

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: P801004

Luminaire Tested: **ARCH-M-PA2-40-727-12VDC-T2R-HSS**

Issue Date: 5/19/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P801004  
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-PA2-40-727-12VDC-T2R-HSS  
Description: ARCHEON-M ROADWAY AND AREA LUMINAIRE  
(2) 70 CRI, 2700K, 240mA 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: 4398 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: B0 - U0 - G1

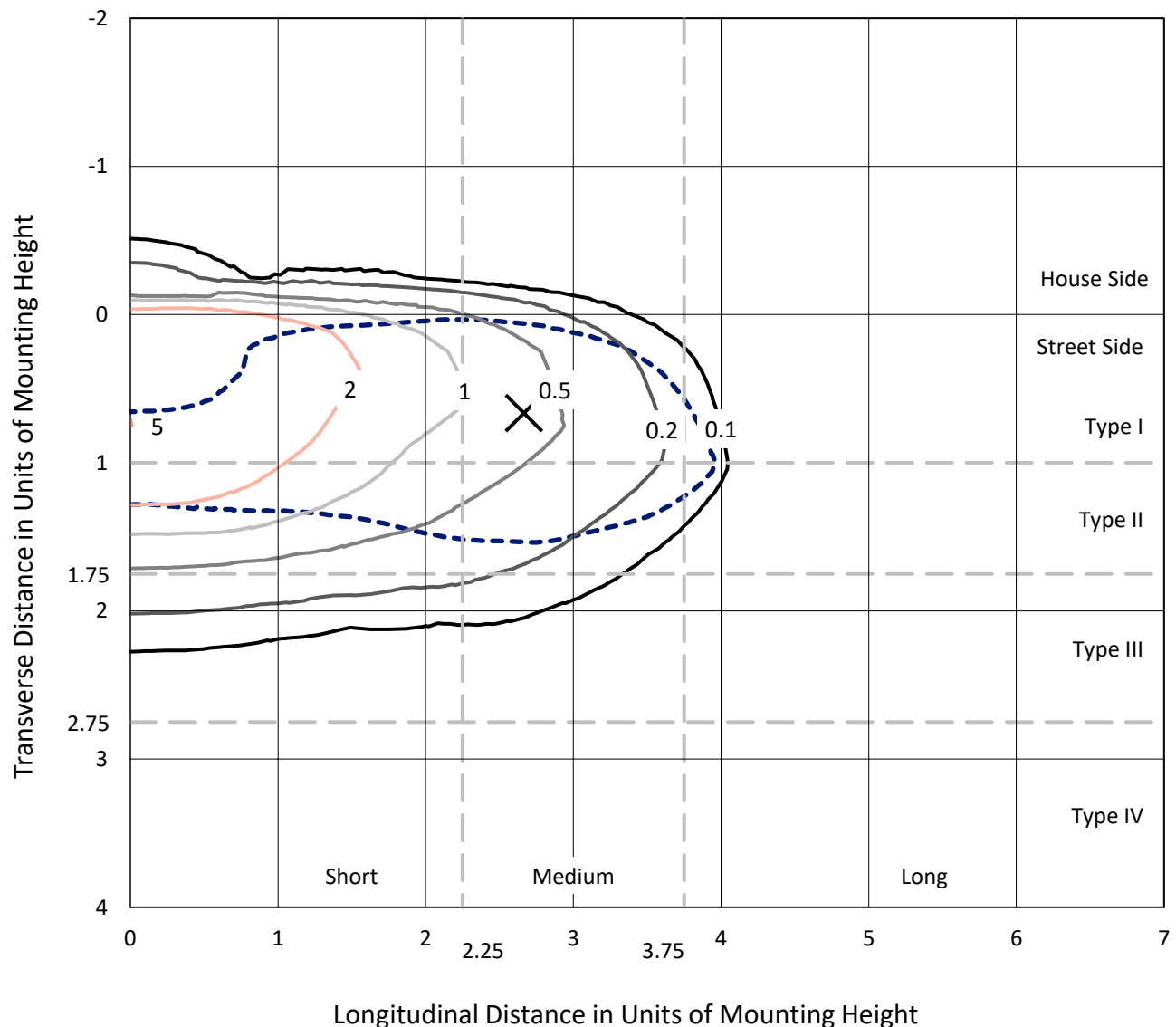
Input Watts (W): 36  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 25 FT

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## Iso-Footcandle Lines of Horizontal Illumination

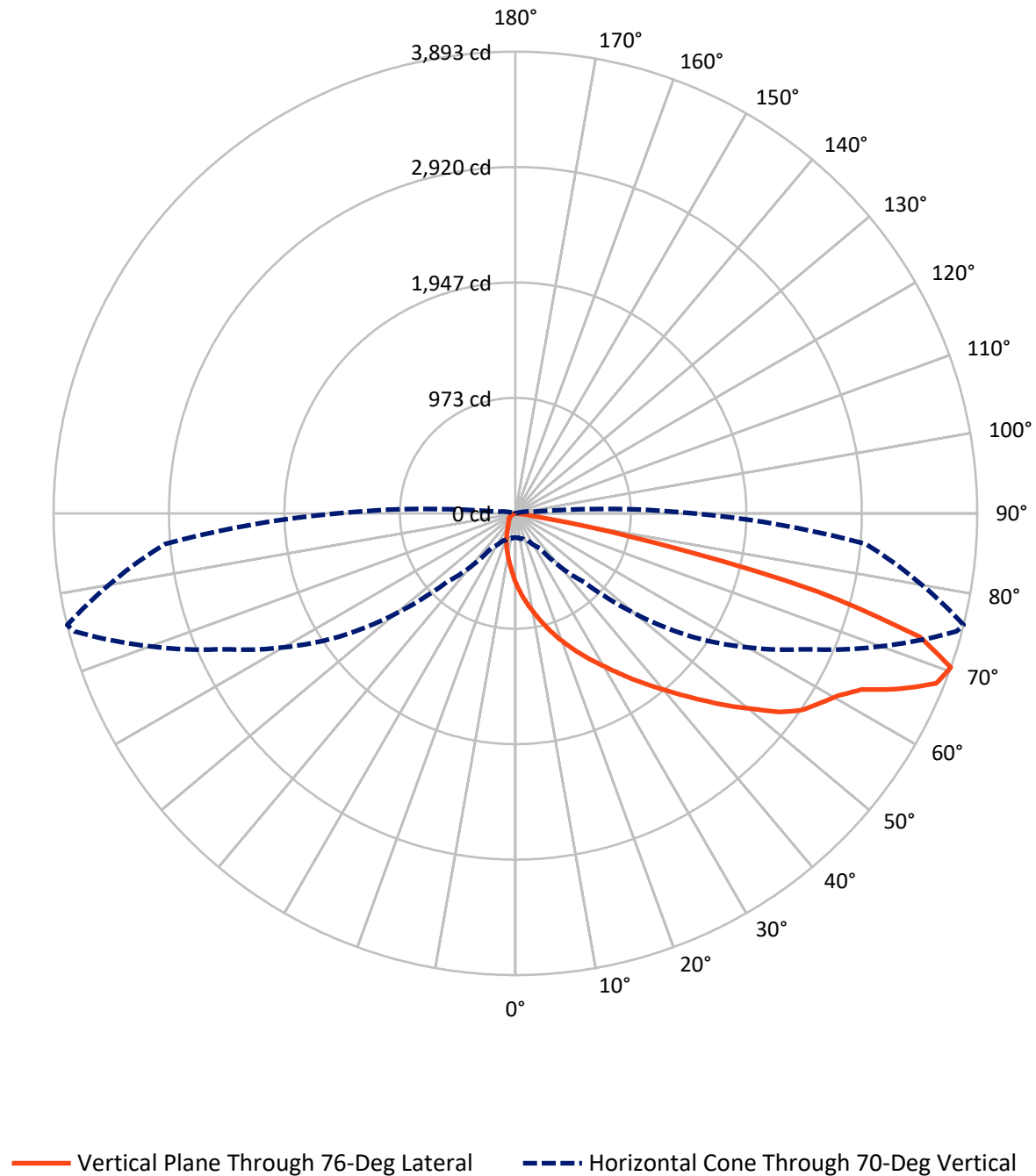
✕ Max cd  
 - - - 1/2 Max cd



Based on 15 foot mounting height. Maximum calculated value = 5 fc  
 Type II - Medium - N/A

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## Luminous Intensity Polar Plot



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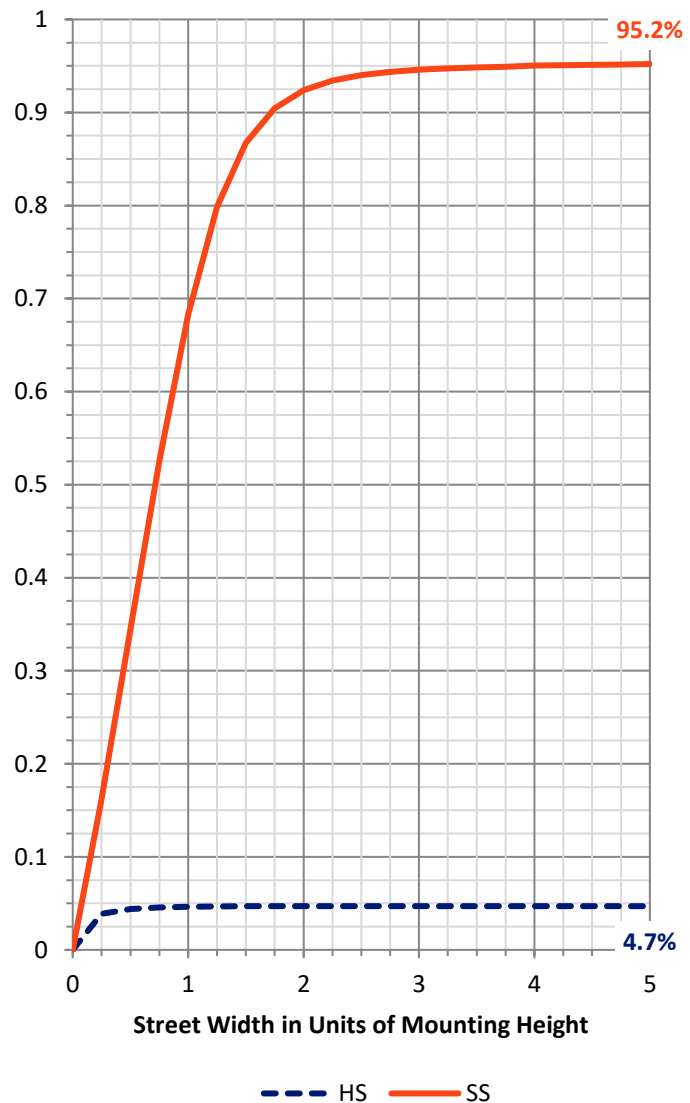
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 207.4    | 0.0    | 207.4  |
|                    | % Fixture | 4.7      | 0.0    | 4.7    |
| <b>Street Side</b> | Lumens    | 4190.6   | 0.0    | 4190.6 |
|                    | % Fixture | 95.3     | 0.0    | 95.3   |
| <b>Total</b>       | Lumens    | 4398.0   | 0.0    | 4398.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 55.5   | 1.3       |
| 10°-20°   | 179.0  | 4.1       |
| 20°-30°   | 333.4  | 7.6       |
| 30°-40°   | 589.6  | 13.4      |
| 40°-50°   | 901.7  | 20.5      |
| 50°-60°   | 1022.3 | 23.2      |
| 60°-70°   | 876.4  | 19.9      |
| 70°-80°   | 424.5  | 9.7       |
| 80°-90°   | 15.7   | 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°    | 4398.0 | 100.0     |
| 0°-180°   | 4398.0 | 100.0     |

**Coefficient of Utilization**



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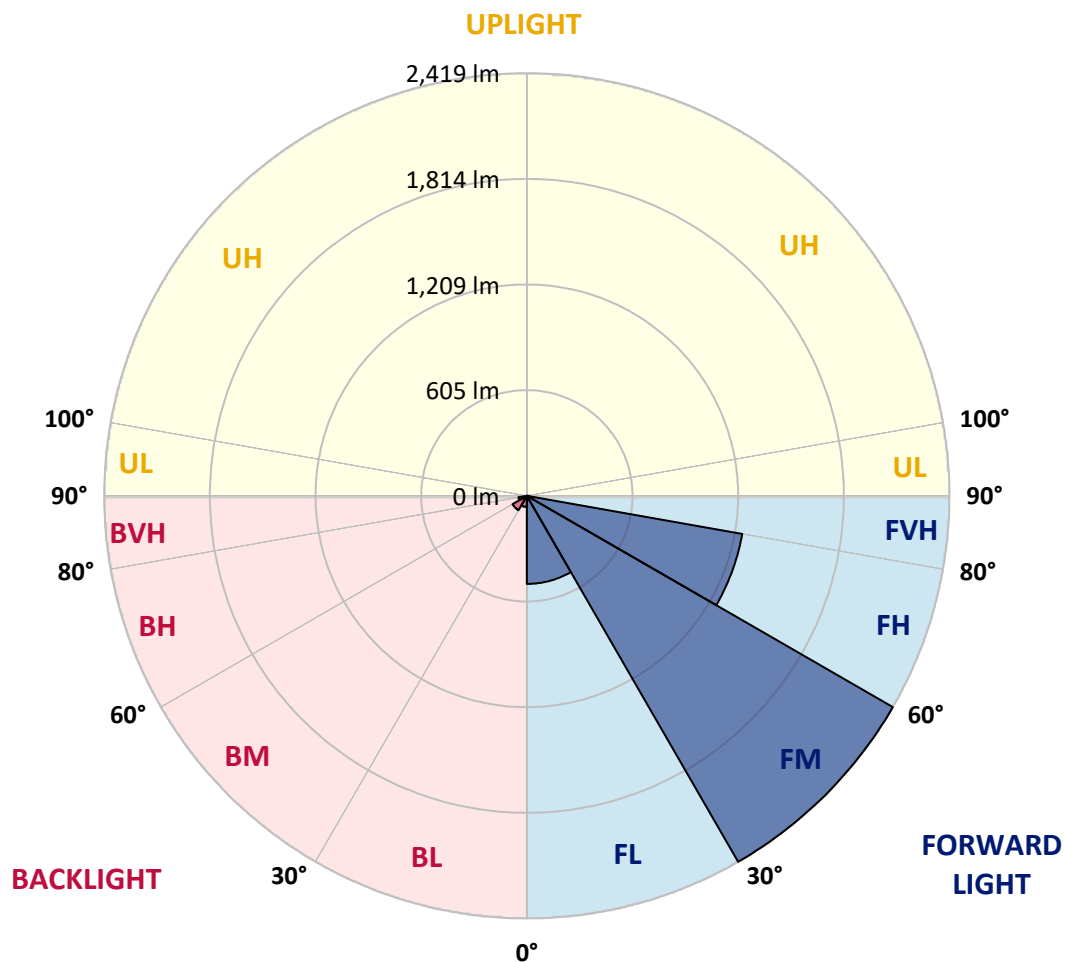
CATALOG NUMBER: ARCH-M-PA2-40-727-12VDC-T2R-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 504.2  | 11.5      |                         |      |         |
| FM   | (30°-60°)   | 2418.9 | 55.0      |                         |      |         |
| FH   | (60°-80°)   | 1252.0 | 28.5      |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 15.5   | 0.4       |                         |      | G1/100  |
| BL   | (0°-30°)    | 63.6   | 1.4       | B0/110                  |      |         |
| BM   | (30°-60°)   | 94.7   | 2.2       | B0/220                  |      |         |
| BH   | (60°-80°)   | 48.8   | 1.1       | B0/110                  |      | G0/110  |
| BVH  | (80°-90°)   | 0.3    | 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-G1**

Type II Medium



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 75°    | 76°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 588.7  | 588.7  | 588.7  | 588.7  | 588.7  | 588.7  | 588.7  | 588.7  | 588.7  | 588.7  | 588.7  |
| 2.5°  | 804.7  | 800.3  | 795.9  | 779.1  | 763.7  | 749.8  | 723.4  | 689.0  | 658.3  | 651.7  | 615.8  |
| 5°    | 945.3  | 940.2  | 933.6  | 916.7  | 897.0  | 873.5  | 834.7  | 782.0  | 727.8  | 716.1  | 649.5  |
| 7.5°  | 1040.5 | 1036.1 | 1026.6 | 1018.5 | 998.7  | 976.0  | 932.8  | 871.3  | 796.6  | 782.0  | 688.3  |
| 10°   | 1105.6 | 1102.7 | 1101.3 | 1094.7 | 1080.0 | 1061.7 | 1018.5 | 954.1  | 866.2  | 849.4  | 729.3  |
| 12.5° | 1129.1 | 1129.1 | 1136.4 | 1147.4 | 1149.6 | 1143.7 | 1104.2 | 1039.7 | 939.4  | 921.9  | 777.6  |
| 15°   | 1097.6 | 1101.3 | 1117.4 | 1152.5 | 1189.1 | 1213.3 | 1188.4 | 1128.3 | 1020.0 | 1000.9 | 834.7  |
| 17.5° | 1088.8 | 1092.5 | 1103.4 | 1134.2 | 1183.3 | 1247.7 | 1260.1 | 1214.0 | 1096.1 | 1080.0 | 893.3  |
| 20°   | 1113.7 | 1117.4 | 1126.9 | 1153.2 | 1190.6 | 1255.7 | 1307.7 | 1296.8 | 1176.7 | 1159.8 | 952.6  |
| 22.5° | 1173.0 | 1175.2 | 1175.2 | 1195.7 | 1228.7 | 1277.0 | 1337.8 | 1375.1 | 1259.4 | 1241.1 | 1011.2 |
| 25°   | 1300.4 | 1296.0 | 1278.4 | 1268.2 | 1289.4 | 1329.0 | 1375.8 | 1443.9 | 1351.7 | 1326.8 | 1074.2 |
| 27.5° | 1467.4 | 1482.0 | 1439.5 | 1390.5 | 1374.4 | 1397.1 | 1429.3 | 1504.7 | 1441.0 | 1414.6 | 1131.3 |
| 30°   | 1693.6 | 1687.8 | 1632.1 | 1561.8 | 1492.3 | 1484.2 | 1495.2 | 1556.7 | 1530.3 | 1505.4 | 1195.0 |
| 32.5° | 1879.6 | 1890.6 | 1832.0 | 1746.3 | 1642.4 | 1593.3 | 1581.6 | 1618.9 | 1625.5 | 1609.4 | 1270.4 |
| 35°   | 2070.7 | 2082.4 | 2025.3 | 1930.1 | 1806.4 | 1724.4 | 1690.7 | 1695.8 | 1743.4 | 1722.9 | 1349.5 |
| 37.5° | 2242.0 | 2252.3 | 2195.9 | 2098.5 | 1974.8 | 1874.5 | 1826.1 | 1786.6 | 1857.6 | 1839.3 | 1432.9 |
| 40°   | 2372.4 | 2373.8 | 2335.8 | 2248.6 | 2131.5 | 2027.5 | 1972.6 | 1895.0 | 1978.4 | 1966.0 | 1520.1 |
| 42.5° | 2464.6 | 2467.6 | 2439.7 | 2365.1 | 2256.7 | 2160.0 | 2115.4 | 2023.1 | 2117.6 | 2106.6 | 1621.1 |
| 45°   | 2507.8 | 2513.0 | 2510.0 | 2441.2 | 2351.1 | 2267.7 | 2253.0 | 2159.3 | 2269.9 | 2259.6 | 1737.5 |
| 47.5° | 2466.8 | 2466.8 | 2504.2 | 2494.7 | 2411.9 | 2356.3 | 2373.1 | 2301.4 | 2435.3 | 2425.8 | 1856.2 |
| 50°   | 2296.2 | 2298.4 | 2374.6 | 2483.7 | 2435.3 | 2422.9 | 2475.6 | 2440.5 | 2585.4 | 2591.3 | 1998.2 |
| 52.5° | 1848.1 | 1844.4 | 2101.5 | 2310.9 | 2419.2 | 2452.9 | 2570.1 | 2582.5 | 2765.6 | 2783.1 | 2139.5 |
| 55°   | 1381.0 | 1378.8 | 1624.8 | 2004.8 | 2306.5 | 2437.5 | 2622.8 | 2709.2 | 2919.3 | 2930.3 | 2245.0 |
| 57.5° | 1093.2 | 1087.3 | 1222.8 | 1616.0 | 2051.7 | 2368.7 | 2625.0 | 2733.4 | 3005.0 | 3024.0 | 2347.5 |
| 60°   | 840.6  | 835.5  | 936.5  | 1202.3 | 1690.7 | 2185.7 | 2562.0 | 2734.8 | 3087.7 | 3121.4 | 2485.1 |
| 62.5° | 601.1  | 607.0  | 684.6  | 862.5  | 1300.4 | 1927.2 | 2480.0 | 2755.3 | 3234.9 | 3273.0 | 2680.6 |
| 65°   | 405.6  | 402.7  | 467.2  | 587.2  | 924.8  | 1579.4 | 2354.1 | 2798.5 | 3500.0 | 3566.6 | 2914.9 |
| 67.5° | 281.9  | 284.1  | 313.4  | 382.2  | 587.2  | 1212.5 | 2144.7 | 2822.7 | 3773.8 | 3825.8 | 3079.0 |
| 70°   | 203.6  | 206.5  | 222.6  | 257.0  | 358.8  | 822.3  | 1813.0 | 2712.1 | 3847.8 | 3893.2 | 2964.7 |
| 72.5° | 134.0  | 139.9  | 164.0  | 182.3  | 229.2  | 514.7  | 1335.6 | 2336.5 | 3529.3 | 3563.0 | 2487.3 |
| 75°   | 72.5   | 74.0   | 105.4  | 136.2  | 163.3  | 320.7  | 796.6  | 1575.7 | 2640.4 | 2629.4 | 1640.2 |
| 77.5° | 56.4   | 58.6   | 65.2   | 97.4   | 109.8  | 176.5  | 314.9  | 711.7  | 1250.6 | 1216.9 | 559.4  |
| 80°   | 34.4   | 35.9   | 45.4   | 57.8   | 76.9   | 102.5  | 92.3   | 193.3  | 254.1  | 238.0  | 82.0   |
| 82.5° | 20.5   | 22.0   | 27.1   | 48.3   | 60.8   | 48.3   | 32.2   | 46.9   | 47.6   | 46.9   | 20.5   |
| 85°   | 3.7    | 3.7    | 19.0   | 33.7   | 32.2   | 13.9   | 19.0   | 15.4   | 13.9   | 14.6   | 4.4    |
| 87.5° | 0.0    | 0.0    | 7.3    | 10.3   | 14.6   | 5.1    | 7.3    | 3.7    | 3.7    | 3.7    | 2.2    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

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**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°   | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 588.7  | 588.7 | 588.7 | 588.7 | 588.7 | 588.7 | 588.7 | 588.7 | 588.7 | 588.7 | 588.7 |
| 2.5°  | 593.8  | 568.9 | 517.7 | 473.0 | 428.3 | 395.4 | 370.5 | 344.9 | 336.1 | 325.1 | 319.2 |
| 5°    | 604.1  | 555.0 | 453.2 | 372.0 | 303.1 | 250.4 | 216.7 | 196.2 | 183.1 | 173.5 | 171.3 |
| 7.5°  | 619.5  | 544.0 | 401.3 | 291.4 | 216.0 | 163.3 | 135.5 | 121.5 | 114.2 | 109.8 | 108.4 |
| 10°   | 637.8  | 534.5 | 350.0 | 227.0 | 152.3 | 115.0 | 99.6  | 93.7  | 90.8  | 89.3  | 88.6  |
| 12.5° | 663.4  | 530.9 | 306.8 | 175.0 | 115.0 | 94.5  | 86.4  | 82.7  | 80.5  | 78.3  | 77.6  |
| 15°   | 697.1  | 532.3 | 267.3 | 135.5 | 95.2  | 84.2  | 77.6  | 74.0  | 71.0  | 68.8  | 68.8  |
| 17.5° | 732.2  | 534.5 | 228.5 | 109.8 | 86.4  | 76.9  | 69.6  | 64.4  | 62.2  | 60.0  | 59.3  |
| 20°   | 765.2  | 533.8 | 191.1 | 93.7  | 78.3  | 68.8  | 61.5  | 56.4  | 52.7  | 50.5  | 50.5  |
| 22.5° | 796.6  | 529.4 | 156.0 | 84.2  | 71.8  | 60.8  | 52.7  | 47.6  | 44.7  | 42.5  | 42.5  |
| 25°   | 830.3  | 520.6 | 127.4 | 76.9  | 63.7  | 53.5  | 45.4  | 40.3  | 38.1  | 35.9  | 35.9  |
| 27.5° | 856.7  | 506.0 | 104.0 | 70.3  | 56.4  | 46.1  | 38.8  | 34.4  | 32.2  | 30.8  | 30.8  |
| 30°   | 885.2  | 484.7 | 86.4  | 63.0  | 49.1  | 39.5  | 32.9  | 29.3  | 27.1  | 26.4  | 26.4  |
| 32.5° | 916.7  | 461.3 | 74.0  | 55.6  | 41.7  | 33.7  | 27.8  | 25.6  | 23.4  | 22.7  | 22.7  |
| 35°   | 953.3  | 440.8 | 66.6  | 48.3  | 36.6  | 28.6  | 24.2  | 22.0  | 20.5  | 20.5  | 20.5  |
| 37.5° | 995.1  | 419.6 | 60.0  | 42.5  | 31.5  | 24.2  | 20.5  | 19.8  | 19.0  | 18.3  | 18.3  |
| 40°   | 1040.5 | 396.9 | 54.2  | 37.3  | 27.1  | 20.5  | 17.6  | 17.6  | 16.8  | 16.8  | 16.8  |
| 42.5° | 1091.7 | 377.1 | 49.1  | 32.9  | 23.4  | 17.6  | 15.4  | 15.4  | 14.6  | 14.6  | 14.6  |
| 45°   | 1147.4 | 358.8 | 44.7  | 29.3  | 20.5  | 15.4  | 13.9  | 13.2  | 12.4  | 12.4  | 12.4  |
| 47.5° | 1213.3 | 348.5 | 41.0  | 25.6  | 17.6  | 13.2  | 11.7  | 11.0  | 10.3  | 9.5   | 9.5   |
| 50°   | 1297.5 | 352.9 | 37.3  | 21.2  | 15.4  | 11.0  | 9.5   | 8.8   | 8.1   | 7.3   | 7.3   |
| 52.5° | 1364.1 | 350.7 | 32.2  | 18.3  | 12.4  | 8.8   | 7.3   | 6.6   | 5.9   | 5.1   | 5.1   |
| 55°   | 1412.4 | 341.9 | 27.8  | 15.4  | 9.5   | 7.3   | 5.9   | 4.4   | 3.7   | 3.7   | 3.7   |
| 57.5° | 1460.0 | 333.2 | 23.4  | 12.4  | 7.3   | 5.1   | 3.7   | 2.9   | 2.9   | 2.9   | 2.9   |
| 60°   | 1534.0 | 320.7 | 20.5  | 10.3  | 5.9   | 3.7   | 2.2   | 2.2   | 1.5   | 1.5   | 1.5   |
| 62.5° | 1624.1 | 305.3 | 16.8  | 8.8   | 4.4   | 2.9   | 1.5   | 1.5   | 0.0   | 0.0   | 0.0   |
| 65°   | 1722.9 | 278.2 | 13.9  | 6.6   | 3.7   | 2.2   | 1.5   | 0.0   | 0.0   | 0.0   | 0.0   |
| 67.5° | 1700.2 | 223.3 | 11.7  | 4.4   | 2.9   | 1.5   | 0.7   | 0.0   | 0.0   | 0.0   | 0.0   |
| 70°   | 1504.0 | 150.8 | 9.5   | 3.7   | 2.2   | 1.5   | 0.7   | 0.0   | 0.0   | 0.0   | 0.0   |
| 72.5° | 1178.1 | 89.3  | 6.6   | 2.9   | 1.5   | 0.7   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 75°   | 754.2  | 44.7  | 4.4   | 2.2   | 1.5   | 0.7   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 77.5° | 252.6  | 22.0  | 2.9   | 1.5   | 0.7   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 80°   | 35.9   | 7.3   | 1.5   | 0.7   | 0.7   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 82.5° | 8.1    | 2.9   | 0.7   | 0.7   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 85°   | 2.9    | 1.5   | 0.7   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 87.5° | 1.5    | 0.7   | 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: SP1-2101-121-5

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

Test Date: 03/04/2021

### Test Information

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

PROGRAMMED @ 1500mA.

### Spectral Parameters

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



### Test Conditions

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

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

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**CIE 1931 Chromaticity Diagram**



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



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              |           |                  |                  |

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### Scotopic Flux vs. Wavelength



Scotopic Lumens: 15895.6

S/P: 1.11

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 4854             | 0.0              | 490       | 23280            | 35.8             | 620       | 266893           | 3.3              | 750       | 19996            | 0.0              | 880       | 6314             | 0.0              |
| 365       | 4049             | 0.0              | 495       | 29582            | 47.8             | 625       | 255096           | 2.2              | 755       | 17900            | 0.0              | 885       | 7853             | 0.0              |
| 370       | 3795             | 0.0              | 500       | 39981            | 66.9             | 630       | 240244           | 1.4              | 760       | 17272            | 0.0              | 890       | 5823             | 0.0              |
| 375       | 4296             | 0.0              | 505       | 54556            | 92.7             | 635       | 223787           | 0.9              | 765       | 14514            | 0.0              | 895       | 7346             | 0.0              |
| 380       | 4496             | 0.0              | 510       | 71364            | 121.0            | 640       | 207566           | 0.5              | 770       | 12643            | 0.0              | 900       | 6920             | 0.0              |
| 385       | 4186             | 0.0              | 515       | 89828            | 148.9            | 645       | 192517           | 0.3              | 775       | 12475            | 0.0              | 905       | 6608             | 0.0              |
| 390       | 3945             | 0.0              | 520       | 108414           | 172.3            | 650       | 177187           | 0.2              | 780       | 11188            | 0.0              | 910       | 6279             | 0.0              |
| 395       | 3780             | 0.0              | 525       | 124929           | 186.9            | 655       | 161553           | 0.1              | 785       | 10229            | 0.0              | 915       | 5131             | 0.0              |
| 400       | 3679             | 0.1              | 530       | 141352           | 194.9            | 660       | 147361           | 0.1              | 790       | 8578             | 0.0              | 920       | 5855             | 0.0              |
| 405       | 4475             | 0.1              | 535       | 154552           | 192.6            | 665       | 132756           | 0.0              | 795       | 9114             | 0.0              | 925       | 5678             | 0.0              |
| 410       | 7499             | 0.4              | 540       | 166297           | 183.8            | 670       | 118534           | 0.0              | 800       | 8597             | 0.0              | 930       | 6661             | 0.0              |
| 415       | 14449            | 1.5              | 545       | 178874           | 171.5            | 675       | 105260           | 0.0              | 805       | 8790             | 0.0              | 935       | 8074             | 0.0              |
| 420       | 26000            | 4.3              | 550       | 193176           | 158.0            | 680       | 93637            | 0.0              | 810       | 7814             | 0.0              | 940       | 7823             | 0.0              |
| 425       | 45491            | 11.1             | 555       | 206008           | 140.8            | 685       | 83217            | 0.0              | 815       | 7533             | 0.0              | 945       | 8364             | 0.0              |
| 430       | 70707            | 24.1             | 560       | 220126           | 123.0            | 690       | 73671            | 0.0              | 820       | 7303             | 0.0              | 950       | 6763             | 0.0              |
| 435       | 98169            | 43.9             | 565       | 234383           | 105.2            | 695       | 64520            | 0.0              | 825       | 6745             | 0.0              | 955       | 4883             | 0.0              |
| 440       | 123846           | 69.2             | 570       | 248161           | 87.6             | 700       | 57442            | 0.0              | 830       | 7209             | 0.0              | 960       | 7488             | 0.0              |
| 445       | 139822           | 93.6             | 575       | 261970           | 71.3             | 705       | 51479            | 0.0              | 835       | 6674             | 0.0              | 965       | 9316             | 0.0              |
| 450       | 131679           | 102.1            | 580       | 272271           | 56.1             | 710       | 45940            | 0.0              | 840       | 6151             | 0.0              | 970       | 6857             | 0.0              |
| 455       | 99242            | 86.7             | 585       | 283822           | 43.4             | 715       | 41575            | 0.0              | 845       | 5371             | 0.0              | 975       | 4388             | 0.0              |
| 460       | 65216            | 63.0             | 590       | 291192           | 32.4             | 720       | 37753            | 0.0              | 850       | 6484             | 0.0              | 980       | 6095             | 0.0              |
| 465       | 44137            | 46.6             | 595       | 294651           | 23.5             | 725       | 33818            | 0.0              | 855       | 6614             | 0.0              | 985       | 7701             | 0.0              |
| 470       | 32002            | 36.9             | 600       | 297168           | 16.7             | 730       | 30414            | 0.0              | 860       | 5959             | 0.0              | 990       | 9045             | 0.0              |
| 475       | 24549            | 30.7             | 605       | 295658           | 11.6             | 735       | 26662            | 0.0              | 865       | 4768             | 0.0              | 995       | 6989             | 0.0              |
| 480       | 20801            | 28.1             | 610       | 287633           | 7.8              | 740       | 23848            | 0.0              | 870       | 5098             | 0.0              | 1000      | 7341             | 0.0              |
| 485       | 20656            | 29.9             | 615       | 279152           | 5.2              | 745       | 21851            | 0.0              | 875       | 5516             | 0.0              |           |                  |                  |

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              |           |                  |                  |

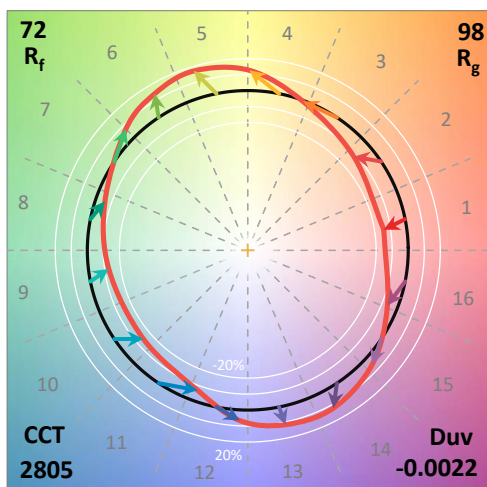
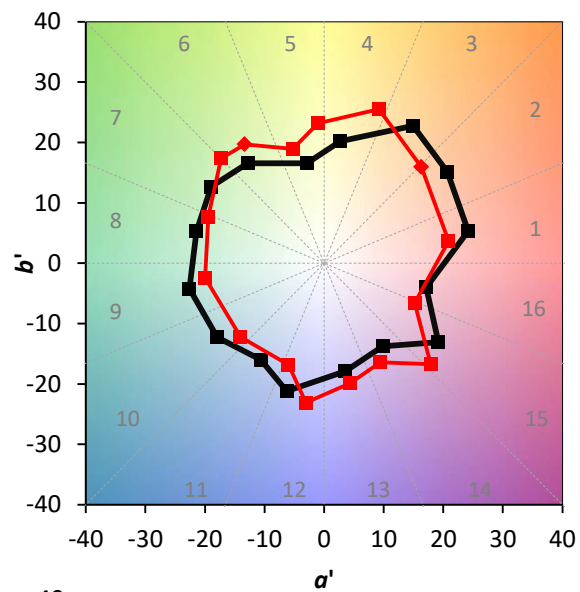
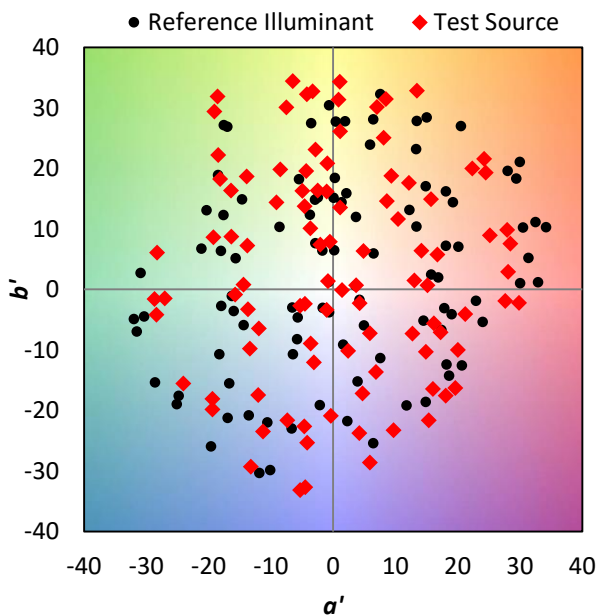
### Summary

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

### Spectral Power Distribution Comparison



### Color Vector Graphics

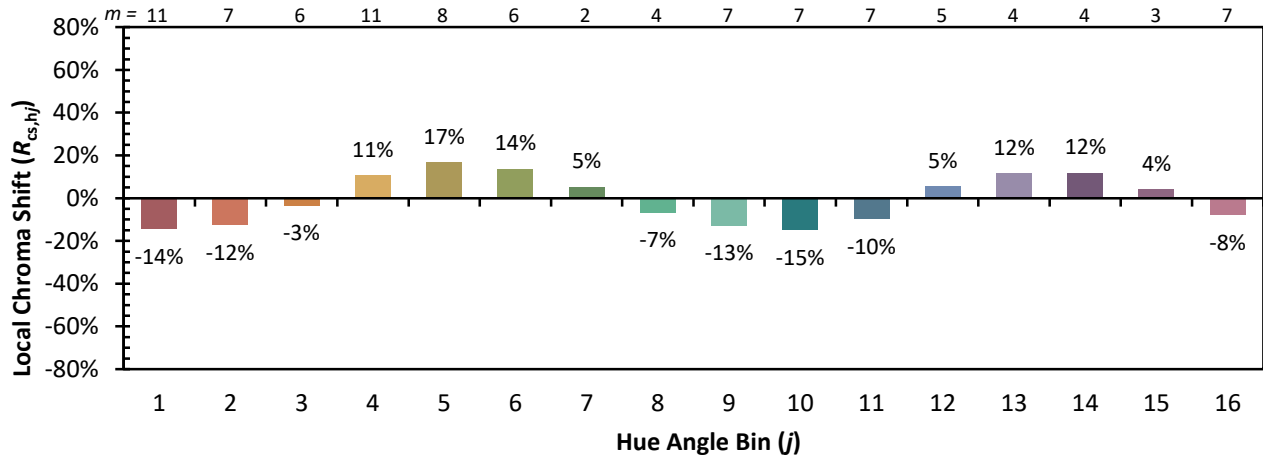


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

|            |            |            |            |
|------------|------------|------------|------------|
| 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)