

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: P868144

Luminaire Tested: **MEM2-HSN-SA-70-730-U-T4W-HSS**

Issue Date: 08/21/2024



**Test Information**

Test Method: LM-79-08  
Report Number: P868144  
Test Lab: INNOVATION CENTER(G3)  
Issue Date: 08/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: STREETWORKS  
Catalog Number: MEM2-HSN-SA-70-730-U-T4W-HSS  
Description: EPIC MODERN SHORT HOUSING DISCRETE LED ARRAYS 70W 70CRI 3000K  
FIXTURE w/ TYPE IV WIDE DISTRIBUTION OPTIC AND HOUSE SIDE SHIELD  
Light Source: (20) 3000K CCT, 70 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

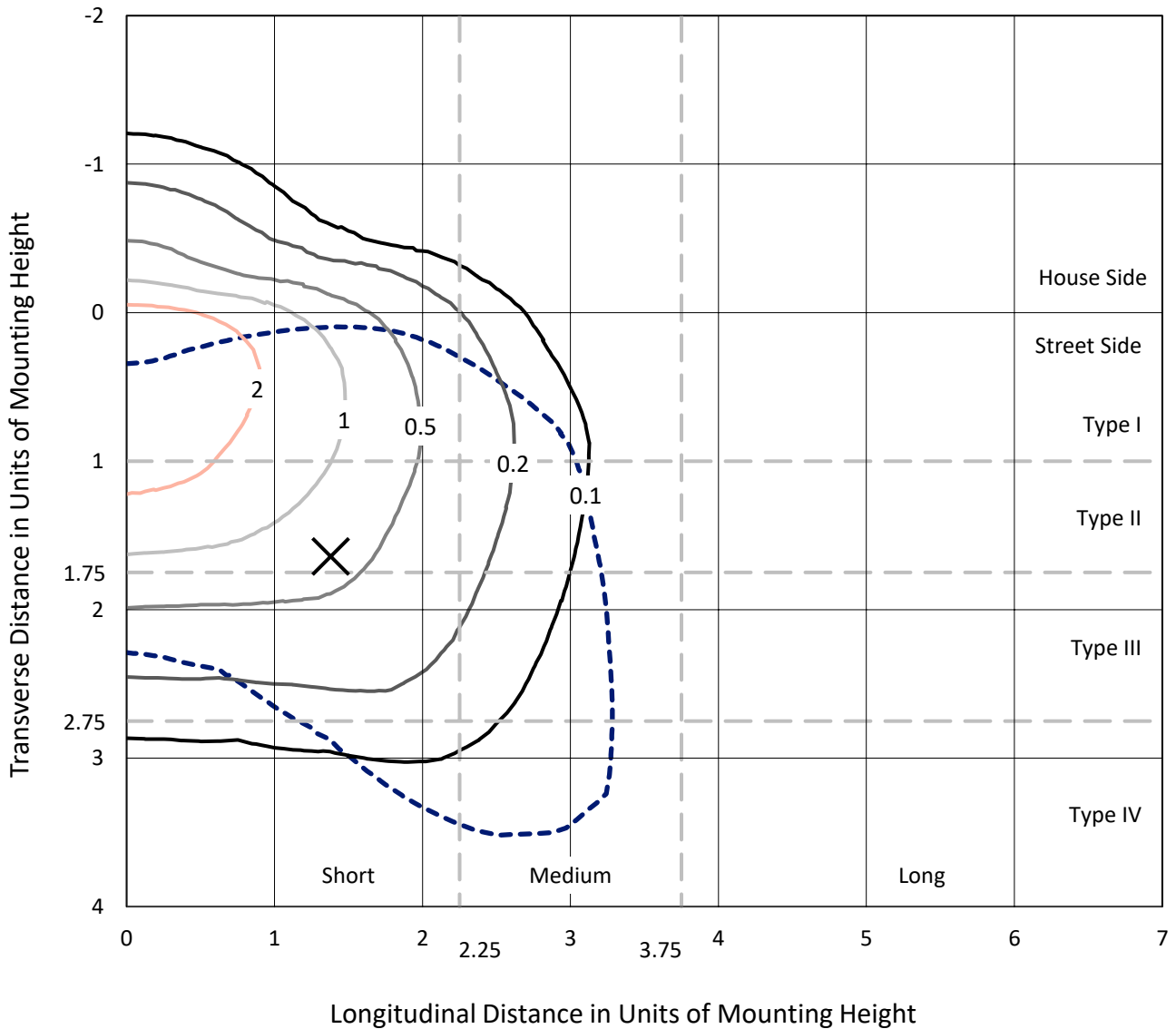
Lumens per Lamp: N/A  
Luminaire Lumens: 6231.9 lumens  
Efficiency: N/A  
Efficacy: 102.2 lumens/watt  
Luminous Opening: Rectangular (W 0.67' x L: 0.33' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B1 - U0 - G2

Input Watts (W): 61  
Input Voltage (V): 120  
Input Current (A<sub>in</sub>): NR  
Voltage Rise (V): NR  
Power Factor: 0.99  
Total Harmonic Distortion (THDi): 9.89%  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT

REPORT NUMBER: P868144  
 CATALOG NUMBER: MEM2-HSN-SA-70-730-U-T4W-HSS

### Iso-Footcandle Lines of Horizontal Illumination

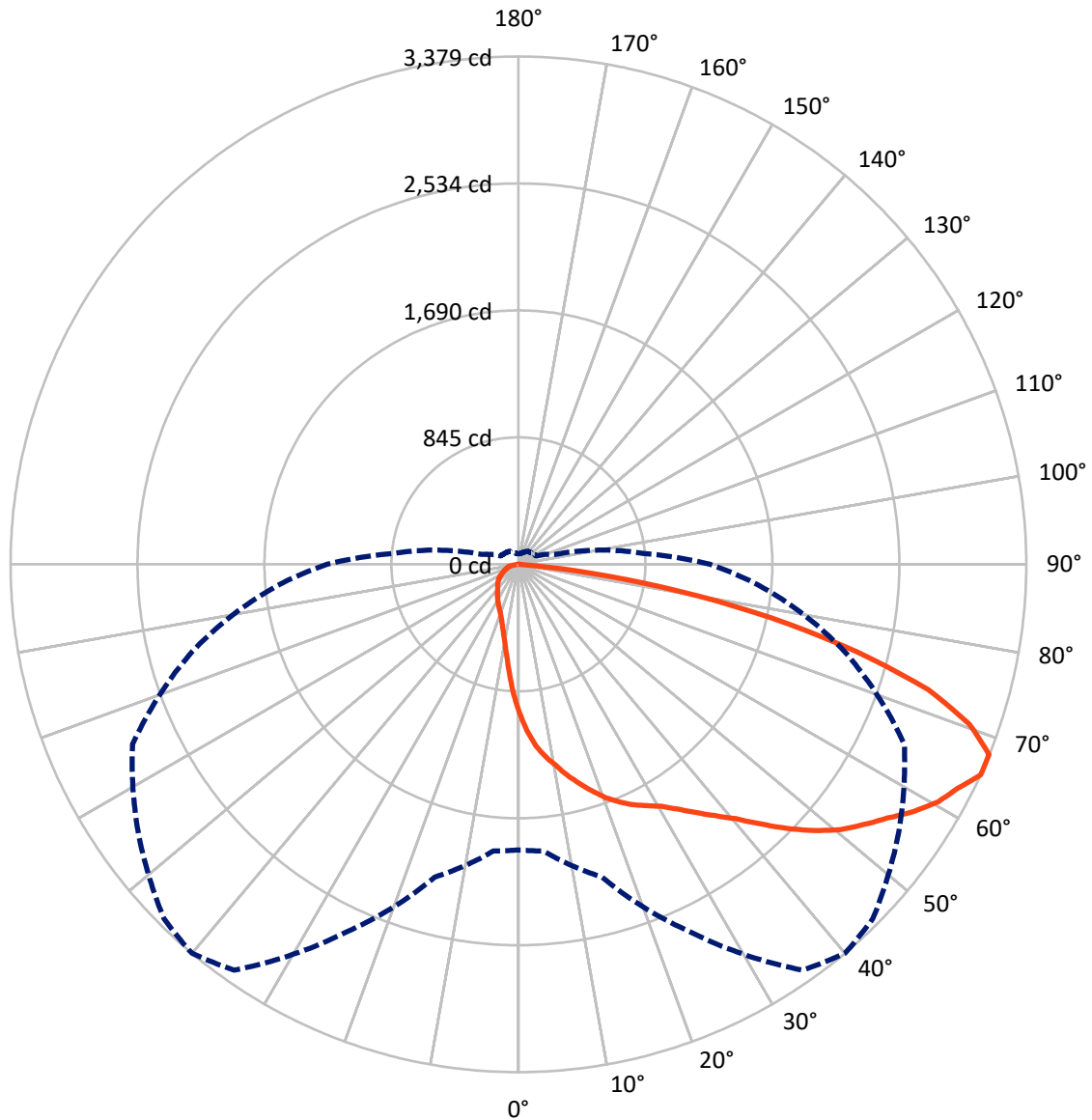
✕ Max cd  
 - - - 1/2 Max cd



Based on 20 foot mounting height. Maximum calculated value = 3.6 fc  
 Type IV - Short - N/A

REPORT NUMBER: P868144  
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### Luminous Intensity Polar Plot



— Vertical Plane Through 40-Deg Lateral    - - - Horizontal Cone Through 65-Deg Vertical

REPORT NUMBER: P868144

CATALOG NUMBER: MEM2-HSN-SA-70-730-U-T4W-HSS

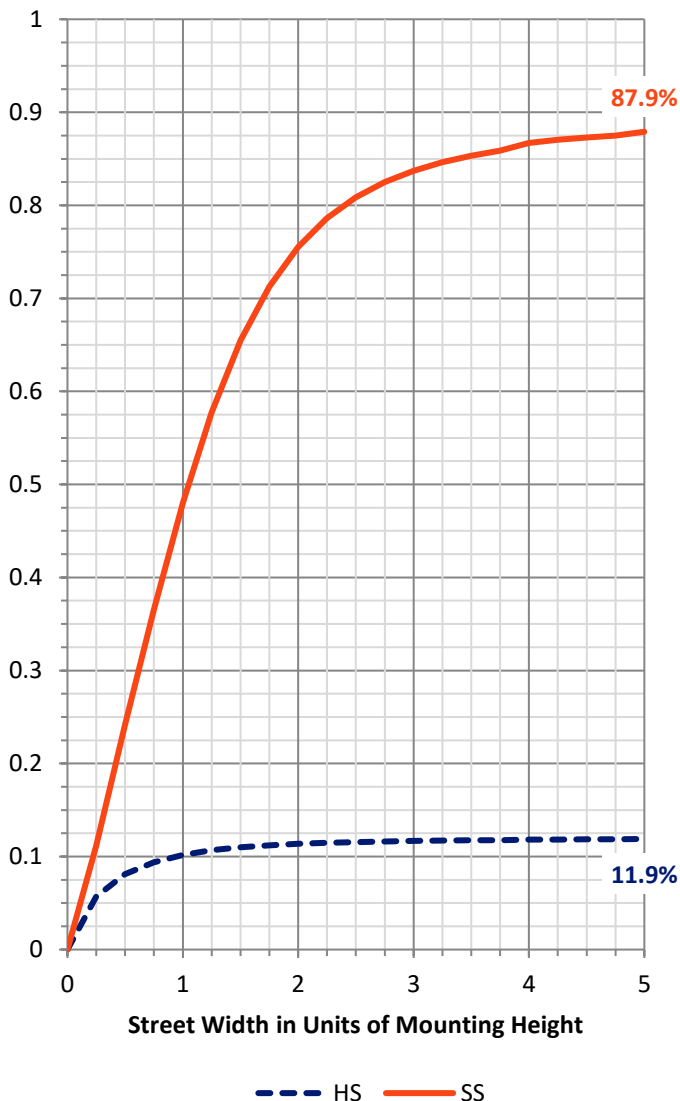
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 746.1    | 0.0    | 746.1  |
|                    | % Fixture | 12.0     | 0.0    | 12.0   |
| <b>Street Side</b> | Lumens    | 5485.8   | 0.0    | 5485.8 |
|                    | % Fixture | 88.0     | 0.0    | 88.0   |
| <b>Total</b>       | Lumens    | 6231.9   | 0.0    | 6231.9 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 92.7   | 1.5       |
| 10°-20°   | 278.8  | 4.5       |
| 20°-30°   | 479.6  | 7.7       |
| 30°-40°   | 725.0  | 11.6      |
| 40°-50°   | 1060.2 | 17.0      |
| 50°-60°   | 1354.1 | 21.7      |
| 60°-70°   | 1351.3 | 21.7      |
| 70°-80°   | 792.4  | 12.7      |
| 80°-90°   | 97.6   | 1.6       |
| 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°    | 6231.9 | 100.0     |
| 0°-180°   | 6231.9 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P868144

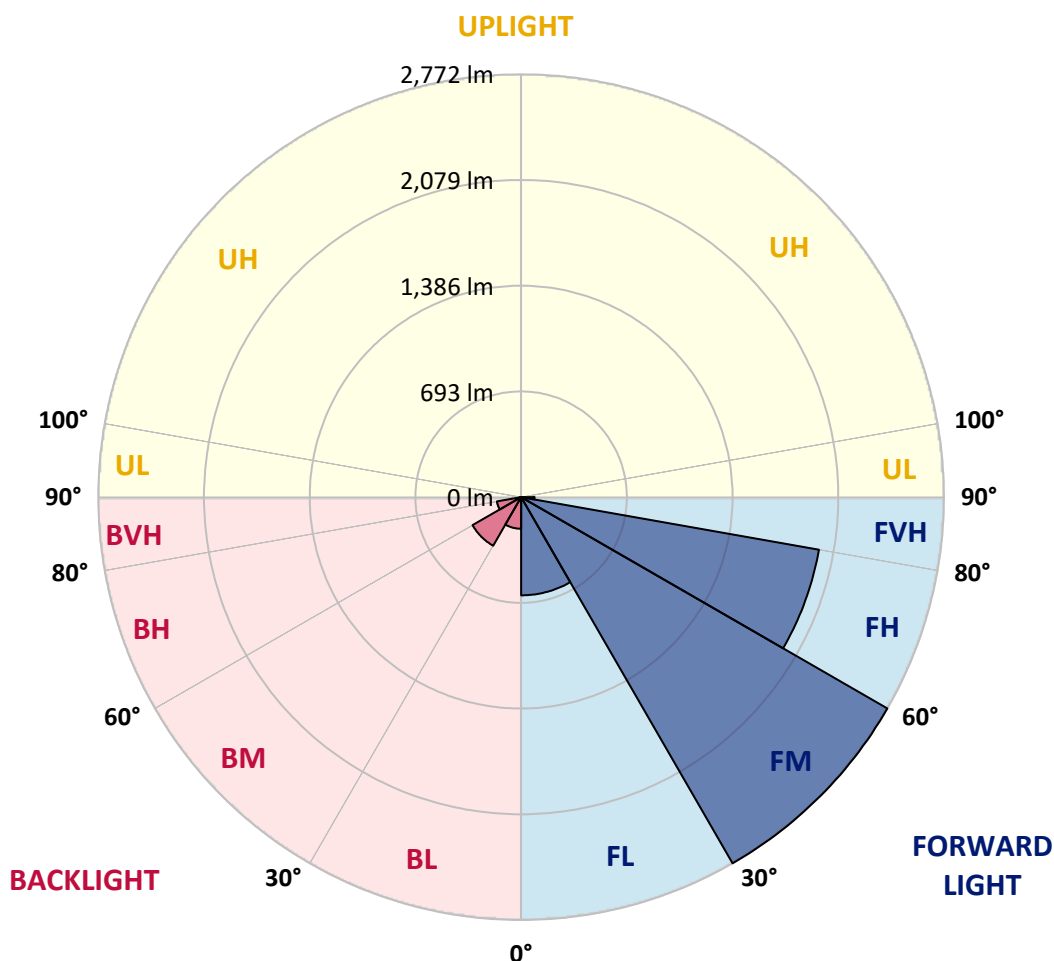
CATALOG NUMBER: MEM2-HSN-SA-70-730-U-T4W-HSS

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

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|--------|-----------|-------------------------|------|---------|
|                |        |           | B                       | U    | G       |
| FL (0°-30°)    | 643.7  | 10.3      |                         |      |         |
| FM (30°-60°)   | 2771.6 | 44.5      |                         |      |         |
| FH (60°-80°)   | 1982.3 | 31.8      |                         |      | G2/5000 |
| FVH (80°-90°)  | 88.2   | 1.4       |                         |      | G1/100  |
| BL (0°-30°)    | 207.5  | 3.3       | B1/500                  |      |         |
| BM (30°-60°)   | 367.6  | 5.9       | B1/1000                 |      |         |
| BH (60°-80°)   | 161.5  | 2.6       | B1/500                  |      | G1/500  |
| BVH (80°-90°)  | 9.4    | 0.2       |                         |      | G0/10   |
| UL (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

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

Type IV Short





REPORT NUMBER: P868144

CATALOG NUMBER: MEM2-HSN-SA-70-730-U-T4W-HSS

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 40°    | 45°    | 55°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 990.6  | 990.6  | 990.6  | 990.6  | 990.6  | 990.6  | 990.6  | 990.6  | 990.6  | 990.6  | 990.6  |
| 2.5°  | 1155.7 | 1150.4 | 1139.9 | 1131.1 | 1118.8 | 1108.3 | 1097.7 | 1078.4 | 1053.8 | 1032.8 | 1006.4 |
| 5°    | 1269.9 | 1261.1 | 1254.1 | 1243.5 | 1222.4 | 1213.7 | 1206.6 | 1166.2 | 1124.1 | 1080.2 | 1022.2 |
| 7.5°  | 1350.7 | 1357.7 | 1343.6 | 1327.8 | 1301.5 | 1290.9 | 1280.4 | 1240.0 | 1187.3 | 1124.1 | 1041.5 |
| 10°   | 1443.8 | 1445.5 | 1427.9 | 1408.6 | 1380.5 | 1359.4 | 1345.4 | 1296.2 | 1238.3 | 1168.0 | 1062.6 |
| 12.5° | 1533.3 | 1533.3 | 1522.8 | 1494.7 | 1457.8 | 1438.5 | 1413.9 | 1357.7 | 1287.4 | 1204.9 | 1087.2 |
| 15°   | 1605.3 | 1608.9 | 1600.1 | 1579.0 | 1538.6 | 1512.2 | 1487.7 | 1422.7 | 1333.1 | 1247.0 | 1106.5 |
| 17.5° | 1670.3 | 1668.6 | 1663.3 | 1644.0 | 1605.3 | 1584.3 | 1559.7 | 1487.7 | 1385.8 | 1280.4 | 1136.4 |
| 20°   | 1714.2 | 1714.2 | 1712.5 | 1701.9 | 1673.8 | 1658.0 | 1628.2 | 1552.6 | 1443.8 | 1329.6 | 1168.0 |
| 22.5° | 1747.6 | 1745.8 | 1745.8 | 1747.6 | 1731.8 | 1716.0 | 1703.7 | 1628.2 | 1503.5 | 1371.7 | 1199.6 |
| 25°   | 1775.7 | 1774.0 | 1779.2 | 1782.7 | 1775.7 | 1772.2 | 1758.1 | 1700.2 | 1577.2 | 1420.9 | 1231.2 |
| 27.5° | 1812.6 | 1817.9 | 1816.1 | 1816.1 | 1814.3 | 1817.9 | 1816.1 | 1766.9 | 1649.2 | 1473.6 | 1264.6 |
| 30°   | 1870.6 | 1879.3 | 1874.1 | 1867.0 | 1867.0 | 1868.8 | 1877.6 | 1846.0 | 1733.6 | 1538.6 | 1301.5 |
| 32.5° | 2005.8 | 1997.0 | 1960.1 | 1935.5 | 1939.1 | 1940.8 | 1949.6 | 1932.0 | 1817.9 | 1612.4 | 1340.1 |
| 35°   | 2160.4 | 2149.8 | 2109.4 | 2053.2 | 2033.9 | 2026.9 | 2025.1 | 2014.6 | 1909.2 | 1691.4 | 1385.8 |
| 37.5° | 2360.6 | 2364.1 | 2304.4 | 2223.6 | 2165.6 | 2121.7 | 2112.9 | 2090.1 | 1988.2 | 1763.4 | 1433.2 |
| 40°   | 2564.3 | 2550.3 | 2499.3 | 2420.3 | 2306.1 | 2225.3 | 2199.0 | 2167.4 | 2077.8 | 1838.9 | 1478.9 |
| 42.5° | 2761.0 | 2734.7 | 2668.0 | 2581.9 | 2448.4 | 2360.6 | 2300.9 | 2260.5 | 2160.4 | 1921.5 | 1522.8 |
| 45°   | 3017.5 | 2941.9 | 2822.5 | 2745.2 | 2578.4 | 2506.4 | 2451.9 | 2362.3 | 2258.7 | 2004.0 | 1575.5 |
| 47.5° | 3219.5 | 3073.7 | 2964.8 | 2931.4 | 2713.6 | 2646.9 | 2597.7 | 2473.0 | 2358.8 | 2097.1 | 1629.9 |
| 50°   | 3182.6 | 3093.0 | 3066.7 | 3036.8 | 2815.5 | 2775.1 | 2729.4 | 2599.5 | 2460.7 | 2195.5 | 1682.6 |
| 52.5° | 3087.7 | 3098.3 | 3131.6 | 3080.7 | 2905.1 | 2877.0 | 2847.1 | 2734.7 | 2562.6 | 2276.3 | 1730.0 |
| 55°   | 3012.2 | 3033.3 | 3122.9 | 3107.0 | 3012.2 | 2980.6 | 2959.5 | 2868.2 | 2660.9 | 2350.0 | 1770.4 |
| 57.5° | 2875.2 | 2857.6 | 2970.1 | 3152.7 | 3126.4 | 3101.8 | 3080.7 | 3008.7 | 2761.0 | 2402.7 | 1796.8 |
| 60°   | 2659.2 | 2594.2 | 2745.2 | 3096.5 | 3205.4 | 3208.9 | 3196.6 | 3114.1 | 2841.8 | 2402.7 | 1782.7 |
| 62.5° | 2355.3 | 2293.8 | 2480.0 | 2908.6 | 3247.6 | 3280.9 | 3273.9 | 3151.0 | 2877.0 | 2350.0 | 1728.3 |
| 65°   | 1900.4 | 1914.5 | 2155.1 | 2696.1 | 3296.7 | 3379.3 | 3335.4 | 3091.2 | 2833.1 | 2248.2 | 1605.3 |
| 67.5° | 1517.5 | 1559.7 | 1775.7 | 2420.3 | 3273.9 | 3377.5 | 3316.1 | 2922.6 | 2645.1 | 2105.9 | 1417.4 |
| 70°   | 1197.9 | 1226.0 | 1405.1 | 2047.9 | 3073.7 | 3182.6 | 3105.3 | 2664.4 | 2327.2 | 1886.4 | 1178.5 |
| 72.5° | 936.2  | 962.5  | 1115.3 | 1638.7 | 2725.9 | 2852.4 | 2755.8 | 2316.7 | 1930.3 | 1600.1 | 936.2  |
| 75°   | 711.3  | 730.7  | 844.8  | 1262.8 | 2170.9 | 2329.0 | 2258.7 | 1854.7 | 1507.0 | 1266.4 | 716.6  |
| 77.5° | 458.4  | 484.8  | 613.0  | 885.2  | 1533.3 | 1723.0 | 1731.8 | 1385.8 | 1083.7 | 915.1  | 526.9  |
| 80°   | 303.9  | 314.4  | 393.4  | 576.1  | 943.2  | 1090.7 | 1141.7 | 936.2  | 692.0  | 583.1  | 379.4  |
| 82.5° | 126.5  | 140.5  | 187.9  | 289.8  | 472.5  | 474.2  | 542.7  | 395.2  | 281.0  | 247.7  | 159.8  |
| 85°   | 3.5    | 7.0    | 5.3    | 14.1   | 12.3   | 19.3   | 22.8   | 31.6   | 22.8   | 24.6   | 24.6   |
| 87.5° | 0.0    | 0.0    | 1.8    | 1.8    | 3.5    | 3.5    | 3.5    | 3.5    | 3.5    | 5.3    | 3.5    |
| 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: P868144

CATALOG NUMBER: MEM2-HSN-SA-70-730-U-T4W-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°   | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 990.6  | 990.6 | 990.6 | 990.6 | 990.6 | 990.6 | 990.6 | 990.6 | 990.6 | 990.6 | 990.6 |
| 2.5°  | 994.1  | 978.3 | 946.7 | 922.1 | 895.8 | 876.4 | 858.9 | 839.6 | 827.3 | 829.0 | 816.7 |
| 5°    | 994.1  | 964.3 | 901.0 | 844.8 | 793.9 | 757.0 | 716.6 | 685.0 | 662.2 | 658.6 | 669.2 |
| 7.5°  | 999.4  | 950.2 | 855.4 | 771.1 | 700.8 | 642.8 | 600.7 | 569.1 | 553.3 | 542.7 | 541.0 |
| 10°   | 1004.7 | 939.7 | 813.2 | 706.1 | 618.2 | 555.0 | 518.1 | 483.0 | 465.4 | 463.7 | 458.4 |
| 12.5° | 1008.2 | 927.4 | 774.6 | 641.1 | 549.7 | 490.0 | 453.1 | 425.0 | 411.0 | 411.0 | 409.2 |
| 15°   | 1020.5 | 923.9 | 734.2 | 591.9 | 497.1 | 439.1 | 407.5 | 384.6 | 375.9 | 370.6 | 368.8 |
| 17.5° | 1031.0 | 916.8 | 699.0 | 542.7 | 449.6 | 398.7 | 368.8 | 353.0 | 344.3 | 340.7 | 339.0 |
| 20°   | 1046.8 | 913.3 | 665.7 | 502.3 | 414.5 | 365.3 | 342.5 | 328.4 | 323.2 | 319.7 | 319.7 |
| 22.5° | 1062.6 | 909.8 | 632.3 | 467.2 | 384.6 | 340.7 | 319.7 | 307.4 | 302.1 | 300.3 | 298.6 |
| 25°   | 1081.9 | 908.1 | 604.2 | 437.3 | 358.3 | 321.4 | 302.1 | 291.6 | 284.5 | 281.0 | 281.0 |
| 27.5° | 1101.3 | 909.8 | 576.1 | 407.5 | 335.5 | 303.9 | 284.5 | 272.2 | 267.0 | 259.9 | 261.7 |
| 30°   | 1127.6 | 911.6 | 553.3 | 382.9 | 316.1 | 286.3 | 268.7 | 252.9 | 245.9 | 242.4 | 242.4 |
| 32.5° | 1153.9 | 918.6 | 530.4 | 360.1 | 296.8 | 272.2 | 251.2 | 237.1 | 228.3 | 226.6 | 224.8 |
| 35°   | 1182.0 | 923.9 | 509.4 | 340.7 | 281.0 | 256.4 | 235.4 | 221.3 | 214.3 | 212.5 | 212.5 |
| 37.5° | 1213.7 | 932.6 | 493.5 | 323.2 | 265.2 | 240.6 | 221.3 | 207.3 | 202.0 | 200.2 | 200.2 |
| 40°   | 1247.0 | 946.7 | 481.3 | 307.4 | 252.9 | 226.6 | 209.0 | 196.7 | 193.2 | 191.4 | 191.4 |
| 42.5° | 1280.4 | 959.0 | 470.7 | 295.1 | 240.6 | 214.3 | 200.2 | 187.9 | 182.7 | 182.7 | 182.7 |
| 45°   | 1312.0 | 967.8 | 460.2 | 282.8 | 228.3 | 205.5 | 189.7 | 179.2 | 173.9 | 173.9 | 173.9 |
| 47.5° | 1340.1 | 976.6 | 444.4 | 270.5 | 216.0 | 193.2 | 180.9 | 170.4 | 165.1 | 165.1 | 165.1 |
| 50°   | 1370.0 | 981.8 | 426.8 | 254.7 | 203.7 | 184.4 | 172.1 | 159.8 | 156.3 | 154.6 | 154.6 |
| 52.5° | 1394.6 | 981.8 | 404.0 | 238.9 | 189.7 | 172.1 | 161.6 | 151.0 | 145.8 | 142.3 | 142.3 |
| 55°   | 1412.1 | 981.8 | 379.4 | 219.5 | 175.6 | 161.6 | 151.0 | 140.5 | 133.5 | 128.2 | 128.2 |
| 57.5° | 1422.7 | 976.6 | 351.3 | 196.7 | 161.6 | 147.5 | 140.5 | 128.2 | 114.2 | 103.6 | 100.1 |
| 60°   | 1413.9 | 960.7 | 321.4 | 172.1 | 145.8 | 135.2 | 130.0 | 114.2 | 94.8  | 89.6  | 89.6  |
| 62.5° | 1377.0 | 923.9 | 291.6 | 151.0 | 133.5 | 122.9 | 117.7 | 100.1 | 86.1  | 80.8  | 80.8  |
| 65°   | 1273.4 | 834.3 | 254.7 | 131.7 | 119.4 | 112.4 | 105.4 | 89.6  | 77.3  | 70.3  | 70.3  |
| 67.5° | 1122.3 | 720.1 | 212.5 | 115.9 | 107.1 | 101.9 | 96.6  | 80.8  | 68.5  | 61.5  | 61.5  |
| 70°   | 909.8  | 581.4 | 180.9 | 101.9 | 94.8  | 91.3  | 86.1  | 73.8  | 59.7  | 54.4  | 54.4  |
| 72.5° | 714.8  | 456.7 | 151.0 | 91.3  | 87.8  | 80.8  | 77.3  | 65.0  | 54.4  | 49.2  | 49.2  |
| 75°   | 532.2  | 340.7 | 133.5 | 80.8  | 80.8  | 72.0  | 70.3  | 58.0  | 47.4  | 43.9  | 43.9  |
| 77.5° | 391.7  | 252.9 | 115.9 | 70.3  | 70.3  | 63.2  | 59.7  | 50.9  | 43.9  | 40.4  | 40.4  |
| 80°   | 265.2  | 172.1 | 86.1  | 52.7  | 52.7  | 50.9  | 47.4  | 43.9  | 36.9  | 33.4  | 31.6  |
| 82.5° | 112.4  | 72.0  | 42.2  | 26.3  | 24.6  | 19.3  | 15.8  | 12.3  | 12.3  | 10.5  | 10.5  |
| 85°   | 19.3   | 8.8   | 8.8   | 7.0   | 5.3   | 5.3   | 5.3   | 3.5   | 3.5   | 3.5   | 3.5   |
| 87.5° | 3.5    | 3.5   | 3.5   | 3.5   | 3.5   | 3.5   | 1.8   | 1.8   | 1.8   | 1.8   | 1.8   |
| 90°   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |



LM-79-2019: Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Report Prepared for

Cooper Lighting Solutions

Streetworks

Report Number: SP1-2407-157-4

Test Date: 08/07/2024

Luminaire Tested: MEM2-HTN-SA-40-730-U-5WQ-2

Data in this report applies to families of products including MEM2-HTN-SA-40-730-U-5WQ-2

**Test Information**

Test Method: LM-79-2019  
 Report Number: SP1-2407-157-4  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 08/20/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: Streetworks  
 Catalog Number: **MEM2-HTN-SA-40-730-U-5WQ-2**  
 Description: Epic Modern Light Square 40W 5WQ Optic and Flare Trim

**Spectral Parameters**

CCT (K): 3057  
 CIE u': 0.2487  
 CIE v': 0.5199  
 Duv: -0.0002  
 CIE x: 0.4326  
 CIE y: 0.4020  
 CIE z: 0.1654  
 Peak Wavelength (nm): 593  
 Dominant Wavelength (nm): 582  
 Purity: 50.50735  
 Rf: 74.6  
 Rg: 94

|           |      |      |       |
|-----------|------|------|-------|
| CRI (Ra): | 71.7 |      |       |
| R1:       | 68.1 | R9:  | -34.8 |
| R2:       | 82.0 | R10: | 58.5  |
| R3:       | 93.5 | R11: | 62.5  |
| R4:       | 67.5 | R12: | 47.5  |
| R5:       | 67.2 | R13: | 70.7  |
| R6:       | 74.9 | R14: | 96.4  |
| R7:       | 77.4 | R15: | 60.0  |
| R8:       | 43.1 |      |       |



**Test Conditions**

Stabilization Time: 21M  
 Operation Time: 1H 21M  
 Sphere Temperature (°C): 24.2

REPORT NUMBER: SP1-2407-157-4

| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 6/18/2024        | 12/18/2024           |
| Power Meter                    | INXT2011004           | 2/8/2024         | 2/8/2025             |
| AC Power Source                | IN0063                | 10/24/2023       | 10/24/2024           |
| DC Power Source                | IN0208                | 10/24/2023       | 10/24/2024           |
| Sphere Thermometer             | IN0085                | 10/24/2023       | 10/24/2024           |
| Room Thermometer               | IN0046                | 10/24/2023       | 10/24/2024           |

REPORT NUMBER: SP1-2407-157-4

CIE 1931 Chromaticity Diagram



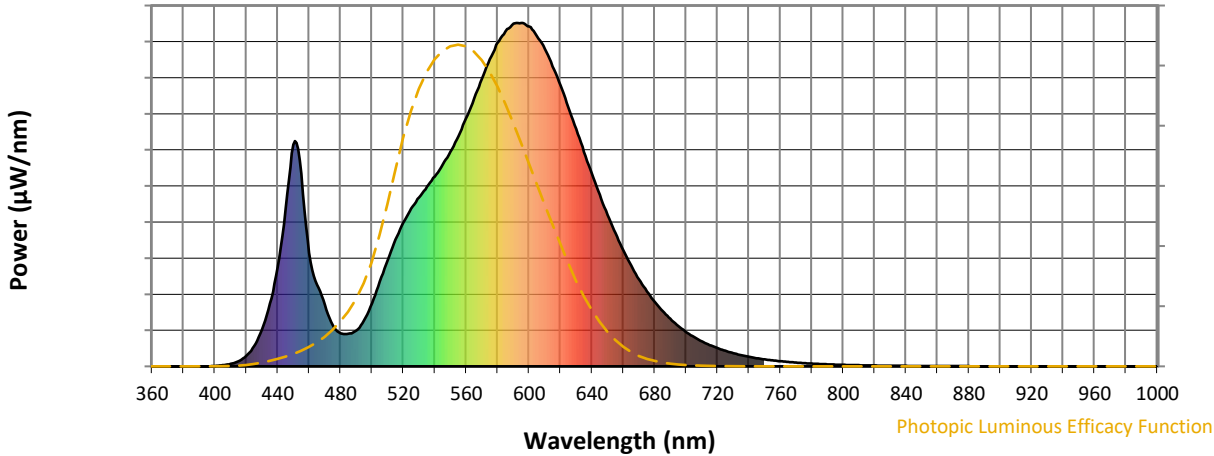
CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles



Point lies inside the ANSI 3000K 4-step quadrangle

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**Photopic Flux vs. Wavelength**

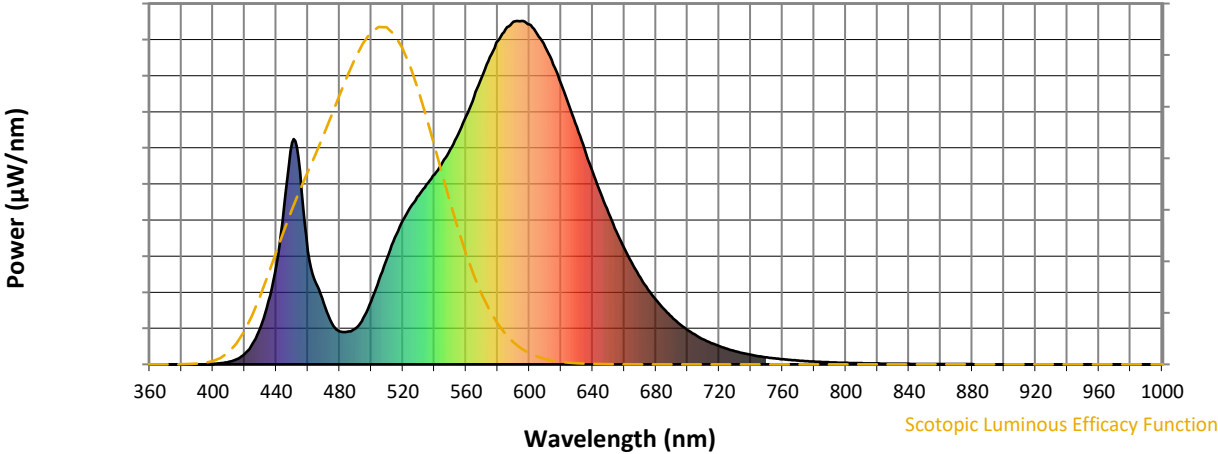


**Photopic Lumens: NR**

| $\lambda$ (nm) | Power W <sup>^</sup> /nm | Lumens ( $\phi$ /nm) | $\lambda$ (nm) | Power W <sup>^</sup> /nm | Lumens ( $\phi$ /nm) | $\lambda$ (nm) | Power W <sup>^</sup> /nm | Lumens ( $\phi$ /nm) | $\lambda$ (nm) | Power W <sup>^</sup> /nm | Lumens ( $\phi$ /nm) | $\lambda$ (nm) | Power W <sup>^</sup> /nm | Lumens ( $\phi$ /nm) |
|----------------|--------------------------|----------------------|----------------|--------------------------|----------------------|----------------|--------------------------|----------------------|----------------|--------------------------|----------------------|----------------|--------------------------|----------------------|
| 360            | 0                        | NR                   | 490            | 104                      | NR                   | 620            | 818                      | NR                   | 750            | 20                       | NR                   | 880            | 1                        | NR                   |
| 365            | 0                        | NR                   | 495            | 135                      | NR                   | 625            | 755                      | NR                   | 755            | 17                       | NR                   | 885            | 0                        | NR                   |
| 370            | 0                        | NR                   | 500            | 184                      | NR                   | 630            | 691                      | NR                   | 760            | 15                       | NR                   | 890            | 0                        | NR                   |
| 375            | 0                        | NR                   | 505            | 247                      | NR                   | 635            | 625                      | NR                   | 765            | 13                       | NR                   | 895            | 0                        | NR                   |
| 380            | 0                        | NR                   | 510            | 309                      | NR                   | 640            | 561                      | NR                   | 770            | 11                       | NR                   | 900            | 0                        | NR                   |
| 385            | 0                        | NR                   | 515            | 369                      | NR                   | 645            | 499                      | NR                   | 775            | 9                        | NR                   | 905            | 0                        | NR                   |
| 390            | 0                        | NR                   | 520            | 419                      | NR                   | 650            | 441                      | NR                   | 780            | 8                        | NR                   | 910            | 0                        | NR                   |
| 395            | 0                        | NR                   | 525            | 460                      | NR                   | 655            | 388                      | NR                   | 785            | 7                        | NR                   | 915            | 0                        | NR                   |
| 400            | 1                        | NR                   | 530            | 492                      | NR                   | 660            | 338                      | NR                   | 790            | 6                        | NR                   | 920            | 0                        | NR                   |
| 405            | 3                        | NR                   | 535            | 524                      | NR                   | 665            | 294                      | NR                   | 795            | 5                        | NR                   | 925            | 0                        | NR                   |
| 410            | 7                        | NR                   | 540            | 553                      | NR                   | 670            | 253                      | NR                   | 800            | 4                        | NR                   | 930            | 0                        | NR                   |
| 415            | 15                       | NR                   | 545            | 588                      | NR                   | 675            | 218                      | NR                   | 805            | 4                        | NR                   | 935            | 0                        | NR                   |
| 420            | 31                       | NR                   | 550            | 625                      | NR                   | 680            | 188                      | NR                   | 810            | 3                        | NR                   | 940            | 0                        | NR                   |
| 425            | 60                       | NR                   | 555            | 670                      | NR                   | 685            | 161                      | NR                   | 815            | 3                        | NR                   | 945            | 0                        | NR                   |
| 430            | 107                      | NR                   | 560            | 723                      | NR                   | 690            | 139                      | NR                   | 820            | 3                        | NR                   | 950            | 0                        | NR                   |
| 435            | 183                      | NR                   | 565            | 780                      | NR                   | 695            | 118                      | NR                   | 825            | 2                        | NR                   | 955            | 0                        | NR                   |
| 440            | 289                      | NR                   | 570            | 837                      | NR                   | 700            | 100                      | NR                   | 830            | 2                        | NR                   | 960            | 0                        | NR                   |
| 445            | 460                      | NR                   | 575            | 894                      | NR                   | 705            | 85                       | NR                   | 835            | 2                        | NR                   | 965            | 0                        | NR                   |
| 450            | 646                      | NR                   | 580            | 942                      | NR                   | 710            | 73                       | NR                   | 840            | 1                        | NR                   | 970            | 0                        | NR                   |
| 455            | 561                      | NR                   | 585            | 976                      | NR                   | 715            | 62                       | NR                   | 845            | 1                        | NR                   | 975            | 0                        | NR                   |
| 460            | 331                      | NR                   | 590            | 998                      | NR                   | 720            | 53                       | NR                   | 850            | 1                        | NR                   | 980            | 0                        | NR                   |
| 465            | 238                      | NR                   | 595            | 1000                     | NR                   | 725            | 45                       | NR                   | 855            | 1                        | NR                   | 985            | 0                        | NR                   |
| 470            | 178                      | NR                   | 600            | 990                      | NR                   | 730            | 39                       | NR                   | 860            | 1                        | NR                   | 990            | 0                        | NR                   |
| 475            | 120                      | NR                   | 605            | 962                      | NR                   | 735            | 33                       | NR                   | 865            | 1                        | NR                   | 995            | 0                        | NR                   |
| 480            | 96                       | NR                   | 610            | 925                      | NR                   | 740            | 28                       | NR                   | 870            | 1                        | NR                   | 1000           | 0                        | NR                   |
| 485            | 95                       | NR                   | 615            | 873                      | NR                   | 745            | 24                       | NR                   | 875            | 1                        | NR                   |                |                          |                      |

REPORT NUMBER: SP1-2407-157-4

Scotopic Flux vs. Wavelength



Scotopic Lumens: NR S/P: 1.23

| λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360    | 0                        | NR            | 490    | 104                      | NR            | 620    | 818                      | NR            | 750    | 20                       | NR            | 880    | 1                        | NR            |
| 365    | 0                        | NR            | 495    | 135                      | NR            | 625    | 755                      | NR            | 755    | 17                       | NR            | 885    | 0                        | NR            |
| 370    | 0                        | NR            | 500    | 184                      | NR            | 630    | 691                      | NR            | 760    | 15                       | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 247                      | NR            | 635    | 625                      | NR            | 765    | 13                       | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 309                      | NR            | 640    | 561                      | NR            | 770    | 11                       | NR            | 900    | 0                        | NR            |
| 385    | 0                        | NR            | 515    | 369                      | NR            | 645    | 499                      | NR            | 775    | 9                        | NR            | 905    | 0                        | NR            |
| 390    | 0                        | NR            | 520    | 419                      | NR            | 650    | 441                      | NR            | 780    | 8                        | NR            | 910    | 0                        | NR            |
| 395    | 0                        | NR            | 525    | 460                      | NR            | 655    | 388                      | NR            | 785    | 7                        | NR            | 915    | 0                        | NR            |
| 400    | 1                        | NR            | 530    | 492                      | NR            | 660    | 338                      | NR            | 790    | 6                        | NR            | 920    | 0                        | NR            |
| 405    | 3                        | NR            | 535    | 524                      | NR            | 665    | 294                      | NR            | 795    | 5                        | NR            | 925    | 0                        | NR            |
| 410    | 7                        | NR            | 540    | 553                      | NR            | 670    | 253                      | NR            | 800    | 4                        | NR            | 930    | 0                        | NR            |
| 415    | 15                       | NR            | 545    | 588                      | NR            | 675    | 218                      | NR            | 805    | 4                        | NR            | 935    | 0                        | NR            |
| 420    | 31                       | NR            | 550    | 625                      | NR            | 680    | 188                      | NR            | 810    | 3                        | NR            | 940    | 0                        | NR            |
| 425    | 60                       | NR            | 555    | 670                      | NR            | 685    | 161                      | NR            | 815    | 3                        | NR            | 945    | 0                        | NR            |
| 430    | 107                      | NR            | 560    | 723                      | NR            | 690    | 139                      | NR            | 820    | 3                        | NR            | 950    | 0                        | NR            |
| 435    | 183                      | NR            | 565    | 780                      | NR            | 695    | 118                      | NR            | 825    | 2                        | NR            | 955    | 0                        | NR            |
| 440    | 289                      | NR            | 570    | 837                      | NR            | 700    | 100                      | NR            | 830    | 2                        | NR            | 960    | 0                        | NR            |
| 445    | 460                      | NR            | 575    | 894                      | NR            | 705    | 85                       | NR            | 835    | 2                        | NR            | 965    | 0                        | NR            |
| 450    | 646                      | NR            | 580    | 942                      | NR            | 710    | 73                       | NR            | 840    | 1                        | NR            | 970    | 0                        | NR            |
| 455    | 561                      | NR            | 585    | 976                      | NR            | 715    | 62                       | NR            | 845    | 1                        | NR            | 975    | 0                        | NR            |
| 460    | 331                      | NR            | 590    | 998                      | NR            | 720    | 53                       | NR            | 850    | 1                        | NR            | 980    | 0                        | NR            |
| 465    | 238                      | NR            | 595    | 1000                     | NR            | 725    | 45                       | NR            | 855    | 1                        | NR            | 985    | 0                        | NR            |
| 470    | 178                      | NR            | 600    | 990                      | NR            | 730    | 39                       | NR            | 860    | 1                        | NR            | 990    | 0                        | NR            |
| 475    | 120                      | NR            | 605    | 962                      | NR            | 735    | 33                       | NR            | 865    | 1                        | NR            | 995    | 0                        | NR            |
| 480    | 96                       | NR            | 610    | 925                      | NR            | 740    | 28                       | NR            | 870    | 1                        | NR            | 1000   | 0                        | NR            |
| 485    | 95                       | NR            | 615    | 873                      | NR            | 745    | 24                       | NR            | 875    | 1                        | NR            |        |                          |               |

REPORT NUMBER: SP1-2407-157-4

**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: NR**

**M/P: 2.27**

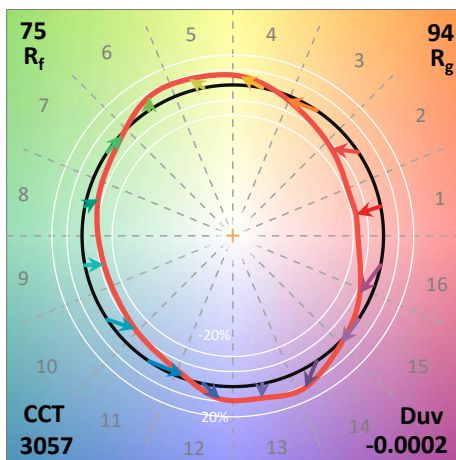
| λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360    | 0                        | NR            | 490    | 104                      | NR            | 620    | 818                      | NR            | 750    | 20                       | NR            | 880    | 1                        | NR            |
| 365    | 0                        | NR            | 495    | 135                      | NR            | 625    | 755                      | NR            | 755    | 17                       | NR            | 885    | 0                        | NR            |
| 370    | 0                        | NR            | 500    | 184                      | NR            | 630    | 691                      | NR            | 760    | 15                       | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 247                      | NR            | 635    | 625                      | NR            | 765    | 13                       | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 309                      | NR            | 640    | 561                      | NR            | 770    | 11                       | NR            | 900    | 0                        | NR            |
| 385    | 0                        | NR            | 515    | 369                      | NR            | 645    | 499                      | NR            | 775    | 9                        | NR            | 905    | 0                        | NR            |
| 390    | 0                        | NR            | 520    | 419                      | NR            | 650    | 441                      | NR            | 780    | 8                        | NR            | 910    | 0                        | NR            |
| 395    | 0                        | NR            | 525    | 460                      | NR            | 655    | 388                      | NR            | 785    | 7                        | NR            | 915    | 0                        | NR            |
| 400    | 1                        | NR            | 530    | 492                      | NR            | 660    | 338                      | NR            | 790    | 6                        | NR            | 920    | 0                        | NR            |
| 405    | 3                        | NR            | 535    | 524                      | NR            | 665    | 294                      | NR            | 795    | 5                        | NR            | 925    | 0                        | NR            |
| 410    | 7                        | NR            | 540    | 553                      | NR            | 670    | 253                      | NR            | 800    | 4                        | NR            | 930    | 0                        | NR            |
| 415    | 15                       | NR            | 545    | 588                      | NR            | 675    | 218                      | NR            | 805    | 4                        | NR            | 935    | 0                        | NR            |
| 420    | 31                       | NR            | 550    | 625                      | NR            | 680    | 188                      | NR            | 810    | 3                        | NR            | 940    | 0                        | NR            |
| 425    | 60                       | NR            | 555    | 670                      | NR            | 685    | 161                      | NR            | 815    | 3                        | NR            | 945    | 0                        | NR            |
| 430    | 107                      | NR            | 560    | 723                      | NR            | 690    | 139                      | NR            | 820    | 3                        | NR            | 950    | 0                        | NR            |
| 435    | 183                      | NR            | 565    | 780                      | NR            | 695    | 118                      | NR            | 825    | 2                        | NR            | 955    | 0                        | NR            |
| 440    | 289                      | NR            | 570    | 837                      | NR            | 700    | 100                      | NR            | 830    | 2                        | NR            | 960    | 0                        | NR            |
| 445    | 460                      | NR            | 575    | 894                      | NR            | 705    | 85                       | NR            | 835    | 2                        | NR            | 965    | 0                        | NR            |
| 450    | 646                      | NR            | 580    | 942                      | NR            | 710    | 73                       | NR            | 840    | 1                        | NR            | 970    | 0                        | NR            |
| 455    | 561                      | NR            | 585    | 976                      | NR            | 715    | 62                       | NR            | 845    | 1                        | NR            | 975    | 0                        | NR            |
| 460    | 331                      | NR            | 590    | 998                      | NR            | 720    | 53                       | NR            | 850    | 1                        | NR            | 980    | 0                        | NR            |
| 465    | 238                      | NR            | 595    | 1000                     | NR            | 725    | 45                       | NR            | 855    | 1                        | NR            | 985    | 0                        | NR            |
| 470    | 178                      | NR            | 600    | 990                      | NR            | 730    | 39                       | NR            | 860    | 1                        | NR            | 990    | 0                        | NR            |
| 475    | 120                      | NR            | 605    | 962                      | NR            | 735    | 33                       | NR            | 865    | 1                        | NR            | 995    | 0                        | NR            |
| 480    | 96                       | NR            | 610    | 925                      | NR            | 740    | 28                       | NR            | 870    | 1                        | NR            | 1000   | 0                        | NR            |
| 485    | 95                       | NR            | 615    | 873                      | NR            | 745    | 24                       | NR            | 875    | 1                        | NR            |        |                          |               |

**Summary**

$R_f = 74.6$   
 $R_g = 94$   
 $CIE R_a = 71.7$   
 $R_9 = -34.8$



**Color Vector Graphics**



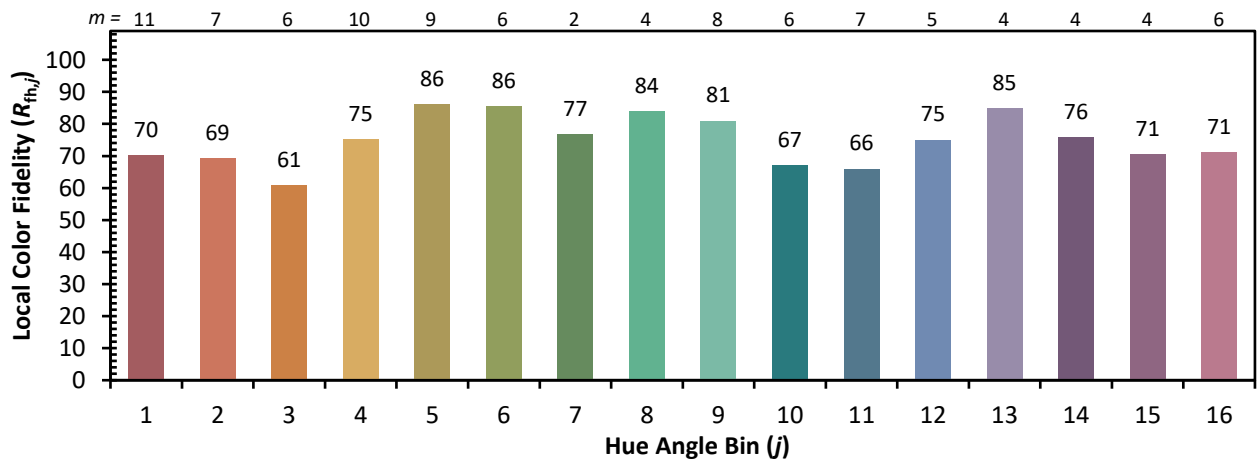


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 65 | CES51 = 87 | CES76 = 58 |
| CES02 = 62 | CES27 = 89 | CES52 = 85 | CES77 = 76 |
| CES03 = 31 | CES28 = 84 | CES53 = 77 | CES78 = 61 |
| CES04 = 71 | CES29 = 68 | CES54 = 85 | CES79 = 86 |
| CES05 = 49 | CES30 = 83 | CES55 = 84 | CES80 = 83 |
| CES06 = 51 | CES31 = 71 | CES56 = 74 | CES81 = 73 |
| CES07 = 41 | CES32 = 64 | CES57 = 74 | CES82 = 93 |
| CES08 = 40 | CES33 = 78 | CES58 = 75 | CES83 = 91 |
| CES09 = 29 | CES34 = 75 | CES59 = 85 | CES84 = 88 |
| CES10 = 76 | CES35 = 87 | CES60 = 90 | CES85 = 75 |
| CES11 = 59 | CES36 = 92 | CES61 = 81 | CES86 = 64 |
| CES12 = 65 | CES37 = 84 | CES62 = 89 | CES87 = 77 |
| CES13 = 43 | CES38 = 92 | CES63 = 75 | CES88 = 80 |
| CES14 = 74 | CES39 = 96 | CES64 = 65 | CES89 = 67 |
| CES15 = 71 | CES40 = 92 | CES65 = 64 | CES90 = 80 |
| CES16 = 47 | CES41 = 93 | CES66 = 60 | CES91 = 78 |
| CES17 = 50 | CES42 = 86 | CES67 = 58 | CES92 = 56 |
| CES18 = 56 | CES43 = 77 | CES68 = 66 | CES93 = 73 |
| CES19 = 73 | CES44 = 99 | CES69 = 75 | CES94 = 49 |
| CES20 = 66 | CES45 = 85 | CES70 = 60 | CES95 = 66 |
| CES21 = 87 | CES46 = 81 | CES71 = 56 | CES96 = 76 |
| CES22 = 79 | CES47 = 86 | CES72 = 85 | CES97 = 82 |
| CES23 = 92 | CES48 = 75 | CES73 = 52 | CES98 = 76 |
| CES24 = 91 | CES49 = 79 | CES74 = 95 | CES99 = 64 |
| CES25 = 73 | CES50 = 86 | CES75 = 60 |            |



Color Rendition by Hue-Angle Bin



Measure Comparisons



(END OF REPORT)