

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: P348976

Luminaire Tested: **ARCH-N-PA1-20-727-12VDC-T2U-HSS**

Issue Date: 3/3/2020



**Test Information**

Test Method: LM-79-08  
Report Number: P348976  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1908-474-2)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: STREETWORKS  
Catalog Number: ARCH-N-PA1-20-727-12VDC-T2U-HSS  
Description: ARCHEON ROADWAY AND AREA LUMINAIRE  
(1) 70 CRI, 2700K, 420mA LIGHT ENGINE WITH 16 LEDS AND  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 2042 lumens  
Efficiency: N/A  
Efficacy: 92.8 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.75' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B0 - U0 - G0

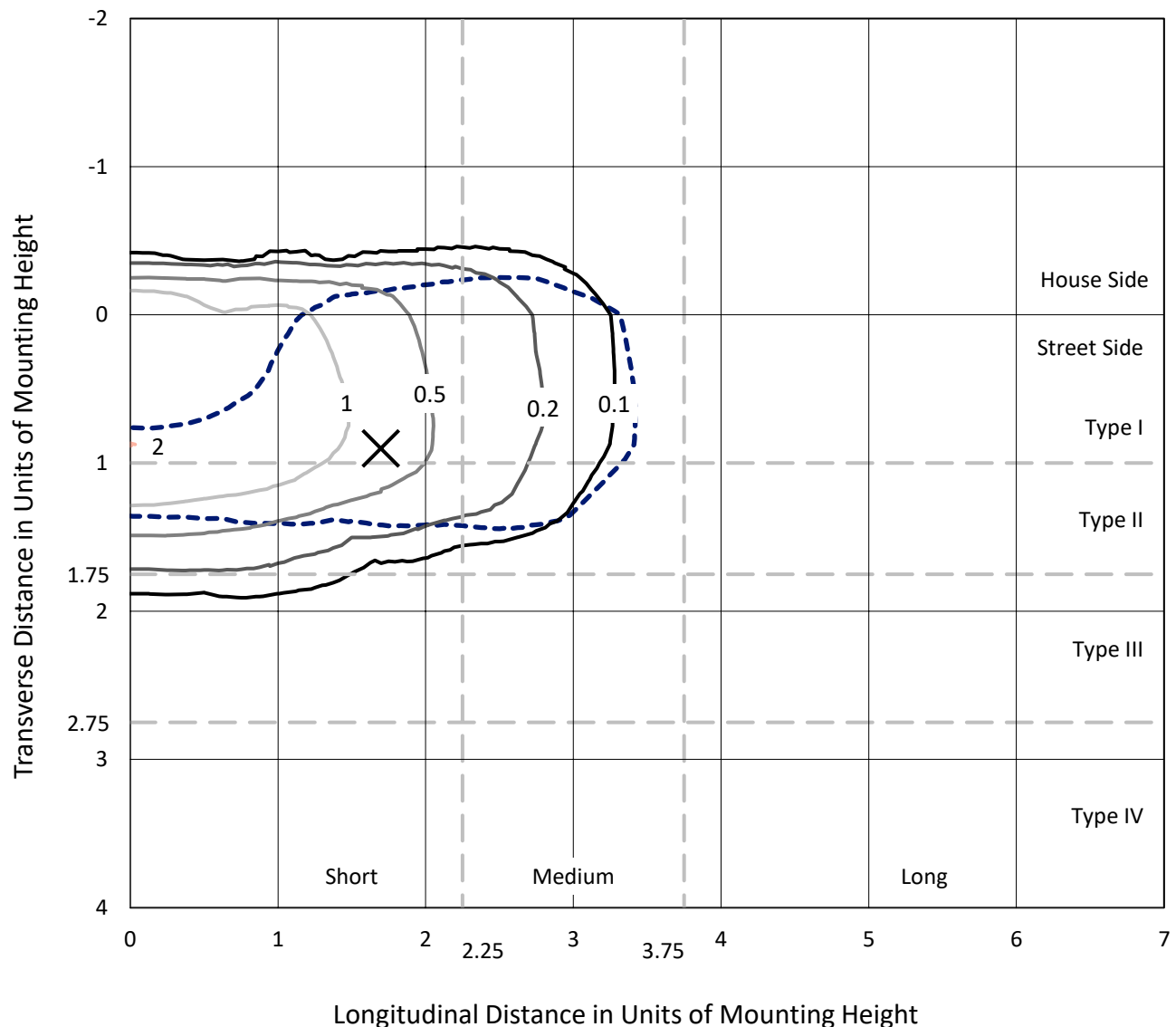
Input Watts (W): 22  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 25 FT

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## Iso-Footcandle Lines of Horizontal Illumination

× Max cd  
 - - - 1/2 Max cd

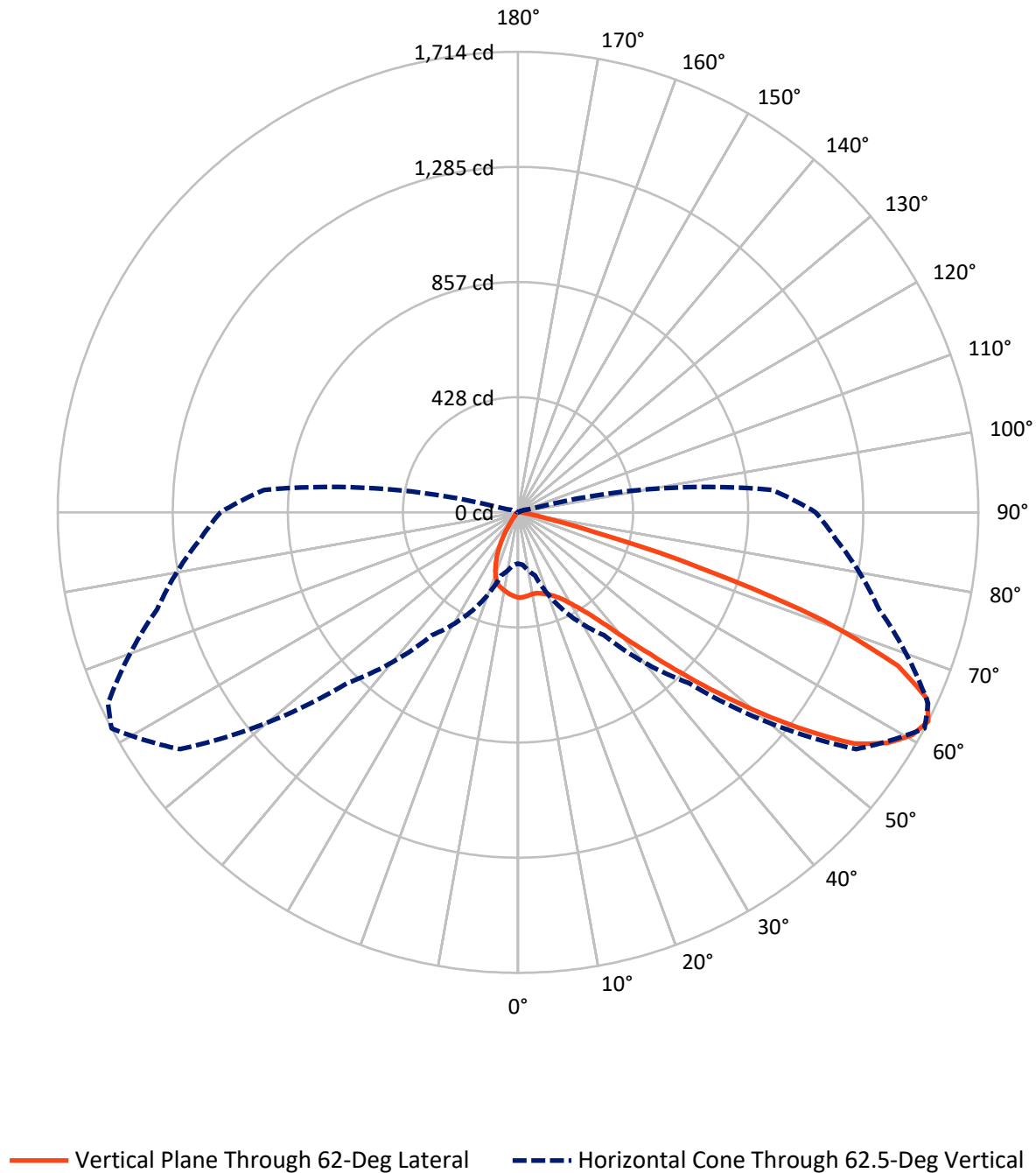


Based on 15 foot mounting height. Maximum calculated value = 2 fc  
 Type II - Short - N/A

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## Luminous Intensity Polar Plot



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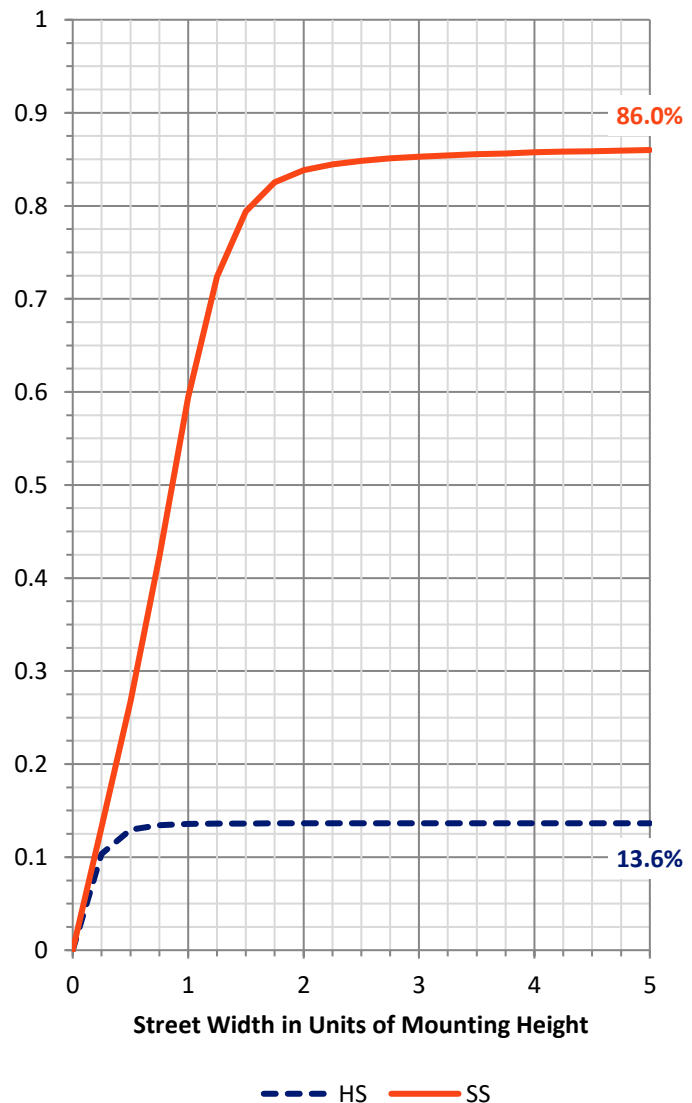
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 281.9    | 0.0    | 281.9  |
|                    | % Fixture | 13.8     | 0.0    | 13.8   |
| <b>Street Side</b> | Lumens    | 1760.1   | 0.0    | 1760.1 |
|                    | % Fixture | 86.2     | 0.0    | 86.2   |
| <b>Total</b>       | Lumens    | 2042.0   | 0.0    | 2042.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 28.9   | 1.4       |
| 10°-20°   | 72.5   | 3.6       |
| 20°-30°   | 108.3  | 5.3       |
| 30°-40°   | 206.3  | 10.1      |
| 40°-50°   | 430.2  | 21.1      |
| 50°-60°   | 571.6  | 28.0      |
| 60°-70°   | 445.6  | 21.8      |
| 70°-80°   | 168.4  | 8.2       |
| 80°-90°   | 10.1   | 0.5       |
| 90°-100°  | 0.0    | 0.0       |
| 100°-110° | 0.0    | 0.0       |
| 110°-120° | 0.0    | 0.0       |
| 120°-130° | 0.0    | 0.0       |
| 130°-140° | 0.0    | 0.0       |
| 140°-150° | 0.0    | 0.0       |
| 150°-160° | 0.0    | 0.0       |
| 160°-170° | 0.0    | 0.0       |
| 170°-180° | 0.0    | 0.0       |
| 0°-90°    | 2042.0 | 100.0     |
| 0°-180°   | 2042.0 | 100.0     |

**Coefficient of Utilization**



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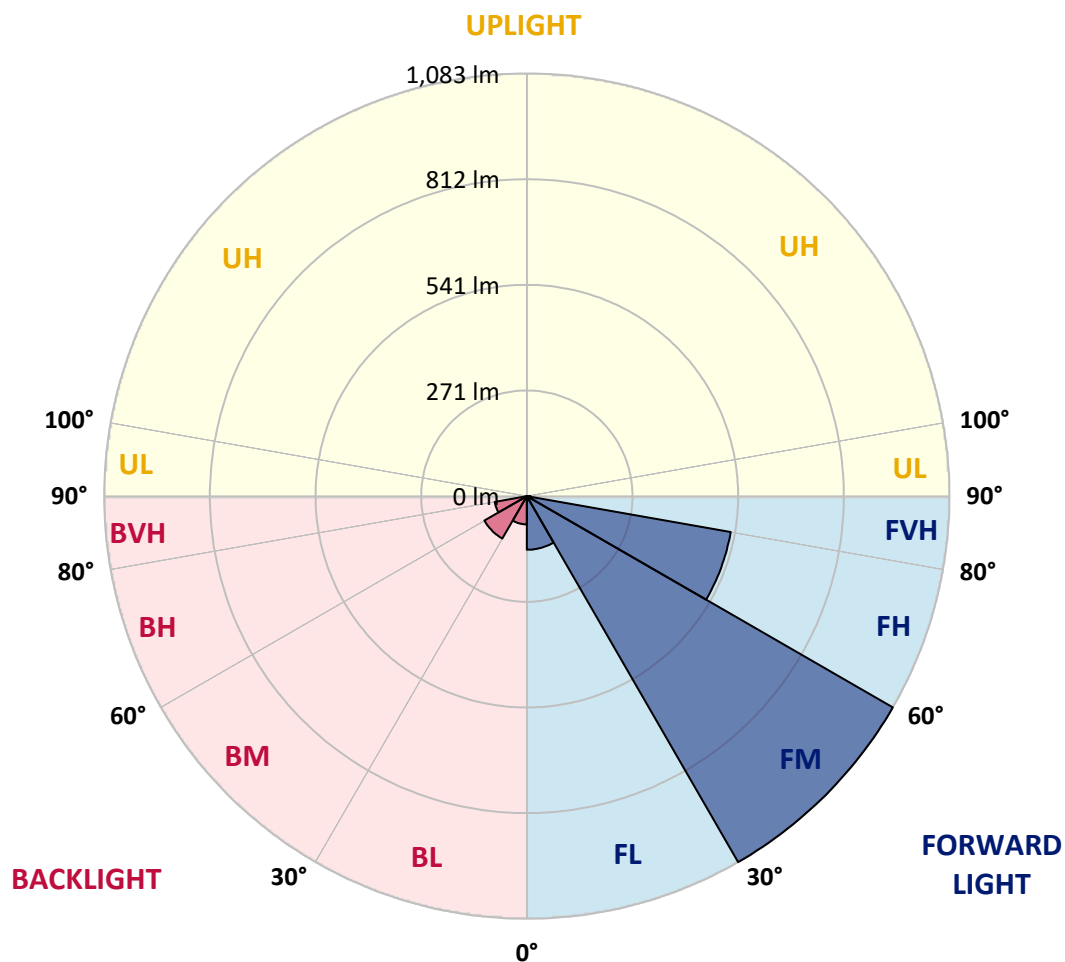
CATALOG NUMBER: ARCH-N-PA1-20-727-12VDC-T2U-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |        |
|------|-------------|--------|-----------|-------------------------|------|--------|
|      |             |        |           | B                       | U    | G      |
| FL   | (0°-30°)    | 137.4  | 6.7       |                         |      |        |
| FM   | (30°-60°)   | 1082.7 | 53.0      |                         |      |        |
| FH   | (60°-80°)   | 530.4  | 26.0      |                         |      | G0/660 |
| FVH  | (80°-90°)   | 9.6    | 0.5       |                         |      | G0/10  |
| BL   | (0°-30°)    | 72.3   | 3.5       | B0/110                  |      |        |
| BM   | (30°-60°)   | 125.5  | 6.1       | B0/220                  |      |        |
| BH   | (60°-80°)   | 83.6   | 4.1       | B0/110                  |      | G0/110 |
| 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: B0-U0-G0**

Type II Short



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 62°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 317.2  | 317.2  | 317.2  | 317.2  | 317.2  | 317.2  | 317.2  | 317.2  | 317.2  | 317.2  | 317.2  |
| 2.5°  | 316.2  | 315.6  | 317.0  | 317.0  | 316.7  | 317.2  | 316.7  | 316.4  | 316.2  | 315.6  | 315.1  |
| 5°    | 307.9  | 307.9  | 309.8  | 310.6  | 311.4  | 313.0  | 313.5  | 314.0  | 313.8  | 314.3  | 314.6  |
| 7.5°  | 298.3  | 298.8  | 301.0  | 302.0  | 303.4  | 306.6  | 308.4  | 310.6  | 310.8  | 312.7  | 313.8  |
| 10°   | 290.3  | 290.8  | 293.0  | 294.3  | 296.2  | 300.4  | 304.4  | 308.2  | 308.7  | 312.2  | 313.0  |
| 12.5° | 285.0  | 285.5  | 287.6  | 289.5  | 293.5  | 298.8  | 304.4  | 308.7  | 310.0  | 314.3  | 314.3  |
| 15°   | 282.8  | 283.4  | 286.0  | 289.2  | 294.6  | 301.5  | 308.4  | 313.0  | 315.6  | 319.1  | 317.5  |
| 17.5° | 282.0  | 283.1  | 287.6  | 292.4  | 298.3  | 305.8  | 314.3  | 319.1  | 321.8  | 325.5  | 322.0  |
| 20°   | 284.4  | 285.8  | 291.6  | 298.3  | 304.4  | 312.2  | 321.5  | 326.8  | 329.5  | 331.9  | 325.2  |
| 22.5° | 293.0  | 295.1  | 300.2  | 307.6  | 312.4  | 321.8  | 331.1  | 337.3  | 340.2  | 339.9  | 331.1  |
| 25°   | 313.5  | 316.2  | 318.6  | 322.6  | 324.7  | 335.9  | 345.8  | 351.9  | 354.1  | 353.3  | 343.1  |
| 27.5° | 362.1  | 365.5  | 357.0  | 348.2  | 343.4  | 353.8  | 364.7  | 371.1  | 373.0  | 371.4  | 355.9  |
| 30°   | 444.0  | 444.2  | 424.8  | 397.0  | 376.5  | 375.4  | 388.7  | 397.3  | 397.3  | 394.1  | 374.1  |
| 32.5° | 563.2  | 554.7  | 530.2  | 481.1  | 434.6  | 410.4  | 420.5  | 428.8  | 428.8  | 424.8  | 401.8  |
| 35°   | 713.2  | 706.8  | 666.2  | 607.3  | 524.6  | 466.4  | 464.3  | 472.3  | 472.5  | 471.5  | 445.3  |
| 37.5° | 865.8  | 850.1  | 816.2  | 745.5  | 648.4  | 552.6  | 527.0  | 532.6  | 536.6  | 536.0  | 503.5  |
| 40°   | 1007.8 | 992.0  | 963.5  | 895.4  | 800.4  | 679.6  | 618.2  | 618.2  | 618.5  | 615.8  | 576.6  |
| 42.5° | 1119.3 | 1112.1 | 1090.7 | 1043.5 | 970.1  | 879.4  | 741.2  | 720.9  | 716.7  | 714.0  | 662.5  |
| 45°   | 1191.6 | 1184.1 | 1172.6 | 1162.8 | 1139.0 | 1106.5 | 906.4  | 853.3  | 846.3  | 820.2  | 757.5  |
| 47.5° | 1195.6 | 1184.1 | 1191.9 | 1229.2 | 1282.8 | 1299.6 | 1110.2 | 1007.5 | 989.1  | 941.9  | 852.7  |
| 50°   | 1106.5 | 1107.5 | 1137.7 | 1228.4 | 1373.3 | 1469.1 | 1326.3 | 1177.2 | 1148.1 | 1053.6 | 936.8  |
| 52.5° | 942.7  | 953.3  | 1000.0 | 1139.6 | 1377.6 | 1577.4 | 1514.4 | 1352.2 | 1294.6 | 1154.0 | 996.0  |
| 55°   | 738.0  | 747.6  | 823.9  | 974.9  | 1273.8 | 1592.9 | 1651.3 | 1519.8 | 1443.5 | 1223.9 | 1049.1 |
| 57.5° | 521.9  | 540.0  | 634.7  | 773.5  | 1075.8 | 1474.7 | 1688.7 | 1620.1 | 1546.2 | 1291.9 | 1099.0 |
| 60°   | 317.2  | 326.3  | 424.8  | 586.2  | 810.8  | 1227.3 | 1644.9 | 1684.1 | 1624.4 | 1350.9 | 1145.7 |
| 62.5° | 190.8  | 196.1  | 243.3  | 403.7  | 557.9  | 898.6  | 1536.6 | 1713.5 | 1684.1 | 1390.1 | 1190.5 |
| 65°   | 112.9  | 116.3  | 138.5  | 243.9  | 371.7  | 551.2  | 1302.6 | 1673.2 | 1696.9 | 1424.0 | 1216.7 |
| 67.5° | 81.4   | 82.4   | 90.4   | 131.3  | 249.5  | 295.4  | 905.8  | 1526.4 | 1615.3 | 1435.2 | 1201.2 |
| 70°   | 70.2   | 71.5   | 79.2   | 92.3   | 176.6  | 174.2  | 471.5  | 1208.1 | 1369.3 | 1376.8 | 1135.8 |
| 72.5° | 53.1   | 55.5   | 68.3   | 86.7   | 126.7  | 123.8  | 177.7  | 720.4  | 929.6  | 1130.2 | 979.2  |
| 75°   | 36.0   | 37.4   | 50.7   | 73.6   | 99.0   | 92.3   | 93.1   | 289.2  | 454.6  | 708.7  | 672.9  |
| 77.5° | 22.7   | 23.7   | 31.0   | 52.8   | 84.8   | 65.1   | 65.9   | 102.7  | 164.1  | 300.4  | 288.4  |
| 80°   | 15.5   | 16.0   | 18.7   | 34.2   | 57.4   | 56.6   | 42.4   | 53.6   | 61.1   | 92.6   | 62.2   |
| 82.5° | 9.3    | 9.3    | 12.3   | 20.3   | 34.7   | 44.8   | 26.7   | 29.6   | 32.6   | 34.4   | 14.1   |
| 85°   | 3.2    | 3.5    | 7.5    | 12.5   | 21.3   | 22.4   | 15.2   | 17.6   | 18.4   | 20.0   | 6.7    |
| 87.5° | 1.3    | 1.1    | 4.0    | 6.9    | 9.1    | 10.4   | 8.8    | 8.0    | 8.8    | 11.7   | 2.9    |
| 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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CATALOG NUMBER: ARCH-N-PA1-20-727-12VDC-T2U-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°   | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 317.2  | 317.2 | 317.2 | 317.2 | 317.2 | 317.2 | 317.2 | 317.2 | 317.2 | 317.2 | 317.2 |
| 2.5°  | 315.4  | 314.3 | 314.3 | 314.0 | 312.4 | 311.6 | 310.8 | 308.7 | 310.0 | 308.4 | 307.4 |
| 5°    | 313.8  | 313.0 | 311.6 | 310.3 | 306.6 | 303.4 | 302.0 | 299.4 | 299.1 | 297.0 | 295.9 |
| 7.5°  | 313.5  | 311.6 | 309.5 | 305.0 | 299.4 | 294.3 | 289.8 | 285.2 | 283.4 | 281.0 | 279.6 |
| 10°   | 312.2  | 309.8 | 305.8 | 298.6 | 290.3 | 282.3 | 272.1 | 259.6 | 250.3 | 244.9 | 244.1 |
| 12.5° | 312.4  | 309.8 | 303.6 | 293.0 | 282.0 | 264.4 | 237.2 | 208.6 | 185.2 | 175.3 | 173.7 |
| 15°   | 314.6  | 311.6 | 302.3 | 287.9 | 269.2 | 230.5 | 180.6 | 136.9 | 106.5 | 95.5  | 93.1  |
| 17.5° | 317.2  | 312.2 | 299.4 | 280.7 | 244.7 | 178.8 | 113.7 | 71.8  | 54.7  | 48.6  | 47.5  |
| 20°   | 318.8  | 311.9 | 294.6 | 269.7 | 207.3 | 119.5 | 61.9  | 42.2  | 37.1  | 35.8  | 35.2  |
| 22.5° | 322.8  | 312.7 | 290.6 | 252.7 | 160.4 | 72.0  | 39.2  | 32.8  | 29.9  | 28.3  | 28.0  |
| 25°   | 331.1  | 318.0 | 290.8 | 230.5 | 112.3 | 43.5  | 31.8  | 26.7  | 24.0  | 22.4  | 21.9  |
| 27.5° | 343.1  | 327.6 | 295.9 | 203.0 | 69.4  | 32.8  | 26.4  | 21.6  | 18.7  | 17.3  | 17.1  |
| 30°   | 358.3  | 339.4 | 301.8 | 167.3 | 43.2  | 27.5  | 21.3  | 16.8  | 14.7  | 13.9  | 13.6  |
| 32.5° | 382.3  | 359.7 | 306.8 | 125.1 | 29.9  | 22.7  | 16.8  | 13.3  | 12.0  | 11.2  | 11.2  |
| 35°   | 422.1  | 394.6 | 315.1 | 83.8  | 23.7  | 18.1  | 13.6  | 10.9  | 9.9   | 9.3   | 9.3   |
| 37.5° | 478.1  | 444.5 | 319.1 | 52.0  | 19.5  | 14.1  | 10.9  | 9.1   | 8.3   | 7.7   | 7.7   |
| 40°   | 546.4  | 505.1 | 313.5 | 32.3  | 16.3  | 11.5  | 9.1   | 7.7   | 6.9   | 6.7   | 6.7   |
| 42.5° | 625.1  | 574.7 | 295.9 | 22.9  | 13.6  | 9.3   | 7.7   | 6.7   | 6.1   | 5.9   | 5.9   |
| 45°   | 713.2  | 651.0 | 264.1 | 19.2  | 11.5  | 8.0   | 6.7   | 5.6   | 5.3   | 5.1   | 5.1   |
| 47.5° | 801.0  | 728.4 | 223.1 | 16.5  | 9.6   | 6.7   | 5.6   | 4.8   | 4.5   | 4.3   | 4.3   |
| 50°   | 877.5  | 796.2 | 179.6 | 14.4  | 8.0   | 5.9   | 4.8   | 4.0   | 3.7   | 3.5   | 3.5   |
| 52.5° | 921.3  | 836.5 | 139.0 | 12.0  | 6.9   | 5.1   | 3.7   | 3.2   | 2.9   | 2.7   | 2.7   |
| 55°   | 968.5  | 870.1 | 103.8 | 10.1  | 5.6   | 4.3   | 2.9   | 2.4   | 2.1   | 1.9   | 1.9   |
| 57.5° | 1012.6 | 900.2 | 77.1  | 8.3   | 4.8   | 3.2   | 2.4   | 1.9   | 1.6   | 1.3   | 1.3   |
| 60°   | 1055.2 | 925.8 | 57.1  | 6.7   | 4.0   | 2.7   | 1.9   | 1.3   | 1.1   | 0.8   | 0.8   |
| 62.5° | 1107.3 | 949.3 | 41.9  | 5.3   | 3.5   | 1.9   | 1.3   | 0.8   | 0.5   | 0.3   | 0.3   |
| 65°   | 1146.0 | 961.3 | 31.5  | 4.0   | 2.9   | 1.3   | 0.8   | 0.5   | 0.0   | 0.0   | 0.0   |
| 67.5° | 1145.7 | 938.1 | 22.9  | 2.9   | 2.1   | 1.1   | 0.5   | 0.0   | 0.0   | 0.0   | 0.0   |
| 70°   | 1092.1 | 867.7 | 16.0  | 2.4   | 1.6   | 0.8   | 0.3   | 0.0   | 0.0   | 0.0   | 0.0   |
| 72.5° | 936.5  | 686.2 | 10.4  | 1.6   | 1.3   | 0.5   | 0.3   | 0.0   | 0.0   | 0.0   | 0.0   |
| 75°   | 632.1  | 348.5 | 6.1   | 1.3   | 1.1   | 0.5   | 0.3   | 0.0   | 0.0   | 0.0   | 0.0   |
| 77.5° | 270.3  | 136.9 | 3.2   | 0.8   | 0.8   | 0.3   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 80°   | 56.6   | 33.1  | 1.3   | 0.5   | 0.5   | 0.3   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 82.5° | 9.6    | 4.8   | 0.5   | 0.5   | 0.3   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 85°   | 2.4    | 1.3   | 0.3   | 0.3   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 87.5° | 1.1    | 0.5   | 0.3   | 0.3   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 90°   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |

Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

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

REPORT NUMBER: SP1-2101-121-5

| 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**



CCT = 2805K  
 CIE  $x$  = 0.4477  
 CIE  $y$  = 0.4017  
 Duv = -0.0022

Point lies inside the ANSI 2700K 4-step quadrangle

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### Photopic Flux vs. Wavelength

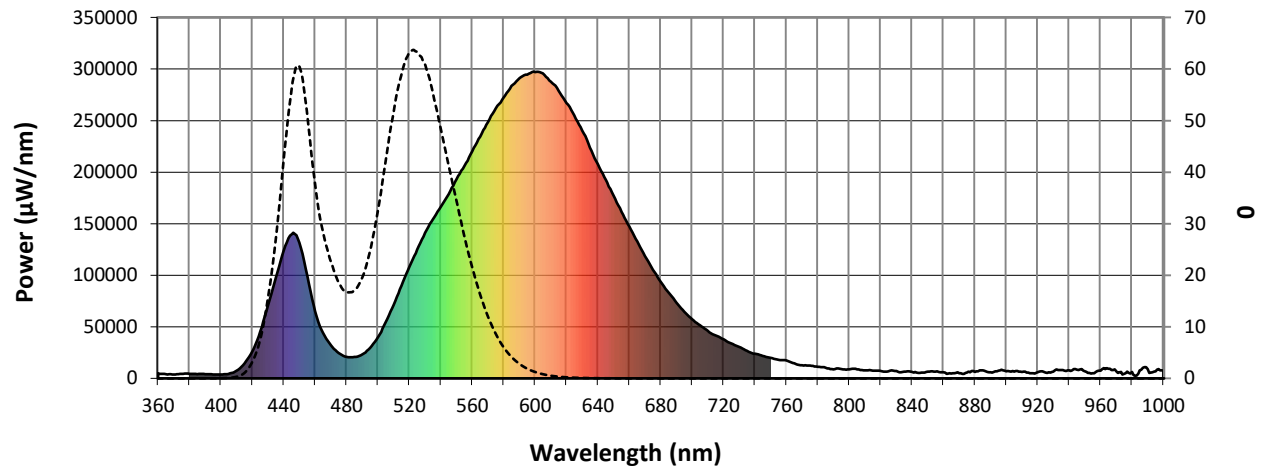


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| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 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              |           |                  |                  |

REPORT NUMBER: SP1-2101-121-5

### Scotopic Flux vs. Wavelength


**Scotopic Lumens: 15895.6**
**S/P: 1.11**

| $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\Phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\Phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\Phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\Phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\Phi/\text{nm}$ ) |
|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|
| 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                            |                   |                               |                                |

REPORT NUMBER: SP1-2101-121-5

### 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              |           |                  |                  |

### 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)