

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: P800824

Luminaire Tested: **ARCH-M-PA2-50-740-24VDC-T2R-HSS**

Issue Date: 5/19/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P800824  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1910-568-13)  
Test Lab: INNOVATION CENTER  
Issue Date: 5/19/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: STREETWORKS  
Catalog Number: ARCH-M-PA2-50-740-24VDC-T2R-HSS  
Description: ARCHEON-M ROADWAY AND AREA LUMINAIRE  
(2) 70 CRI, 4000K, 305mA LIGHT ENGINES WITH 16 LEDS AND TYPE II ROADWAY  
OPTICS WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 6533 lumens  
Efficiency: N/A  
Efficacy: 142.0 lumens/watt  
Luminous Opening: Rectangular (W 0.75' x L: 1' x H: 0')  
IES Classification: Type II - Medium  
BUG Rating: B0 - U0 - G2

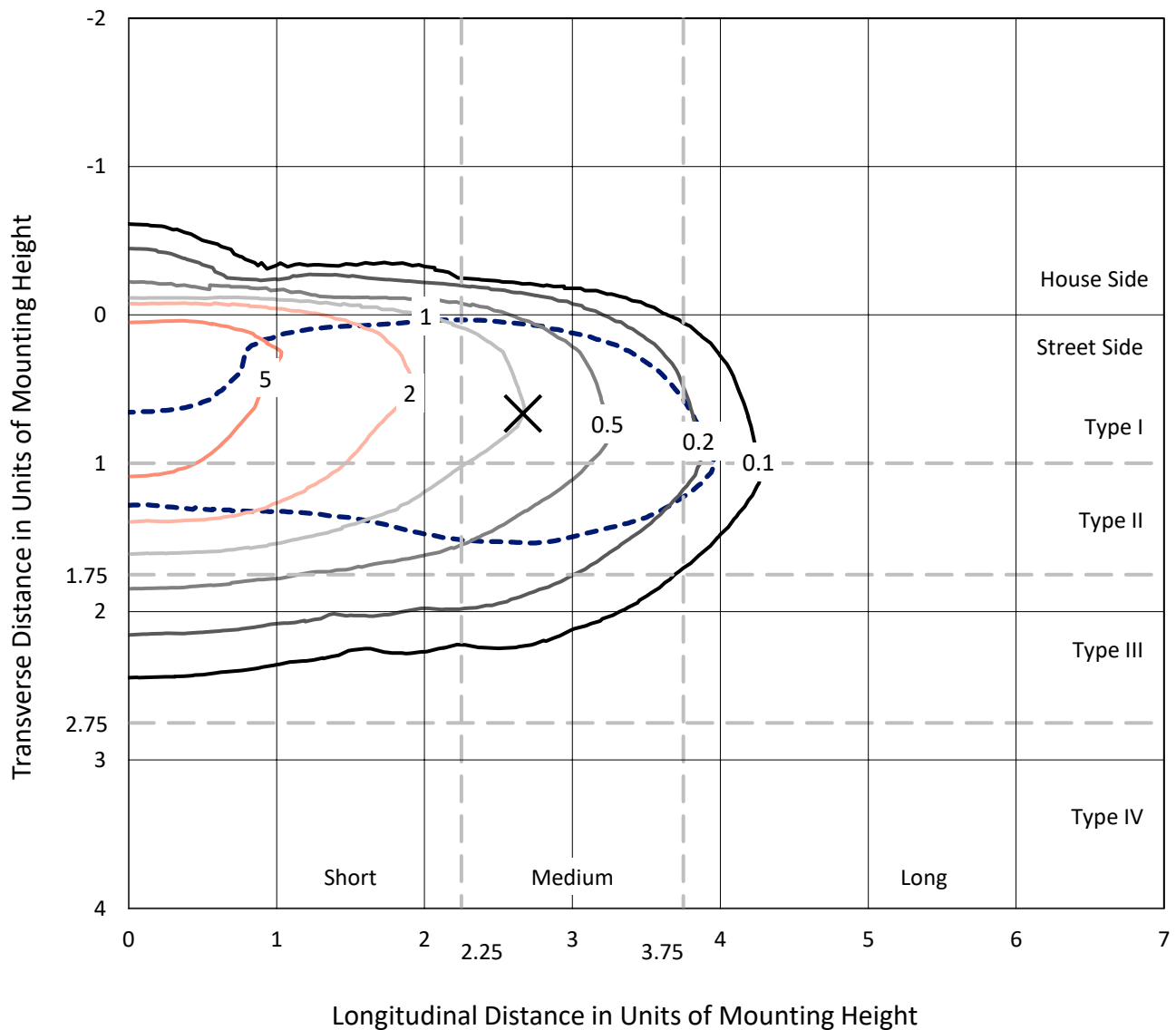
Input Watts (W): 46  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 25 FT

REPORT NUMBER: P800824

CATALOG NUMBER: ARCH-M-PA2-50-740-24VDC-T2R-HSS

## Iso-Footcandle Lines of Horizontal Illumination

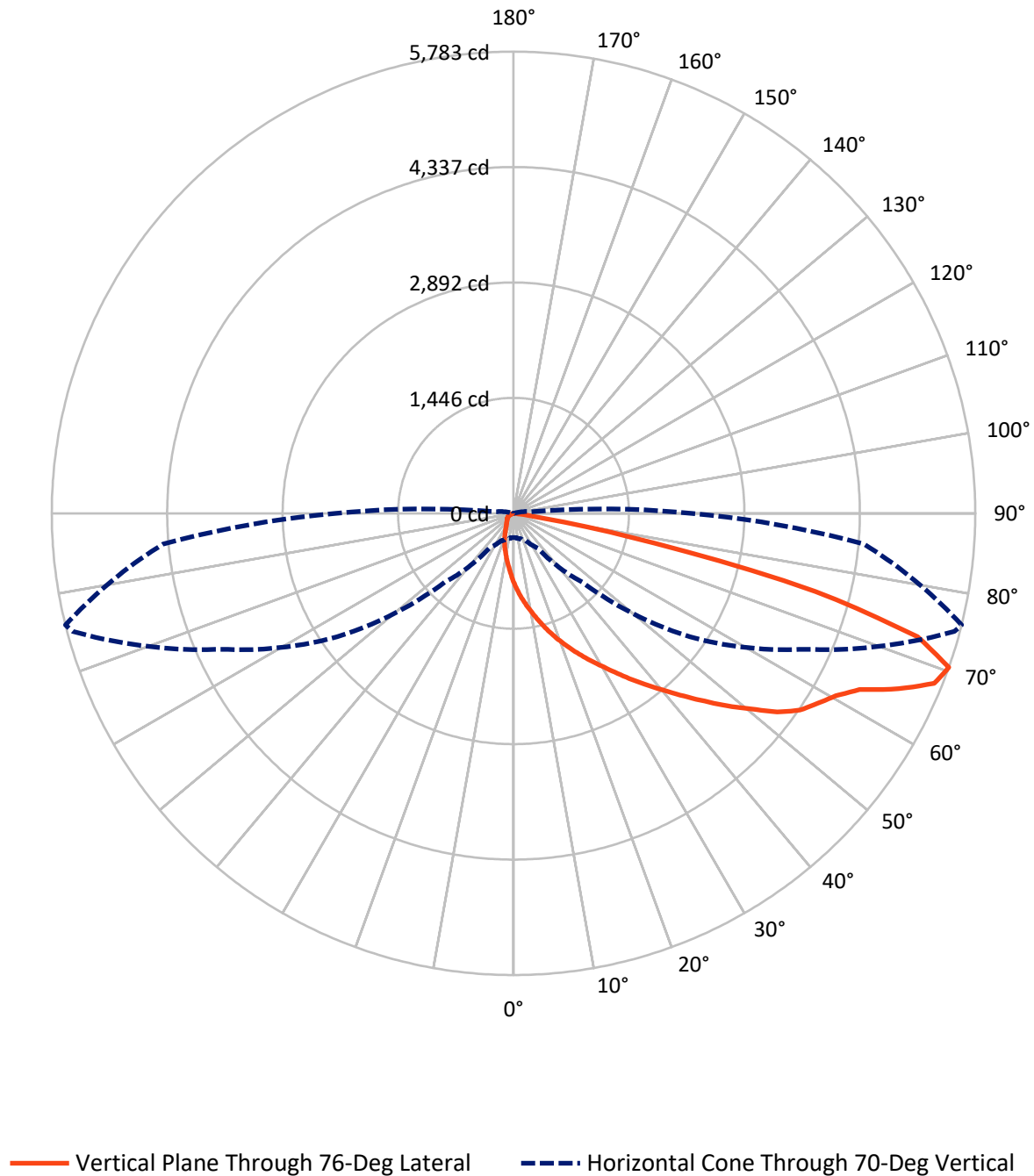
× Max cd  
 - - - 1/2 Max cd



Based on 15 foot mounting height. Maximum calculated value = 7.4 fc  
 Type II - Medium - N/A

REPORT NUMBER: P800824  
CATALOG NUMBER: ARCH-M-PA2-50-740-24VDC-T2R-HSS

## Luminous Intensity Polar Plot



REPORT NUMBER: P800824

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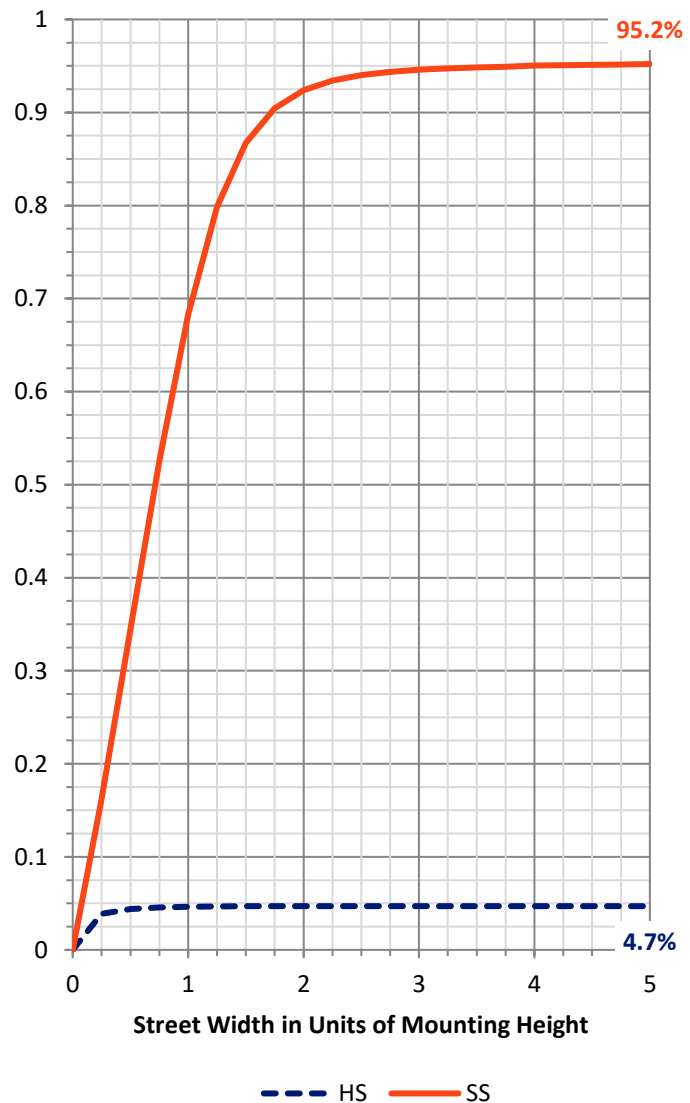
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 308.1    | 0.0    | 308.1  |
|                    | % Fixture | 4.7      | 0.0    | 4.7    |
| <b>Street Side</b> | Lumens    | 6224.9   | 0.0    | 6224.9 |
|                    | % Fixture | 95.3     | 0.0    | 95.3   |
| <b>Total</b>       | Lumens    | 6533.0   | 0.0    | 6533.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 82.4   | 1.3       |
| 10°-20°   | 265.9  | 4.1       |
| 20°-30°   | 495.2  | 7.6       |
| 30°-40°   | 875.9  | 13.4      |
| 40°-50°   | 1339.4 | 20.5      |
| 50°-60°   | 1518.6 | 23.2      |
| 60°-70°   | 1301.8 | 19.9      |
| 70°-80°   | 630.5  | 9.7       |
| 80°-90°   | 23.4   | 0.4       |
| 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°    | 6533.0 | 100.0     |
| 0°-180°   | 6533.0 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P800824

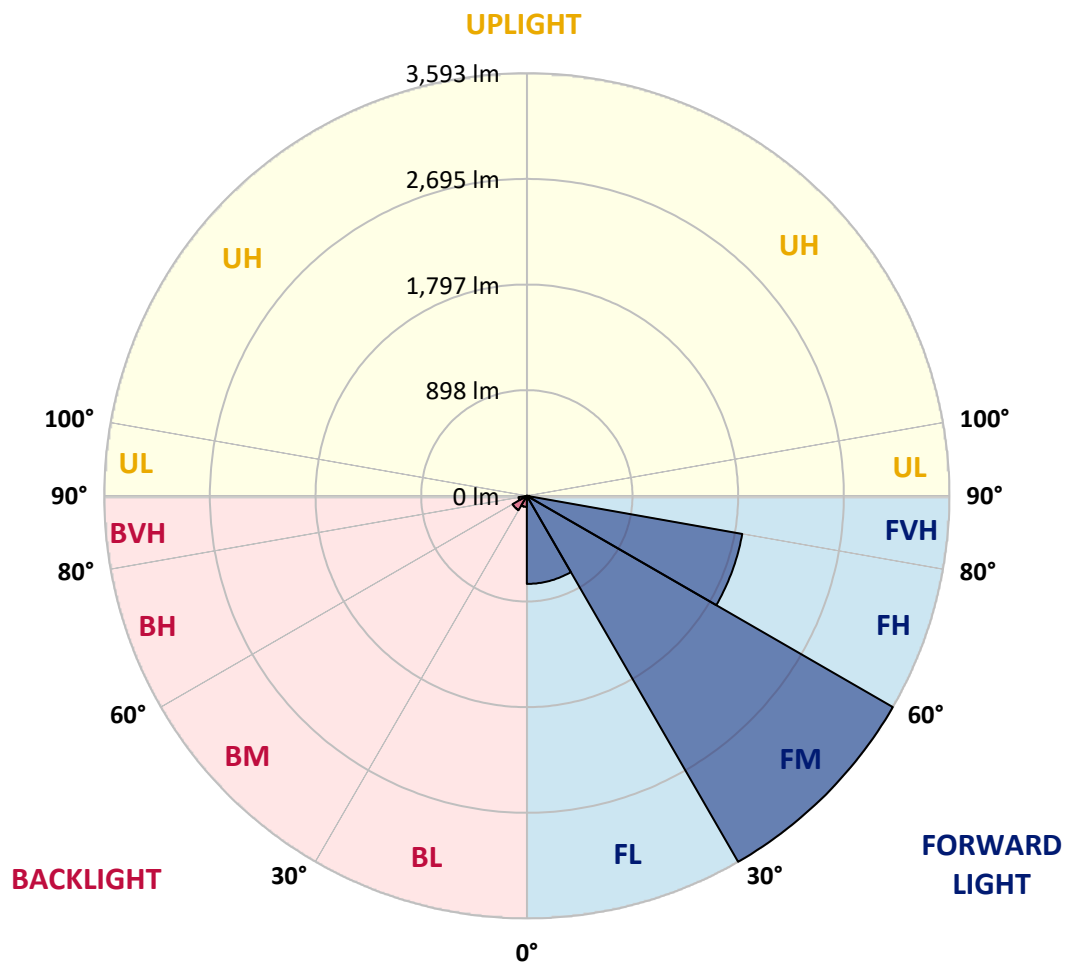
CATALOG NUMBER: ARCH-M-PA2-50-740-24VDC-T2R-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 748.9  | 11.5      |                         |      |         |
| FM   | (30°-60°)   | 3593.2 | 55.0      |                         |      |         |
| FH   | (60°-80°)   | 1859.7 | 28.5      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 23.0   | 0.4       |                         |      | G1/100  |
| BL   | (0°-30°)    | 94.5   | 1.4       | B0/110                  |      |         |
| BM   | (30°-60°)   | 140.7  | 2.2       | B0/220                  |      |         |
| BH   | (60°-80°)   | 72.6   | 1.1       | B0/110                  |      | G0/110  |
| BVH  | (80°-90°)   | 0.4    | 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-G2**

Type II Medium



REPORT NUMBER: P800824

CATALOG NUMBER: ARCH-M-PA2-50-740-24VDC-T2R-HSS

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 75°    | 76°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 874.5  | 874.5  | 874.5  | 874.5  | 874.5  | 874.5  | 874.5  | 874.5  | 874.5  | 874.5  | 874.5  |
| 2.5°  | 1195.3 | 1188.8 | 1182.3 | 1157.3 | 1134.4 | 1113.8 | 1074.6 | 1023.5 | 977.8  | 968.0  | 914.7  |
| 5°    | 1404.2 | 1396.6 | 1386.8 | 1361.8 | 1332.4 | 1297.6 | 1239.9 | 1161.6 | 1081.1 | 1063.7 | 964.8  |
| 7.5°  | 1545.6 | 1539.0 | 1524.9 | 1512.9 | 1483.6 | 1449.9 | 1385.7 | 1294.3 | 1183.4 | 1161.6 | 1022.4 |
| 10°   | 1642.4 | 1638.0 | 1635.9 | 1626.1 | 1604.3 | 1577.1 | 1512.9 | 1417.2 | 1286.7 | 1261.7 | 1083.3 |
| 12.5° | 1677.2 | 1677.2 | 1688.1 | 1704.4 | 1707.6 | 1698.9 | 1640.2 | 1544.5 | 1395.5 | 1369.4 | 1155.1 |
| 15°   | 1630.4 | 1635.9 | 1659.8 | 1712.0 | 1766.4 | 1802.3 | 1765.3 | 1676.1 | 1515.1 | 1486.8 | 1239.9 |
| 17.5° | 1617.4 | 1622.8 | 1639.1 | 1684.8 | 1757.7 | 1853.4 | 1871.9 | 1803.4 | 1628.2 | 1604.3 | 1327.0 |
| 20°   | 1654.3 | 1659.8 | 1673.9 | 1713.1 | 1768.5 | 1865.3 | 1942.6 | 1926.3 | 1747.9 | 1722.9 | 1415.1 |
| 22.5° | 1742.4 | 1745.7 | 1745.7 | 1776.2 | 1825.1 | 1896.9 | 1987.2 | 2042.6 | 1870.8 | 1843.6 | 1502.1 |
| 25°   | 1931.7 | 1925.2 | 1899.1 | 1883.8 | 1915.4 | 1974.1 | 2043.7 | 2144.9 | 2007.8 | 1970.9 | 1595.6 |
| 27.5° | 2179.7 | 2201.4 | 2138.4 | 2065.5 | 2041.6 | 2075.3 | 2123.1 | 2235.2 | 2140.5 | 2101.4 | 1680.4 |
| 30°   | 2515.8 | 2507.1 | 2424.4 | 2320.0 | 2216.7 | 2204.7 | 2221.0 | 2312.4 | 2273.2 | 2236.2 | 1775.1 |
| 32.5° | 2792.0 | 2808.4 | 2721.3 | 2594.1 | 2439.6 | 2366.8 | 2349.4 | 2404.8 | 2414.6 | 2390.7 | 1887.1 |
| 35°   | 3075.9 | 3093.3 | 3008.5 | 2867.1 | 2683.3 | 2561.5 | 2511.4 | 2519.0 | 2589.7 | 2559.3 | 2004.6 |
| 37.5° | 3330.4 | 3345.7 | 3261.9 | 3117.3 | 2933.4 | 2784.4 | 2712.6 | 2653.9 | 2759.4 | 2732.2 | 2128.6 |
| 40°   | 3524.0 | 3526.2 | 3469.7 | 3340.2 | 3166.2 | 3011.7 | 2930.2 | 2814.9 | 2938.9 | 2920.4 | 2258.0 |
| 42.5° | 3661.1 | 3665.4 | 3624.1 | 3513.2 | 3352.2 | 3208.6 | 3142.3 | 3005.2 | 3145.5 | 3129.2 | 2408.1 |
| 45°   | 3725.3 | 3732.9 | 3728.5 | 3626.3 | 3492.5 | 3368.5 | 3346.8 | 3207.5 | 3371.8 | 3356.5 | 2581.0 |
| 47.5° | 3664.3 | 3664.3 | 3719.8 | 3705.7 | 3582.8 | 3500.1 | 3525.1 | 3418.5 | 3617.6 | 3603.4 | 2757.2 |
| 50°   | 3410.9 | 3414.2 | 3527.3 | 3689.4 | 3617.6 | 3599.1 | 3677.4 | 3625.2 | 3840.6 | 3849.3 | 2968.2 |
| 52.5° | 2745.3 | 2739.8 | 3121.6 | 3432.7 | 3593.7 | 3643.7 | 3817.7 | 3836.2 | 4108.1 | 4134.2 | 3178.2 |
| 55°   | 2051.3 | 2048.1 | 2413.5 | 2978.0 | 3426.2 | 3620.8 | 3896.0 | 4024.4 | 4336.5 | 4352.8 | 3334.8 |
| 57.5° | 1623.9 | 1615.2 | 1816.4 | 2400.5 | 3047.6 | 3518.6 | 3899.3 | 4060.3 | 4463.8 | 4492.1 | 3487.1 |
| 60°   | 1248.6 | 1241.0 | 1391.1 | 1785.9 | 2511.4 | 3246.7 | 3805.7 | 4062.4 | 4586.7 | 4636.7 | 3691.5 |
| 62.5° | 893.0  | 901.7  | 1017.0 | 1281.3 | 1931.7 | 2862.7 | 3683.9 | 4092.9 | 4805.3 | 4861.9 | 3981.9 |
| 65°   | 602.6  | 598.2  | 693.9  | 872.3  | 1373.7 | 2346.1 | 3496.8 | 4157.1 | 5199.0 | 5298.0 | 4330.0 |
| 67.5° | 418.8  | 422.0  | 465.5  | 567.8  | 872.3  | 1801.2 | 3185.8 | 4193.0 | 5605.8 | 5683.1 | 4573.6 |
| 70°   | 302.4  | 306.7  | 330.7  | 381.8  | 533.0  | 1221.4 | 2693.1 | 4028.7 | 5715.7 | 5783.1 | 4404.0 |
| 72.5° | 199.0  | 207.7  | 243.6  | 270.8  | 340.4  | 764.6  | 1983.9 | 3470.7 | 5242.6 | 5292.6 | 3694.8 |
| 75°   | 107.7  | 109.9  | 156.6  | 202.3  | 242.5  | 476.4  | 1183.4 | 2340.7 | 3922.1 | 3905.8 | 2436.4 |
| 77.5° | 83.8   | 87.0   | 96.8   | 144.7  | 163.2  | 262.1  | 467.7  | 1057.2 | 1857.7 | 1807.7 | 831.0  |
| 80°   | 51.1   | 53.3   | 67.4   | 85.9   | 114.2  | 152.3  | 137.0  | 287.1  | 377.4  | 353.5  | 121.8  |
| 82.5° | 30.5   | 32.6   | 40.2   | 71.8   | 90.3   | 71.8   | 47.9   | 69.6   | 70.7   | 69.6   | 30.5   |
| 85°   | 5.4    | 5.4    | 28.3   | 50.0   | 47.9   | 20.7   | 28.3   | 22.8   | 20.7   | 21.8   | 6.5    |
| 87.5° | 0.0    | 0.0    | 10.9   | 15.2   | 21.8   | 7.6    | 10.9   | 5.4    | 5.4    | 5.4    | 3.3    |
| 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: P800824

CATALOG NUMBER: ARCH-M-PA2-50-740-24VDC-T2R-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°   | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 874.5  | 874.5 | 874.5 | 874.5 | 874.5 | 874.5 | 874.5 | 874.5 | 874.5 | 874.5 | 874.5 |
| 2.5°  | 882.1  | 845.1 | 769.0 | 702.6 | 636.3 | 587.3 | 550.4 | 512.3 | 499.2 | 482.9 | 474.2 |
| 5°    | 897.3  | 824.5 | 673.3 | 552.5 | 450.3 | 372.0 | 321.9 | 291.5 | 271.9 | 257.8 | 254.5 |
| 7.5°  | 920.2  | 808.1 | 596.0 | 432.9 | 320.9 | 242.5 | 201.2 | 180.6 | 169.7 | 163.2 | 161.0 |
| 10°   | 947.4  | 794.0 | 519.9 | 337.2 | 226.2 | 170.8 | 147.9 | 139.2 | 134.9 | 132.7 | 131.6 |
| 12.5° | 985.4  | 788.6 | 455.7 | 260.0 | 170.8 | 140.3 | 128.3 | 122.9 | 119.6 | 116.4 | 115.3 |
| 15°   | 1035.5 | 790.7 | 397.0 | 201.2 | 141.4 | 125.1 | 115.3 | 109.9 | 105.5 | 102.2 | 102.2 |
| 17.5° | 1087.7 | 794.0 | 339.4 | 163.2 | 128.3 | 114.2 | 103.3 | 95.7  | 92.5  | 89.2  | 88.1  |
| 20°   | 1136.6 | 792.9 | 283.9 | 139.2 | 116.4 | 102.2 | 91.4  | 83.8  | 78.3  | 75.0  | 75.0  |
| 22.5° | 1183.4 | 786.4 | 231.7 | 125.1 | 106.6 | 90.3  | 78.3  | 70.7  | 66.3  | 63.1  | 63.1  |
| 25°   | 1233.4 | 773.3 | 189.3 | 114.2 | 94.6  | 79.4  | 67.4  | 59.8  | 56.6  | 53.3  | 53.3  |
| 27.5° | 1272.6 | 751.6 | 154.4 | 104.4 | 83.8  | 68.5  | 57.6  | 51.1  | 47.9  | 45.7  | 45.7  |
| 30°   | 1315.0 | 720.0 | 128.3 | 93.5  | 72.9  | 58.7  | 48.9  | 43.5  | 40.2  | 39.2  | 39.2  |
| 32.5° | 1361.8 | 685.2 | 109.9 | 82.7  | 62.0  | 50.0  | 41.3  | 38.1  | 34.8  | 33.7  | 33.7  |
| 35°   | 1416.1 | 654.8 | 99.0  | 71.8  | 54.4  | 42.4  | 35.9  | 32.6  | 30.5  | 30.5  | 30.5  |
| 37.5° | 1478.1 | 623.2 | 89.2  | 63.1  | 46.8  | 35.9  | 30.5  | 29.4  | 28.3  | 27.2  | 27.2  |
| 40°   | 1545.6 | 589.5 | 80.5  | 55.5  | 40.2  | 30.5  | 26.1  | 26.1  | 25.0  | 25.0  | 25.0  |
| 42.5° | 1621.7 | 560.1 | 72.9  | 48.9  | 34.8  | 26.1  | 22.8  | 22.8  | 21.8  | 21.8  | 21.8  |
| 45°   | 1704.4 | 533.0 | 66.3  | 43.5  | 30.5  | 22.8  | 20.7  | 19.6  | 18.5  | 18.5  | 18.5  |
| 47.5° | 1802.3 | 517.7 | 60.9  | 38.1  | 26.1  | 19.6  | 17.4  | 16.3  | 15.2  | 14.1  | 14.1  |
| 50°   | 1927.3 | 524.3 | 55.5  | 31.5  | 22.8  | 16.3  | 14.1  | 13.1  | 12.0  | 10.9  | 10.9  |
| 52.5° | 2026.3 | 521.0 | 47.9  | 27.2  | 18.5  | 13.1  | 10.9  | 9.8   | 8.7   | 7.6   | 7.6   |
| 55°   | 2098.1 | 507.9 | 41.3  | 22.8  | 14.1  | 10.9  | 8.7   | 6.5   | 5.4   | 5.4   | 5.4   |
| 57.5° | 2168.8 | 494.9 | 34.8  | 18.5  | 10.9  | 7.6   | 5.4   | 4.4   | 4.4   | 4.4   | 4.4   |
| 60°   | 2278.7 | 476.4 | 30.5  | 15.2  | 8.7   | 5.4   | 3.3   | 3.3   | 2.2   | 2.2   | 2.2   |
| 62.5° | 2412.4 | 453.6 | 25.0  | 13.1  | 6.5   | 4.4   | 2.2   | 2.2   | 0.0   | 0.0   | 0.0   |
| 65°   | 2559.3 | 413.3 | 20.7  | 9.8   | 5.4   | 3.3   | 2.2   | 0.0   | 0.0   | 0.0   | 0.0   |
| 67.5° | 2525.6 | 331.7 | 17.4  | 6.5   | 4.4   | 2.2   | 1.1   | 0.0   | 0.0   | 0.0   | 0.0   |
| 70°   | 2234.1 | 224.1 | 14.1  | 5.4   | 3.3   | 2.2   | 1.1   | 0.0   | 0.0   | 0.0   | 0.0   |
| 72.5° | 1750.1 | 132.7 | 9.8   | 4.4   | 2.2   | 1.1   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 75°   | 1120.3 | 66.3  | 6.5   | 3.3   | 2.2   | 1.1   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 77.5° | 375.2  | 32.6  | 4.4   | 2.2   | 1.1   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 80°   | 53.3   | 10.9  | 2.2   | 1.1   | 1.1   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 82.5° | 12.0   | 4.4   | 1.1   | 1.1   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 85°   | 4.4    | 2.2   | 1.1   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 87.5° | 2.2    | 1.1   | 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

REPORT NUMBER: SP1-2101-121-2

| 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

REPORT NUMBER: SP1-2101-121-2

### 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       | 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              |           |                  |                  |

REPORT NUMBER: SP1-2101-121-2

### Scotopic Flux vs. Wavelength



Scotopic Lumens: 10425.8

S/P: 1.47

| $\lambda$<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               | 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                            |                   |                               |                                |

REPORT NUMBER: SP1-2101-121-2

### 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              |           |                  |                  |

REPORT NUMBER: SP1-2101-121-2

TM-30-18

### 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)