   | 48.2   | 2.5    |
| 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: P348882

CATALOG NUMBER: ARCH-N-PA1-60-740-24VDC-T4W-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 542.3  | 542.3  | 542.3 | 542.3 | 542.3 | 542.3 | 542.3 | 542.3 | 542.3 | 542.3 | 542.3 |
| 2.5°  | 542.8  | 538.2  | 530.3 | 521.7 | 515.6 | 509.3 | 504.2 | 501.9 | 499.4 | 497.6 | 499.9 |
| 5°    | 541.8  | 532.9  | 517.6 | 502.9 | 492.3 | 483.6 | 476.5 | 473.7 | 471.0 | 468.9 | 468.7 |
| 7.5°  | 550.6  | 538.2  | 514.9 | 493.3 | 476.8 | 465.1 | 455.5 | 451.4 | 448.1 | 446.6 | 445.3 |
| 10°   | 567.6  | 551.7  | 520.4 | 492.3 | 471.0 | 451.2 | 430.4 | 414.4 | 404.0 | 399.1 | 397.4 |
| 12.5° | 589.7  | 569.7  | 531.1 | 497.6 | 466.6 | 428.6 | 384.4 | 346.4 | 321.8 | 313.6 | 308.8 |
| 15°   | 615.6  | 590.7  | 545.1 | 504.5 | 450.9 | 381.4 | 306.5 | 256.8 | 234.0 | 229.4 | 224.3 |
| 17.5° | 640.5  | 613.1  | 561.8 | 505.7 | 416.4 | 304.8 | 224.6 | 190.8 | 181.9 | 185.0 | 185.7 |
| 20°   | 662.3  | 635.1  | 578.3 | 494.6 | 353.7 | 228.6 | 173.8 | 165.4 | 168.7 | 174.6 | 175.6 |
| 22.5° | 684.4  | 656.4  | 593.5 | 465.1 | 273.5 | 173.6 | 156.6 | 158.6 | 161.9 | 167.7 | 168.7 |
| 25°   | 711.3  | 682.3  | 607.7 | 411.1 | 205.3 | 147.7 | 148.7 | 151.7 | 155.0 | 160.4 | 160.9 |
| 27.5° | 742.2  | 715.1  | 617.1 | 340.8 | 152.2 | 135.8 | 139.1 | 143.6 | 146.9 | 152.0 | 153.0 |
| 30°   | 783.3  | 758.2  | 620.2 | 268.0 | 127.6 | 125.1 | 126.6 | 132.2 | 137.0 | 141.6 | 142.4 |
| 32.5° | 821.9  | 800.8  | 610.0 | 202.2 | 118.2 | 115.2 | 115.2 | 118.5 | 124.1 | 128.4 | 129.4 |
| 35°   | 857.4  | 843.7  | 577.5 | 147.9 | 111.1 | 106.1 | 103.5 | 103.5 | 107.1 | 110.6 | 111.6 |
| 37.5° | 904.4  | 903.9  | 525.0 | 118.0 | 104.3 | 98.5  | 93.1  | 89.1  | 87.8  | 88.6  | 89.1  |
| 40°   | 984.8  | 985.6  | 456.5 | 105.8 | 98.5  | 90.6  | 82.5  | 75.1  | 68.3  | 66.0  | 65.7  |
| 42.5° | 1110.4 | 1099.0 | 384.7 | 100.0 | 93.4  | 82.5  | 70.3  | 60.4  | 49.7  | 46.4  | 46.2  |
| 45°   | 1309.9 | 1242.1 | 308.6 | 94.6  | 88.1  | 73.3  | 58.1  | 44.7  | 36.0  | 33.5  | 33.5  |
| 47.5° | 1600.4 | 1430.1 | 239.0 | 88.8  | 80.9  | 62.9  | 43.9  | 32.2  | 26.4  | 25.1  | 25.4  |
| 50°   | 1900.8 | 1614.4 | 183.2 | 81.5  | 72.3  | 52.0  | 32.5  | 23.3  | 20.0  | 20.0  | 20.3  |
| 52.5° | 2167.3 | 1749.3 | 142.9 | 73.6  | 61.7  | 40.9  | 24.6  | 18.3  | 16.7  | 16.5  | 16.7  |
| 55°   | 2416.7 | 1836.4 | 109.4 | 64.5  | 49.0  | 30.4  | 18.8  | 15.0  | 14.0  | 13.4  | 13.2  |
| 57.5° | 2657.3 | 1879.5 | 82.0  | 52.0  | 35.5  | 22.1  | 15.0  | 12.7  | 11.7  | 10.9  | 10.7  |
| 60°   | 2817.4 | 1844.5 | 56.3  | 38.3  | 24.6  | 16.0  | 12.4  | 10.9  | 9.6   | 8.9   | 8.6   |
| 62.5° | 2907.7 | 1748.8 | 36.3  | 27.7  | 17.5  | 11.9  | 9.9   | 9.1   | 7.4   | 6.6   | 6.6   |
| 65°   | 2871.2 | 1591.0 | 25.4  | 19.8  | 12.7  | 8.9   | 7.4   | 7.4   | 5.3   | 4.3   | 4.1   |
| 67.5° | 2544.3 | 1344.1 | 19.3  | 14.7  | 9.1   | 6.6   | 5.6   | 6.3   | 3.3   | 2.0   | 2.0   |
| 69°   | 2189.1 | 1114.0 | 16.5  | 12.2  | 7.6   | 5.3   | 4.8   | 5.8   | 2.3   | 1.5   | 1.3   |
| 70°   | 1902.6 | 960.9  | 15.0  | 10.7  | 6.3   | 4.6   | 4.3   | 5.6   | 2.3   | 1.3   | 1.0   |
| 72.5° | 1138.3 | 535.9  | 11.4  | 7.6   | 4.1   | 3.6   | 3.6   | 6.3   | 2.3   | 1.3   | 1.0   |
| 75°   | 460.0  | 188.8  | 8.4   | 5.3   | 3.0   | 3.0   | 4.3   | 8.1   | 2.0   | 1.0   | 0.8   |
| 77.5° | 104.3  | 41.4   | 4.8   | 3.3   | 2.0   | 3.0   | 5.1   | 6.3   | 1.3   | 0.5   | 0.0   |
| 80°   | 25.4   | 10.1   | 3.0   | 2.0   | 1.3   | 2.3   | 3.8   | 3.6   | 0.3   | 0.0   | 0.0   |
| 82.5° | 8.4    | 3.6    | 1.3   | 1.0   | 0.3   | 0.8   | 1.8   | 1.0   | 0.0   | 0.0   | 0.0   |
| 85°   | 3.6    | 2.0    | 0.5   | 0.3   | 0.0   | 0.0   | 0.3   | 0.0   | 0.0   | 0.0   | 0.0   |
| 87.5° | 2.3    | 0.8    | 0.0   | 0.0   | 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)

STREETWORKS

Report Number: SP1-2101-121-2

Luminaire Tested: IFLD-S-SA2A-740-U-T3R-HSS

Test Date: 03/05/2021

### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2101-121-2  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 03/05/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: STREETWORKS  
 Catalog Number: **IFLD-S-SA2A-740-U-T3R-HSS**  
 Description: STREETWORKS INF FLOOD

SHIELD, DRIVER PROGRAMMED @ 615mA.

### Spectral Parameters

|                           |         |           |      |      |       |
|---------------------------|---------|-----------|------|------|-------|
| CCT (K):                  | 3905    | CRI (Ra): | 71.2 |      |       |
| CIE u':                   | 0.2273  | R1:       | 68.9 | R9:  | -29.7 |
| CIE v':                   | 0.5024  | R2:       | 77.0 | R10: | 46.2  |
| Duv:                      | -0.0008 | R3:       | 84.0 | R11: | 68.8  |
| CIE x:                    | 0.3841  | R4:       | 71.6 | R12: | 45.6  |
| CIE y:                    | 0.3774  | R5:       | 68.9 | R13: | 69.5  |
| CIE z:                    | 0.2385  | R6:       | 68.3 | R14: | 90.7  |
| Peak Wavelength (nm):     | 443     | R7:       | 78.7 |      |       |
| Dominant Wavelength (nm): | 579     | R8:       | 52.2 |      |       |
| Purity:                   | 28.7    |           |      |      |       |
| Rf:                       | 71.7    |           |      |      |       |
| Rg:                       | 96.9    |           |      |      |       |



### Test Conditions

Stabilization Time: 211M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.8/312%  
 Sphere Temperature (°C): 24.1

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

REPORT NUMBER: SP1-2101-121-2

**CIE 1931 Chromaticity Diagram**



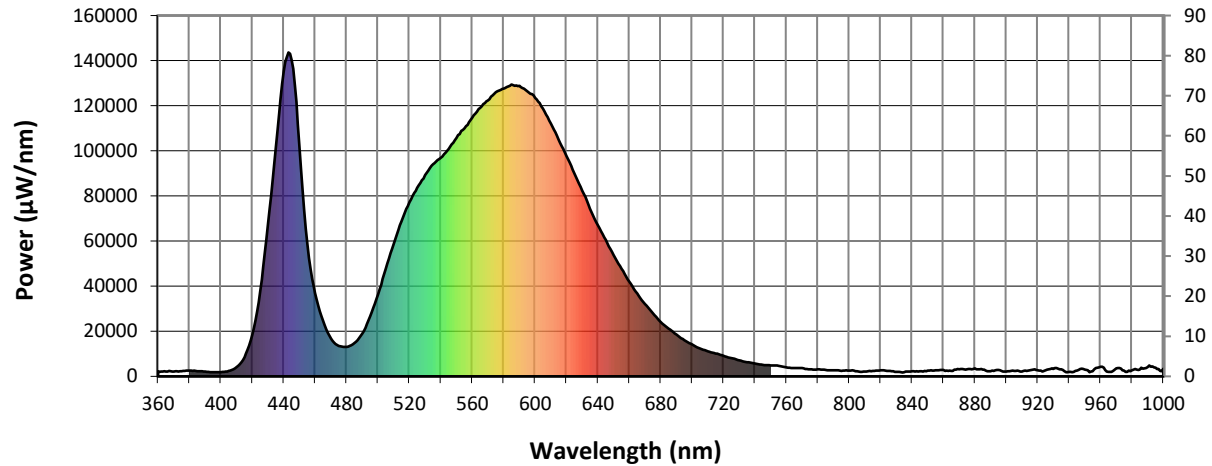
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 4000K 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       | 2304             | 0.0              | 490       | 19043            | 2.7              | 620       | 97577            | 25.4             | 750       | 4830             | 0.0              | 880       | 3505             | 0.0              |
| 365       | 2150             | 0.0              | 495       | 26606            | 4.8              | 625       | 90158            | 19.9             | 755       | 4664             | 0.0              | 885       | 2991             | 0.0              |
| 370       | 2146             | 0.0              | 500       | 36376            | 8.0              | 630       | 82240            | 14.9             | 760       | 4006             | 0.0              | 890       | 2327             | 0.0              |
| 375       | 2332             | 0.0              | 505       | 47714            | 13.3             | 635       | 74361            | 11.2             | 765       | 3715             | 0.0              | 895       | 2775             | 0.0              |
| 380       | 2527             | 0.0              | 510       | 58741            | 20.2             | 640       | 66994            | 8.0              | 770       | 3696             | 0.0              | 900       | 2141             | 0.0              |
| 385       | 2304             | 0.0              | 515       | 68716            | 28.5             | 645       | 60405            | 5.8              | 775       | 3117             | 0.0              | 905       | 2421             | 0.0              |
| 390       | 2064             | 0.0              | 520       | 77136            | 37.4             | 650       | 53806            | 3.9              | 780       | 3062             | 0.0              | 910       | 2200             | 0.0              |
| 395       | 1856             | 0.0              | 525       | 83567            | 44.9             | 655       | 47610            | 2.7              | 785       | 2907             | 0.0              | 915       | 2716             | 0.0              |
| 400       | 1856             | 0.0              | 530       | 89283            | 52.6             | 660       | 42018            | 1.8              | 790       | 2655             | 0.0              | 920       | 2656             | 0.0              |
| 405       | 2374             | 0.0              | 535       | 94097            | 58.4             | 665       | 36742            | 1.2              | 795       | 2467             | 0.0              | 925       | 2671             | 0.0              |
| 410       | 4084             | 0.0              | 540       | 96845            | 63.1             | 670       | 32105            | 0.7              | 800       | 2609             | 0.0              | 930       | 3292             | 0.0              |
| 415       | 8543             | 0.0              | 545       | 100829           | 67.1             | 675       | 27946            | 0.5              | 805       | 2293             | 0.0              | 935       | 3188             | 0.0              |
| 420       | 18394            | 0.1              | 550       | 105648           | 71.8             | 680       | 24146            | 0.3              | 810       | 2188             | 0.0              | 940       | 1997             | 0.0              |
| 425       | 37987            | 0.2              | 555       | 110017           | 75.1             | 685       | 21191            | 0.2              | 815       | 2386             | 0.0              | 945       | 2623             | 0.0              |
| 430       | 67605            | 0.5              | 560       | 114586           | 77.9             | 690       | 18544            | 0.1              | 820       | 2712             | 0.0              | 950       | 2969             | 0.0              |
| 435       | 102160           | 1.2              | 565       | 118987           | 79.1             | 695       | 16058            | 0.1              | 825       | 2473             | 0.0              | 955       | 2277             | 0.0              |
| 440       | 135103           | 2.1              | 570       | 122326           | 79.5             | 700       | 14133            | 0.0              | 830       | 1969             | 0.0              | 960       | 4267             | 0.0              |
| 445       | 140126           | 2.9              | 575       | 125968           | 78.4             | 705       | 12309            | 0.0              | 835       | 1917             | 0.0              | 965       | 2034             | 0.0              |
| 450       | 102339           | 2.7              | 580       | 127613           | 75.8             | 710       | 11142            | 0.0              | 840       | 2248             | 0.0              | 970       | 3586             | 0.0              |
| 455       | 58751            | 2.0              | 585       | 129466           | 71.9             | 715       | 10143            | 0.0              | 845       | 2266             | 0.0              | 975       | 2505             | 0.0              |
| 460       | 36892            | 1.5              | 590       | 128813           | 66.6             | 720       | 9072             | 0.0              | 850       | 2558             | 0.0              | 980       | 2666             | 0.0              |
| 465       | 24637            | 1.3              | 595       | 126387           | 59.9             | 725       | 8130             | 0.0              | 855       | 2767             | 0.0              | 985       | 2934             | 0.0              |
| 470       | 16738            | 1.0              | 600       | 123477           | 53.2             | 730       | 7149             | 0.0              | 860       | 2826             | 0.0              | 990       | 4120             | 0.0              |
| 475       | 13456            | 1.1              | 605       | 118718           | 46.0             | 735       | 6311             | 0.0              | 865       | 2385             | 0.0              | 995       | 3858             | 0.0              |
| 480       | 13081            | 1.2              | 610       | 112091           | 38.5             | 740       | 5711             | 0.0              | 870       | 3194             | 0.0              | 1000      | 3405             | 0.0              |
| 485       | 14734            | 1.7              | 615       | 105039           | 31.7             | 745       | 5111             | 0.0              | 875       | 3189             | 0.0              |           |                  |                  |

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### Scotopic Flux vs. Wavelength



Scotopic Lumens: 10425.8

S/P: 1.47

| 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       | 2304             | 0.0              | 490       | 19043            | 29.3             | 620       | 97577            | 1.2              | 750       | 4830             | 0.0              | 880       | 3505             | 0.0              |
| 365       | 2150             | 0.0              | 495       | 26606            | 43.0             | 625       | 90158            | 0.8              | 755       | 4664             | 0.0              | 885       | 2991             | 0.0              |
| 370       | 2146             | 0.0              | 500       | 36376            | 60.8             | 630       | 82240            | 0.5              | 760       | 4006             | 0.0              | 890       | 2327             | 0.0              |
| 375       | 2332             | 0.0              | 505       | 47714            | 81.1             | 635       | 74361            | 0.3              | 765       | 3715             | 0.0              | 895       | 2775             | 0.0              |
| 380       | 2527             | 0.0              | 510       | 58741            | 99.6             | 640       | 66994            | 0.2              | 770       | 3696             | 0.0              | 900       | 2141             | 0.0              |
| 385       | 2304             | 0.0              | 515       | 68716            | 113.9            | 645       | 60405            | 0.1              | 775       | 3117             | 0.0              | 905       | 2421             | 0.0              |
| 390       | 2064             | 0.0              | 520       | 77136            | 122.6            | 650       | 53806            | 0.1              | 780       | 3062             | 0.0              | 910       | 2200             | 0.0              |
| 395       | 1856             | 0.0              | 525       | 83567            | 125.0            | 655       | 47610            | 0.0              | 785       | 2907             | 0.0              | 915       | 2716             | 0.0              |
| 400       | 1856             | 0.0              | 530       | 89283            | 123.1            | 660       | 42018            | 0.0              | 790       | 2655             | 0.0              | 920       | 2656             | 0.0              |
| 405       | 2374             | 0.1              | 535       | 94097            | 117.3            | 665       | 36742            | 0.0              | 795       | 2467             | 0.0              | 925       | 2671             | 0.0              |
| 410       | 4084             | 0.2              | 540       | 96845            | 107.0            | 670       | 32105            | 0.0              | 800       | 2609             | 0.0              | 930       | 3292             | 0.0              |
| 415       | 8543             | 0.9              | 545       | 100829           | 96.7             | 675       | 27946            | 0.0              | 805       | 2293             | 0.0              | 935       | 3188             | 0.0              |
| 420       | 18394            | 3.0              | 550       | 105648           | 86.4             | 680       | 24146            | 0.0              | 810       | 2188             | 0.0              | 940       | 1997             | 0.0              |
| 425       | 37987            | 9.3              | 555       | 110017           | 75.2             | 685       | 21191            | 0.0              | 815       | 2386             | 0.0              | 945       | 2623             | 0.0              |
| 430       | 67605            | 23.0             | 560       | 114586           | 64.0             | 690       | 18544            | 0.0              | 820       | 2712             | 0.0              | 950       | 2969             | 0.0              |
| 435       | 102160           | 45.7             | 565       | 118987           | 53.4             | 695       | 16058            | 0.0              | 825       | 2473             | 0.0              | 955       | 2277             | 0.0              |
| 440       | 135103           | 75.5             | 570       | 122326           | 43.2             | 700       | 14133            | 0.0              | 830       | 1969             | 0.0              | 960       | 4267             | 0.0              |
| 445       | 140126           | 93.8             | 575       | 125968           | 34.3             | 705       | 12309            | 0.0              | 835       | 1917             | 0.0              | 965       | 2034             | 0.0              |
| 450       | 102339           | 79.3             | 580       | 127613           | 26.3             | 710       | 11142            | 0.0              | 840       | 2248             | 0.0              | 970       | 3586             | 0.0              |
| 455       | 58751            | 51.3             | 585       | 129466           | 19.8             | 715       | 10143            | 0.0              | 845       | 2266             | 0.0              | 975       | 2505             | 0.0              |
| 460       | 36892            | 35.6             | 590       | 128813           | 14.3             | 720       | 9072             | 0.0              | 850       | 2558             | 0.0              | 980       | 2666             | 0.0              |
| 465       | 24637            | 26.0             | 595       | 126387           | 10.1             | 725       | 8130             | 0.0              | 855       | 2767             | 0.0              | 985       | 2934             | 0.0              |
| 470       | 16738            | 19.3             | 600       | 123477           | 7.0              | 730       | 7149             | 0.0              | 860       | 2826             | 0.0              | 990       | 4120             | 0.0              |
| 475       | 13456            | 16.8             | 605       | 118718           | 4.7              | 735       | 6311             | 0.0              | 865       | 2385             | 0.0              | 995       | 3858             | 0.0              |
| 480       | 13081            | 17.7             | 610       | 112091           | 3.0              | 740       | 5711             | 0.0              | 870       | 3194             | 0.0              | 1000      | 3405             | 0.0              |
| 485       | 14734            | 21.4             | 615       | 105039           | 1.9              | 745       | 5111             | 0.0              | 875       | 3189             | 0.0              |           |                  |                  |

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### Melanopic Flux vs. Wavelength



**Melanopic Lumens: 3927.2**

**M/P: 0.55**

| 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       | 2304             | 0.0              | 490       | 19043            | 15.8             | 620       | 97577            | 0.1              | 750       | 4830             | 0.0              | 880       | 3505             | 0.0              |
| 365       | 2150             | 0.0              | 495       | 26606            | 22.0             | 625       | 90158            | 0.0              | 755       | 4664             | 0.0              | 885       | 2991             | 0.0              |
| 370       | 2146             | 0.0              | 500       | 36376            | 29.2             | 630       | 82240            | 0.0              | 760       | 4006             | 0.0              | 890       | 2327             | 0.0              |
| 375       | 2332             | 0.0              | 505       | 47714            | 36.6             | 635       | 74361            | 0.0              | 765       | 3715             | 0.0              | 895       | 2775             | 0.0              |
| 380       | 2527             | 0.0              | 510       | 58741            | 42.2             | 640       | 66994            | 0.0              | 770       | 3696             | 0.0              | 900       | 2141             | 0.0              |
| 385       | 2304             | 0.0              | 515       | 68716            | 44.9             | 645       | 60405            | 0.0              | 775       | 3117             | 0.0              | 905       | 2421             | 0.0              |
| 390       | 2064             | 0.0              | 520       | 77136            | 44.9             | 650       | 53806            | 0.0              | 780       | 3062             | 0.0              | 910       | 2200             | 0.0              |
| 395       | 1856             | 0.0              | 525       | 83567            | 42.4             | 655       | 47610            | 0.0              | 785       | 2907             | 0.0              | 915       | 2716             | 0.0              |
| 400       | 1856             | 0.0              | 530       | 89283            | 38.6             | 660       | 42018            | 0.0              | 790       | 2655             | 0.0              | 920       | 2656             | 0.0              |
| 405       | 2374             | 0.0              | 535       | 94097            | 33.9             | 665       | 36742            | 0.0              | 795       | 2467             | 0.0              | 925       | 2671             | 0.0              |
| 410       | 4084             | 0.2              | 540       | 96845            | 28.3             | 670       | 32105            | 0.0              | 800       | 2609             | 0.0              | 930       | 3292             | 0.0              |
| 415       | 8543             | 0.6              | 545       | 100829           | 23.4             | 675       | 27946            | 0.0              | 805       | 2293             | 0.0              | 935       | 3188             | 0.0              |
| 420       | 18394            | 2.1              | 550       | 105648           | 19.0             | 680       | 24146            | 0.0              | 810       | 2188             | 0.0              | 940       | 1997             | 0.0              |
| 425       | 37987            | 5.9              | 555       | 110017           | 14.8             | 685       | 21191            | 0.0              | 815       | 2386             | 0.0              | 945       | 2623             | 0.0              |
| 430       | 67605            | 14.3             | 560       | 114586           | 11.3             | 690       | 18544            | 0.0              | 820       | 2712             | 0.0              | 950       | 2969             | 0.0              |
| 435       | 102160           | 27.3             | 565       | 118987           | 8.4              | 695       | 16058            | 0.0              | 825       | 2473             | 0.0              | 955       | 2277             | 0.0              |
| 440       | 135103           | 45.1             | 570       | 122326           | 6.0              | 700       | 14133            | 0.0              | 830       | 1969             | 0.0              | 960       | 4267             | 0.0              |
| 445       | 140126           | 55.3             | 575       | 125968           | 4.2              | 705       | 12309            | 0.0              | 835       | 1917             | 0.0              | 965       | 2034             | 0.0              |
| 450       | 102339           | 47.2             | 580       | 127613           | 2.9              | 710       | 11142            | 0.0              | 840       | 2248             | 0.0              | 970       | 3586             | 0.0              |
| 455       | 58751            | 30.8             | 585       | 129466           | 1.9              | 715       | 10143            | 0.0              | 845       | 2266             | 0.0              | 975       | 2505             | 0.0              |
| 460       | 36892            | 21.7             | 590       | 128813           | 1.3              | 720       | 9072             | 0.0              | 850       | 2558             | 0.0              | 980       | 2666             | 0.0              |
| 465       | 24637            | 16.1             | 595       | 126387           | 0.8              | 725       | 8130             | 0.0              | 855       | 2767             | 0.0              | 985       | 2934             | 0.0              |
| 470       | 16738            | 12.0             | 600       | 123477           | 0.5              | 730       | 7149             | 0.0              | 860       | 2826             | 0.0              | 990       | 4120             | 0.0              |
| 475       | 13456            | 10.3             | 605       | 118718           | 0.3              | 735       | 6311             | 0.0              | 865       | 2385             | 0.0              | 995       | 3858             | 0.0              |
| 480       | 13081            | 10.5             | 610       | 112091           | 0.2              | 740       | 5711             | 0.0              | 870       | 3194             | 0.0              | 1000      | 3405             | 0.0              |
| 485       | 14734            | 12.1             | 615       | 105039           | 0.1              | 745       | 5111             | 0.0              | 875       | 3189             | 0.0              |           |                  |                  |

### Summary

$R_f = 71.7$   
 $R_g = 96.9$   
 CIE  $R_a = 71.2$   
 $R_g = -29.7$



### Color Vector Graphics



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 55 | CES51 = 86 | CES76 = 45 |
| CES02 = 61 | CES27 = 80 | CES52 = 87 | CES77 = 68 |
| CES03 = 30 | CES28 = 79 | CES53 = 74 | CES78 = 49 |
| CES04 = 70 | CES29 = 51 | CES54 = 81 | CES79 = 77 |
| CES05 = 47 | CES30 = 60 | CES55 = 80 | CES80 = 75 |
| CES06 = 50 | CES31 = 56 | CES56 = 69 | CES81 = 75 |
| CES07 = 40 | CES32 = 52 | CES57 = 67 | CES82 = 90 |
| CES08 = 39 | CES33 = 62 | CES58 = 69 | CES83 = 85 |
| CES09 = 29 | CES34 = 65 | CES59 = 86 | CES84 = 87 |
| CES10 = 74 | CES35 = 81 | CES60 = 91 | CES85 = 83 |
| CES11 = 57 | CES36 = 92 | CES61 = 85 | CES86 = 72 |
| CES12 = 63 | CES37 = 74 | CES62 = 81 | CES87 = 77 |
| CES13 = 42 | CES38 = 69 | CES63 = 72 | CES88 = 77 |
| CES14 = 74 | CES39 = 92 | CES64 = 69 | CES89 = 72 |
| CES15 = 71 | CES40 = 86 | CES65 = 64 | CES90 = 75 |
| CES16 = 46 | CES41 = 84 | CES66 = 63 | CES91 = 91 |
| CES17 = 49 | CES42 = 75 | CES67 = 60 | CES92 = 66 |
| CES18 = 56 | CES43 = 70 | CES68 = 67 | CES93 = 80 |
| CES19 = 72 | CES44 = 98 | CES69 = 77 | CES94 = 56 |
| CES20 = 65 | CES45 = 80 | CES70 = 57 | CES95 = 72 |
| CES21 = 86 | CES46 = 77 | CES71 = 53 | CES96 = 78 |
| CES22 = 78 | CES47 = 74 | CES72 = 84 | CES97 = 83 |
| CES23 = 92 | CES48 = 66 | CES73 = 47 | CES98 = 73 |
| CES24 = 91 | CES49 = 76 | CES74 = 96 | CES99 = 63 |
| CES25 = 72 | CES50 = 85 | CES75 = 52 |            |



**Color Rendition by Hue-Angle Bin**


REPORT NUMBER: SP1-2101-121-2

**TM-30-18**

**Measure Comparisons**



(END OF REPORT)