

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: P800978

Luminaire Tested: **ARCH-M-PA2-80-827-24VDC-T2R**

Issue Date: 5/19/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P800978  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1910-568-9)  
Test Lab: INNOVATION CENTER  
Issue Date: 5/19/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: STREETWORKS  
Catalog Number: ARCH-M-PA2-80-827-24VDC-T2R  
Description: ARCHEON-M ROADWAY AND AREA LUMINAIRE  
(2) 80 CRI, 2700K, 535mA LIGHT ENGINES WITH 16 LEDS AND TYPE II ROADWAY OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

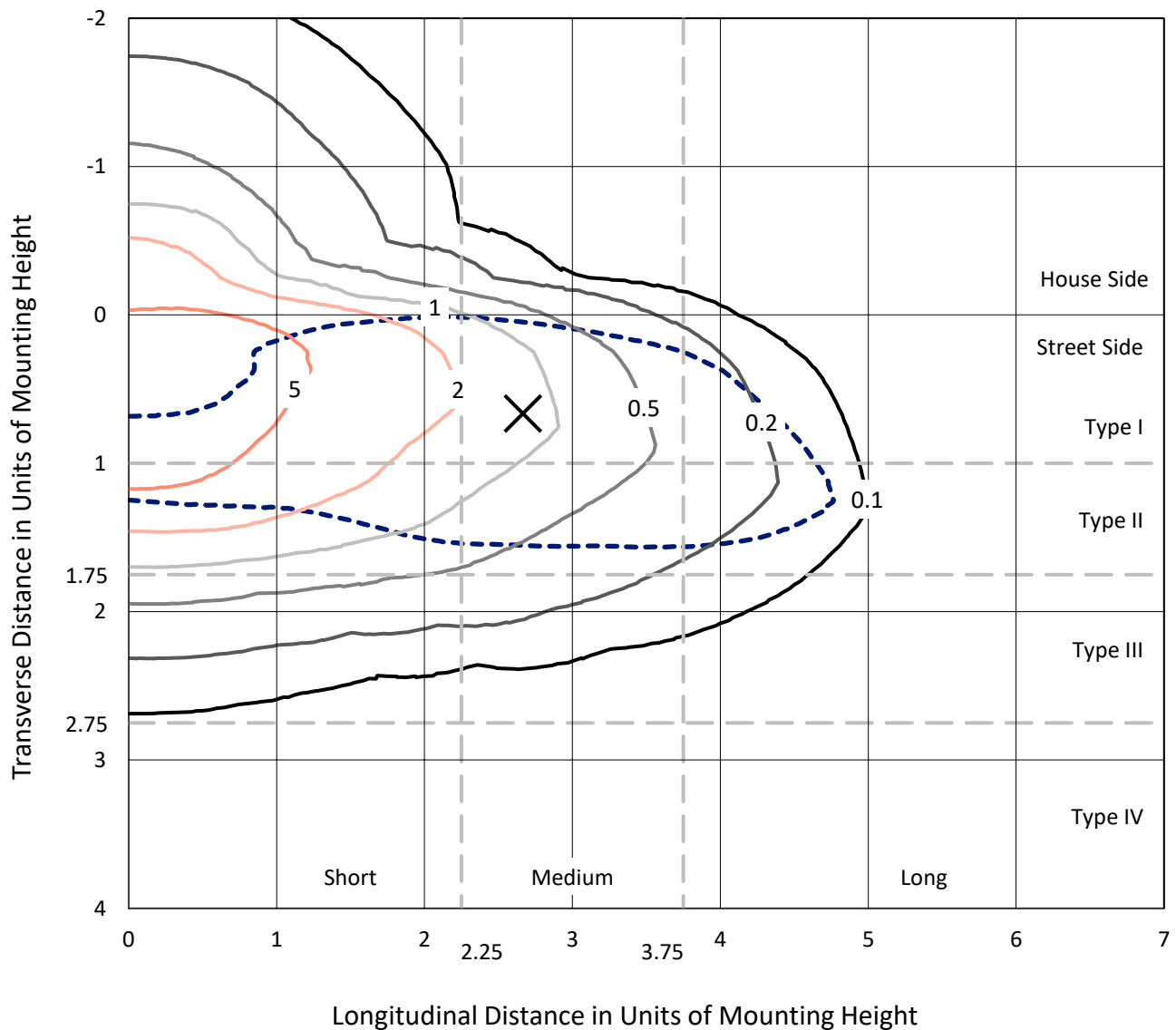
Lumens per Lamp: N/A  
Luminaire Lumens: 9776 lumens  
Efficiency: N/A  
Efficacy: 122.2 lumens/watt  
Luminous Opening: Rectangular (W 0.75' x L: 1' x H: 0')  
IES Classification: Type II - Medium  
BUG Rating: B1 - U0 - G2

Input Watts (W): 80  
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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 CATALOG NUMBER: ARCH-M-PA2-80-827-24VDC-T2R

## Iso-Footcandle Lines of Horizontal Illumination

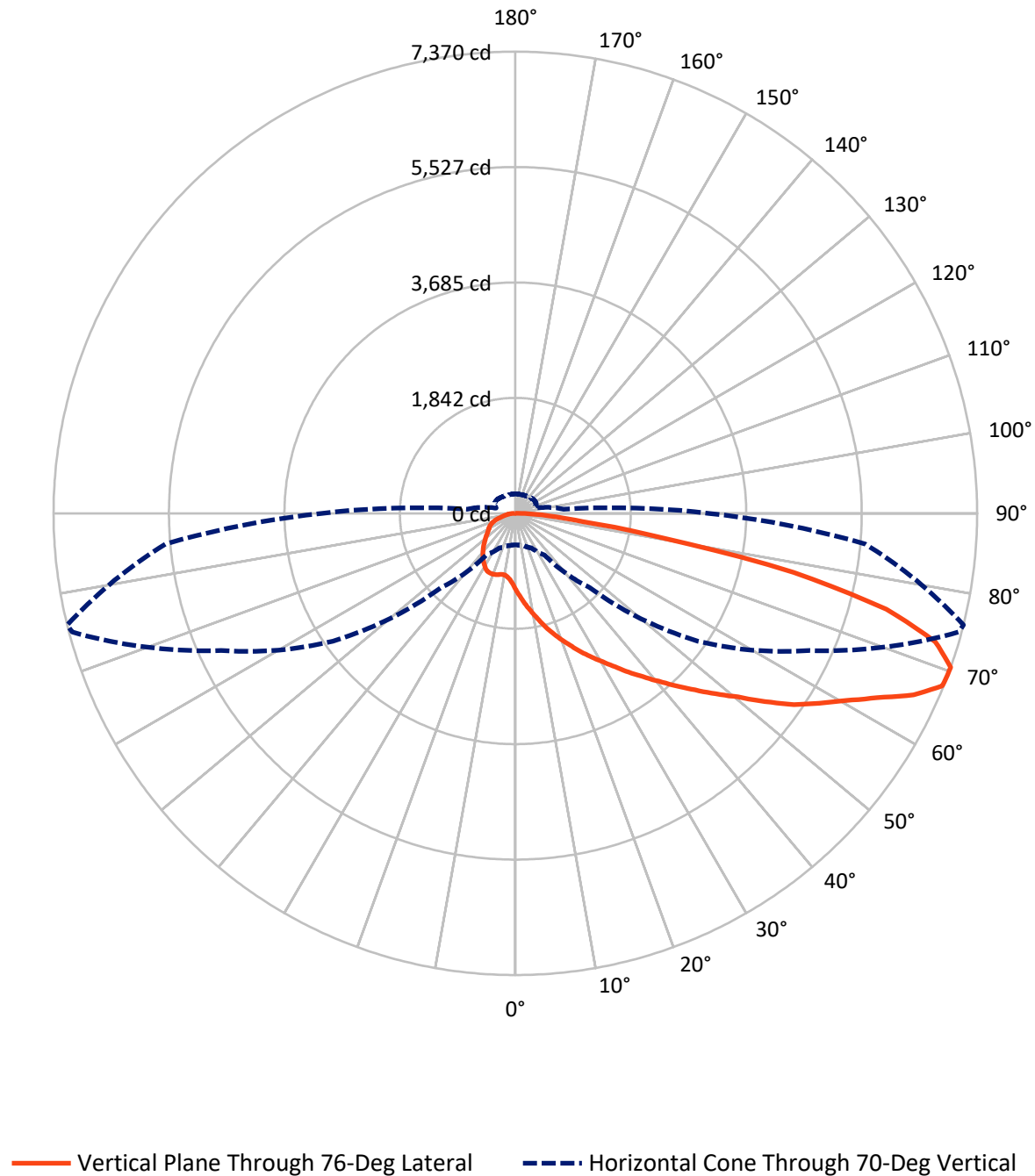
✕ Max cd  
 - - - 1/2 Max cd



Based on 15 foot mounting height. Maximum calculated value = 9.2 fc  
 Type II - Medium - N/A

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## Luminous Intensity Polar Plot



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CATALOG NUMBER: ARCH-M-PA2-80-827-24VDC-T2R

**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 1596.0   | 0.0    | 1596.0 |
|                    | % Fixture | 16.3     | 0.0    | 16.3   |
| <b>Street Side</b> | Lumens    | 8180.0   | 0.0    | 8180.0 |
|                    | % Fixture | 83.7     | 0.0    | 83.7   |
| <b>Total</b>       | Lumens    | 9776.0   | 0.0    | 9776.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**Coefficient of Utilization**

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 127.0  | 1.3       |
| 10°-20°   | 431.7  | 4.4       |
| 20°-30°   | 772.4  | 7.9       |
| 30°-40°   | 1249.5 | 12.8      |
| 40°-50°   | 1807.6 | 18.5      |
| 50°-60°   | 2068.9 | 21.2      |
| 60°-70°   | 1903.1 | 19.5      |
| 70°-80°   | 1176.9 | 12.0      |
| 80°-90°   | 239.0  | 2.4       |
| 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°    | 9776.0 | 100.0     |
| 0°-180°   | 9776.0 | 100.0     |



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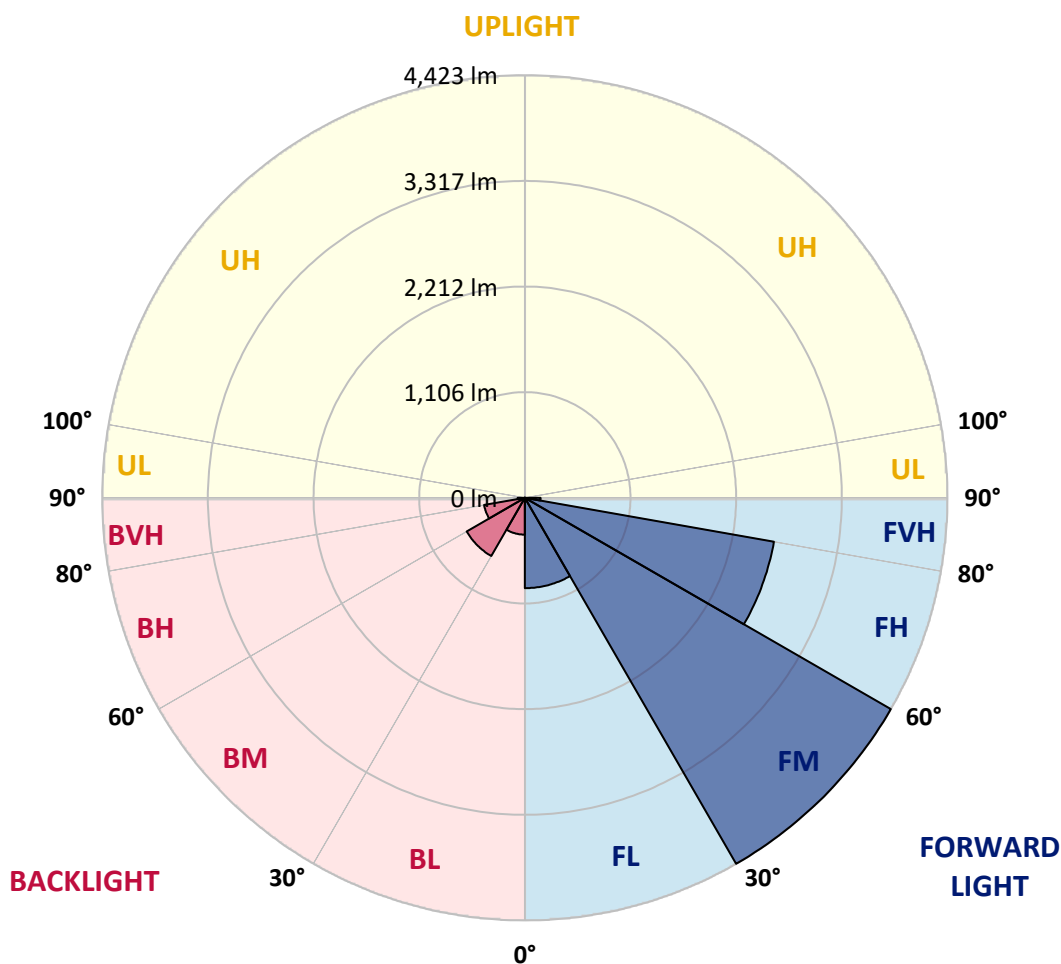
CATALOG NUMBER: ARCH-M-PA2-80-827-24VDC-T2R

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 945.7  | 9.7       |                         |      |         |
| FM   | (30°-60°)   | 4423.2 | 45.2      |                         |      |         |
| FH   | (60°-80°)   | 2647.1 | 27.1      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 164.1  | 1.7       |                         |      | G2/225  |
| BL   | (0°-30°)    | 385.5  | 3.9       | B1/500                  |      |         |
| BM   | (30°-60°)   | 702.7  | 7.2       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 432.9  | 4.4       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 74.9   | 0.8       |                         |      | G1/100  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

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

Type II Medium





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CATALOG NUMBER: ARCH-M-PA2-80-827-24VDC-T2R

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 75°    | 76°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1222.5 | 1222.5 | 1222.5 | 1222.5 | 1222.5 | 1222.5 | 1222.5 | 1222.5 | 1222.5 | 1222.5 | 1222.5 |
| 2.5°  | 1558.1 | 1546.5 | 1545.2 | 1527.2 | 1510.5 | 1465.5 | 1433.4 | 1376.8 | 1320.2 | 1318.9 | 1262.4 |
| 5°    | 1801.0 | 1789.4 | 1783.0 | 1761.2 | 1732.9 | 1673.7 | 1615.9 | 1528.5 | 1432.1 | 1425.6 | 1318.9 |
| 7.5°  | 1965.6 | 1955.3 | 1942.4 | 1933.4 | 1906.4 | 1853.7 | 1783.0 | 1678.9 | 1546.5 | 1533.6 | 1384.5 |
| 10°   | 2076.1 | 2069.7 | 2067.1 | 2060.7 | 2044.0 | 2001.6 | 1933.4 | 1822.9 | 1660.9 | 1646.8 | 1453.9 |
| 12.5° | 2123.7 | 2121.1 | 2132.7 | 2150.7 | 2157.1 | 2140.4 | 2074.8 | 1970.7 | 1786.9 | 1771.4 | 1537.5 |
| 15°   | 2068.4 | 2071.0 | 2100.5 | 2162.2 | 2227.8 | 2263.8 | 2225.2 | 2123.7 | 1929.6 | 1907.7 | 1635.2 |
| 17.5° | 2042.7 | 2046.5 | 2067.1 | 2126.3 | 2218.8 | 2330.6 | 2348.6 | 2268.9 | 2067.1 | 2036.3 | 1738.0 |
| 20°   | 2087.7 | 2092.8 | 2108.3 | 2154.5 | 2218.8 | 2338.4 | 2432.2 | 2407.8 | 2202.1 | 2170.0 | 1837.0 |
| 22.5° | 2202.1 | 2208.5 | 2207.2 | 2236.8 | 2280.5 | 2362.8 | 2478.5 | 2538.9 | 2343.5 | 2307.5 | 1939.9 |
| 25°   | 2446.3 | 2441.2 | 2397.5 | 2383.4 | 2394.9 | 2447.6 | 2540.2 | 2664.9 | 2491.3 | 2455.3 | 2047.8 |
| 27.5° | 2778.0 | 2771.6 | 2691.9 | 2619.9 | 2555.6 | 2578.8 | 2627.6 | 2766.4 | 2641.7 | 2600.6 | 2150.7 |
| 30°   | 3132.8 | 3125.1 | 3032.5 | 2915.6 | 2772.9 | 2739.4 | 2733.0 | 2855.1 | 2793.4 | 2749.7 | 2259.9 |
| 32.5° | 3478.6 | 3472.2 | 3373.2 | 3236.9 | 3040.3 | 2940.0 | 2878.3 | 2954.1 | 2965.7 | 2923.3 | 2379.5 |
| 35°   | 3793.6 | 3793.6 | 3708.7 | 3546.8 | 3324.4 | 3172.7 | 3071.1 | 3076.3 | 3163.7 | 3114.8 | 2515.8 |
| 37.5° | 4073.8 | 4072.5 | 3980.0 | 3820.6 | 3607.2 | 3433.6 | 3307.6 | 3224.1 | 3352.6 | 3310.2 | 2658.5 |
| 40°   | 4296.2 | 4287.2 | 4219.1 | 4080.2 | 3865.6 | 3693.3 | 3566.0 | 3397.6 | 3563.5 | 3524.9 | 2810.1 |
| 42.5° | 4458.2 | 4453.0 | 4406.8 | 4285.9 | 4081.5 | 3919.6 | 3832.1 | 3616.2 | 3802.6 | 3764.0 | 2987.6 |
| 45°   | 4521.2 | 4531.5 | 4531.5 | 4417.1 | 4255.1 | 4107.2 | 4068.7 | 3856.6 | 4061.0 | 4022.4 | 3177.8 |
| 47.5° | 4419.6 | 4446.6 | 4501.9 | 4509.6 | 4366.9 | 4266.6 | 4279.5 | 4098.2 | 4327.1 | 4306.5 | 3386.1 |
| 50°   | 4102.1 | 4152.2 | 4273.1 | 4491.6 | 4411.9 | 4388.8 | 4459.5 | 4345.1 | 4612.4 | 4606.0 | 3639.3 |
| 52.5° | 3283.2 | 3405.3 | 3782.0 | 4174.1 | 4381.1 | 4445.3 | 4638.2 | 4622.7 | 4980.1 | 4990.4 | 3969.7 |
| 55°   | 2518.3 | 2564.6 | 3000.4 | 3667.6 | 4192.1 | 4427.3 | 4757.7 | 4894.0 | 5378.6 | 5391.5 | 4273.1 |
| 57.5° | 2036.3 | 2067.1 | 2304.9 | 3000.4 | 3761.4 | 4329.6 | 4851.6 | 5052.1 | 5684.6 | 5718.0 | 4543.0 |
| 60°   | 1613.3 | 1658.3 | 1817.7 | 2295.9 | 3158.5 | 4094.4 | 4917.1 | 5228.2 | 6013.7 | 6063.8 | 4865.7 |
| 62.5° | 1199.4 | 1221.2 | 1371.7 | 1700.7 | 2500.3 | 3671.4 | 4882.4 | 5419.8 | 6417.3 | 6477.7 | 5253.9 |
| 65°   | 853.6  | 872.9  | 979.6  | 1209.7 | 1848.6 | 3099.4 | 4680.6 | 5562.5 | 6923.8 | 6985.5 | 5644.7 |
| 67.5° | 638.9  | 646.6  | 707.0  | 845.9  | 1245.7 | 2407.8 | 4271.8 | 5538.0 | 7294.0 | 7349.3 | 5801.6 |
| 70°   | 505.2  | 507.8  | 537.3  | 611.9  | 809.9  | 1676.3 | 3555.8 | 5179.4 | 7321.0 | 7369.9 | 5603.6 |
| 72.5° | 419.1  | 417.8  | 434.5  | 470.5  | 564.3  | 1060.6 | 2634.0 | 4513.5 | 6974.0 | 7007.4 | 5050.8 |
| 75°   | 345.8  | 348.4  | 359.9  | 380.5  | 430.6  | 699.3  | 1707.2 | 3600.7 | 6152.5 | 6116.5 | 4238.4 |
| 77.5° | 290.5  | 289.2  | 294.4  | 312.4  | 348.4  | 502.6  | 1000.1 | 2601.9 | 4559.7 | 4541.7 | 2781.9 |
| 80°   | 234.0  | 236.5  | 244.2  | 259.7  | 293.1  | 383.1  | 591.3  | 1623.6 | 2446.3 | 2380.8 | 1329.2 |
| 82.5° | 156.8  | 181.3  | 196.7  | 214.7  | 253.2  | 282.8  | 375.4  | 825.3  | 1094.0 | 1077.3 | 602.9  |
| 85°   | 74.6   | 99.0   | 146.5  | 167.1  | 205.7  | 177.4  | 254.5  | 393.4  | 547.6  | 541.2  | 217.3  |
| 87.5° | 15.4   | 15.4   | 78.4   | 93.8   | 127.3  | 75.8   | 141.4  | 171.0  | 264.8  | 248.1  | 88.7   |
| 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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CATALOG NUMBER: ARCH-M-PA2-80-827-24VDC-T2R

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1222.5 | 1222.5 | 1222.5 | 1222.5 | 1222.5 | 1222.5 | 1222.5 | 1222.5 | 1222.5 | 1222.5 | 1222.5 |
| 2.5°  | 1229.0 | 1194.2 | 1124.8 | 1069.6 | 1013.0 | 980.9  | 941.0  | 921.7  | 917.9  | 907.6  | 915.3  |
| 5°    | 1250.8 | 1182.7 | 1051.6 | 965.4  | 907.6  | 879.3  | 865.2  | 860.0  | 858.7  | 856.2  | 856.2  |
| 7.5°  | 1280.4 | 1176.3 | 1005.3 | 917.9  | 880.6  | 871.6  | 875.4  | 883.2  | 884.4  | 887.0  | 885.7  |
| 10°   | 1316.4 | 1177.5 | 979.6  | 906.3  | 888.3  | 889.6  | 902.4  | 912.7  | 917.9  | 921.7  | 920.4  |
| 12.5° | 1366.5 | 1193.0 | 975.7  | 914.0  | 906.3  | 911.4  | 924.3  | 934.6  | 939.7  | 941.0  | 941.0  |
| 15°   | 1432.1 | 1225.1 | 984.7  | 930.7  | 924.3  | 928.1  | 935.9  | 939.7  | 941.0  | 939.7  | 939.7  |
| 17.5° | 1504.1 | 1263.7 | 997.6  | 941.0  | 930.7  | 926.9  | 924.3  | 920.4  | 912.7  | 907.6  | 907.6  |
| 20°   | 1573.5 | 1298.4 | 1004.0 | 939.7  | 921.7  | 906.3  | 890.9  | 871.6  | 858.7  | 848.4  | 848.4  |
| 22.5° | 1642.9 | 1330.5 | 1004.0 | 925.6  | 897.3  | 867.7  | 835.6  | 804.7  | 785.5  | 772.6  | 772.6  |
| 25°   | 1716.2 | 1361.4 | 996.3  | 901.2  | 858.7  | 816.3  | 772.6  | 734.0  | 714.7  | 701.9  | 699.3  |
| 27.5° | 1777.9 | 1379.4 | 975.7  | 866.4  | 811.2  | 757.2  | 707.0  | 667.2  | 653.0  | 641.5  | 641.5  |
| 30°   | 1843.4 | 1390.9 | 937.1  | 821.4  | 757.2  | 695.5  | 644.0  | 611.9  | 596.5  | 579.8  | 578.5  |
| 32.5° | 1916.7 | 1398.6 | 893.4  | 773.9  | 701.9  | 636.3  | 592.6  | 566.9  | 533.5  | 515.5  | 512.9  |
| 35°   | 2001.6 | 1408.9 | 847.2  | 719.9  | 646.6  | 587.5  | 561.8  | 519.4  | 487.2  | 471.8  | 470.5  |
| 37.5° | 2091.5 | 1416.6 | 797.0  | 672.3  | 596.5  | 555.3  | 529.6  | 479.5  | 451.2  | 428.1  | 425.5  |
| 40°   | 2186.7 | 1416.6 | 745.6  | 626.0  | 556.6  | 541.2  | 492.4  | 447.4  | 399.8  | 388.2  | 385.7  |
| 42.5° | 2292.1 | 1414.1 | 694.2  | 581.1  | 519.4  | 509.1  | 470.5  | 422.9  | 398.5  | 388.2  | 385.7  |
| 45°   | 2403.9 | 1405.1 | 645.3  | 529.6  | 480.8  | 460.2  | 430.6  | 417.8  | 407.5  | 407.5  | 407.5  |
| 47.5° | 2531.2 | 1397.4 | 590.1  | 483.4  | 452.5  | 429.4  | 407.5  | 399.8  | 398.5  | 402.4  | 406.2  |
| 50°   | 2694.5 | 1394.8 | 543.8  | 449.9  | 430.6  | 403.7  | 401.1  | 394.7  | 395.9  | 395.9  | 395.9  |
| 52.5° | 2892.4 | 1371.7 | 500.1  | 425.5  | 408.8  | 376.7  | 384.4  | 390.8  | 393.4  | 392.1  | 390.8  |
| 55°   | 3037.7 | 1330.5 | 462.8  | 408.8  | 393.4  | 366.4  | 376.7  | 386.9  | 389.5  | 385.7  | 385.7  |
| 57.5° | 3168.8 | 1272.7 | 433.2  | 395.9  | 383.1  | 359.9  | 371.5  | 381.8  | 379.2  | 377.9  | 376.7  |
| 60°   | 3319.2 | 1217.4 | 410.1  | 389.5  | 372.8  | 357.4  | 367.7  | 374.1  | 370.2  | 367.7  | 366.4  |
| 62.5° | 3482.5 | 1163.4 | 393.4  | 389.5  | 365.1  | 356.1  | 363.8  | 366.4  | 358.7  | 356.1  | 356.1  |
| 65°   | 3558.3 | 1078.6 | 375.4  | 389.5  | 361.2  | 353.5  | 356.1  | 353.5  | 345.8  | 345.8  | 344.5  |
| 67.5° | 3433.6 | 938.4  | 352.2  | 384.4  | 366.4  | 349.7  | 344.5  | 340.7  | 331.7  | 331.7  | 329.1  |
| 70°   | 3089.1 | 771.3  | 318.8  | 367.7  | 367.7  | 348.4  | 329.1  | 320.1  | 309.8  | 313.7  | 308.5  |
| 72.5° | 2639.2 | 611.9  | 277.7  | 339.4  | 359.9  | 347.1  | 312.4  | 298.2  | 289.2  | 293.1  | 285.4  |
| 75°   | 2137.8 | 474.4  | 228.8  | 294.4  | 340.7  | 340.7  | 295.7  | 276.4  | 266.1  | 266.1  | 257.1  |
| 77.5° | 1362.7 | 350.9  | 186.4  | 244.2  | 306.0  | 331.7  | 281.5  | 252.0  | 236.5  | 232.7  | 226.3  |
| 80°   | 674.9  | 246.8  | 153.0  | 194.1  | 261.0  | 311.1  | 271.2  | 223.7  | 201.8  | 194.1  | 182.5  |
| 82.5° | 358.7  | 171.0  | 122.1  | 151.7  | 208.3  | 280.2  | 258.4  | 192.8  | 165.8  | 154.3  | 141.4  |
| 85°   | 160.7  | 105.4  | 97.7   | 115.7  | 158.1  | 230.1  | 232.7  | 158.1  | 127.3  | 151.7  | 111.8  |
| 87.5° | 59.1   | 47.6   | 47.6   | 59.1   | 91.3   | 96.4   | 164.5  | 101.6  | 81.0   | 55.3   | 43.7   |
| 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: SP1-2101-121-9

Luminaire Tested: IFLD-S-SA2A-827-U-T2

Test Date: 03/05/2021

### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2101-121-9  
 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-827-U-T2**  
 Description: STREETWORKS INF FLOOD

PROGRAMMED @ 615mA.

### Spectral Parameters

|                           |        |           |      |      |      |
|---------------------------|--------|-----------|------|------|------|
| CCT (K):                  | 2709   | CRI (Ra): | 82.1 |      |      |
| CIE u':                   | 0.2620 | R1:       | 80.4 | R9:  | 4.5  |
| CIE v':                   | 0.5273 | R2:       | 91.2 | R10: | 81.3 |
| Duv:                      | 0.0001 | R3:       | 95.2 | R11: | 81.0 |
| CIE x:                    | 0.4591 | R4:       | 80.5 | R12: | 79.0 |
| CIE y:                    | 0.4107 | R5:       | 81.2 | R13: | 82.9 |
| CIE z:                    | 0.1301 | R6:       | 90.9 | R14: | 97.9 |
| Peak Wavelength (nm):     | 606    | R7:       | 81.1 |      |      |
| Dominant Wavelength (nm): | 584    | R8:       | 56.0 |      |      |
| Purity:                   | 61.2   |           |      |      |      |
| Rf:                       | 85.2   |           |      |      |      |
| Rg:                       | 96.4   |           |      |      |      |



### Test Conditions

Stabilization Time: 60M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.9/31%  
 Sphere Temperature (°C): 24.4

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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**



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       | 2013             | 0.0              | 490       | 33356            | 4.7              | 620       | 150993           | 39.3             | 750       | 7593             | 0.0              | 880       | 2373             | 0.0              |
| 365       | 1908             | 0.0              | 495       | 40031            | 7.3              | 625       | 145077           | 32.0             | 755       | 6765             | 0.0              | 885       | 2481             | 0.0              |
| 370       | 1889             | 0.0              | 500       | 46287            | 10.2             | 630       | 136072           | 24.6             | 760       | 6000             | 0.0              | 890       | 2394             | 0.0              |
| 375       | 2095             | 0.0              | 505       | 51783            | 14.5             | 635       | 126417           | 19.0             | 765       | 5393             | 0.0              | 895       | 2574             | 0.0              |
| 380       | 2228             | 0.0              | 510       | 56588            | 19.4             | 640       | 116412           | 13.9             | 770       | 5030             | 0.0              | 900       | 2048             | 0.0              |
| 385       | 2074             | 0.0              | 515       | 60751            | 25.2             | 645       | 107525           | 10.4             | 775       | 4491             | 0.0              | 905       | 2381             | 0.0              |
| 390       | 1820             | 0.0              | 520       | 63966            | 31.0             | 650       | 97857            | 7.2              | 780       | 3943             | 0.0              | 910       | 2017             | 0.0              |
| 395       | 1728             | 0.0              | 525       | 66683            | 35.8             | 655       | 88582            | 5.1              | 785       | 3682             | 0.0              | 915       | 1904             | 0.0              |
| 400       | 1557             | 0.0              | 530       | 69869            | 41.1             | 660       | 79462            | 3.3              | 790       | 3402             | 0.0              | 920       | 2254             | 0.0              |
| 405       | 1644             | 0.0              | 535       | 72510            | 45.0             | 665       | 70606            | 2.2              | 795       | 3156             | 0.0              | 925       | 1998             | 0.0              |
| 410       | 2044             | 0.0              | 540       | 75299            | 49.1             | 670       | 61774            | 1.4              | 800       | 3062             | 0.0              | 930       | 1776             | 0.0              |
| 415       | 3009             | 0.0              | 545       | 79297            | 52.8             | 675       | 53771            | 0.9              | 805       | 2712             | 0.0              | 935       | 2086             | 0.0              |
| 420       | 4992             | 0.0              | 550       | 84946            | 57.7             | 680       | 46786            | 0.5              | 810       | 2896             | 0.0              | 940       | 1766             | 0.0              |
| 425       | 8631             | 0.0              | 555       | 90790            | 62.0             | 685       | 40747            | 0.4              | 815       | 2605             | 0.0              | 945       | 1738             | 0.0              |
| 430       | 14680            | 0.1              | 560       | 98231            | 66.8             | 690       | 35400            | 0.2              | 820       | 2901             | 0.0              | 950       | 2303             | 0.0              |
| 435       | 23899            | 0.3              | 565       | 105738           | 70.3             | 695       | 30445            | 0.1              | 825       | 2541             | 0.0              | 955       | 2567             | 0.0              |
| 440       | 38159            | 0.6              | 570       | 114034           | 74.1             | 700       | 26278            | 0.1              | 830       | 2014             | 0.0              | 960       | 2492             | 0.0              |
| 445       | 53061            | 1.1              | 575       | 123632           | 76.9             | 705       | 22703            | 0.0              | 835       | 2258             | 0.0              | 965       | 810              | 0.0              |
| 450       | 53893            | 1.4              | 580       | 132443           | 78.7             | 710       | 19853            | 0.0              | 840       | 2203             | 0.0              | 970       | 3201             | 0.0              |
| 455       | 41221            | 1.4              | 585       | 141502           | 78.6             | 715       | 17730            | 0.0              | 845       | 2073             | 0.0              | 975       | 1858             | 0.0              |
| 460       | 32969            | 1.4              | 590       | 148917           | 77.0             | 720       | 15616            | 0.0              | 850       | 2096             | 0.0              | 980       | 1769             | 0.0              |
| 465       | 28048            | 1.4              | 595       | 154326           | 73.2             | 725       | 13986            | 0.0              | 855       | 2751             | 0.0              | 985       | 1043             | 0.0              |
| 470       | 23347            | 1.5              | 600       | 159208           | 68.6             | 730       | 12029            | 0.0              | 860       | 2501             | 0.0              | 990       | 2950             | 0.0              |
| 475       | 22136            | 1.7              | 605       | 161290           | 62.5             | 735       | 10461            | 0.0              | 865       | 2512             | 0.0              | 995       | 1643             | 0.0              |
| 480       | 24192            | 2.3              | 610       | 159549           | 54.8             | 740       | 9230             | 0.0              | 870       | 2913             | 0.0              | 1000      | 292              | 0.0              |
| 485       | 28231            | 3.3              | 615       | 156663           | 47.3             | 745       | 8376             | 0.0              | 875       | 2299             | 0.0              |           |                  |                  |

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### Scotopic Flux vs. Wavelength



Scotopic Lumens: 8911.3

S/P: 1.22

| 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       | 2013             | 0.0              | 490       | 33356            | 51.4             | 620       | 150993           | 1.9              | 750       | 7593             | 0.0              | 880       | 2373             | 0.0              |
| 365       | 1908             | 0.0              | 495       | 40031            | 64.7             | 625       | 145077           | 1.2              | 755       | 6765             | 0.0              | 885       | 2481             | 0.0              |
| 370       | 1889             | 0.0              | 500       | 46287            | 77.4             | 630       | 136072           | 0.8              | 760       | 6000             | 0.0              | 890       | 2394             | 0.0              |
| 375       | 2095             | 0.0              | 505       | 51783            | 88.0             | 635       | 126417           | 0.5              | 765       | 5393             | 0.0              | 895       | 2574             | 0.0              |
| 380       | 2228             | 0.0              | 510       | 56588            | 95.9             | 640       | 116412           | 0.3              | 770       | 5030             | 0.0              | 900       | 2048             | 0.0              |
| 385       | 2074             | 0.0              | 515       | 60751            | 100.7            | 645       | 107525           | 0.2              | 775       | 4491             | 0.0              | 905       | 2381             | 0.0              |
| 390       | 1820             | 0.0              | 520       | 63966            | 101.7            | 650       | 97857            | 0.1              | 780       | 3943             | 0.0              | 910       | 2017             | 0.0              |
| 395       | 1728             | 0.0              | 525       | 66683            | 99.8             | 655       | 88582            | 0.1              | 785       | 3682             | 0.0              | 915       | 1904             | 0.0              |
| 400       | 1557             | 0.0              | 530       | 69869            | 96.3             | 660       | 79462            | 0.0              | 790       | 3402             | 0.0              | 920       | 2254             | 0.0              |
| 405       | 1644             | 0.1              | 535       | 72510            | 90.4             | 665       | 70606            | 0.0              | 795       | 3156             | 0.0              | 925       | 1998             | 0.0              |
| 410       | 2044             | 0.1              | 540       | 75299            | 83.2             | 670       | 61774            | 0.0              | 800       | 3062             | 0.0              | 930       | 1776             | 0.0              |
| 415       | 3009             | 0.3              | 545       | 79297            | 76.0             | 675       | 53771            | 0.0              | 805       | 2712             | 0.0              | 935       | 2086             | 0.0              |
| 420       | 4992             | 0.8              | 550       | 84946            | 69.5             | 680       | 46786            | 0.0              | 810       | 2896             | 0.0              | 940       | 1766             | 0.0              |
| 425       | 8631             | 2.1              | 555       | 90790            | 62.0             | 685       | 40747            | 0.0              | 815       | 2605             | 0.0              | 945       | 1738             | 0.0              |
| 430       | 14680            | 5.0              | 560       | 98231            | 54.9             | 690       | 35400            | 0.0              | 820       | 2901             | 0.0              | 950       | 2303             | 0.0              |
| 435       | 23899            | 10.7             | 565       | 105738           | 47.4             | 695       | 30445            | 0.0              | 825       | 2541             | 0.0              | 955       | 2567             | 0.0              |
| 440       | 38159            | 21.3             | 570       | 114034           | 40.2             | 700       | 26278            | 0.0              | 830       | 2014             | 0.0              | 960       | 2492             | 0.0              |
| 445       | 53061            | 35.5             | 575       | 123632           | 33.7             | 705       | 22703            | 0.0              | 835       | 2258             | 0.0              | 965       | 810              | 0.0              |
| 450       | 53893            | 41.8             | 580       | 132443           | 27.3             | 710       | 19853            | 0.0              | 840       | 2203             | 0.0              | 970       | 3201             | 0.0              |
| 455       | 41221            | 36.0             | 585       | 141502           | 21.6             | 715       | 17730            | 0.0              | 845       | 2073             | 0.0              | 975       | 1858             | 0.0              |
| 460       | 32969            | 31.8             | 590       | 148917           | 16.6             | 720       | 15616            | 0.0              | 850       | 2096             | 0.0              | 980       | 1769             | 0.0              |
| 465       | 28048            | 29.6             | 595       | 154326           | 12.3             | 725       | 13986            | 0.0              | 855       | 2751             | 0.0              | 985       | 1043             | 0.0              |
| 470       | 23347            | 26.9             | 600       | 159208           | 9.0              | 730       | 12029            | 0.0              | 860       | 2501             | 0.0              | 990       | 2950             | 0.0              |
| 475       | 22136            | 27.7             | 605       | 161290           | 6.3              | 735       | 10461            | 0.0              | 865       | 2512             | 0.0              | 995       | 1643             | 0.0              |
| 480       | 24192            | 32.7             | 610       | 159549           | 4.3              | 740       | 9230             | 0.0              | 870       | 2913             | 0.0              | 1000      | 292              | 0.0              |
| 485       | 28231            | 40.9             | 615       | 156663           | 2.9              | 745       | 8376             | 0.0              | 875       | 2299             | 0.0              |           |                  |                  |

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### Melanopic Flux vs. Wavelength



**Melanopic Lumens: 3277.6**

**M/P: 0.45**

| 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       | 2013             | 0.0              | 490       | 33356            | 27.8             | 620       | 150993           | 0.1              | 750       | 7593             | 0.0              | 880       | 2373             | 0.0              |
| 365       | 1908             | 0.0              | 495       | 40031            | 33.0             | 625       | 145077           | 0.1              | 755       | 6765             | 0.0              | 885       | 2481             | 0.0              |
| 370       | 1889             | 0.0              | 500       | 46287            | 37.2             | 630       | 136072           | 0.0              | 760       | 6000             | 0.0              | 890       | 2394             | 0.0              |
| 375       | 2095             | 0.0              | 505       | 51783            | 39.7             | 635       | 126417           | 0.0              | 765       | 5393             | 0.0              | 895       | 2574             | 0.0              |
| 380       | 2228             | 0.0              | 510       | 56588            | 40.6             | 640       | 116412           | 0.0              | 770       | 5030             | 0.0              | 900       | 2048             | 0.0              |
| 385       | 2074             | 0.0              | 515       | 60751            | 39.7             | 645       | 107525           | 0.0              | 775       | 4491             | 0.0              | 905       | 2381             | 0.0              |
| 390       | 1820             | 0.0              | 520       | 63966            | 37.2             | 650       | 97857            | 0.0              | 780       | 3943             | 0.0              | 910       | 2017             | 0.0              |
| 395       | 1728             | 0.0              | 525       | 66683            | 33.8             | 655       | 88582            | 0.0              | 785       | 3682             | 0.0              | 915       | 1904             | 0.0              |
| 400       | 1557             | 0.0              | 530       | 69869            | 30.2             | 660       | 79462            | 0.0              | 790       | 3402             | 0.0              | 920       | 2254             | 0.0              |
| 405       | 1644             | 0.0              | 535       | 72510            | 26.1             | 665       | 70606            | 0.0              | 795       | 3156             | 0.0              | 925       | 1998             | 0.0              |
| 410       | 2044             | 0.1              | 540       | 75299            | 22.0             | 670       | 61774            | 0.0              | 800       | 3062             | 0.0              | 930       | 1776             | 0.0              |
| 415       | 3009             | 0.2              | 545       | 79297            | 18.4             | 675       | 53771            | 0.0              | 805       | 2712             | 0.0              | 935       | 2086             | 0.0              |
| 420       | 4992             | 0.6              | 550       | 84946            | 15.2             | 680       | 46786            | 0.0              | 810       | 2896             | 0.0              | 940       | 1766             | 0.0              |
| 425       | 8631             | 1.3              | 555       | 90790            | 12.2             | 685       | 40747            | 0.0              | 815       | 2605             | 0.0              | 945       | 1738             | 0.0              |
| 430       | 14680            | 3.1              | 560       | 98231            | 9.7              | 690       | 35400            | 0.0              | 820       | 2901             | 0.0              | 950       | 2303             | 0.0              |
| 435       | 23899            | 6.4              | 565       | 105738           | 7.4              | 695       | 30445            | 0.0              | 825       | 2541             | 0.0              | 955       | 2567             | 0.0              |
| 440       | 38159            | 12.8             | 570       | 114034           | 5.6              | 700       | 26278            | 0.0              | 830       | 2014             | 0.0              | 960       | 2492             | 0.0              |
| 445       | 53061            | 20.9             | 575       | 123632           | 4.1              | 705       | 22703            | 0.0              | 835       | 2258             | 0.0              | 965       | 810              | 0.0              |
| 450       | 53893            | 24.8             | 580       | 132443           | 3.0              | 710       | 19853            | 0.0              | 840       | 2203             | 0.0              | 970       | 3201             | 0.0              |
| 455       | 41221            | 21.6             | 585       | 141502           | 2.1              | 715       | 17730            | 0.0              | 845       | 2073             | 0.0              | 975       | 1858             | 0.0              |
| 460       | 32969            | 19.4             | 590       | 148917           | 1.5              | 720       | 15616            | 0.0              | 850       | 2096             | 0.0              | 980       | 1769             | 0.0              |
| 465       | 28048            | 18.3             | 595       | 154326           | 1.0              | 725       | 13986            | 0.0              | 855       | 2751             | 0.0              | 985       | 1043             | 0.0              |
| 470       | 23347            | 16.7             | 600       | 159208           | 0.7              | 730       | 12029            | 0.0              | 860       | 2501             | 0.0              | 990       | 2950             | 0.0              |
| 475       | 22136            | 16.9             | 605       | 161290           | 0.4              | 735       | 10461            | 0.0              | 865       | 2512             | 0.0              | 995       | 1643             | 0.0              |
| 480       | 24192            | 19.4             | 610       | 159549           | 0.3              | 740       | 9230             | 0.0              | 870       | 2913             | 0.0              | 1000      | 292              | 0.0              |
| 485       | 28231            | 23.3             | 615       | 156663           | 0.2              | 745       | 8376             | 0.0              | 875       | 2299             | 0.0              |           |                  |                  |

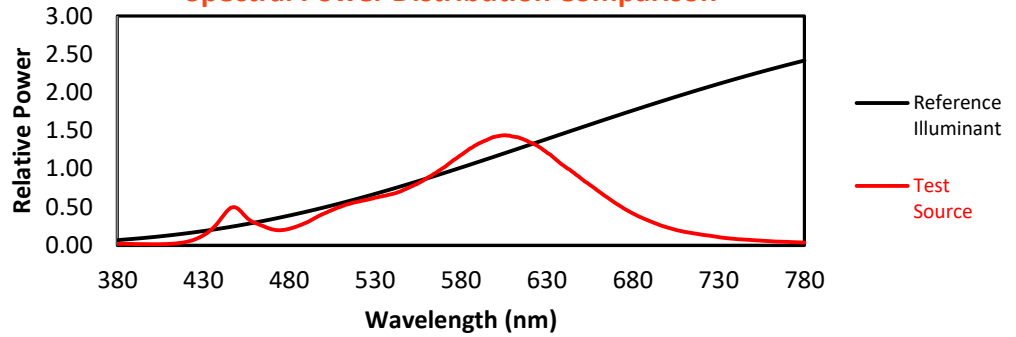
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TM-30-18

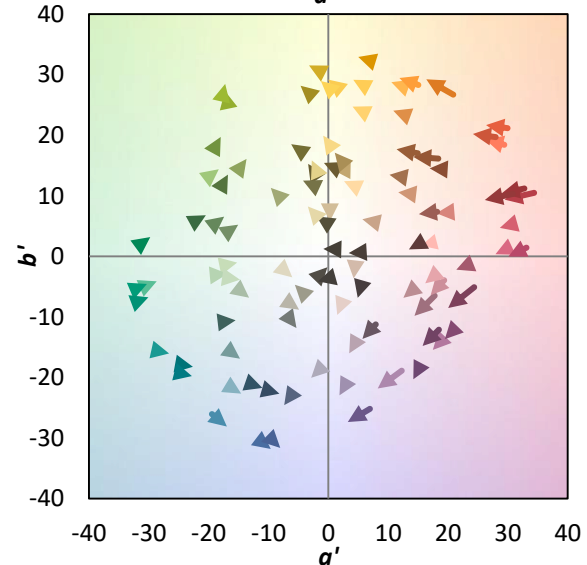
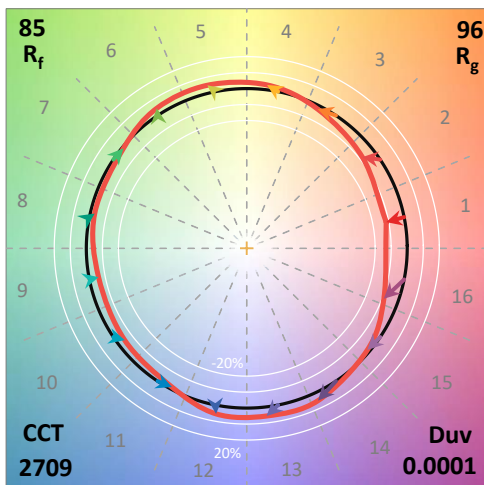
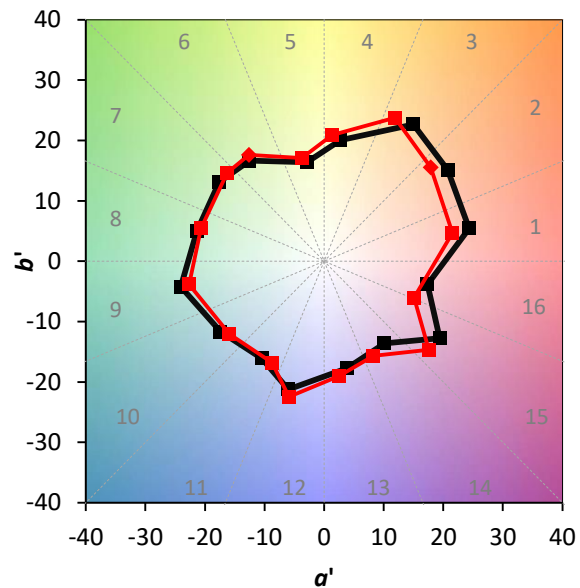
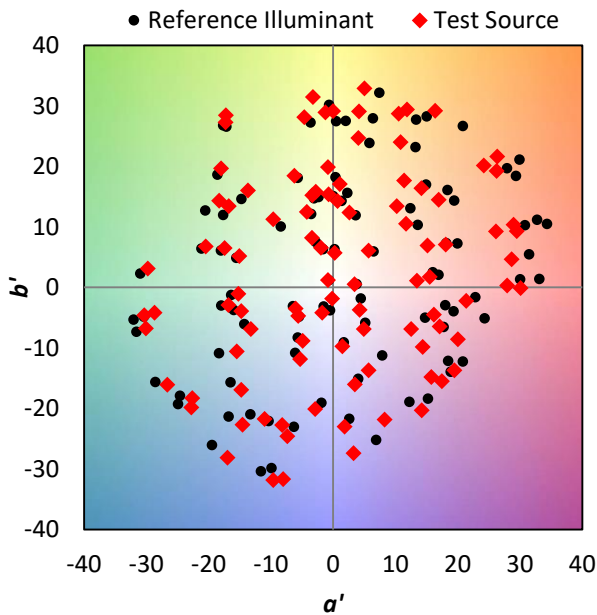
### Summary

$R_f = 85.2$   
 $R_g = 96.4$   
 CIE  $R_a = 82.1$   
 $R_9 = 4.5$

### Spectral Power Distribution Comparison



### Color Vector Graphics



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 83 | CES51 = 95 | CES76 = 83 |
| CES02 = 64 | CES27 = 95 | CES52 = 94 | CES77 = 85 |
| CES03 = 31 | CES28 = 94 | CES53 = 89 | CES78 = 82 |
| CES04 = 71 | CES29 = 82 | CES54 = 92 | CES79 = 89 |
| CES05 = 50 | CES30 = 87 | CES55 = 92 | CES80 = 89 |
| CES06 = 52 | CES31 = 85 | CES56 = 87 | CES81 = 69 |
| CES07 = 43 | CES32 = 80 | CES57 = 87 | CES82 = 96 |
| CES08 = 42 | CES33 = 86 | CES58 = 88 | CES83 = 93 |
| CES09 = 29 | CES34 = 91 | CES59 = 92 | CES84 = 93 |
| CES10 = 77 | CES35 = 96 | CES60 = 96 | CES85 = 78 |
| CES11 = 60 | CES36 = 96 | CES61 = 91 | CES86 = 65 |
| CES12 = 66 | CES37 = 95 | CES62 = 97 | CES87 = 85 |
| CES13 = 44 | CES38 = 93 | CES63 = 87 | CES88 = 86 |
| CES14 = 74 | CES39 = 97 | CES64 = 86 | CES89 = 74 |
| CES15 = 72 | CES40 = 94 | CES65 = 81 | CES90 = 86 |
| CES16 = 48 | CES41 = 93 | CES66 = 85 | CES91 = 87 |
| CES17 = 50 | CES42 = 95 | CES67 = 84 | CES92 = 67 |
| CES18 = 57 | CES43 = 88 | CES68 = 85 | CES93 = 80 |
| CES19 = 73 | CES44 = 99 | CES69 = 91 | CES94 = 61 |
| CES20 = 67 | CES45 = 92 | CES70 = 82 | CES95 = 77 |
| CES21 = 87 | CES46 = 88 | CES71 = 83 | CES96 = 84 |
| CES22 = 79 | CES47 = 88 | CES72 = 93 | CES97 = 88 |
| CES23 = 92 | CES48 = 81 | CES73 = 78 | CES98 = 84 |
| CES24 = 91 | CES49 = 88 | CES74 = 91 | CES99 = 76 |
| CES25 = 72 | CES50 = 94 | CES75 = 85 |            |



### Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)