

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: P348750

Luminaire Tested: **ARCH-N-PA1-10-727-24VDC-T2R-HSS**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P348750  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-9)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: STREETWORKS  
Catalog Number: ARCH-N-PA1-10-727-24VDC-T2R-HSS  
Description: ARCHEON ROADWAY AND AREA LUMINAIRE  
(1) 70 CRI, 2700K, 270mA LIGHT ENGINE WITH 16 LEDS AND  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 1488 lumens  
Efficiency: N/A  
Efficacy: 106.3 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.75' x H: 0')  
IES Classification: Type II - Medium  
BUG Rating: B0 - U0 - G0

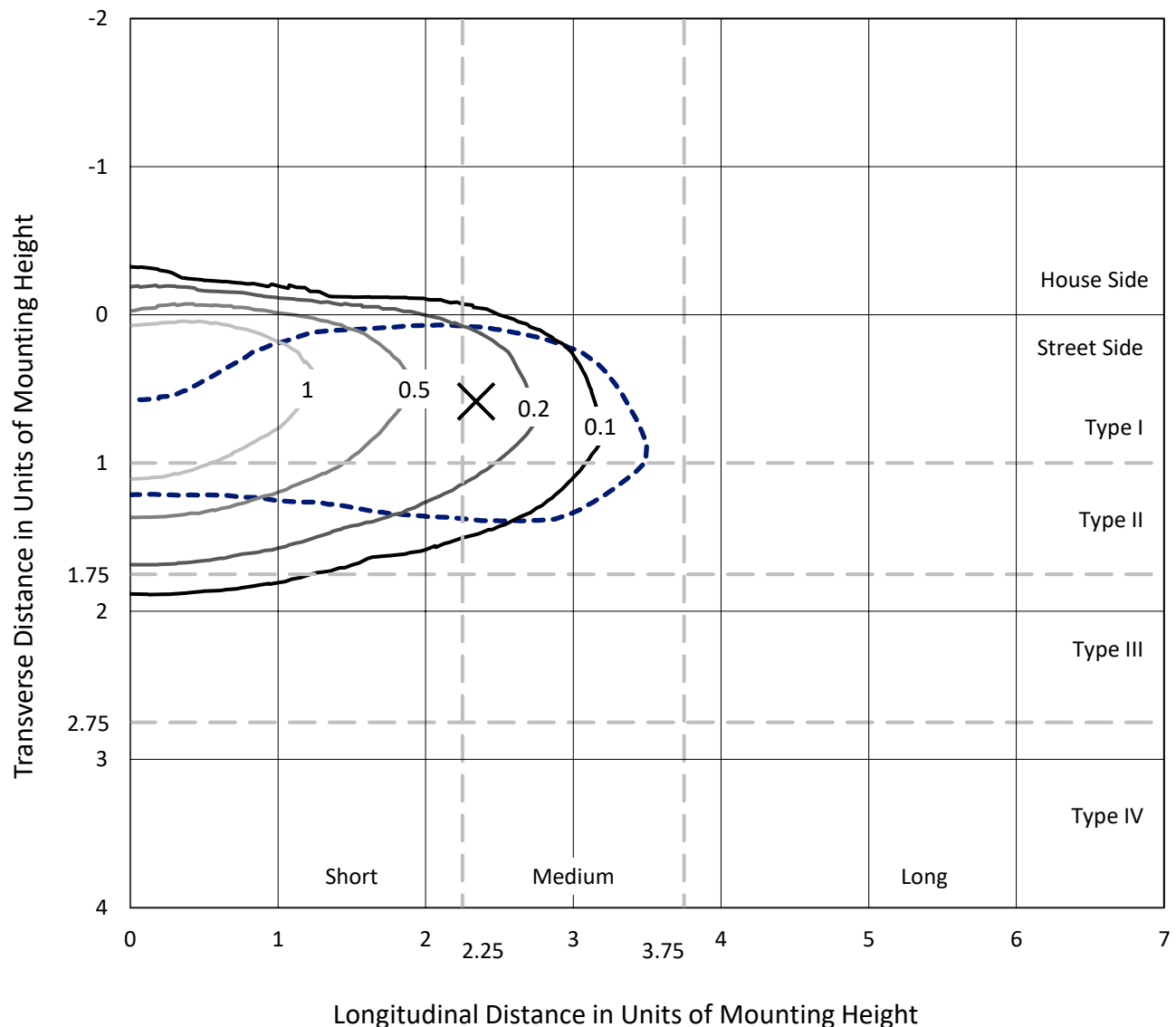
Input Watts (W): 14  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 25 FT

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## Iso-Footcandle Lines of Horizontal Illumination

× Max cd  
 - - - 1/2 Max cd

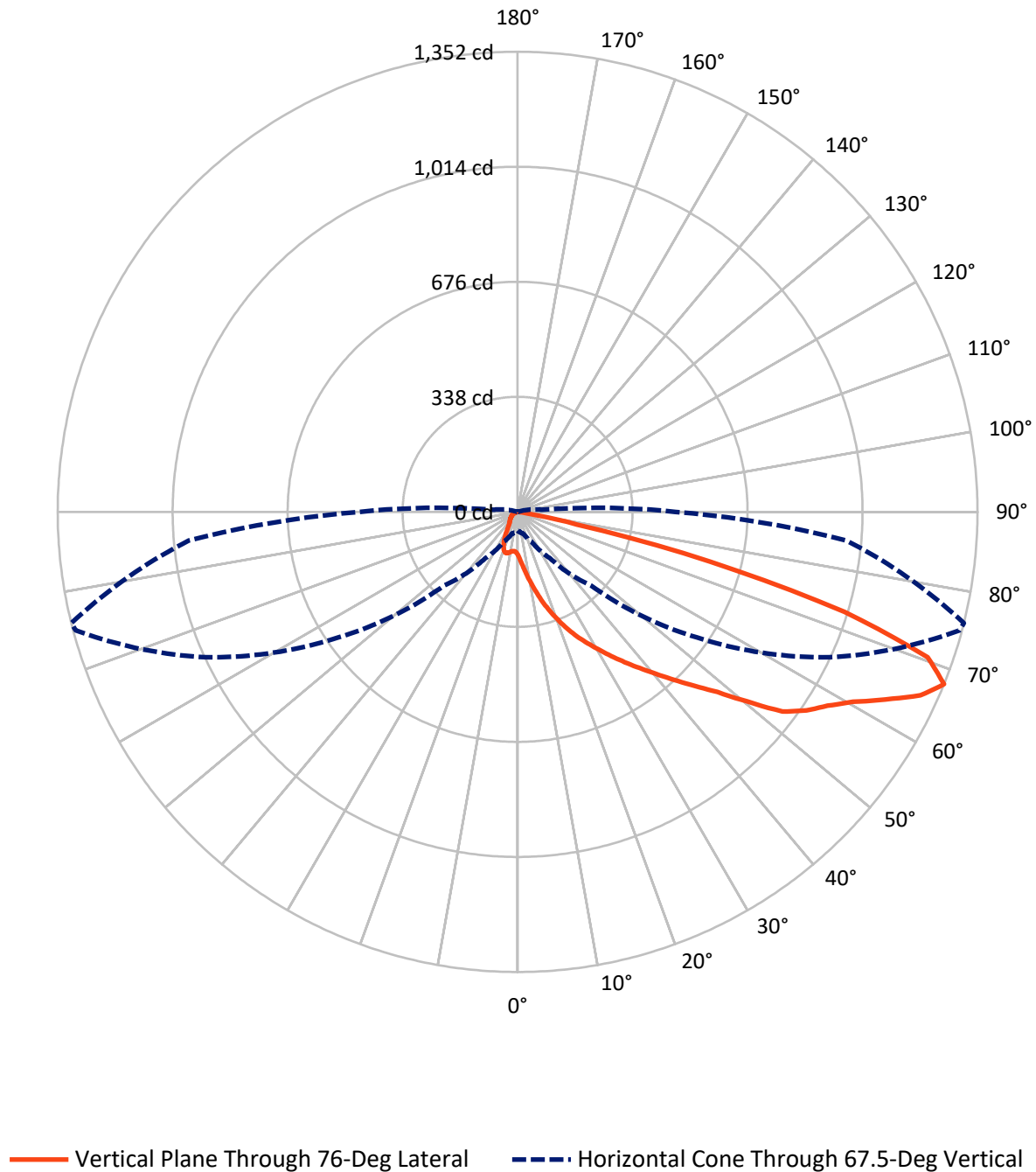


Based on 15 foot mounting height. Maximum calculated value = 2 fc  
 Type II - Medium - N/A

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## Luminous Intensity Polar Plot



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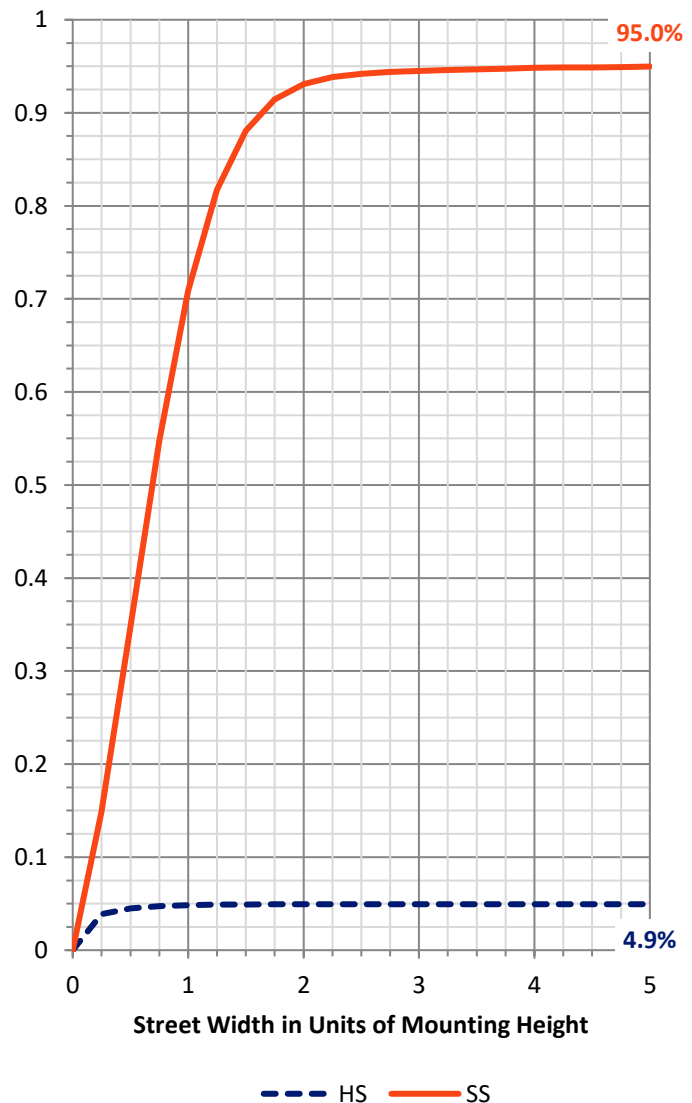
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 73.9     | 0.0    | 73.9   |
|                    | % Fixture | 5.0      | 0.0    | 5.0    |
| <b>Street Side</b> | Lumens    | 1414.1   | 0.0    | 1414.1 |
|                    | % Fixture | 95.0     | 0.0    | 95.0   |
| <b>Total</b>       | Lumens    | 1488.0   | 0.0    | 1488.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 15.7   | 1.1       |
| 10°-20°   | 62.2   | 4.2       |
| 20°-30°   | 126.6  | 8.5       |
| 30°-40°   | 219.7  | 14.8      |
| 40°-50°   | 310.5  | 20.9      |
| 50°-60°   | 352.1  | 23.7      |
| 60°-70°   | 292.0  | 19.6      |
| 70°-80°   | 105.8  | 7.1       |
| 80°-90°   | 3.4    | 0.2       |
| 90°-100°  | 0.0    | 0.0       |
| 100°-110° | 0.0    | 0.0       |
| 110°-120° | 0.0    | 0.0       |
| 120°-130° | 0.0    | 0.0       |
| 130°-140° | 0.0    | 0.0       |
| 140°-150° | 0.0    | 0.0       |
| 150°-160° | 0.0    | 0.0       |
| 160°-170° | 0.0    | 0.0       |
| 170°-180° | 0.0    | 0.0       |
| 0°-90°    | 1488.0 | 100.0     |
| 0°-180°   | 1488.0 | 100.0     |

**Coefficient of Utilization**



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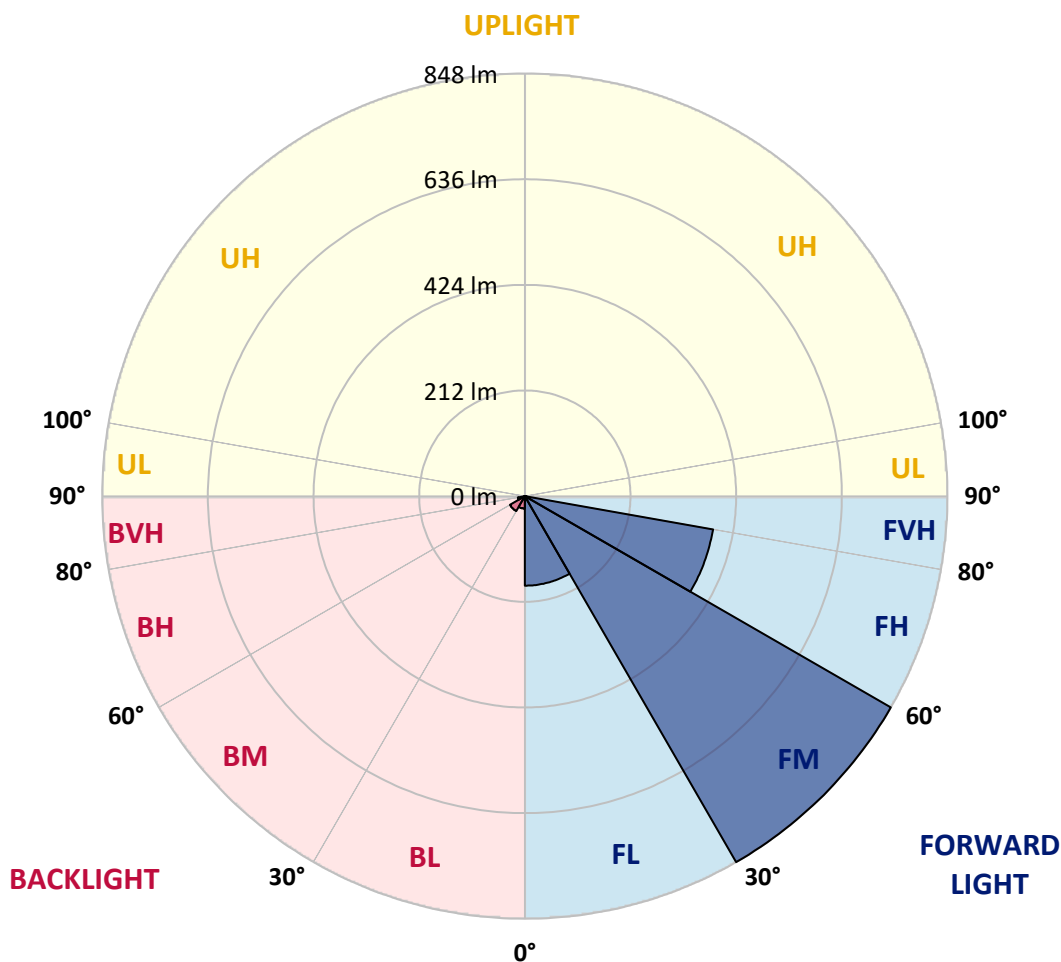
CATALOG NUMBER: ARCH-N-PA1-10-727-24VDC-T2R-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |        |
|------|-------------|--------|-----------|-------------------------|------|--------|
|      |             |        |           | B                       | U    | G      |
| FL   | (0°-30°)    | 179.6  | 12.1      |                         |      |        |
| FM   | (30°-60°)   | 847.7  | 57.0      |                         |      |        |
| FH   | (60°-80°)   | 383.5  | 25.8      |                         |      | G0/660 |
| FVH  | (80°-90°)   | 3.3    | 0.2       |                         |      | G0/10  |
| BL   | (0°-30°)    | 24.9   | 1.7       | B0/110                  |      |        |
| BM   | (30°-60°)   | 34.6   | 2.3       | B0/220                  |      |        |
| BH   | (60°-80°)   | 14.3   | 1.0       | B0/110                  |      | G0/110 |
| BVH  | (80°-90°)   | 0.1    | 0.0       |                         |      | G0/10  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |        |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |        |

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

Type II Medium



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°    | 5°    | 15°   | 25°   | 35°   | 45°   | 55°   | 65°    | 75°    | 76°    | 85°   |
|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|-------|
| 0°    | 126.2 | 126.2 | 126.2 | 126.2 | 126.2 | 126.2 | 126.2 | 126.2  | 126.2  | 126.2  | 126.2 |
| 2.5°  | 188.4 | 184.2 | 185.2 | 182.4 | 177.5 | 167.3 | 158.6 | 150.4  | 140.8  | 140.5  | 132.6 |
| 5°    | 254.1 | 250.5 | 250.0 | 244.5 | 235.5 | 218.2 | 201.4 | 182.2  | 160.8  | 159.3  | 142.5 |
| 7.5°  | 313.7 | 310.8 | 309.8 | 303.2 | 286.4 | 269.6 | 247.7 | 219.5  | 186.1  | 183.2  | 155.9 |
| 10°   | 359.4 | 358.1 | 358.3 | 353.6 | 339.3 | 323.6 | 294.9 | 259.0  | 214.7  | 210.3  | 171.9 |
| 12.5° | 394.1 | 394.5 | 396.8 | 393.9 | 385.9 | 374.3 | 343.6 | 301.0  | 246.4  | 240.3  | 190.3 |
| 15°   | 419.6 | 421.3 | 425.6 | 429.1 | 428.6 | 418.5 | 390.3 | 343.7  | 280.0  | 273.3  | 210.7 |
| 17.5° | 436.1 | 437.9 | 444.2 | 452.2 | 459.5 | 457.1 | 435.5 | 384.9  | 314.1  | 306.3  | 232.5 |
| 20°   | 450.6 | 452.7 | 459.5 | 470.0 | 483.6 | 486.5 | 472.3 | 424.9  | 348.0  | 338.6  | 255.1 |
| 22.5° | 482.0 | 481.9 | 486.0 | 492.1 | 505.1 | 512.7 | 503.7 | 462.0  | 381.6  | 371.8  | 278.1 |
| 25°   | 538.7 | 536.5 | 535.1 | 530.3 | 533.1 | 537.8 | 532.8 | 496.7  | 415.4  | 405.4  | 301.4 |
| 27.5° | 606.1 | 607.4 | 595.8 | 582.8 | 572.8 | 567.9 | 559.7 | 528.8  | 447.9  | 436.9  | 324.2 |
| 30°   | 677.2 | 677.6 | 663.9 | 647.4 | 625.3 | 606.9 | 592.7 | 559.5  | 481.2  | 469.3  | 346.4 |
| 32.5° | 741.4 | 738.8 | 725.3 | 702.7 | 674.8 | 654.2 | 624.7 | 593.8  | 516.6  | 505.0  | 371.0 |
| 35°   | 792.2 | 789.2 | 772.7 | 752.2 | 723.3 | 702.5 | 667.0 | 628.1  | 553.7  | 542.5  | 395.8 |
| 37.5° | 829.4 | 825.9 | 808.9 | 787.8 | 762.8 | 750.8 | 716.1 | 665.3  | 594.3  | 582.2  | 421.8 |
| 40°   | 842.3 | 839.2 | 828.6 | 813.2 | 793.1 | 790.3 | 768.2 | 708.1  | 638.4  | 625.5  | 451.2 |
| 42.5° | 834.6 | 831.6 | 827.8 | 822.6 | 814.3 | 816.9 | 817.3 | 757.0  | 687.5  | 674.7  | 483.8 |
| 45°   | 804.1 | 801.4 | 805.3 | 813.0 | 823.3 | 836.2 | 862.2 | 809.4  | 742.2  | 728.7  | 521.4 |
| 47.5° | 759.2 | 757.2 | 768.0 | 787.1 | 817.4 | 853.0 | 903.2 | 864.6  | 803.7  | 791.1  | 568.3 |
| 50°   | 695.3 | 695.0 | 716.6 | 751.4 | 798.0 | 861.1 | 945.6 | 927.3  | 889.1  | 875.9  | 633.6 |
| 52.5° | 595.8 | 596.4 | 639.0 | 694.6 | 763.9 | 855.6 | 972.8 | 1007.9 | 988.5  | 974.7  | 690.1 |
| 55°   | 501.1 | 505.0 | 535.2 | 615.3 | 711.6 | 835.3 | 982.2 | 1045.5 | 1043.3 | 1030.3 | 721.6 |
| 57.5° | 408.3 | 415.4 | 444.5 | 519.4 | 635.2 | 788.4 | 977.1 | 1061.8 | 1084.1 | 1074.2 | 763.0 |
| 60°   | 307.7 | 311.0 | 344.5 | 414.5 | 537.2 | 702.8 | 939.7 | 1070.7 | 1139.9 | 1133.0 | 823.2 |
| 62.5° | 195.8 | 203.9 | 233.7 | 301.2 | 418.3 | 584.1 | 876.7 | 1070.6 | 1209.8 | 1213.6 | 900.9 |
| 65°   | 103.1 | 112.7 | 128.4 | 186.7 | 287.5 | 451.4 | 782.0 | 1060.5 | 1295.4 | 1300.7 | 961.6 |
| 67.5° | 55.6  | 58.4  | 66.7  | 96.9  | 166.7 | 305.8 | 642.8 | 1011.0 | 1345.1 | 1352.0 | 970.0 |
| 70°   | 40.7  | 42.2  | 45.3  | 53.6  | 83.9  | 177.6 | 469.0 | 898.6  | 1281.1 | 1278.5 | 861.9 |
| 72.5° | 31.2  | 33.6  | 35.9  | 39.2  | 48.2  | 94.8  | 292.0 | 703.7  | 1022.2 | 1005.0 | 644.2 |
| 75°   | 24.6  | 25.0  | 28.4  | 31.4  | 36.2  | 54.0  | 129.7 | 409.8  | 623.9  | 583.1  | 334.1 |
| 77.5° | 19.7  | 20.0  | 21.9  | 24.5  | 29.1  | 35.5  | 40.2  | 161.2  | 199.2  | 177.7  | 72.5  |
| 80°   | 11.7  | 12.3  | 16.3  | 18.9  | 24.1  | 22.4  | 14.7  | 35.0   | 31.1   | 28.2   | 12.2  |
| 82.5° | 6.5   | 7.0   | 9.2   | 14.9  | 16.8  | 10.7  | 7.3   | 9.5    | 7.3    | 7.1    | 3.5   |
| 85°   | 0.0   | 0.3   | 5.9   | 9.3   | 6.8   | 2.3   | 3.1   | 3.1    | 2.2    | 2.0    | 1.4   |
| 87.5° | 0.0   | 0.0   | 1.8   | 1.8   | 0.3   | 0.4   | 0.7   | 1.0    | 0.8    | 0.8    | 0.7   |
| 90°   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    | 0.0    | 0.0    | 0.0   |



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**CANDELA DISTRIBUTION (continued):**

|       | 90°   | 95°   | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 126.2 | 126.2 | 126.2 | 126.2 | 126.2 | 126.2 | 126.2 | 126.2 | 126.2 | 126.2 | 126.2 |
| 2.5°  | 128.7 | 125.2 | 118.5 | 112.0 | 106.5 | 102.0 | 98.0  | 96.4  | 95.1  | 94.9  | 93.8  |
| 5°    | 134.4 | 127.3 | 114.6 | 104.2 | 97.2  | 92.3  | 88.0  | 85.4  | 83.4  | 82.6  | 81.9  |
| 7.5°  | 143.1 | 132.4 | 114.1 | 102.1 | 93.8  | 85.4  | 77.6  | 69.1  | 63.8  | 61.8  | 60.6  |
| 10°   | 153.7 | 139.0 | 116.1 | 101.5 | 86.9  | 69.3  | 56.3  | 45.6  | 41.2  | 39.8  | 39.4  |
| 12.5° | 166.0 | 147.3 | 119.4 | 97.9  | 72.3  | 49.2  | 38.9  | 35.2  | 34.2  | 33.8  | 33.8  |
| 15°   | 180.1 | 156.3 | 121.9 | 87.3  | 53.5  | 37.2  | 33.6  | 31.9  | 30.9  | 30.3  | 30.4  |
| 17.5° | 194.6 | 165.2 | 120.7 | 72.0  | 39.4  | 33.1  | 30.4  | 28.6  | 27.2  | 26.6  | 26.5  |
| 20°   | 209.2 | 173.4 | 114.2 | 53.6  | 33.4  | 30.1  | 27.1  | 25.0  | 23.6  | 23.0  | 22.9  |
| 22.5° | 224.4 | 180.4 | 102.7 | 39.3  | 30.0  | 26.7  | 23.7  | 21.7  | 20.3  | 19.8  | 19.6  |
| 25°   | 239.1 | 186.1 | 86.6  | 31.8  | 26.8  | 23.5  | 20.7  | 18.8  | 17.5  | 17.0  | 17.0  |
| 27.5° | 252.8 | 189.7 | 68.1  | 28.1  | 24.0  | 20.6  | 18.1  | 16.4  | 15.3  | 14.9  | 14.9  |
| 30°   | 265.2 | 190.0 | 50.3  | 25.4  | 21.5  | 18.1  | 15.8  | 14.3  | 13.4  | 13.0  | 12.8  |
| 32.5° | 277.7 | 187.3 | 36.6  | 22.9  | 19.2  | 16.0  | 13.7  | 12.5  | 11.9  | 11.5  | 11.5  |
| 35°   | 289.5 | 180.9 | 28.6  | 20.7  | 17.0  | 13.9  | 12.1  | 11.2  | 10.8  | 10.5  | 10.5  |
| 37.5° | 301.1 | 171.9 | 24.3  | 18.8  | 14.9  | 12.1  | 10.6  | 10.1  | 9.8   | 9.5   | 9.5   |
| 40°   | 312.8 | 160.5 | 22.0  | 17.1  | 13.2  | 10.8  | 9.5   | 9.0   | 8.7   | 8.4   | 8.3   |
| 42.5° | 327.2 | 147.3 | 20.6  | 15.5  | 11.7  | 9.5   | 8.3   | 7.8   | 7.6   | 7.3   | 7.2   |
| 45°   | 343.9 | 135.9 | 19.4  | 13.8  | 10.5  | 8.5   | 7.2   | 6.7   | 6.3   | 6.0   | 5.9   |
| 47.5° | 368.0 | 127.7 | 17.9  | 12.1  | 9.3   | 7.4   | 6.3   | 5.7   | 5.1   | 4.8   | 4.7   |
| 50°   | 398.7 | 120.9 | 15.8  | 10.5  | 8.1   | 6.3   | 5.2   | 4.5   | 4.0   | 3.7   | 3.7   |
| 52.5° | 413.9 | 112.1 | 14.0  | 9.1   | 6.8   | 5.3   | 4.2   | 3.4   | 3.1   | 2.8   | 2.8   |
| 55°   | 420.1 | 105.3 | 12.2  | 7.8   | 5.7   | 4.4   | 3.3   | 2.6   | 2.4   | 2.2   | 2.2   |
| 57.5° | 437.3 | 103.3 | 10.6  | 6.6   | 4.7   | 3.5   | 2.5   | 2.0   | 1.8   | 1.6   | 1.6   |
| 60°   | 465.0 | 104.3 | 9.2   | 5.6   | 3.8   | 2.7   | 1.9   | 1.5   | 1.4   | 1.1   | 1.1   |
| 62.5° | 494.9 | 103.1 | 7.8   | 4.8   | 2.9   | 2.0   | 1.3   | 1.1   | 1.1   | 0.7   | 0.6   |
| 65°   | 500.7 | 91.8  | 6.7   | 4.0   | 2.3   | 1.4   | 0.8   | 0.7   | 1.0   | 0.1   | 0.0   |
| 67.5° | 464.7 | 71.2  | 5.7   | 3.1   | 1.7   | 1.1   | 0.7   | 0.3   | 0.8   | 0.0   | 0.0   |
| 70°   | 371.6 | 45.2  | 4.6   | 2.2   | 1.3   | 0.9   | 0.5   | 0.1   | 0.7   | 0.0   | 0.0   |
| 72.5° | 262.8 | 26.3  | 3.7   | 1.6   | 1.1   | 0.7   | 0.4   | 0.0   | 0.4   | 0.0   | 0.0   |
| 75°   | 132.9 | 14.0  | 2.3   | 1.2   | 0.8   | 0.5   | 0.3   | 0.0   | 0.1   | 0.0   | 0.0   |
| 77.5° | 28.8  | 6.5   | 1.4   | 0.8   | 0.6   | 0.3   | 0.1   | 0.0   | 0.0   | 0.0   | 0.0   |
| 80°   | 6.3   | 2.9   | 0.9   | 0.5   | 0.3   | 0.2   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 82.5° | 2.3   | 1.5   | 0.5   | 0.3   | 0.1   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 85°   | 1.2   | 0.8   | 0.3   | 0.1   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 87.5° | 0.7   | 0.3   | 0.1   | 0.1   | 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: SP1-2101-121-5

Luminaire Tested: IFLD-S-SA2E-727-U-T2

Test Date: 03/04/2021

### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2101-121-5  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 03/04/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: STREETWORKS  
 Catalog Number: **IFLD-S-SA2E-727-U-T2**  
 Description: STREETWORKS INF FLOOD

PROGRAMMED @ 1500mA.

### Spectral Parameters

|                           |         |           |      |      |       |
|---------------------------|---------|-----------|------|------|-------|
| CCT (K):                  | 2805    | CRI (Ra): | 72.4 |      |       |
| CIE u':                   | 0.2586  | R1:       | 69.8 | R9:  | -15.0 |
| CIE v':                   | 0.5221  | R2:       | 81.3 | R10: | 55.6  |
| Duv:                      | -0.0022 | R3:       | 90.2 | R11: | 61.7  |
| CIE x:                    | 0.4477  | R4:       | 68.5 | R12: | 47.2  |
| CIE y:                    | 0.4017  | R5:       | 67.5 | R13: | 71.4  |
| CIE z:                    | 0.1506  | R6:       | 72.4 | R14: | 93.9  |
| Peak Wavelength (nm):     | 599     | R7:       | 79.4 |      |       |
| Dominant Wavelength (nm): | 584     | R8:       | 49.9 |      |       |
| Purity:                   | 55.3    |           |      |      |       |
| Rf:                       | 71.9    |           |      |      |       |
| Rg:                       | 97.9    |           |      |      |       |



### Test Conditions

Stabilization Time: 60M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.3/31%  
 Sphere Temperature (°C): 24.8

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

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**CIE 1931 Chromaticity Diagram**



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



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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       | 4854             | 0.0              | 490       | 23280            | 3.3              | 620       | 266893           | 69.5             | 750       | 19996            | 0.0              | 880       | 6314             | 0.0              |
| 365       | 4049             | 0.0              | 495       | 29582            | 5.4              | 625       | 255096           | 56.3             | 755       | 17900            | 0.0              | 885       | 7853             | 0.0              |
| 370       | 3795             | 0.0              | 500       | 39981            | 8.8              | 630       | 240244           | 43.5             | 760       | 17272            | 0.0              | 890       | 5823             | 0.0              |
| 375       | 4296             | 0.0              | 505       | 54556            | 15.3             | 635       | 223787           | 33.6             | 765       | 14514            | 0.0              | 895       | 7346             | 0.0              |
| 380       | 4496             | 0.0              | 510       | 71364            | 24.5             | 640       | 207566           | 24.8             | 770       | 12643            | 0.0              | 900       | 6920             | 0.0              |
| 385       | 4186             | 0.0              | 515       | 89828            | 37.2             | 645       | 192517           | 18.5             | 775       | 12475            | 0.0              | 905       | 6608             | 0.0              |
| 390       | 3945             | 0.0              | 520       | 108414           | 52.6             | 650       | 177187           | 12.9             | 780       | 11188            | 0.0              | 910       | 6279             | 0.0              |
| 395       | 3780             | 0.0              | 525       | 124929           | 67.1             | 655       | 161553           | 9.3              | 785       | 10229            | 0.0              | 915       | 5131             | 0.0              |
| 400       | 3679             | 0.0              | 530       | 141352           | 83.2             | 660       | 147361           | 6.1              | 790       | 8578             | 0.0              | 920       | 5855             | 0.0              |
| 405       | 4475             | 0.0              | 535       | 154552           | 95.8             | 665       | 132756           | 4.2              | 795       | 9114             | 0.0              | 925       | 5678             | 0.0              |
| 410       | 7499             | 0.0              | 540       | 166297           | 108.4            | 670       | 118534           | 2.6              | 800       | 8597             | 0.0              | 930       | 6661             | 0.0              |
| 415       | 14449            | 0.0              | 545       | 178874           | 119.1            | 675       | 105260           | 1.8              | 805       | 8790             | 0.0              | 935       | 8074             | 0.0              |
| 420       | 26000            | 0.1              | 550       | 193176           | 131.3            | 680       | 93637            | 1.1              | 810       | 7814             | 0.0              | 940       | 7823             | 0.0              |
| 425       | 45491            | 0.2              | 555       | 206008           | 140.7            | 685       | 83217            | 0.7              | 815       | 7533             | 0.0              | 945       | 8364             | 0.0              |
| 430       | 70707            | 0.6              | 560       | 220126           | 149.6            | 690       | 73671            | 0.4              | 820       | 7303             | 0.0              | 950       | 6763             | 0.0              |
| 435       | 98169            | 1.2              | 565       | 234383           | 155.8            | 695       | 64520            | 0.3              | 825       | 6745             | 0.0              | 955       | 4883             | 0.0              |
| 440       | 123846           | 1.9              | 570       | 248161           | 161.4            | 700       | 57442            | 0.2              | 830       | 7209             | 0.0              | 960       | 7488             | 0.0              |
| 445       | 139822           | 2.9              | 575       | 261970           | 163.0            | 705       | 51479            | 0.1              | 835       | 6674             | 0.0              | 965       | 9316             | 0.0              |
| 450       | 131679           | 3.4              | 580       | 272271           | 161.8            | 710       | 45940            | 0.1              | 840       | 6151             | 0.0              | 970       | 6857             | 0.0              |
| 455       | 99242            | 3.3              | 585       | 283822           | 157.7            | 715       | 41575            | 0.0              | 845       | 5371             | 0.0              | 975       | 4388             | 0.0              |
| 460       | 65216            | 2.7              | 590       | 291192           | 150.6            | 720       | 37753            | 0.0              | 850       | 6484             | 0.0              | 980       | 6095             | 0.0              |
| 465       | 44137            | 2.3              | 595       | 294651           | 139.7            | 725       | 33818            | 0.0              | 855       | 6614             | 0.0              | 985       | 7701             | 0.0              |
| 470       | 32002            | 2.0              | 600       | 297168           | 128.1            | 730       | 30414            | 0.0              | 860       | 5959             | 0.0              | 990       | 9045             | 0.0              |
| 475       | 24549            | 1.9              | 605       | 295658           | 114.5            | 735       | 26662            | 0.0              | 865       | 4768             | 0.0              | 995       | 6989             | 0.0              |
| 480       | 20801            | 2.0              | 610       | 287633           | 98.8             | 740       | 23848            | 0.0              | 870       | 5098             | 0.0              | 1000      | 7341             | 0.0              |
| 485       | 20656            | 2.4              | 615       | 279152           | 84.3             | 745       | 21851            | 0.0              | 875       | 5516             | 0.0              |           |                  |                  |

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### Scotopic Flux vs. Wavelength



Scotopic Lumens: 15895.6

S/P: 1.11

| 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       | 4854             | 0.0              | 490       | 23280            | 35.8             | 620       | 266893           | 3.3              | 750       | 19996            | 0.0              | 880       | 6314             | 0.0              |
| 365       | 4049             | 0.0              | 495       | 29582            | 47.8             | 625       | 255096           | 2.2              | 755       | 17900            | 0.0              | 885       | 7853             | 0.0              |
| 370       | 3795             | 0.0              | 500       | 39981            | 66.9             | 630       | 240244           | 1.4              | 760       | 17272            | 0.0              | 890       | 5823             | 0.0              |
| 375       | 4296             | 0.0              | 505       | 54556            | 92.7             | 635       | 223787           | 0.9              | 765       | 14514            | 0.0              | 895       | 7346             | 0.0              |
| 380       | 4496             | 0.0              | 510       | 71364            | 121.0            | 640       | 207566           | 0.5              | 770       | 12643            | 0.0              | 900       | 6920             | 0.0              |
| 385       | 4186             | 0.0              | 515       | 89828            | 148.9            | 645       | 192517           | 0.3              | 775       | 12475            | 0.0              | 905       | 6608             | 0.0              |
| 390       | 3945             | 0.0              | 520       | 108414           | 172.3            | 650       | 177187           | 0.2              | 780       | 11188            | 0.0              | 910       | 6279             | 0.0              |
| 395       | 3780             | 0.0              | 525       | 124929           | 186.9            | 655       | 161553           | 0.1              | 785       | 10229            | 0.0              | 915       | 5131             | 0.0              |
| 400       | 3679             | 0.1              | 530       | 141352           | 194.9            | 660       | 147361           | 0.1              | 790       | 8578             | 0.0              | 920       | 5855             | 0.0              |
| 405       | 4475             | 0.1              | 535       | 154552           | 192.6            | 665       | 132756           | 0.0              | 795       | 9114             | 0.0              | 925       | 5678             | 0.0              |
| 410       | 7499             | 0.4              | 540       | 166297           | 183.8            | 670       | 118534           | 0.0              | 800       | 8597             | 0.0              | 930       | 6661             | 0.0              |
| 415       | 14449            | 1.5              | 545       | 178874           | 171.5            | 675       | 105260           | 0.0              | 805       | 8790             | 0.0              | 935       | 8074             | 0.0              |
| 420       | 26000            | 4.3              | 550       | 193176           | 158.0            | 680       | 93637            | 0.0              | 810       | 7814             | 0.0              | 940       | 7823             | 0.0              |
| 425       | 45491            | 11.1             | 555       | 206008           | 140.8            | 685       | 83217            | 0.0              | 815       | 7533             | 0.0              | 945       | 8364             | 0.0              |
| 430       | 70707            | 24.1             | 560       | 220126           | 123.0            | 690       | 73671            | 0.0              | 820       | 7303             | 0.0              | 950       | 6763             | 0.0              |
| 435       | 98169            | 43.9             | 565       | 234383           | 105.2            | 695       | 64520            | 0.0              | 825       | 6745             | 0.0              | 955       | 4883             | 0.0              |
| 440       | 123846           | 69.2             | 570       | 248161           | 87.6             | 700       | 57442            | 0.0              | 830       | 7209             | 0.0              | 960       | 7488             | 0.0              |
| 445       | 139822           | 93.6             | 575       | 261970           | 71.3             | 705       | 51479            | 0.0              | 835       | 6674             | 0.0              | 965       | 9316             | 0.0              |
| 450       | 131679           | 102.1            | 580       | 272271           | 56.1             | 710       | 45940            | 0.0              | 840       | 6151             | 0.0              | 970       | 6857             | 0.0              |
| 455       | 99242            | 86.7             | 585       | 283822           | 43.4             | 715       | 41575            | 0.0              | 845       | 5371             | 0.0              | 975       | 4388             | 0.0              |
| 460       | 65216            | 63.0             | 590       | 291192           | 32.4             | 720       | 37753            | 0.0              | 850       | 6484             | 0.0              | 980       | 6095             | 0.0              |
| 465       | 44137            | 46.6             | 595       | 294651           | 23.5             | 725       | 33818            | 0.0              | 855       | 6614             | 0.0              | 985       | 7701             | 0.0              |
| 470       | 32002            | 36.9             | 600       | 297168           | 16.7             | 730       | 30414            | 0.0              | 860       | 5959             | 0.0              | 990       | 9045             | 0.0              |
| 475       | 24549            | 30.7             | 605       | 295658           | 11.6             | 735       | 26662            | 0.0              | 865       | 4768             | 0.0              | 995       | 6989             | 0.0              |
| 480       | 20801            | 28.1             | 610       | 287633           | 7.8              | 740       | 23848            | 0.0              | 870       | 5098             | 0.0              | 1000      | 7341             | 0.0              |
| 485       | 20656            | 29.9             | 615       | 279152           | 5.2              | 745       | 21851            | 0.0              | 875       | 5516             | 0.0              |           |                  |                  |

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### Melanopic Flux vs. Wavelength



**Melanopic Lumens: 5527.7**

**M/P: 0.39**

| 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       | 4854             | 0.0              | 490       | 23280            | 19.4             | 620       | 266893           | 0.2              | 750       | 19996            | 0.0              | 880       | 6314             | 0.0              |
| 365       | 4049             | 0.0              | 495       | 29582            | 24.4             | 625       | 255096           | 0.1              | 755       | 17900            | 0.0              | 885       | 7853             | 0.0              |
| 370       | 3795             | 0.0              | 500       | 39981            | 32.1             | 630       | 240244           | 0.1              | 760       | 17272            | 0.0              | 890       | 5823             | 0.0              |
| 375       | 4296             | 0.0              | 505       | 54556            | 41.9             | 635       | 223787           | 0.1              | 765       | 14514            | 0.0              | 895       | 7346             | 0.0              |
| 380       | 4496             | 0.0              | 510       | 71364            | 51.2             | 640       | 207566           | 0.0              | 770       | 12643            | 0.0              | 900       | 6920             | 0.0              |
| 385       | 4186             | 0.0              | 515       | 89828            | 58.7             | 645       | 192517           | 0.0              | 775       | 12475            | 0.0              | 905       | 6608             | 0.0              |
| 390       | 3945             | 0.0              | 520       | 108414           | 63.1             | 650       | 177187           | 0.0              | 780       | 11188            | 0.0              | 910       | 6279             | 0.0              |
| 395       | 3780             | 0.0              | 525       | 124929           | 63.4             | 655       | 161553           | 0.0              | 785       | 10229            | 0.0              | 915       | 5131             | 0.0              |
| 400       | 3679             | 0.0              | 530       | 141352           | 61.1             | 660       | 147361           | 0.0              | 790       | 8578             | 0.0              | 920       | 5855             | 0.0              |
| 405       | 4475             | 0.1              | 535       | 154552           | 55.6             | 665       | 132756           | 0.0              | 795       | 9114             | 0.0              | 925       | 5678             | 0.0              |
| 410       | 7499             | 0.3              | 540       | 166297           | 48.7             | 670       | 118534           | 0.0              | 800       | 8597             | 0.0              | 930       | 6661             | 0.0              |
| 415       | 14449            | 1.0              | 545       | 178874           | 41.5             | 675       | 105260           | 0.0              | 805       | 8790             | 0.0              | 935       | 8074             | 0.0              |
| 420       | 26000            | 3.0              | 550       | 193176           | 34.7             | 680       | 93637            | 0.0              | 810       | 7814             | 0.0              | 940       | 7823             | 0.0              |
| 425       | 45491            | 7.1              | 555       | 206008           | 27.8             | 685       | 83217            | 0.0              | 815       | 7533             | 0.0              | 945       | 8364             | 0.0              |
| 430       | 70707            | 14.9             | 560       | 220126           | 21.7             | 690       | 73671            | 0.0              | 820       | 7303             | 0.0              | 950       | 6763             | 0.0              |
| 435       | 98169            | 26.2             | 565       | 234383           | 16.5             | 695       | 64520            | 0.0              | 825       | 6745             | 0.0              | 955       | 4883             | 0.0              |
| 440       | 123846           | 41.4             | 570       | 248161           | 12.1             | 700       | 57442            | 0.0              | 830       | 7209             | 0.0              | 960       | 7488             | 0.0              |
| 445       | 139822           | 55.1             | 575       | 261970           | 8.7              | 705       | 51479            | 0.0              | 835       | 6674             | 0.0              | 965       | 9316             | 0.0              |
| 450       | 131679           | 60.7             | 580       | 272271           | 6.1              | 710       | 45940            | 0.0              | 840       | 6151             | 0.0              | 970       | 6857             | 0.0              |
| 455       | 99242            | 52.0             | 585       | 283822           | 4.2              | 715       | 41575            | 0.0              | 845       | 5371             | 0.0              | 975       | 4388             | 0.0              |
| 460       | 65216            | 38.4             | 590       | 291192           | 2.9              | 720       | 37753            | 0.0              | 850       | 6484             | 0.0              | 980       | 6095             | 0.0              |
| 465       | 44137            | 28.8             | 595       | 294651           | 1.9              | 725       | 33818            | 0.0              | 855       | 6614             | 0.0              | 985       | 7701             | 0.0              |
| 470       | 32002            | 22.9             | 600       | 297168           | 1.3              | 730       | 30414            | 0.0              | 860       | 5959             | 0.0              | 990       | 9045             | 0.0              |
| 475       | 24549            | 18.7             | 605       | 295658           | 0.8              | 735       | 26662            | 0.0              | 865       | 4768             | 0.0              | 995       | 6989             | 0.0              |
| 480       | 20801            | 16.7             | 610       | 287633           | 0.5              | 740       | 23848            | 0.0              | 870       | 5098             | 0.0              | 1000      | 7341             | 0.0              |
| 485       | 20656            | 17.0             | 615       | 279152           | 0.3              | 745       | 21851            | 0.0              | 875       | 5516             | 0.0              |           |                  |                  |

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TM-30-18

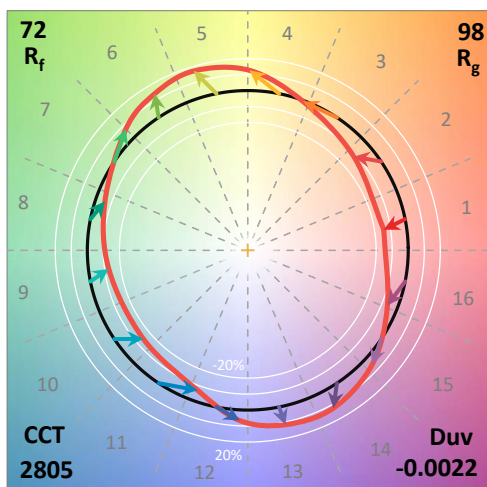
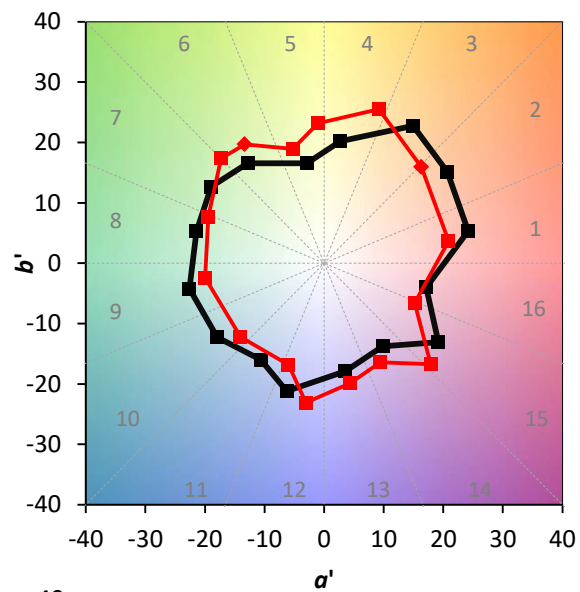
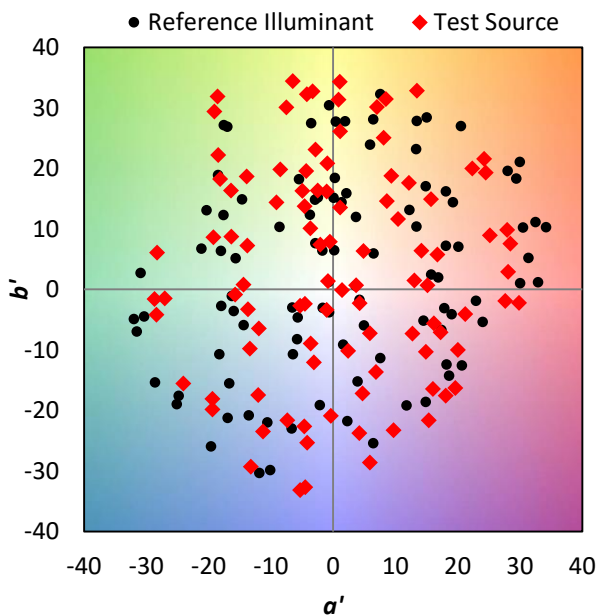
### Summary

$R_f = 71.9$   
 $R_g = 97.9$   
 CIE  $R_a = 72.4$   
 $R_g = -15.0$

### Spectral Power Distribution Comparison



### Color Vector Graphics



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 56 | CES51 = 80 | CES76 = 50 |
| CES02 = 63 | CES27 = 80 | CES52 = 81 | CES77 = 74 |
| CES03 = 31 | CES28 = 81 | CES53 = 70 | CES78 = 56 |
| CES04 = 71 | CES29 = 51 | CES54 = 82 | CES79 = 81 |
| CES05 = 50 | CES30 = 61 | CES55 = 80 | CES80 = 80 |
| CES06 = 52 | CES31 = 56 | CES56 = 69 | CES81 = 74 |
| CES07 = 42 | CES32 = 52 | CES57 = 67 | CES82 = 91 |
| CES08 = 41 | CES33 = 62 | CES58 = 70 | CES83 = 86 |
| CES09 = 29 | CES34 = 67 | CES59 = 85 | CES84 = 89 |
| CES10 = 76 | CES35 = 83 | CES60 = 91 | CES85 = 83 |
| CES11 = 60 | CES36 = 89 | CES61 = 83 | CES86 = 67 |
| CES12 = 66 | CES37 = 76 | CES62 = 82 | CES87 = 78 |
| CES13 = 43 | CES38 = 68 | CES63 = 71 | CES88 = 76 |
| CES14 = 74 | CES39 = 93 | CES64 = 67 | CES89 = 68 |
| CES15 = 71 | CES40 = 88 | CES65 = 66 | CES90 = 74 |
| CES16 = 48 | CES41 = 82 | CES66 = 61 | CES91 = 96 |
| CES17 = 50 | CES42 = 77 | CES67 = 58 | CES92 = 68 |
| CES18 = 57 | CES43 = 67 | CES68 = 65 | CES93 = 80 |
| CES19 = 73 | CES44 = 99 | CES69 = 75 | CES94 = 57 |
| CES20 = 67 | CES45 = 78 | CES70 = 58 | CES95 = 75 |
| CES21 = 88 | CES46 = 74 | CES71 = 57 | CES96 = 79 |
| CES22 = 80 | CES47 = 71 | CES72 = 85 | CES97 = 81 |
| CES23 = 92 | CES48 = 62 | CES73 = 50 | CES98 = 75 |
| CES24 = 91 | CES49 = 71 | CES74 = 96 | CES99 = 67 |
| CES25 = 73 | CES50 = 80 | CES75 = 59 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)