

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: P867582

Luminaire Tested: **MEM2-HTN-SA-40-730-U-T2U-HSS**

Issue Date: 08/21/2024



**Test Information**

Test Method: LM-79-08  
Report Number: P867582  
Test Lab: INNOVATION CENTER(G3)  
Issue Date: 08/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: STREETWORKS  
Catalog Number: MEM2-HTN-SA-40-730-U-T2U-HSS  
Description: EPIC MODERN TALL HOUSING DISCRETE LED ARRAYS 40W 70CRI 3000K  
FIXTURE w/ TYPE II URBAN DISTRIBUTION OPTIC AND HOUSE SIDE SHIELD  
Light Source: (10) 3000K CCT, 70 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

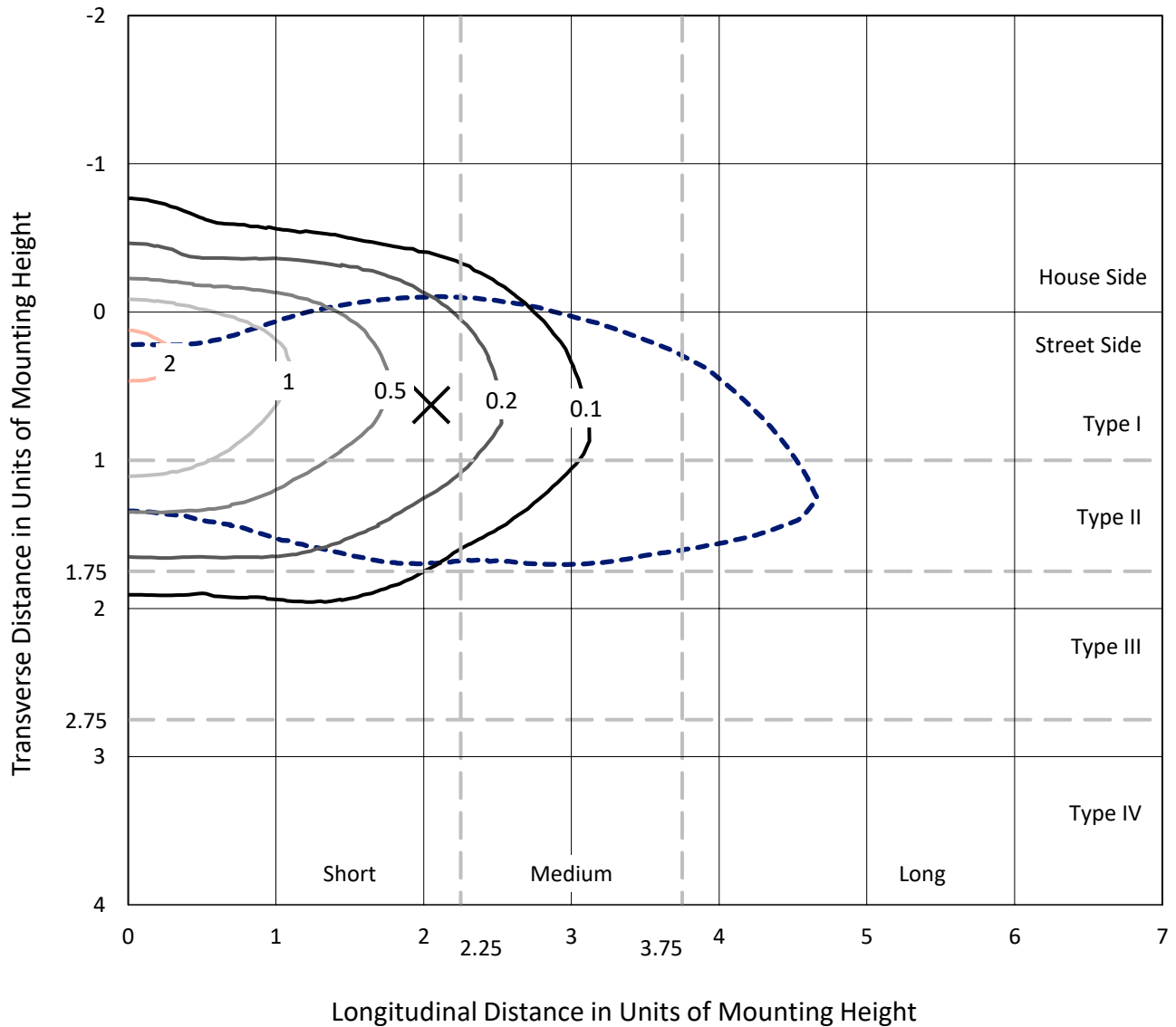
Lumens per Lamp: N/A  
Luminaire Lumens: 3167.5 lumens  
Efficiency: N/A  
Efficacy: 96.6 lumens/watt  
Luminous Opening: Rectangular (W 0.33' x L: 0.33' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B1 - U0 - G1

Input Watts (W): 32.8  
Input Voltage (V): 120  
Input Current (A<sub>in</sub>): NR  
Voltage Rise (V): NR  
Power Factor: 0.99  
Total Harmonic Distortion (THDi): 9.76%  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT

REPORT NUMBER: P867582  
 CATALOG NUMBER: MEM2-HTN-SA-40-730-U-T2U-HSS

### Iso-Footcandle Lines of Horizontal Illumination

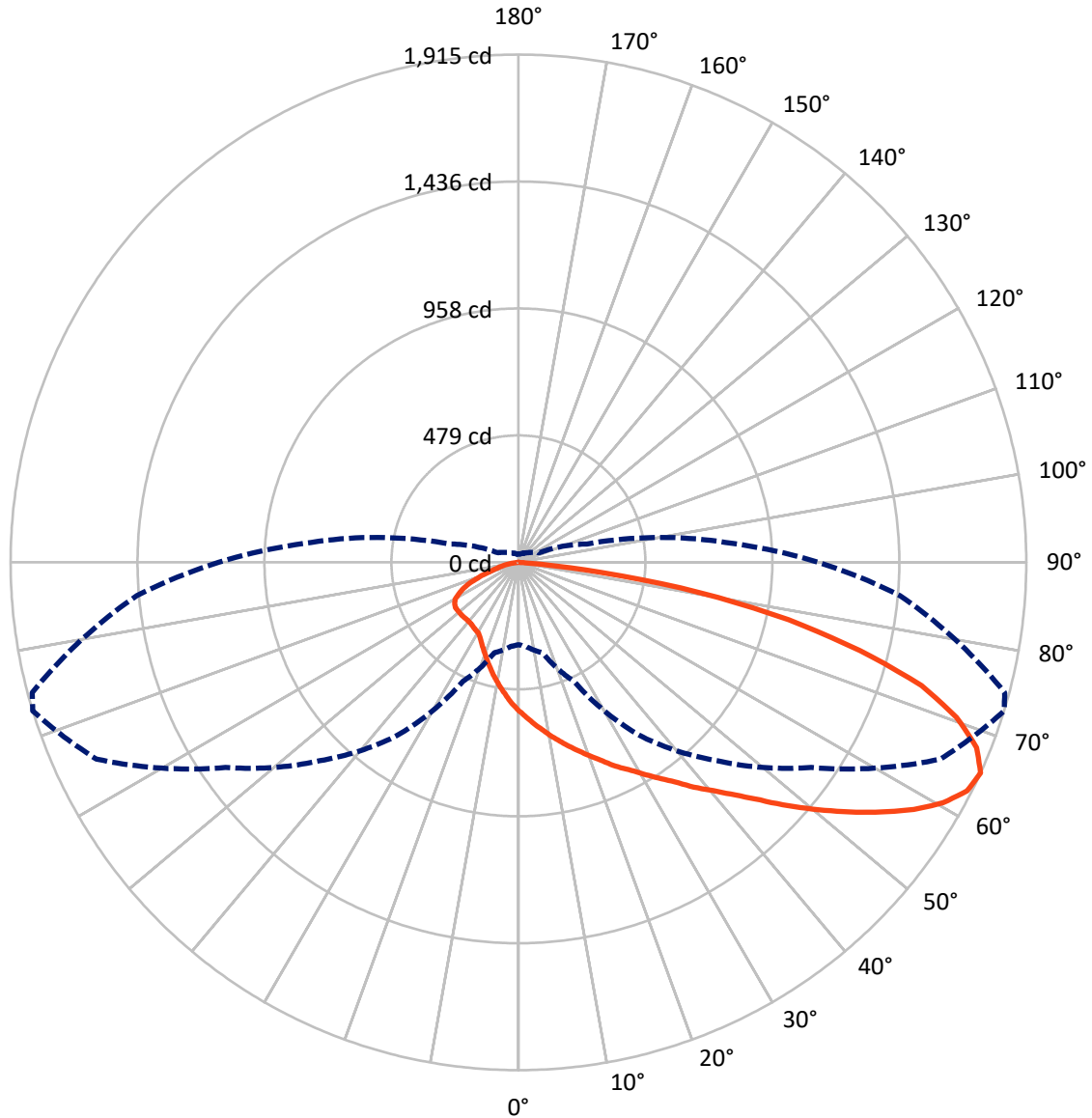
× Max cd  
 - - - 1/2 Max cd



Based on 20 foot mounting height. Maximum calculated value = 2.3 fc  
 Type II - Short - N/A

REPORT NUMBER: P867582  
CATALOG NUMBER: MEM2-HTN-SA-40-730-U-T2U-HSS

### Luminous Intensity Polar Plot



— Vertical Plane Through 73-Deg Lateral      - - - Horizontal Cone Through 65-Deg Vertical

REPORT NUMBER: P867582

CATALOG NUMBER: MEM2-HTN-SA-40-730-U-T2U-HSS

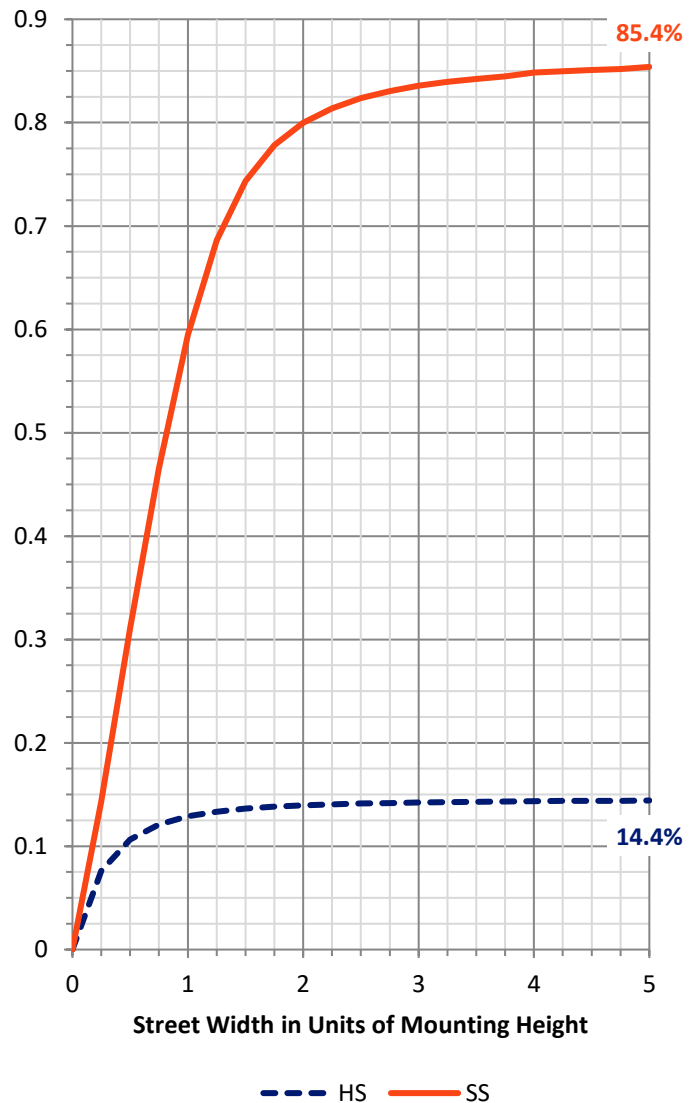
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 460.6    | 0.0    | 460.6  |
|                    | % Fixture | 14.5     | 0.0    | 14.5   |
| <b>Street Side</b> | Lumens    | 2706.9   | 0.0    | 2706.9 |
|                    | % Fixture | 85.5     | 0.0    | 85.5   |
| <b>Total</b>       | Lumens    | 3167.5   | 0.0    | 3167.5 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**Coefficient of Utilization**

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 54.2   | 1.7       |
| 10°-20°   | 164.8  | 5.2       |
| 20°-30°   | 276.1  | 8.7       |
| 30°-40°   | 416.4  | 13.1      |
| 40°-50°   | 588.4  | 18.6      |
| 50°-60°   | 662.1  | 20.9      |
| 60°-70°   | 593.7  | 18.7      |
| 70°-80°   | 361.1  | 11.4      |
| 80°-90°   | 50.5   | 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°    | 3167.5 | 100.0     |
| 0°-180°   | 3167.5 | 100.0     |



REPORT NUMBER: P867582

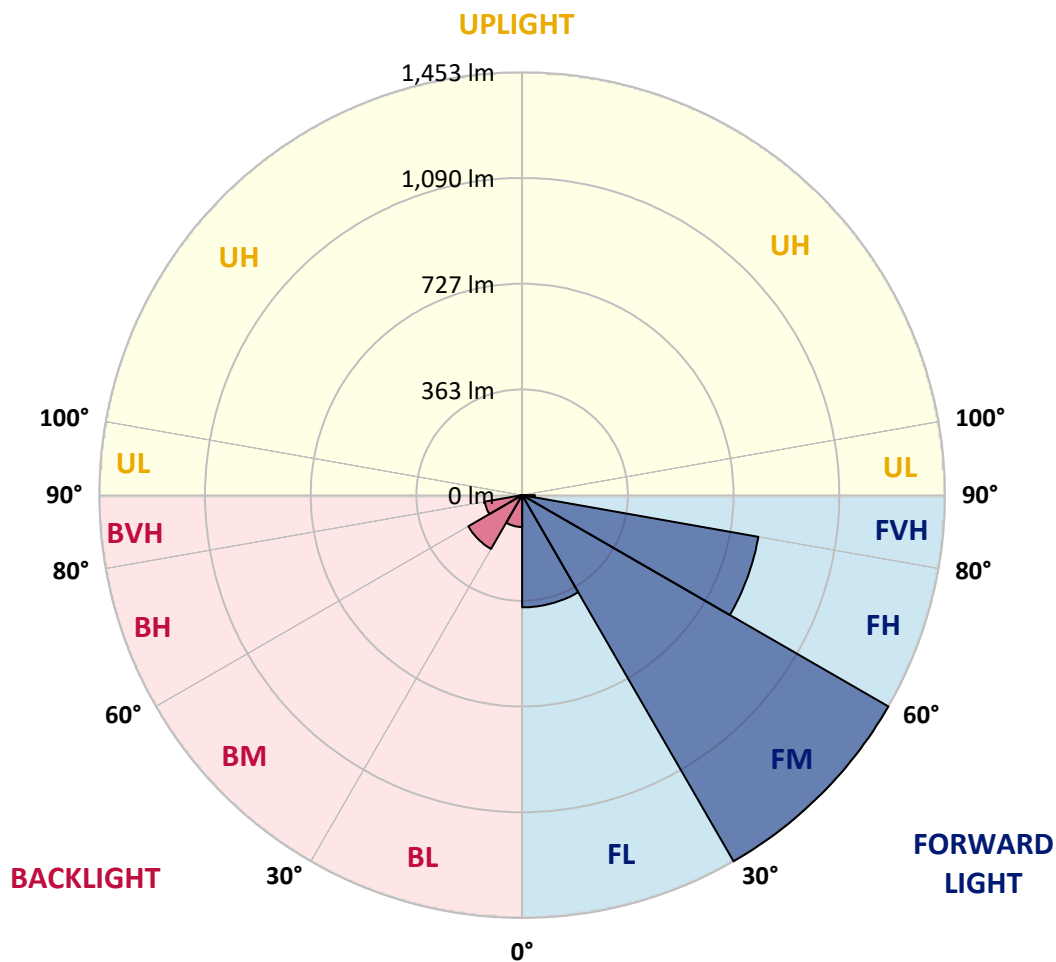
CATALOG NUMBER: MEM2-HTN-SA-40-730-U-T2U-HSS

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

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|--------|-----------|-------------------------|------|---------|
|                |        |           | B                       | U    | G       |
| FL (0°-30°)    | 385.7  | 12.2      |                         |      |         |
| FM (30°-60°)   | 1453.4 | 45.9      |                         |      |         |
| FH (60°-80°)   | 824.4  | 26.0      |                         |      | G1/1800 |
| FVH (80°-90°)  | 43.4   | 1.4       |                         |      | G1/100  |
| BL (0°-30°)    | 109.4  | 3.5       | B0/110                  |      |         |
| BM (30°-60°)   | 213.6  | 6.7       | B0/220                  |      |         |
| BH (60°-80°)   | 130.5  | 4.1       | B1/500                  |      | G1/500  |
| BVH (80°-90°)  | 7.1    | 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-G1**

Type II Short





REPORT NUMBER: P867582

CATALOG NUMBER: MEM2-HTN-SA-40-730-U-T2U-HSS

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 73°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 561.9  | 561.9  | 561.9  | 561.9  | 561.9  | 561.9  | 561.9  | 561.9  | 561.9  | 561.9  | 561.9  |
| 2.5°  | 648.6  | 644.9  | 639.3  | 634.6  | 626.2  | 615.0  | 605.7  | 593.6  | 585.2  | 582.4  | 570.3  |
| 5°    | 742.7  | 738.1  | 731.5  | 720.3  | 698.0  | 684.9  | 660.7  | 632.7  | 610.4  | 605.7  | 577.8  |
| 7.5°  | 839.6  | 837.8  | 822.9  | 806.1  | 779.1  | 750.2  | 712.9  | 669.1  | 636.5  | 629.0  | 586.2  |
| 10°   | 921.6  | 913.2  | 904.9  | 889.0  | 860.1  | 819.1  | 770.7  | 710.1  | 664.4  | 652.3  | 594.5  |
| 12.5° | 971.0  | 968.2  | 960.8  | 942.1  | 914.2  | 878.8  | 821.0  | 750.2  | 691.5  | 674.7  | 602.9  |
| 15°   | 1007.4 | 1010.2 | 1002.7 | 990.6  | 961.7  | 928.2  | 872.2  | 792.1  | 720.3  | 700.8  | 612.2  |
| 17.5° | 1041.8 | 1040.0 | 1039.1 | 1025.1 | 999.0  | 965.4  | 908.6  | 826.6  | 749.2  | 727.8  | 621.6  |
| 20°   | 1061.4 | 1062.3 | 1060.5 | 1054.9 | 1029.7 | 997.1  | 944.0  | 867.6  | 780.9  | 756.7  | 633.7  |
| 22.5° | 1071.7 | 1075.4 | 1079.1 | 1078.2 | 1057.7 | 1032.5 | 977.5  | 900.2  | 813.5  | 788.4  | 648.6  |
| 25°   | 1078.2 | 1081.0 | 1089.4 | 1100.6 | 1081.9 | 1061.4 | 1014.8 | 939.3  | 851.7  | 822.9  | 666.3  |
| 27.5° | 1083.8 | 1087.5 | 1097.8 | 1114.5 | 1099.6 | 1087.5 | 1047.4 | 972.9  | 884.4  | 858.3  | 686.8  |
| 30°   | 1120.1 | 1124.8 | 1124.8 | 1133.2 | 1116.4 | 1113.6 | 1083.8 | 1013.0 | 925.4  | 897.4  | 712.9  |
| 32.5° | 1216.1 | 1206.8 | 1190.0 | 1181.6 | 1141.6 | 1142.5 | 1119.2 | 1053.0 | 969.2  | 941.2  | 745.5  |
| 35°   | 1299.0 | 1299.0 | 1278.5 | 1251.5 | 1187.2 | 1174.2 | 1160.2 | 1106.1 | 1016.7 | 989.7  | 788.4  |
| 37.5° | 1379.2 | 1380.1 | 1358.7 | 1335.4 | 1261.8 | 1215.2 | 1207.7 | 1157.4 | 1075.4 | 1043.7 | 833.1  |
| 40°   | 1429.5 | 1435.1 | 1429.5 | 1411.8 | 1341.0 | 1286.9 | 1254.3 | 1215.2 | 1131.3 | 1107.1 | 884.4  |
| 42.5° | 1437.9 | 1449.1 | 1469.6 | 1475.2 | 1398.8 | 1351.2 | 1314.0 | 1274.8 | 1198.4 | 1171.4 | 943.1  |
| 45°   | 1416.5 | 1420.2 | 1465.9 | 1472.4 | 1441.6 | 1402.5 | 1377.3 | 1344.7 | 1278.5 | 1255.2 | 1008.3 |
| 47.5° | 1357.8 | 1350.3 | 1366.1 | 1423.0 | 1435.1 | 1433.2 | 1439.8 | 1423.9 | 1371.7 | 1341.9 | 1080.1 |
| 50°   | 1232.0 | 1234.7 | 1286.0 | 1355.0 | 1396.9 | 1444.4 | 1486.4 | 1504.1 | 1465.9 | 1436.0 | 1157.4 |
| 52.5° | 1002.7 | 1015.8 | 1113.6 | 1276.7 | 1349.4 | 1437.0 | 1519.9 | 1579.5 | 1563.7 | 1534.8 | 1233.8 |
| 55°   | 823.8  | 843.4  | 941.2  | 1150.9 | 1284.1 | 1400.6 | 1539.5 | 1658.8 | 1661.5 | 1639.2 | 1303.7 |
| 57.5° | 644.9  | 660.7  | 764.1  | 956.1  | 1190.9 | 1343.8 | 1542.3 | 1726.8 | 1758.5 | 1732.4 | 1365.2 |
| 60°   | 505.1  | 516.3  | 576.8  | 796.8  | 1076.3 | 1262.7 | 1521.8 | 1780.8 | 1840.5 | 1820.9 | 1418.3 |
| 62.5° | 383.0  | 391.4  | 445.4  | 630.0  | 935.6  | 1167.7 | 1452.8 | 1800.4 | 1898.2 | 1879.6 | 1448.1 |
| 65°   | 310.3  | 317.8  | 353.2  | 494.8  | 796.8  | 1057.7 | 1348.4 | 1755.7 | 1915.0 | 1898.2 | 1444.4 |
| 67.5° | 253.5  | 256.3  | 285.2  | 385.8  | 673.8  | 933.7  | 1195.6 | 1639.2 | 1863.8 | 1862.8 | 1401.6 |
| 70°   | 205.0  | 212.5  | 236.7  | 307.5  | 560.1  | 791.2  | 1017.6 | 1456.5 | 1752.9 | 1762.2 | 1315.8 |
| 72.5° | 174.3  | 176.1  | 197.6  | 254.4  | 456.6  | 642.1  | 842.4  | 1245.9 | 1589.8 | 1597.2 | 1181.6 |
| 75°   | 147.2  | 150.0  | 165.9  | 205.9  | 370.9  | 509.7  | 677.5  | 1006.4 | 1330.7 | 1362.4 | 995.3  |
| 77.5° | 126.7  | 127.7  | 138.9  | 169.6  | 263.7  | 383.0  | 496.7  | 754.8  | 1041.8 | 1064.2 | 781.9  |
| 80°   | 99.7   | 101.6  | 113.7  | 134.2  | 183.6  | 248.8  | 342.9  | 516.3  | 696.1  | 721.3  | 541.4  |
| 82.5° | 46.6   | 52.2   | 55.0   | 73.6   | 96.0   | 123.0  | 162.1  | 215.3  | 315.0  | 314.0  | 252.5  |
| 85°   | 4.7    | 3.7    | 3.7    | 5.6    | 8.4    | 8.4    | 10.3   | 12.1   | 24.2   | 28.9   | 22.4   |
| 87.5° | 0.0    | 0.0    | 0.0    | 0.9    | 1.9    | 1.9    | 1.9    | 2.8    | 2.8    | 2.8    | 2.8    |
| 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: P867582

CATALOG NUMBER: MEM2-HTN-SA-40-730-U-T2U-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°   | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 561.9  | 561.9 | 561.9 | 561.9 | 561.9 | 561.9 | 561.9 | 561.9 | 561.9 | 561.9 | 561.9 |
| 2.5°  | 564.7  | 556.3 | 541.4 | 527.4 | 518.1 | 510.7 | 498.6 | 491.1 | 485.5 | 478.1 | 477.1 |
| 5°    | 562.9  | 547.9 | 518.1 | 493.0 | 468.7 | 448.2 | 426.8 | 413.8 | 399.8 | 393.3 | 398.8 |
| 7.5°  | 564.7  | 540.5 | 493.9 | 455.7 | 419.3 | 386.7 | 358.8 | 341.1 | 328.0 | 321.5 | 322.4 |
| 10°   | 565.7  | 534.0 | 473.4 | 420.3 | 373.7 | 335.5 | 303.8 | 279.6 | 263.7 | 260.0 | 255.3 |
| 12.5° | 563.8  | 525.6 | 452.9 | 385.8 | 329.9 | 288.0 | 250.7 | 232.0 | 216.2 | 208.7 | 208.7 |
| 15°   | 565.7  | 519.1 | 431.5 | 354.1 | 290.7 | 242.3 | 210.6 | 190.1 | 180.8 | 174.3 | 175.2 |
| 17.5° | 565.7  | 513.5 | 411.0 | 323.4 | 252.5 | 207.8 | 178.9 | 162.1 | 152.8 | 149.1 | 148.2 |
| 20°   | 572.2  | 508.8 | 391.4 | 294.5 | 219.0 | 177.1 | 153.8 | 140.7 | 133.3 | 129.5 | 127.7 |
| 22.5° | 576.8  | 505.1 | 373.7 | 266.5 | 191.0 | 154.7 | 135.1 | 123.0 | 117.4 | 115.6 | 115.6 |
| 25°   | 585.2  | 504.1 | 357.8 | 239.5 | 168.7 | 137.9 | 120.2 | 110.9 | 106.2 | 104.4 | 104.4 |
| 27.5° | 597.3  | 506.0 | 342.9 | 216.2 | 151.9 | 121.1 | 108.1 | 100.6 | 97.8  | 96.9  | 96.0  |
| 30°   | 615.0  | 514.4 | 333.6 | 198.5 | 136.1 | 110.9 | 98.8  | 94.1  | 92.3  | 91.3  | 91.3  |
| 32.5° | 638.3  | 529.3 | 329.9 | 189.2 | 126.7 | 102.5 | 92.3  | 88.5  | 86.7  | 86.7  | 85.7  |
| 35°   | 667.2  | 546.1 | 327.1 | 180.8 | 120.2 | 96.9  | 87.6  | 83.9  | 82.9  | 82.9  | 82.9  |
| 37.5° | 701.7  | 563.8 | 322.4 | 175.2 | 116.5 | 92.3  | 83.9  | 80.1  | 80.1  | 80.1  | 80.1  |
| 40°   | 739.9  | 589.9 | 321.5 | 171.5 | 113.7 | 89.5  | 80.1  | 76.4  | 76.4  | 76.4  | 76.4  |
| 42.5° | 782.8  | 617.8 | 320.6 | 168.7 | 111.8 | 87.6  | 76.4  | 72.7  | 72.7  | 72.7  | 72.7  |
| 45°   | 835.0  | 653.3 | 322.4 | 166.8 | 111.8 | 85.7  | 73.6  | 69.0  | 68.0  | 68.0  | 68.0  |
| 47.5° | 886.2  | 686.8 | 324.3 | 164.9 | 110.0 | 82.9  | 69.9  | 65.2  | 64.3  | 63.4  | 63.4  |
| 50°   | 941.2  | 721.3 | 324.3 | 163.1 | 108.1 | 80.1  | 67.1  | 60.6  | 59.6  | 58.7  | 58.7  |
| 52.5° | 995.3  | 750.2 | 325.2 | 160.3 | 103.4 | 75.5  | 62.4  | 56.8  | 55.0  | 54.0  | 53.1  |
| 55°   | 1047.4 | 780.9 | 326.2 | 155.6 | 97.8  | 70.8  | 59.6  | 53.1  | 50.3  | 48.5  | 48.5  |
| 57.5° | 1086.6 | 806.1 | 321.5 | 146.3 | 90.4  | 66.2  | 55.0  | 48.5  | 44.7  | 42.9  | 42.9  |
| 60°   | 1123.9 | 821.9 | 313.1 | 132.3 | 82.9  | 61.5  | 51.3  | 43.8  | 40.1  | 38.2  | 38.2  |
| 62.5° | 1138.8 | 824.7 | 293.5 | 108.1 | 73.6  | 56.8  | 46.6  | 40.1  | 37.3  | 36.3  | 36.3  |
| 65°   | 1130.4 | 812.6 | 267.5 | 85.7  | 65.2  | 51.3  | 42.9  | 37.3  | 33.5  | 30.8  | 30.8  |
| 67.5° | 1084.7 | 770.7 | 232.0 | 68.0  | 56.8  | 46.6  | 39.1  | 33.5  | 29.8  | 27.0  | 27.0  |
| 70°   | 998.0  | 703.6 | 180.8 | 54.0  | 49.4  | 41.0  | 35.4  | 30.8  | 27.0  | 24.2  | 24.2  |
| 72.5° | 870.4  | 610.4 | 131.4 | 45.7  | 42.9  | 36.3  | 31.7  | 28.0  | 24.2  | 22.4  | 22.4  |
| 75°   | 717.6  | 470.6 | 93.2  | 39.1  | 38.2  | 32.6  | 28.9  | 25.2  | 22.4  | 20.5  | 20.5  |
| 77.5° | 538.6  | 328.0 | 72.7  | 34.5  | 33.5  | 29.8  | 26.1  | 23.3  | 20.5  | 19.6  | 18.6  |
| 80°   | 358.8  | 203.2 | 55.0  | 26.1  | 25.2  | 23.3  | 21.4  | 19.6  | 16.8  | 14.9  | 14.9  |
| 82.5° | 160.3  | 85.7  | 28.0  | 14.9  | 13.0  | 11.2  | 9.3   | 6.5   | 6.5   | 5.6   | 5.6   |
| 85°   | 16.8   | 11.2  | 5.6   | 3.7   | 3.7   | 2.8   | 2.8   | 2.8   | 1.9   | 1.9   | 1.9   |
| 87.5° | 2.8    | 2.8   | 1.9   | 1.9   | 1.9   | 0.9   | 0.9   | 0.9   | 0.9   | 0.9   | 0.9   |
| 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: 4π  
 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

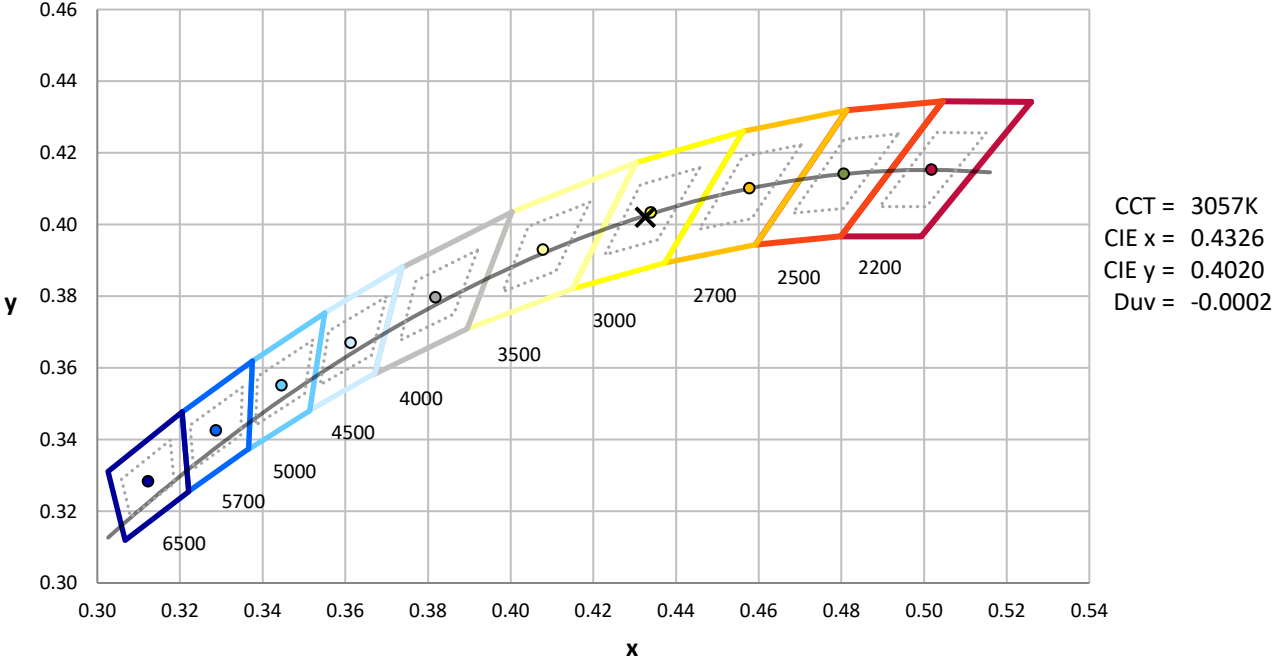
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| 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



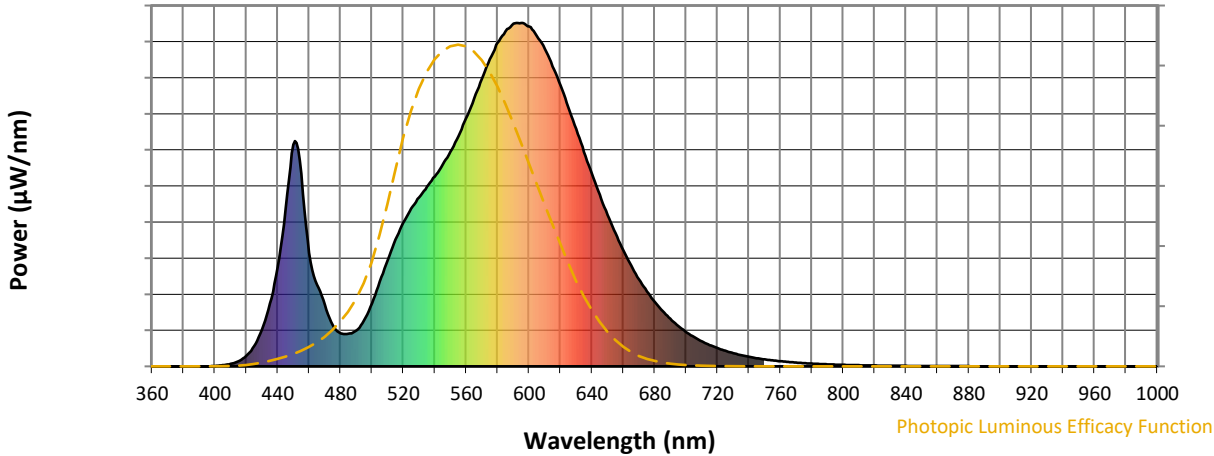
CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles



Point lies inside the ANSI 3000K 4-step quadrangle

REPORT NUMBER: SP1-2407-157-4

**Photopic Flux vs. Wavelength**



**Photopic Lumens: NR**

| $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /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**

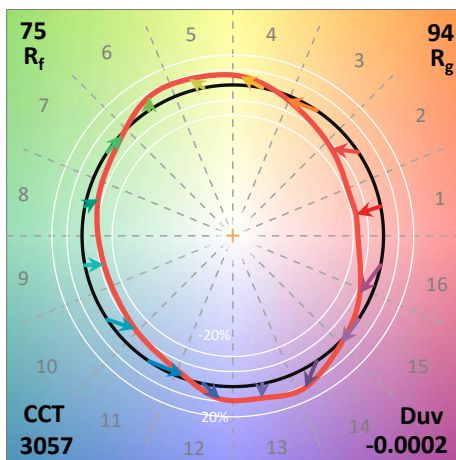
| $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /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                      |                   |                             |                         |

**Summary**

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



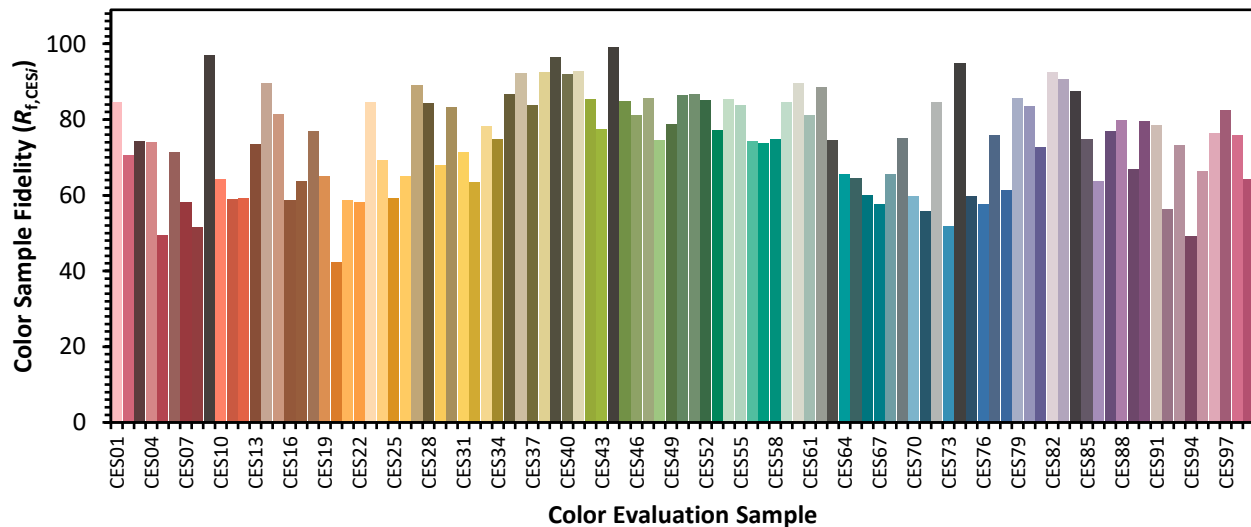
**Color Vector Graphics**



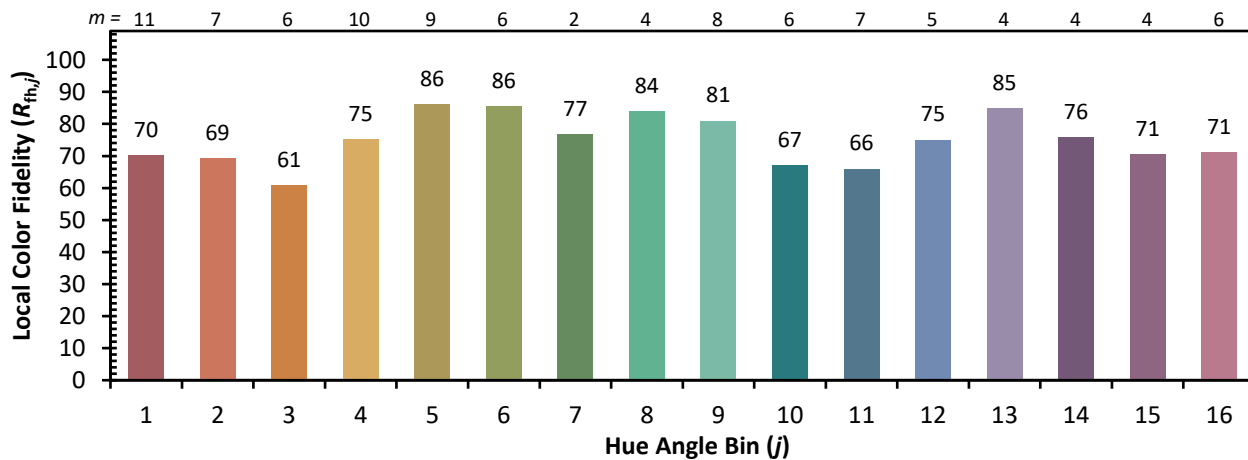


Individual Sample Fidelity Index ( $R_{f,i}$ )

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