

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: P868065

Luminaire Tested: **MEM2-HSN-SA-40-727-U-T3-HSS**

Issue Date: 08/21/2024



**Test Information**

Test Method: LM-79-08  
Report Number: P868065  
Test Lab: INNOVATION CENTER(G3)  
Issue Date: 08/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: STREETWORKS  
Catalog Number: MEM2-HSN-SA-40-727-U-T3-HSS  
Description: EPIC MODERN SHORT HOUSING DISCRETE LED ARRAYS 40W 70CRI 2700K  
FITXURE w/ TYPE III DISTRIBUTION OPTIC AND HOUSE SIDE SHIELD  
Light Source: (10) 2700K CCT, 70 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

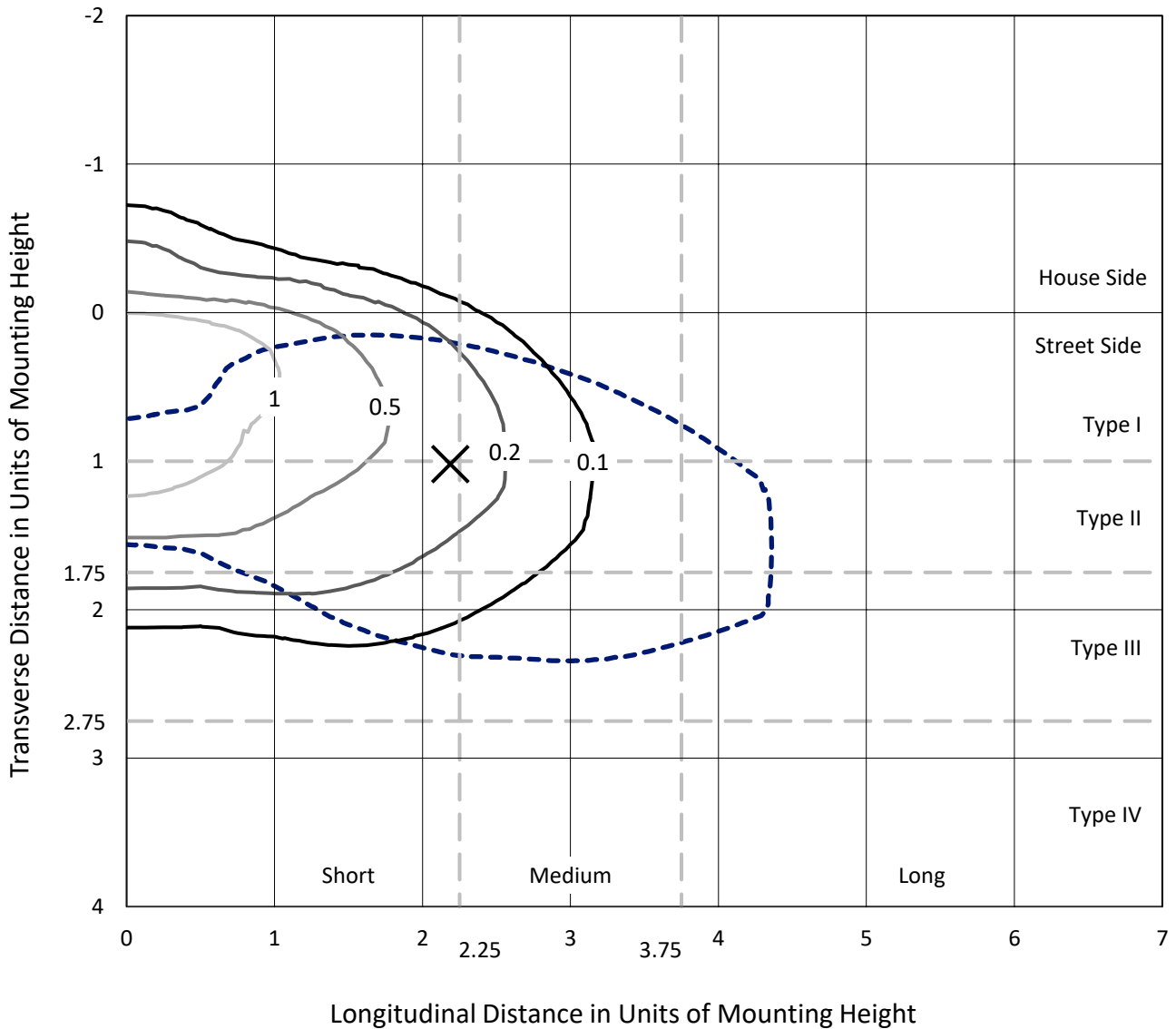
Lumens per Lamp: N/A  
Luminaire Lumens: 3195.9 lumens  
Efficiency: N/A  
Efficacy: 97.4 lumens/watt  
Luminous Opening: Rectangular (W 0.33' x L: 0.33' x H: 0')  
IES Classification: Type III - Short  
BUG Rating: B0 - U0 - G1

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

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### Iso-Footcandle Lines of Horizontal Illumination

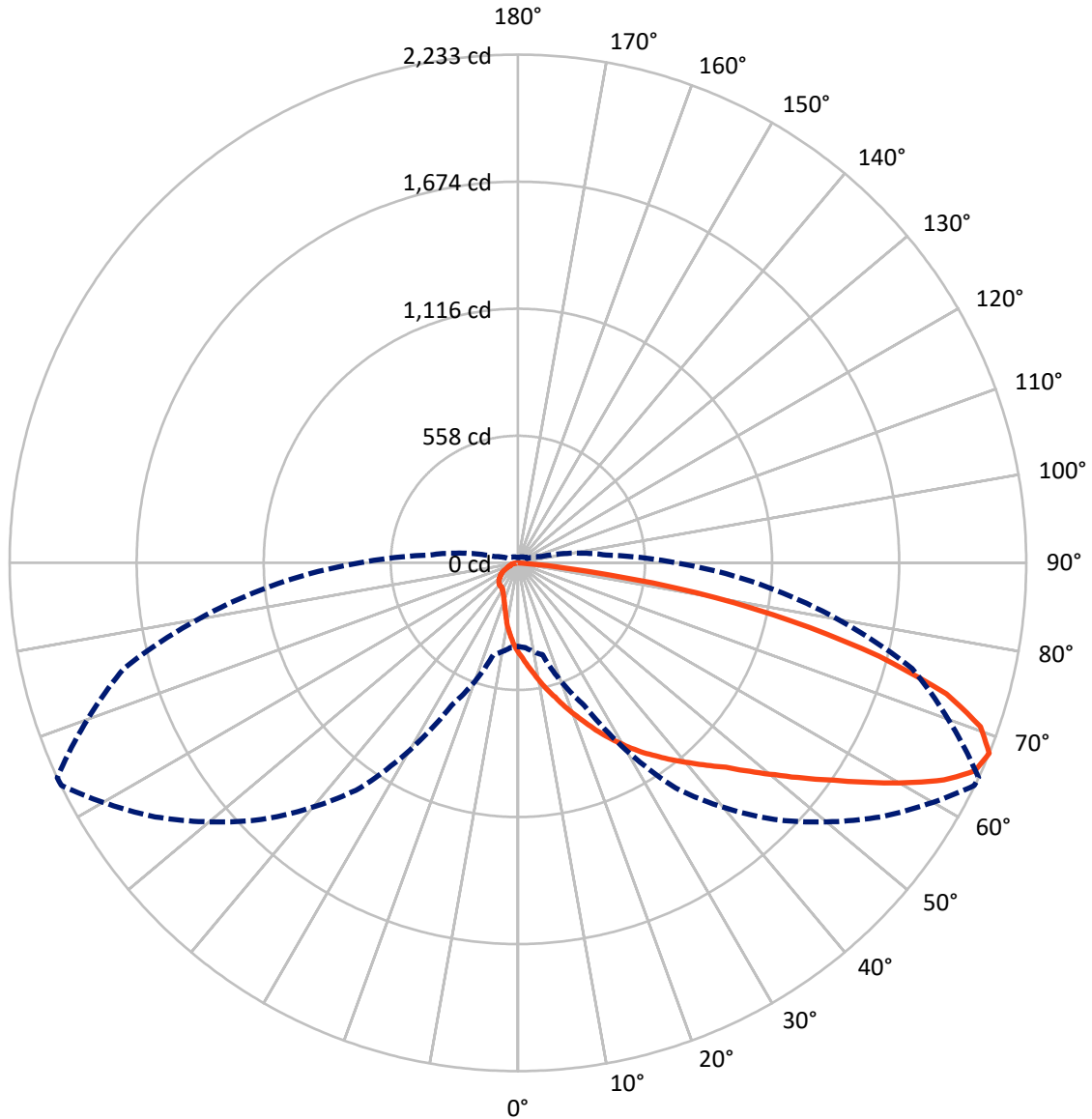
× Max cd  
 - - - 1/2 Max cd



Based on 20 foot mounting height. Maximum calculated value = 1.8 fc  
 Type III - Short - N/A

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### Luminous Intensity Polar Plot



— Vertical Plane Through 65-Deg Lateral    - - - Horizontal Cone Through 67.5-Deg Vertical

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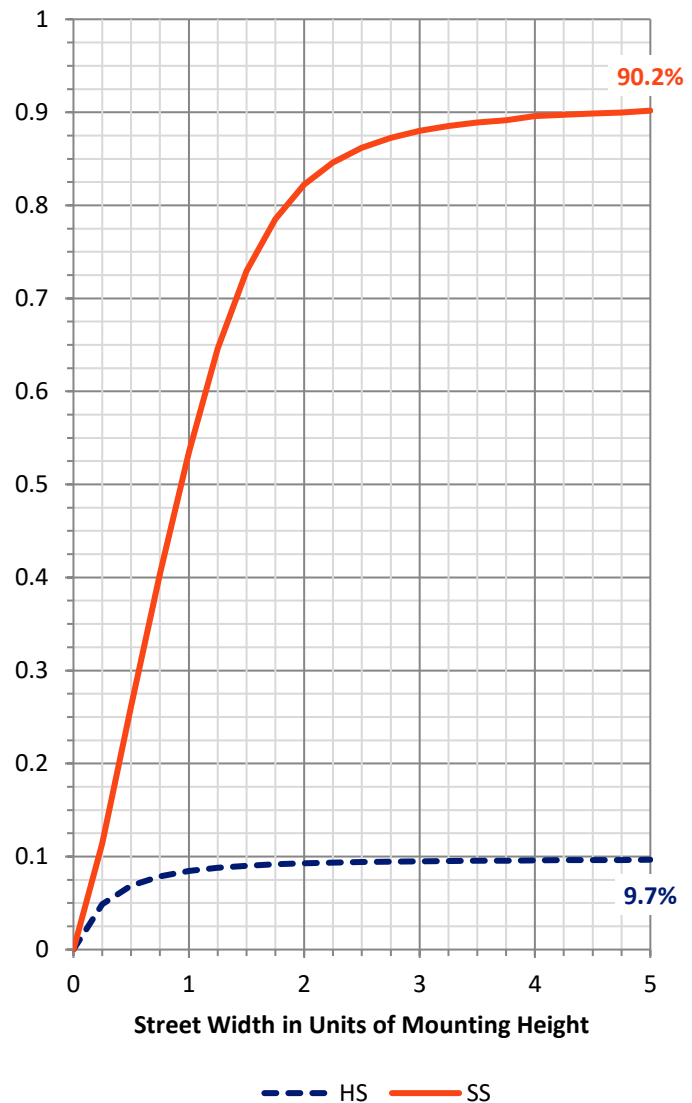
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 311.1    | 0.0    | 311.1  |
|                    | % Fixture | 9.7      | 0.0    | 9.7    |
| <b>Street Side</b> | Lumens    | 2884.8   | 0.0    | 2884.8 |
|                    | % Fixture | 90.3     | 0.0    | 90.3   |
| <b>Total</b>       | Lumens    | 3195.9   | 0.0    | 3195.9 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**Coefficient of Utilization**

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 38.6   | 1.2       |
| 10°-20°   | 128.2  | 4.0       |
| 20°-30°   | 233.4  | 7.3       |
| 30°-40°   | 361.2  | 11.3      |
| 40°-50°   | 546.0  | 17.1      |
| 50°-60°   | 710.4  | 22.2      |
| 60°-70°   | 700.8  | 21.9      |
| 70°-80°   | 426.6  | 13.3      |
| 80°-90°   | 50.7   | 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°    | 3195.9 | 100.0     |
| 0°-180°   | 3195.9 | 100.0     |



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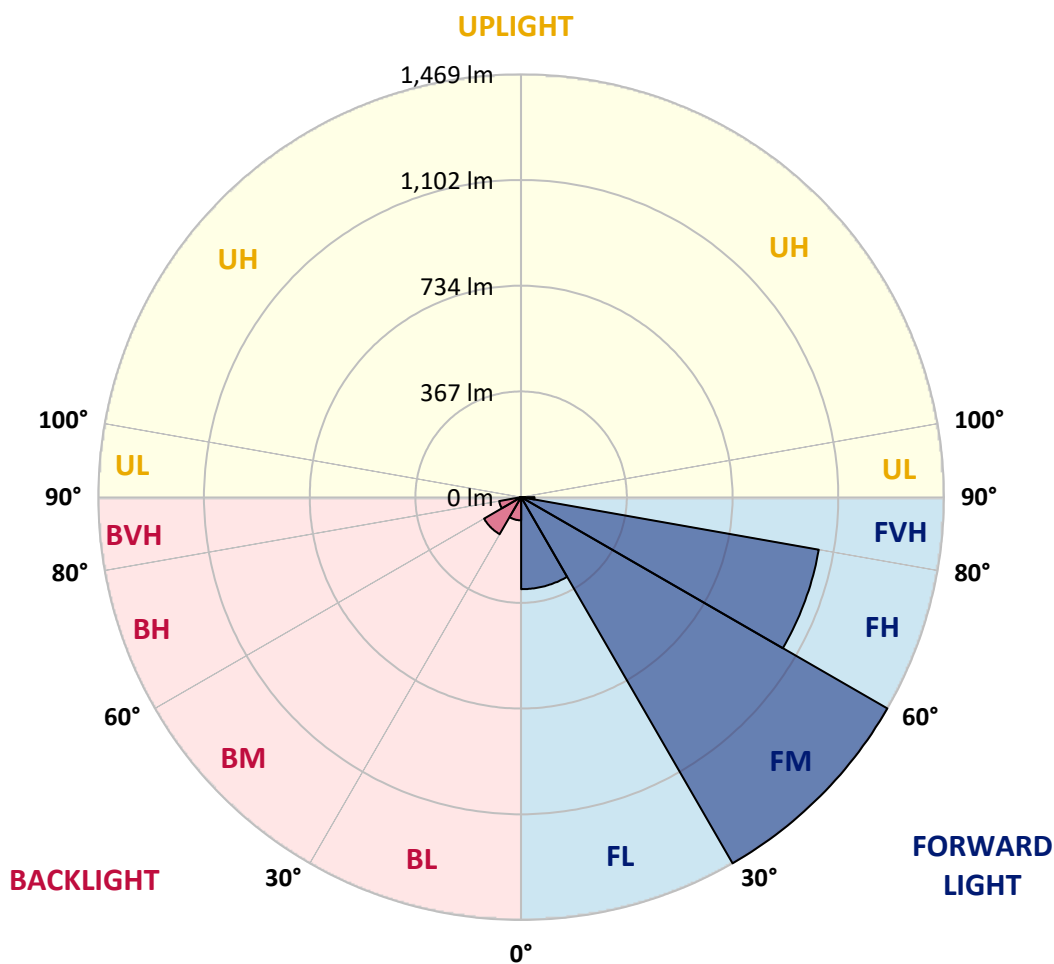
CATALOG NUMBER: MEM2-HSN-SA-40-727-U-T3-HSS

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

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|--------|-----------|-------------------------|------|---------|
|                |        |           | B                       | U    | G       |
| FL (0°-30°)    | 319.8  | 10.0      |                         |      |         |
| FM (30°-60°)   | 1468.8 | 46.0      |                         |      |         |
| FH (60°-80°)   | 1049.9 | 32.9      |                         |      | G1/1800 |
| FVH (80°-90°)  | 46.3   | 1.5       |                         |      | G1/100  |
| BL (0°-30°)    | 80.5   | 2.5       | B0/110                  |      |         |
| BM (30°-60°)   | 148.8  | 4.7       | B0/220                  |      |         |
| BH (60°-80°)   | 77.5   | 2.4       | B0/110                  |      | G0/110  |
| BVH (80°-90°)  | 4.3    | 0.1       |                         |      | 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 III Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 64°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 394.9  | 394.9  | 394.9  | 394.9  | 394.9  | 394.9  | 394.9  | 394.9  | 394.9  | 394.9  | 394.9  |
| 2.5°  | 461.5  | 457.8  | 460.6  | 454.2  | 446.9  | 441.4  | 430.5  | 421.4  | 420.4  | 411.3  | 401.3  |
| 5°    | 550.0  | 538.1  | 539.0  | 526.2  | 510.7  | 494.3  | 477.0  | 454.2  | 454.2  | 432.3  | 409.5  |
| 7.5°  | 629.3  | 627.5  | 619.3  | 599.2  | 581.0  | 555.4  | 523.5  | 494.3  | 487.9  | 454.2  | 418.6  |
| 10°   | 705.9  | 703.2  | 695.9  | 680.4  | 649.4  | 621.1  | 581.0  | 537.2  | 529.0  | 480.6  | 429.6  |
| 12.5° | 767.0  | 767.9  | 759.7  | 747.0  | 719.6  | 685.8  | 632.9  | 578.2  | 570.9  | 506.2  | 440.5  |
| 15°   | 820.8  | 819.9  | 818.1  | 807.1  | 780.7  | 749.7  | 687.7  | 623.8  | 612.0  | 533.5  | 451.5  |
| 17.5° | 861.9  | 860.0  | 856.4  | 847.3  | 834.5  | 804.4  | 745.1  | 672.2  | 662.1  | 565.5  | 464.2  |
| 20°   | 873.7  | 872.8  | 872.8  | 879.2  | 873.7  | 855.5  | 802.6  | 722.3  | 711.4  | 599.2  | 481.6  |
| 22.5° | 895.6  | 894.7  | 893.8  | 900.2  | 903.8  | 902.0  | 856.4  | 773.4  | 763.4  | 638.4  | 503.4  |
| 25°   | 923.9  | 922.1  | 919.3  | 925.7  | 930.3  | 941.2  | 910.2  | 833.6  | 821.7  | 684.0  | 525.3  |
| 27.5° | 961.3  | 963.1  | 959.5  | 958.5  | 958.5  | 964.9  | 957.6  | 887.4  | 876.5  | 727.8  | 550.9  |
| 30°   | 1010.5 | 1013.3 | 1006.9 | 1002.3 | 994.1  | 993.2  | 995.0  | 947.6  | 932.1  | 775.2  | 577.3  |
| 32.5° | 1058.9 | 1061.6 | 1058.0 | 1051.6 | 1030.6 | 1022.4 | 1029.7 | 998.7  | 988.6  | 827.2  | 611.1  |
| 35°   | 1098.1 | 1104.5 | 1104.5 | 1091.7 | 1062.5 | 1058.0 | 1069.8 | 1048.8 | 1041.5 | 888.3  | 651.2  |
| 37.5° | 1151.0 | 1154.6 | 1151.0 | 1127.3 | 1090.8 | 1096.3 | 1114.5 | 1101.7 | 1097.2 | 954.0  | 698.6  |
| 40°   | 1264.1 | 1268.6 | 1244.9 | 1188.4 | 1130.0 | 1136.4 | 1168.3 | 1161.0 | 1153.7 | 1018.7 | 742.4  |
| 42.5° | 1421.9 | 1410.9 | 1406.4 | 1280.5 | 1190.2 | 1186.6 | 1226.7 | 1216.6 | 1215.7 | 1084.4 | 782.5  |
| 45°   | 1525.8 | 1529.5 | 1506.7 | 1387.2 | 1317.0 | 1248.6 | 1291.4 | 1287.8 | 1280.5 | 1151.0 | 830.9  |
| 47.5° | 1597.9 | 1589.7 | 1533.1 | 1475.7 | 1489.3 | 1329.7 | 1363.5 | 1372.6 | 1368.0 | 1226.7 | 890.1  |
| 50°   | 1628.0 | 1619.8 | 1582.4 | 1544.1 | 1560.5 | 1422.8 | 1437.4 | 1467.5 | 1462.9 | 1303.3 | 940.3  |
| 52.5° | 1590.6 | 1580.5 | 1583.3 | 1593.3 | 1585.1 | 1495.7 | 1528.6 | 1576.0 | 1570.5 | 1392.7 | 998.7  |
| 55°   | 1352.5 | 1379.0 | 1481.1 | 1583.3 | 1580.5 | 1551.4 | 1626.1 | 1695.5 | 1684.5 | 1485.7 | 1048.8 |
| 57.5° | 1090.8 | 1105.4 | 1234.9 | 1511.2 | 1566.0 | 1597.9 | 1737.4 | 1823.1 | 1819.5 | 1578.7 | 1094.4 |
| 60°   | 867.3  | 882.8  | 981.3  | 1361.7 | 1532.2 | 1646.2 | 1851.4 | 1964.5 | 1960.9 | 1672.7 | 1127.3 |
| 62.5° | 689.5  | 689.5  | 777.0  | 1146.4 | 1467.5 | 1674.5 | 1941.7 | 2106.8 | 2100.4 | 1748.4 | 1135.5 |
| 65°   | 496.1  | 502.5  | 568.2  | 922.1  | 1362.6 | 1667.2 | 1985.5 | 2208.0 | 2204.4 | 1791.2 | 1118.1 |
| 67.5° | 366.6  | 373.9  | 417.7  | 691.3  | 1207.5 | 1594.2 | 1945.4 | 2230.8 | 2232.6 | 1792.1 | 1061.6 |
| 70°   | 286.4  | 288.2  | 321.0  | 480.6  | 989.6  | 1431.9 | 1794.9 | 2155.1 | 2155.1 | 1747.4 | 977.7  |
| 72.5° | 218.0  | 219.8  | 248.1  | 327.4  | 728.7  | 1183.8 | 1569.6 | 1954.5 | 1968.2 | 1628.9 | 853.7  |
| 75°   | 168.7  | 172.4  | 191.5  | 235.3  | 456.9  | 841.8  | 1289.6 | 1600.6 | 1638.0 | 1399.1 | 703.2  |
| 77.5° | 130.4  | 134.1  | 149.6  | 172.4  | 266.3  | 518.9  | 906.6  | 1196.6 | 1230.3 | 1101.7 | 542.7  |
| 80°   | 104.9  | 106.7  | 116.7  | 129.5  | 161.4  | 267.2  | 553.6  | 786.2  | 796.2  | 748.8  | 359.3  |
| 82.5° | 48.3   | 52.0   | 62.9   | 71.1   | 80.3   | 124.0  | 236.2  | 290.9  | 303.7  | 297.3  | 147.7  |
| 85°   | 5.5    | 5.5    | 6.4    | 7.3    | 8.2    | 12.8   | 16.4   | 14.6   | 14.6   | 17.3   | 15.5   |
| 87.5° | 0.0    | 0.0    | 0.0    | 0.9    | 1.8    | 1.8    | 2.7    | 2.7    | 2.7    | 2.7    | 2.7    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



REPORT NUMBER: P868065

CATALOG NUMBER: MEM2-HSN-SA-40-727-U-T3-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°   | 95°   | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 394.9 | 394.9 | 394.9 | 394.9 | 394.9 | 394.9 | 394.9 | 394.9 | 394.9 | 394.9 | 394.9 |
| 2.5°  | 395.8 | 389.4 | 377.6 | 367.5 | 358.4 | 349.3 | 344.7 | 333.8 | 331.1 | 332.9 | 326.5 |
| 5°    | 397.6 | 384.9 | 360.3 | 337.5 | 318.3 | 300.1 | 284.6 | 268.1 | 264.5 | 259.0 | 256.3 |
| 7.5°  | 400.4 | 381.2 | 342.9 | 307.4 | 278.2 | 251.7 | 232.6 | 219.8 | 209.8 | 207.0 | 206.1 |
| 10°   | 404.0 | 376.7 | 323.8 | 279.1 | 239.0 | 211.6 | 194.3 | 185.1 | 181.5 | 178.8 | 179.7 |
| 12.5° | 406.8 | 372.1 | 305.5 | 247.2 | 207.9 | 183.3 | 175.1 | 167.8 | 166.0 | 165.1 | 165.1 |
| 15°   | 410.4 | 367.5 | 283.6 | 218.9 | 181.5 | 166.9 | 158.7 | 156.0 | 156.0 | 155.0 | 155.0 |
| 17.5° | 415.0 | 363.9 | 265.4 | 197.0 | 166.0 | 152.3 | 148.7 | 145.0 | 145.0 | 145.0 | 144.1 |
| 20°   | 424.1 | 362.1 | 249.0 | 178.8 | 152.3 | 143.2 | 137.7 | 135.0 | 134.1 | 133.2 | 133.2 |
| 22.5° | 433.2 | 362.1 | 230.7 | 165.1 | 143.2 | 133.2 | 127.7 | 124.9 | 124.0 | 124.0 | 124.0 |
| 25°   | 446.0 | 361.2 | 216.2 | 153.2 | 135.0 | 123.1 | 117.7 | 114.9 | 113.1 | 113.1 | 112.2 |
| 27.5° | 460.6 | 361.2 | 203.4 | 144.1 | 125.9 | 114.0 | 107.6 | 104.9 | 102.1 | 102.1 | 101.2 |
| 30°   | 475.2 | 363.0 | 192.4 | 136.8 | 116.7 | 105.8 | 97.6  | 93.9  | 92.1  | 91.2  | 91.2  |
| 32.5° | 494.3 | 368.5 | 185.1 | 131.3 | 108.5 | 97.6  | 89.4  | 85.7  | 83.9  | 83.0  | 83.0  |
| 35°   | 523.5 | 382.1 | 186.1 | 128.6 | 103.1 | 90.3  | 82.1  | 77.5  | 76.6  | 76.6  | 75.7  |
| 37.5° | 554.5 | 394.9 | 188.8 | 126.8 | 97.6  | 84.8  | 76.6  | 72.1  | 71.1  | 71.1  | 71.1  |
| 40°   | 581.0 | 405.9 | 192.4 | 125.9 | 93.0  | 79.3  | 72.1  | 68.4  | 66.6  | 66.6  | 66.6  |
| 42.5° | 607.4 | 412.2 | 193.4 | 123.1 | 90.3  | 74.8  | 68.4  | 64.8  | 62.9  | 63.8  | 63.8  |
| 45°   | 633.9 | 416.8 | 190.6 | 119.5 | 87.6  | 71.1  | 64.8  | 61.1  | 59.3  | 59.3  | 59.3  |
| 47.5° | 665.8 | 426.8 | 186.1 | 114.0 | 85.7  | 68.4  | 61.1  | 57.5  | 56.5  | 56.5  | 56.5  |
| 50°   | 697.7 | 435.0 | 182.4 | 107.6 | 81.2  | 64.8  | 58.4  | 53.8  | 52.9  | 52.9  | 52.9  |
| 52.5° | 724.2 | 438.7 | 177.8 | 99.4  | 76.6  | 61.1  | 54.7  | 50.2  | 48.3  | 48.3  | 48.3  |
| 55°   | 744.2 | 439.6 | 171.5 | 93.0  | 70.2  | 57.5  | 51.1  | 46.5  | 44.7  | 43.8  | 43.8  |
| 57.5° | 760.6 | 438.7 | 165.1 | 86.6  | 64.8  | 52.9  | 46.5  | 42.9  | 40.1  | 39.2  | 39.2  |
| 60°   | 769.8 | 436.0 | 156.0 | 78.4  | 57.5  | 48.3  | 42.9  | 38.3  | 36.5  | 35.6  | 35.6  |
| 62.5° | 764.3 | 428.7 | 143.2 | 65.7  | 52.0  | 43.8  | 39.2  | 35.6  | 32.8  | 31.9  | 31.9  |
| 65°   | 738.7 | 414.1 | 126.8 | 53.8  | 46.5  | 39.2  | 35.6  | 31.9  | 28.3  | 27.4  | 27.4  |
| 67.5° | 694.1 | 389.4 | 104.9 | 45.6  | 42.9  | 35.6  | 31.9  | 28.3  | 25.5  | 23.7  | 23.7  |
| 70°   | 632.0 | 356.6 | 82.1  | 39.2  | 38.3  | 32.8  | 29.2  | 25.5  | 22.8  | 21.0  | 21.0  |
| 72.5° | 543.6 | 302.8 | 61.1  | 33.7  | 33.7  | 30.1  | 26.4  | 23.7  | 21.0  | 19.2  | 19.2  |
| 75°   | 439.6 | 228.9 | 46.5  | 31.0  | 30.1  | 27.4  | 23.7  | 21.0  | 19.2  | 17.3  | 17.3  |
| 77.5° | 321.0 | 152.3 | 38.3  | 28.3  | 28.3  | 24.6  | 21.9  | 19.2  | 17.3  | 16.4  | 16.4  |
| 80°   | 195.2 | 87.6  | 27.4  | 21.9  | 21.9  | 21.0  | 18.2  | 16.4  | 15.5  | 13.7  | 12.8  |
| 82.5° | 79.3  | 33.7  | 14.6  | 10.9  | 10.9  | 10.0  | 6.4   | 5.5   | 5.5   | 5.5   | 4.6   |
| 85°   | 8.2   | 5.5   | 3.6   | 2.7   | 2.7   | 2.7   | 1.8   | 1.8   | 1.8   | 1.8   | 1.8   |
| 87.5° | 2.7   | 2.7   | 1.8   | 1.8   | 1.8   | 1.8   | 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: SP1-2407-157-3

Test Date: 08/07/2024

Luminaire Tested: MEM2-HTN-SA-40-727-U-5WQ-2

Data in this report applies to families of products including MEM2-HTN-SA-40-727-U-5WQ-2

**Test Information**

Test Method: LM-79-2019  
 Report Number: SP1-2407-157-3  
 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-40-727-U-5WQ-2**  
 Description: Epic Modern Light Square 40W 5WQ Optic and Flare Trim

**Spectral Parameters**

CCT (K): 2747  
 CIE u': 0.2606  
 CIE v': 0.5257  
 Duv: -0.0005  
 CIE x: 0.4552  
 CIE y: 0.4082  
 CIE z: 0.1366  
 Peak Wavelength (nm): 597  
 Dominant Wavelength (nm): 584  
 Purity: 59.16856  
 R<sub>f</sub>: 75.5  
 R<sub>g</sub>: 93.6

|           |      |      |       |
|-----------|------|------|-------|
| CRI (Ra): | 71.7 |      |       |
| R1:       | 68.1 | R9:  | -35.3 |
| R2:       | 83.9 | R10: | 64.2  |
| R3:       | 94.7 | R11: | 61.7  |
| R4:       | 66.3 | R12: | 53.9  |
| R5:       | 67.4 | R13: | 71.2  |
| R6:       | 78.7 | R14: | 97.6  |
| R7:       | 75.0 | R15: | 59.3  |
| R8:       | 39.4 |      |       |



**Test Conditions**

Stabilization Time: 22M  
 Operation Time: 1H 22M  
 Sphere Temperature (°C): 24.2

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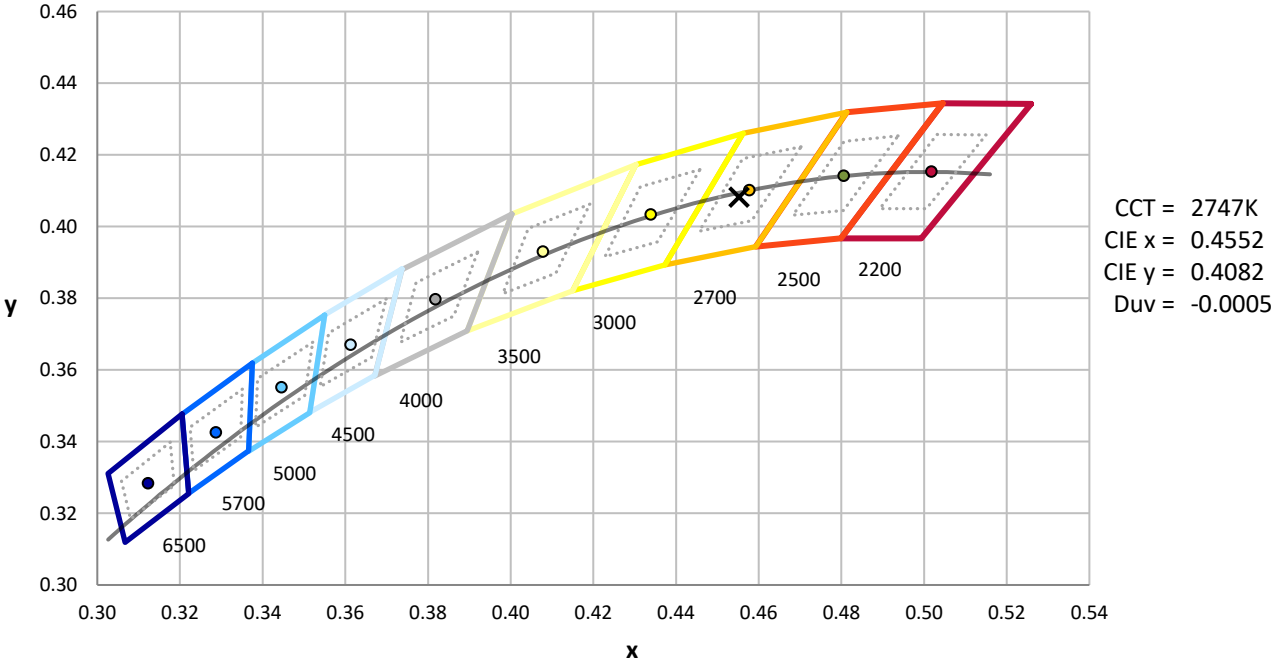
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date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

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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**



**Photopic Lumens: NR**

| 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    | 103                      | NR            | 620    | 846                      | NR            | 750    | 20                       | NR            | 880    | 0                        | NR            |
| 365    | 0                        | NR            | 495    | 130                      | NR            | 625    | 784                      | NR            | 755    | 17                       | NR            | 885    | 1                        | NR            |
| 370    | 0                        | NR            | 500    | 171                      | NR            | 630    | 720                      | NR            | 760    | 15                       | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 221                      | NR            | 635    | 652                      | NR            | 765    | 13                       | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 268                      | NR            | 640    | 587                      | NR            | 770    | 11                       | NR            | 900    | 0                        | NR            |
| 385    | 0                        | NR            | 515    | 313                      | NR            | 645    | 521                      | NR            | 775    | 9                        | NR            | 905    | 0                        | NR            |
| 390    | 0                        | NR            | 520    | 350                      | NR            | 650    | 461                      | NR            | 780    | 8                        | NR            | 910    | 0                        | NR            |
| 395    | 0                        | NR            | 525    | 381                      | NR            | 655    | 406                      | NR            | 785    | 7                        | NR            | 915    | 0                        | NR            |
| 400    | 0                        | NR            | 530    | 407                      | NR            | 660    | 353                      | NR            | 790    | 6                        | NR            | 920    | 0                        | NR            |
| 405    | 2                        | NR            | 535    | 435                      | NR            | 665    | 307                      | NR            | 795    | 5                        | NR            | 925    | 0                        | NR            |
| 410    | 4                        | NR            | 540    | 462                      | NR            | 670    | 264                      | NR            | 800    | 4                        | NR            | 930    | 0                        | NR            |
| 415    | 9                        | NR            | 545    | 496                      | NR            | 675    | 227                      | NR            | 805    | 4                        | NR            | 935    | 0                        | NR            |
| 420    | 20                       | NR            | 550    | 534                      | NR            | 680    | 196                      | NR            | 810    | 3                        | NR            | 940    | 0                        | NR            |
| 425    | 38                       | NR            | 555    | 582                      | NR            | 685    | 167                      | NR            | 815    | 3                        | NR            | 945    | 0                        | NR            |
| 430    | 69                       | NR            | 560    | 638                      | NR            | 690    | 144                      | NR            | 820    | 2                        | NR            | 950    | 0                        | NR            |
| 435    | 120                      | NR            | 565    | 700                      | NR            | 695    | 122                      | NR            | 825    | 2                        | NR            | 955    | 0                        | NR            |
| 440    | 193                      | NR            | 570    | 767                      | NR            | 700    | 103                      | NR            | 830    | 2                        | NR            | 960    | 0                        | NR            |
| 445    | 316                      | NR            | 575    | 836                      | NR            | 705    | 88                       | NR            | 835    | 2                        | NR            | 965    | 0                        | NR            |
| 450    | 469                      | NR            | 580    | 898                      | NR            | 710    | 74                       | NR            | 840    | 1                        | NR            | 970    | 0                        | NR            |
| 455    | 431                      | NR            | 585    | 947                      | NR            | 715    | 63                       | NR            | 845    | 1                        | NR            | 975    | 0                        | NR            |
| 460    | 264                      | NR            | 590    | 982                      | NR            | 720    | 54                       | NR            | 850    | 1                        | NR            | 980    | 0                        | NR            |
| 465    | 197                      | NR            | 595    | 997                      | NR            | 725    | 46                       | NR            | 855    | 1                        | NR            | 985    | 0                        | NR            |
| 470    | 155                      | NR            | 600    | 997                      | NR            | 730    | 39                       | NR            | 860    | 1                        | NR            | 990    | 0                        | NR            |
| 475    | 108                      | NR            | 605    | 978                      | NR            | 735    | 33                       | NR            | 865    | 1                        | NR            | 995    | 0                        | NR            |
| 480    | 90                       | NR            | 610    | 947                      | NR            | 740    | 28                       | NR            | 870    | 1                        | NR            | 1000   | 0                        | NR            |
| 485    | 92                       | NR            | 615    | 900                      | NR            | 745    | 24                       | NR            | 875    | 1                        | NR            |        |                          |               |

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**Scotopic Flux vs. Wavelength**



**Scotopic Lumens: NR**

**S/P: 1.13**

| 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    | 103                      | NR            | 620    | 846                      | NR            | 750    | 20                       | NR            | 880    | 0                        | NR            |
| 365    | 0                        | NR            | 495    | 130                      | NR            | 625    | 784                      | NR            | 755    | 17                       | NR            | 885    | 1                        | NR            |
| 370    | 0                        | NR            | 500    | 171                      | NR            | 630    | 720                      | NR            | 760    | 15                       | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 221                      | NR            | 635    | 652                      | NR            | 765    | 13                       | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 268                      | NR            | 640    | 587                      | NR            | 770    | 11                       | NR            | 900    | 0                        | NR            |
| 385    | 0                        | NR            | 515    | 313                      | NR            | 645    | 521                      | NR            | 775    | 9                        | NR            | 905    | 0                        | NR            |
| 390    | 0                        | NR            | 520    | 350                      | NR            | 650    | 461                      | NR            | 780    | 8                        | NR            | 910    | 0                        | NR            |
| 395    | 0                        | NR            | 525    | 381                      | NR            | 655    | 406                      | NR            | 785    | 7                        | NR            | 915    | 0                        | NR            |
| 400    | 0                        | NR            | 530    | 407                      | NR            | 660    | 353                      | NR            | 790    | 6                        | NR            | 920    | 0                        | NR            |
| 405    | 2                        | NR            | 535    | 435                      | NR            | 665    | 307                      | NR            | 795    | 5                        | NR            | 925    | 0                        | NR            |
| 410    | 4                        | NR            | 540    | 462                      | NR            | 670    | 264                      | NR            | 800    | 4                        | NR            | 930    | 0                        | NR            |
| 415    | 9                        | NR            | 545    | 496                      | NR            | 675    | 227                      | NR            | 805    | 4                        | NR            | 935    | 0                        | NR            |
| 420    | 20                       | NR            | 550    | 534                      | NR            | 680    | 196                      | NR            | 810    | 3                        | NR            | 940    | 0                        | NR            |
| 425    | 38                       | NR            | 555    | 582                      | NR            | 685    | 167                      | NR            | 815    | 3                        | NR            | 945    | 0                        | NR            |
| 430    | 69                       | NR            | 560    | 638                      | NR            | 690    | 144                      | NR            | 820    | 2                        | NR            | 950    | 0                        | NR            |
| 435    | 120                      | NR            | 565    | 700                      | NR            | 695    | 122                      | NR            | 825    | 2                        | NR            | 955    | 0                        | NR            |
| 440    | 193                      | NR            | 570    | 767                      | NR            | 700    | 103                      | NR            | 830    | 2                        | NR            | 960    | 0                        | NR            |
| 445    | 316                      | NR            | 575    | 836                      | NR            | 705    | 88                       | NR            | 835    | 2                        | NR            | 965    | 0                        | NR            |
| 450    | 469                      | NR            | 580    | 898                      | NR            | 710    | 74                       | NR            | 840    | 1                        | NR            | 970    | 0                        | NR            |
| 455    | 431                      | NR            | 585    | 947                      | NR            | 715    | 63                       | NR            | 845    | 1                        | NR            | 975    | 0                        | NR            |
| 460    | 264                      | NR            | 590    | 982                      | NR            | 720    | 54                       | NR            | 850    | 1                        | NR            | 980    | 0                        | NR            |
| 465    | 197                      | NR            | 595    | 997                      | NR            | 725    | 46                       | NR            | 855    | 1                        | NR            | 985    | 0                        | NR            |
| 470    | 155                      | NR            | 600    | 997                      | NR            | 730    | 39                       | NR            | 860    | 1                        | NR            | 990    | 0                        | NR            |
| 475    | 108                      | NR            | 605    | 978                      | NR            | 735    | 33                       | NR            | 865    | 1                        | NR            | 995    | 0                        | NR            |
| 480    | 90                       | NR            | 610    | 947                      | NR            | 740    | 28                       | NR            | 870    | 1                        | NR            | 1000   | 0                        | NR            |
| 485    | 92                       | NR            | 615    | 900                      | NR            | 745    | 24                       | NR            | 875    | 1                        | NR            |        |                          |               |

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Melanopic Flux vs. Wavelength



Melanopic Lumens: NR M/P: 2.04

| 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    | 103                      | NR            | 620    | 846                      | NR            | 750    | 20                       | NR            | 880    | 0                        | NR            |
| 365    | 0                        | NR            | 495    | 130                      | NR            | 625    | 784                      | NR            | 755    | 17                       | NR            | 885    | 1                        | NR            |
| 370    | 0                        | NR            | 500    | 171                      | NR            | 630    | 720                      | NR            | 760    | 15                       | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 221                      | NR            | 635    | 652                      | NR            | 765    | 13                       | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 268                      | NR            | 640    | 587                      | NR            | 770    | 11                       | NR            | 900    | 0                        | NR            |
| 385    | 0                        | NR            | 515    | 313                      | NR            | 645    | 521                      | NR            | 775    | 9                        | NR            | 905    | 0                        | NR            |
| 390    | 0                        | NR            | 520    | 350                      | NR            | 650    | 461                      | NR            | 780    | 8                        | NR            | 910    | 0                        | NR            |
| 395    | 0                        | NR            | 525    | 381                      | NR            | 655    | 406                      | NR            | 785    | 7                        | NR            | 915    | 0                        | NR            |
| 400    | 0                        | NR            | 530    | 407                      | NR            | 660    | 353                      | NR            | 790    | 6                        | NR            | 920    | 0                        | NR            |
| 405    | 2                        | NR            | 535    | 435                      | NR            | 665    | 307                      | NR            | 795    | 5                        | NR            | 925    | 0                        | NR            |
| 410    | 4                        | NR            | 540    | 462                      | NR            | 670    | 264                      | NR            | 800    | 4                        | NR            | 930    | 0                        | NR            |
| 415    | 9                        | NR            | 545    | 496                      | NR            | 675    | 227                      | NR            | 805    | 4                        | NR            | 935    | 0                        | NR            |
| 420    | 20                       | NR            | 550    | 534                      | NR            | 680    | 196                      | NR            | 810    | 3                        | NR            | 940    | 0                        | NR            |
| 425    | 38                       | NR            | 555    | 582                      | NR            | 685    | 167                      | NR            | 815    | 3                        | NR            | 945    | 0                        | NR            |
| 430    | 69                       | NR            | 560    | 638                      | NR            | 690    | 144                      | NR            | 820    | 2                        | NR            | 950    | 0                        | NR            |
| 435    | 120                      | NR            | 565    | 700                      | NR            | 695    | 122                      | NR            | 825    | 2                        | NR            | 955    | 0                        | NR            |
| 440    | 193                      | NR            | 570    | 767                      | NR            | 700    | 103                      | NR            | 830    | 2                        | NR            | 960    | 0                        | NR            |
| 445    | 316                      | NR            | 575    | 836                      | NR            | 705    | 88                       | NR            | 835    | 2                        | NR            | 965    | 0                        | NR            |
| 450    | 469                      | NR            | 580    | 898                      | NR            | 710    | 74                       | NR            | 840    | 1                        | NR            | 970    | 0                        | NR            |
| 455    | 431                      | NR            | 585    | 947                      | NR            | 715    | 63                       | NR            | 845    | 1                        | NR            | 975    | 0                        | NR            |
| 460    | 264                      | NR            | 590    | 982                      | NR            | 720    | 54                       | NR            | 850    | 1                        | NR            | 980    | 0                        | NR            |
| 465    | 197                      | NR            | 595    | 997                      | NR            | 725    | 46                       | NR            | 855    | 1                        | NR            | 985    | 0                        | NR            |
| 470    | 155                      | NR            | 600    | 997                      | NR            | 730    | 39                       | NR            | 860    | 1                        | NR            | 990    | 0                        | NR            |
| 475    | 108                      | NR            | 605    | 978                      | NR            | 735    | 33                       | NR            | 865    | 1                        | NR            | 995    | 0                        | NR            |
| 480    | 90                       | NR            | 610    | 947                      | NR            | 740    | 28                       | NR            | 870    | 1                        | NR            | 1000   | 0                        | NR            |
| 485    | 92                       | NR            | 615    | 900                      | NR            | 745    | 24                       | NR            | 875    | 1                        | NR            |        |                          |               |

**Summary**

$R_f = 75.5$   
 $R_g = 93.6$   
 $CIE R_a = 71.7$   
 $R_9 = -35.3$



**Color Vector Graphics**





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

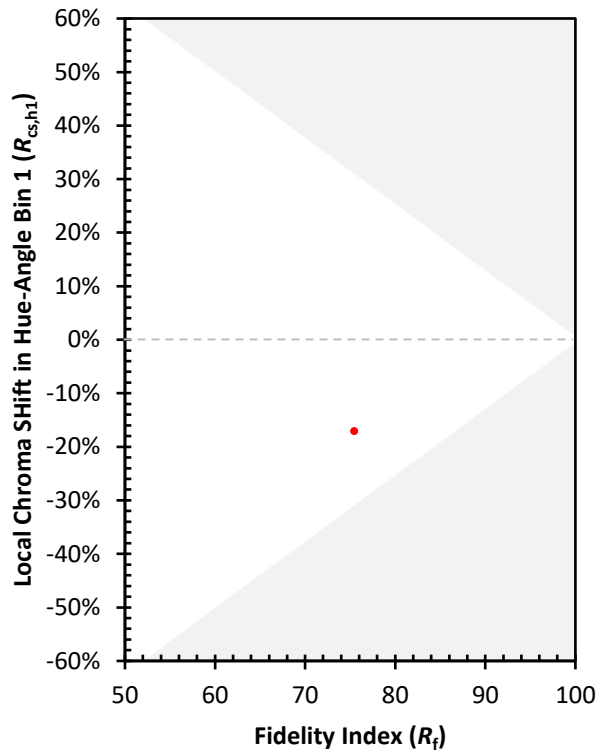
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 68 | CES51 = 87 | CES76 = 63 |
| CES02 = 63 | CES27 = 90 | CES52 = 85 | CES77 = 79 |
| CES03 = 31 | CES28 = 87 | CES53 = 78 | CES78 = 66 |
| CES04 = 71 | CES29 = 71 | CES54 = 86 | CES79 = 87 |
| CES05 = 50 | CES30 = 85 | CES55 = 84 | CES80 = 85 |
| CES06 = 52 | CES31 = 74 | CES56 = 75 | CES81 = 67 |
| CES07 = 42 | CES32 = 66 | CES57 = 75 | CES82 = 93 |
| CES08 = 41 | CES33 = 80 | CES58 = 76 | CES83 = 91 |
| CES09 = 29 | CES34 = 79 | CES59 = 85 | CES84 = 89 |
| CES10 = 77 | CES35 = 89 | CES60 = 90 | CES85 = 72 |
| CES11 = 60 | CES36 = 93 | CES61 = 81 | CES86 = 59 |
| CES12 = 66 | CES37 = 88 | CES62 = 91 | CES87 = 77 |
| CES13 = 43 | CES38 = 93 | CES63 = 77 | CES88 = 79 |
| CES14 = 74 | CES39 = 97 | CES64 = 67 | CES89 = 65 |
| CES15 = 72 | CES40 = 93 | CES65 = 66 | CES90 = 80 |
| CES16 = 48 | CES41 = 93 | CES66 = 63 | CES91 = 80 |
| CES17 = 51 | CES42 = 89 | CES67 = 61 | CES92 = 55 |
| CES18 = 57 | CES43 = 78 | CES68 = 68 | CES93 = 72 |
| CES19 = 73 | CES44 = 99 | CES69 = 78 | CES94 = 48 |
| CES20 = 67 | CES45 = 85 | CES70 = 63 | CES95 = 66 |
| CES21 = 88 | CES46 = 81 | CES71 = 61 | CES96 = 76 |
| CES22 = 80 | CES47 = 86 | CES72 = 86 | CES97 = 81 |
| CES23 = 92 | CES48 = 74 | CES73 = 56 | CES98 = 76 |
| CES24 = 91 | CES49 = 79 | CES74 = 93 | CES99 = 64 |
| CES25 = 73 | CES50 = 86 | CES75 = 66 |            |



Color Rendition by Hue-Angle Bin



Measure Comparisons



(END OF REPORT)