

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: P868023

Luminaire Tested: **MEM2-HSN-SA-40-722-U-T3**

Issue Date: 08/21/2024



**Test Information**

Test Method: LM-79-08  
Report Number: P868023  
Test Lab: INNOVATION CENTER(G3)  
Issue Date: 08/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: STREETWORKS  
Catalog Number: MEM2-HSN-SA-40-722-U-T3  
Description: EPIC MODERN SHORT HOUSING DISCRETE LED ARRAYS 40W 70CRI 2200K  
FITXURE w/ TYPE III DISTRIBUTION OPTIC  
Light Source: (10) 2200K CCT, 70 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

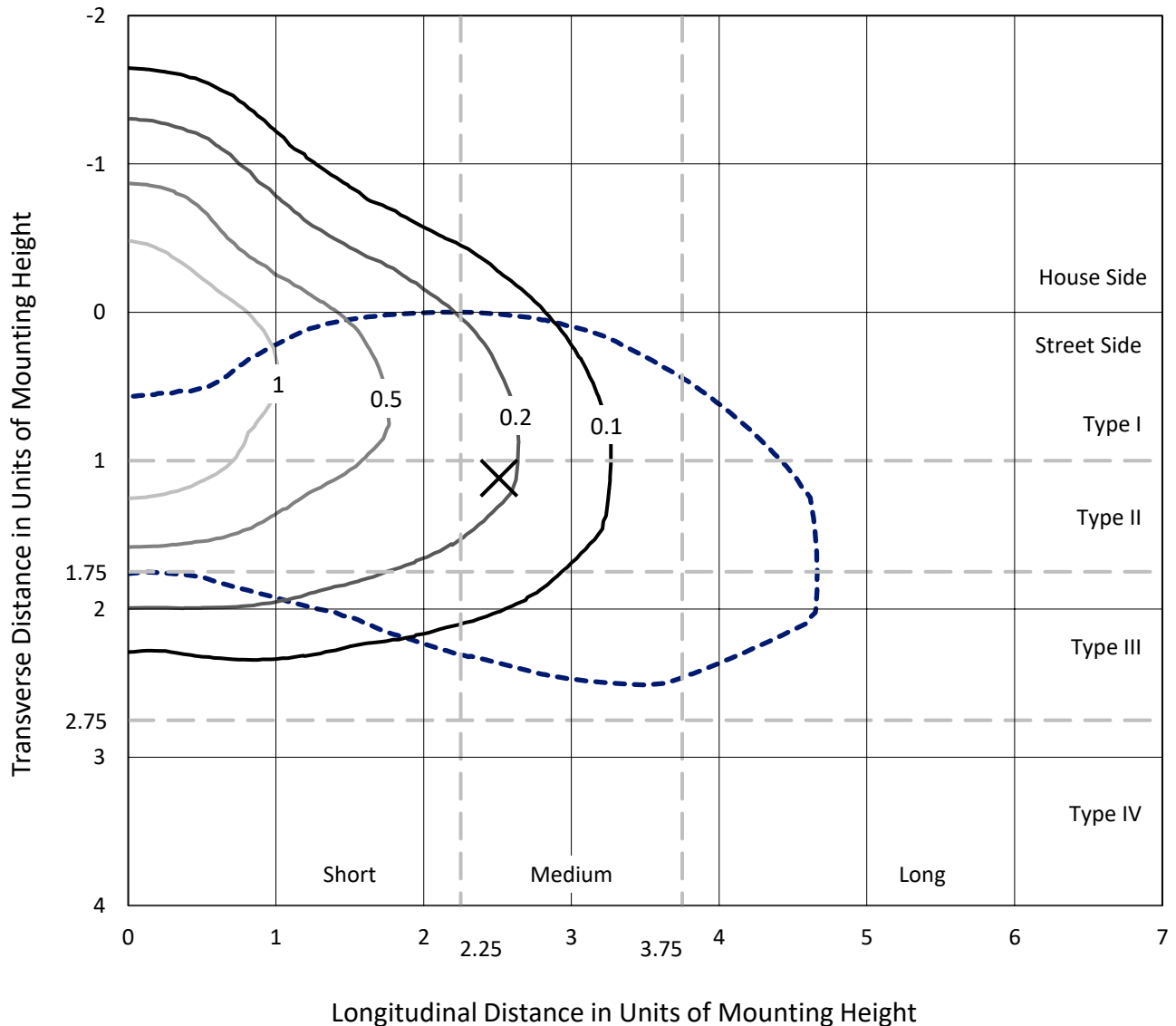
Lumens per Lamp: N/A  
Luminaire Lumens: 4278.1 lumens  
Efficiency: N/A  
Efficacy: 130.4 lumens/watt  
Luminous Opening: Rectangular (W 0.33' x L: 0.33' x H: 0')  
IES Classification: Type III - Medium  
BUG Rating: B1 - U0 - G1

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

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### Iso-Footcandle Lines of Horizontal Illumination

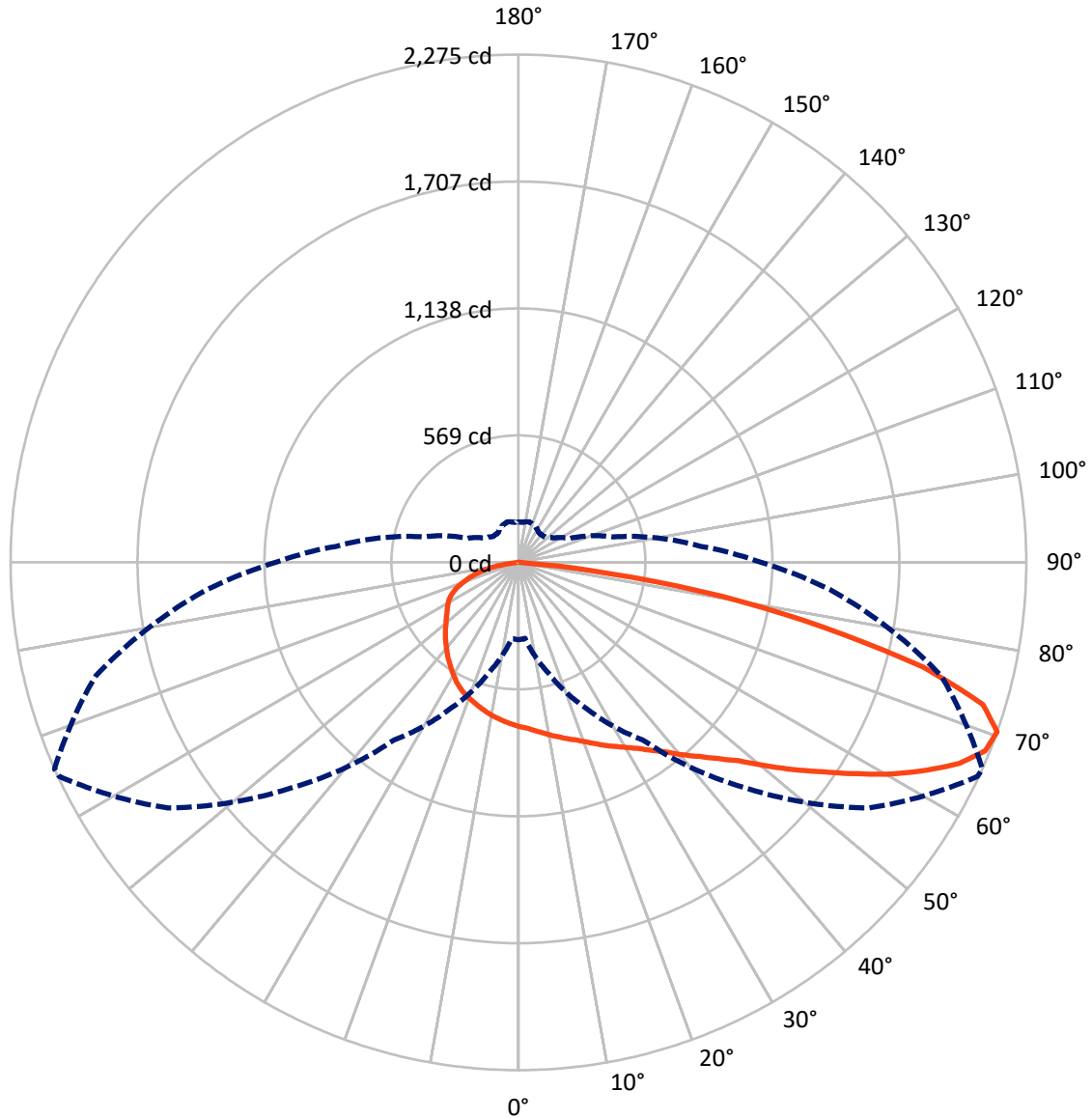
× Max cd  
 - - - 1/2 Max cd



Based on 20 foot mounting height. Maximum calculated value = 2 fc  
 Type III - Medium - N/A

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### Luminous Intensity Polar Plot



— Vertical Plane Through 66-Deg Lateral      - - - Horizontal Cone Through 70-Deg Vertical

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**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 1102.5   | 0.0    | 1102.5 |
|                    | % Fixture | 25.8     | 0.0    | 25.8   |
| <b>Street Side</b> | Lumens    | 3175.6   | 0.0    | 3175.6 |
|                    | % Fixture | 74.2     | 0.0    | 74.2   |
| <b>Total</b>       | Lumens    | 4278.1   | 0.0    | 4278.1 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**Coefficient of Utilization**

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 70.4   | 1.6       |
| 10°-20°   | 209.8  | 4.9       |
| 20°-30°   | 352.4  | 8.2       |
| 30°-40°   | 530.9  | 12.4      |
| 40°-50°   | 720.8  | 16.8      |
| 50°-60°   | 856.6  | 20.0      |
| 60°-70°   | 874.2  | 20.4      |
| 70°-80°   | 584.7  | 13.7      |
| 80°-90°   | 78.2   | 1.8       |
| 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°    | 4278.1 | 100.0     |
| 0°-180°   | 4278.1 | 100.0     |



REPORT NUMBER: P868023

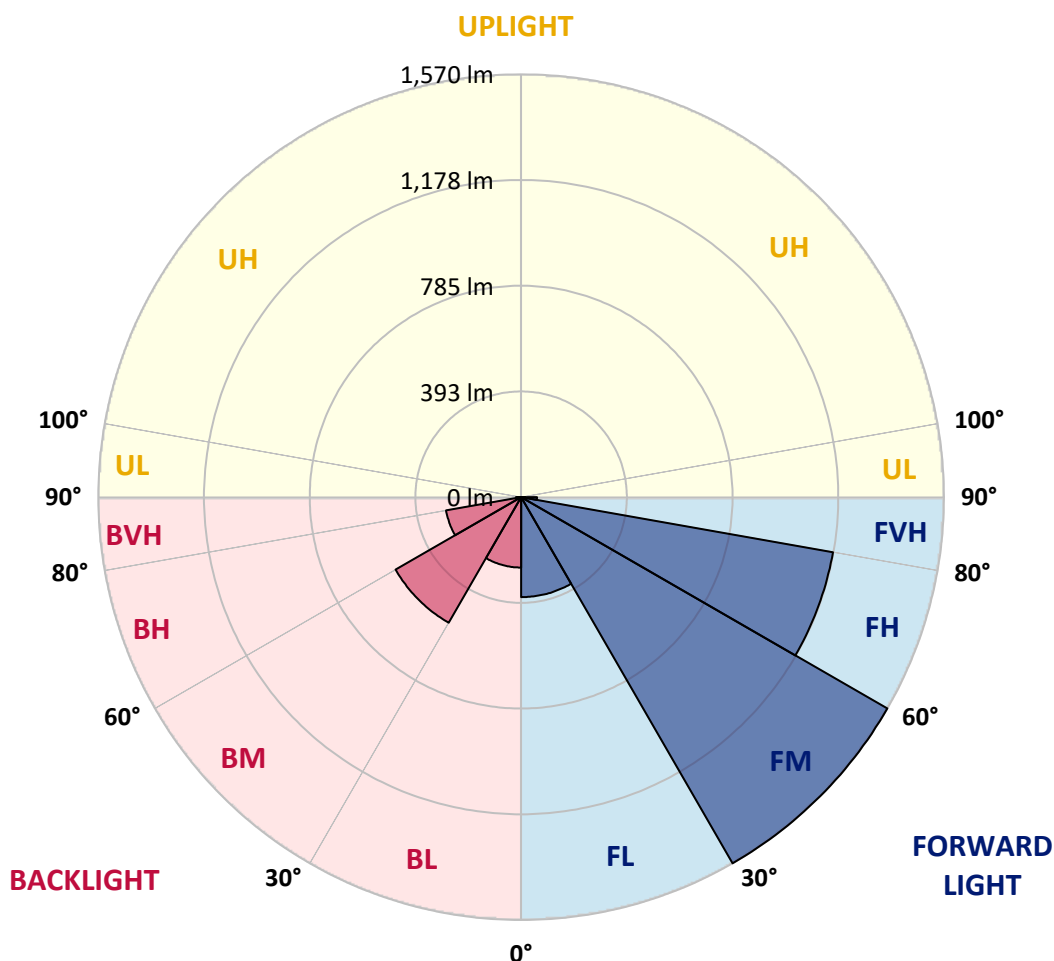
CATALOG NUMBER: MEM2-HSN-SA-40-722-U-T3

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

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|--------|-----------|-------------------------|------|---------|
|                |        |           | B                       | U    | G       |
| FL (0°-30°)    | 371.3  | 8.7       |                         |      |         |
| FM (30°-60°)   | 1570.0 | 36.7      |                         |      |         |
| FH (60°-80°)   | 1175.8 | 27.5      |                         |      | G1/1800 |
| FVH (80°-90°)  | 58.6   | 1.4       |                         |      | G1/100  |
| BL (0°-30°)    | 261.4  | 6.1       | B1/500                  |      |         |
| BM (30°-60°)   | 538.3  | 12.6      | B1/1000                 |      |         |
| BH (60°-80°)   | 283.1  | 6.6       | B1/500                  |      | G1/500  |
| BVH (80°-90°)  | 19.6   | 0.5       |                         |      | G1/100  |
| UL (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B1-U0-G1**

Type III Medium





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CATALOG NUMBER: MEM2-HSN-SA-40-722-U-T3

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 66°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 736.1  | 736.1  | 736.1  | 736.1  | 736.1  | 736.1  | 736.1  | 736.1  | 736.1  | 736.1  | 736.1  |
| 2.5°  | 762.4  | 759.0  | 756.5  | 758.2  | 753.1  | 754.8  | 748.8  | 744.6  | 743.7  | 742.0  | 740.3  |
| 5°    | 786.2  | 786.2  | 782.0  | 782.0  | 776.0  | 775.2  | 766.7  | 757.3  | 757.3  | 751.4  | 744.6  |
| 7.5°  | 811.7  | 810.0  | 804.9  | 804.1  | 797.3  | 795.6  | 786.2  | 771.8  | 770.9  | 759.9  | 749.7  |
| 10°   | 829.6  | 830.4  | 827.0  | 827.0  | 821.9  | 817.7  | 804.1  | 788.8  | 787.1  | 772.6  | 756.5  |
| 12.5° | 843.2  | 844.9  | 844.0  | 844.0  | 839.8  | 839.8  | 824.5  | 804.1  | 802.4  | 783.7  | 760.7  |
| 15°   | 857.6  | 856.8  | 859.3  | 860.2  | 858.5  | 855.9  | 844.9  | 821.1  | 820.2  | 795.6  | 766.7  |
| 17.5° | 870.4  | 869.5  | 870.4  | 874.6  | 875.5  | 875.5  | 864.4  | 839.8  | 836.4  | 810.0  | 771.8  |
| 20°   | 878.0  | 879.7  | 883.1  | 888.2  | 890.8  | 897.6  | 888.2  | 861.9  | 858.5  | 825.3  | 782.8  |
| 22.5° | 906.9  | 901.8  | 904.4  | 907.8  | 911.2  | 920.5  | 912.0  | 884.8  | 882.3  | 848.3  | 795.6  |
| 25°   | 956.2  | 956.2  | 950.3  | 944.3  | 940.1  | 944.3  | 937.5  | 911.2  | 909.5  | 868.7  | 810.0  |
| 27.5° | 1042.1 | 1042.1 | 1029.3 | 1007.2 | 979.2  | 971.5  | 966.4  | 939.2  | 934.1  | 890.8  | 819.4  |
| 30°   | 1150.9 | 1154.3 | 1131.3 | 1093.9 | 1042.1 | 1008.1 | 995.3  | 965.6  | 963.0  | 912.9  | 833.8  |
| 32.5° | 1267.3 | 1274.1 | 1257.1 | 1202.7 | 1117.7 | 1051.4 | 1031.0 | 1000.4 | 994.5  | 939.2  | 852.5  |
| 35°   | 1371.9 | 1378.7 | 1355.7 | 1304.7 | 1195.9 | 1114.3 | 1073.5 | 1038.7 | 1035.3 | 973.2  | 880.6  |
| 37.5° | 1456.9 | 1458.6 | 1444.1 | 1382.1 | 1261.4 | 1167.0 | 1126.2 | 1084.6 | 1077.8 | 1014.0 | 910.3  |
| 40°   | 1547.0 | 1553.8 | 1539.3 | 1462.8 | 1320.9 | 1224.0 | 1178.9 | 1139.8 | 1133.9 | 1056.5 | 938.4  |
| 42.5° | 1641.3 | 1640.5 | 1640.5 | 1532.5 | 1380.4 | 1271.6 | 1235.9 | 1192.5 | 1189.1 | 1099.9 | 969.0  |
| 45°   | 1699.1 | 1702.5 | 1693.2 | 1574.2 | 1467.9 | 1320.9 | 1291.1 | 1259.7 | 1253.7 | 1160.2 | 1008.9 |
| 47.5° | 1713.5 | 1705.9 | 1663.4 | 1606.5 | 1566.5 | 1371.9 | 1360.8 | 1342.1 | 1328.5 | 1226.5 | 1058.2 |
| 50°   | 1694.0 | 1682.1 | 1657.5 | 1620.9 | 1603.1 | 1433.1 | 1431.4 | 1440.7 | 1431.4 | 1307.3 | 1115.2 |
| 52.5° | 1620.9 | 1619.2 | 1615.0 | 1623.5 | 1594.6 | 1481.5 | 1511.3 | 1543.6 | 1541.9 | 1389.7 | 1174.7 |
| 55°   | 1467.1 | 1478.1 | 1529.1 | 1582.7 | 1562.3 | 1514.7 | 1600.5 | 1662.6 | 1655.8 | 1486.6 | 1235.9 |
| 57.5° | 1309.8 | 1320.9 | 1386.3 | 1513.8 | 1530.8 | 1550.4 | 1700.8 | 1797.7 | 1786.6 | 1592.0 | 1292.0 |
| 60°   | 1173.0 | 1161.1 | 1226.5 | 1410.1 | 1486.6 | 1582.7 | 1800.2 | 1934.5 | 1925.2 | 1697.4 | 1349.8 |
| 62.5° | 956.2  | 968.1  | 1072.7 | 1258.8 | 1424.6 | 1603.1 | 1881.8 | 2058.6 | 2052.7 | 1794.3 | 1396.5 |
| 65°   | 756.5  | 740.3  | 897.6  | 1099.9 | 1317.5 | 1596.3 | 1952.4 | 2175.1 | 2170.8 | 1889.5 | 1432.2 |
| 67.5° | 514.2  | 503.2  | 710.6  | 941.8  | 1172.1 | 1541.9 | 1968.5 | 2253.3 | 2255.0 | 1945.6 | 1441.6 |
| 70°   | 346.8  | 341.7  | 510.8  | 724.2  | 970.7  | 1424.6 | 1918.4 | 2269.4 | 2275.4 | 1960.0 | 1399.9 |
| 72.5° | 255.8  | 255.0  | 374.0  | 516.8  | 722.5  | 1202.7 | 1781.5 | 2164.0 | 2175.1 | 1858.0 | 1277.5 |
| 75°   | 201.4  | 204.0  | 266.9  | 367.2  | 481.9  | 889.9  | 1498.5 | 1855.5 | 1872.5 | 1604.8 | 1060.8 |
| 77.5° | 164.9  | 164.9  | 187.0  | 263.5  | 322.1  | 552.5  | 1077.8 | 1358.3 | 1392.3 | 1238.4 | 816.8  |
| 80°   | 133.4  | 136.0  | 138.5  | 183.6  | 213.3  | 315.3  | 627.3  | 906.1  | 930.7  | 862.7  | 589.9  |
| 82.5° | 73.1   | 78.2   | 75.6   | 95.2   | 107.1  | 146.2  | 249.0  | 366.3  | 403.7  | 359.5  | 267.7  |
| 85°   | 5.1    | 3.4    | 5.9    | 7.6    | 9.3    | 14.4   | 19.5   | 27.2   | 25.5   | 36.5   | 18.7   |
| 87.5° | 0.8    | 0.8    | 0.8    | 1.7    | 1.7    | 2.5    | 3.4    | 3.4    | 3.4    | 3.4    | 3.4    |
| 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: P868023

CATALOG NUMBER: MEM2-HSN-SA-40-722-U-T3

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°   | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 736.1  | 736.1 | 736.1 | 736.1 | 736.1 | 736.1 | 736.1 | 736.1 | 736.1 | 736.1 | 736.1 |
| 2.5°  | 739.5  | 735.2 | 728.4 | 726.7 | 724.2 | 720.8 | 717.4 | 712.3 | 710.6 | 712.3 | 714.0 |
| 5°    | 740.3  | 734.4 | 723.3 | 716.5 | 709.7 | 703.8 | 697.0 | 690.2 | 685.9 | 686.8 | 690.2 |
| 7.5°  | 742.9  | 734.4 | 717.4 | 706.3 | 695.3 | 685.9 | 674.9 | 667.2 | 662.1 | 663.0 | 665.5 |
| 10°   | 746.3  | 734.4 | 714.0 | 695.3 | 680.0 | 666.4 | 655.3 | 646.0 | 640.9 | 640.0 | 640.9 |
| 12.5° | 747.1  | 733.5 | 706.3 | 683.4 | 664.7 | 646.8 | 634.9 | 626.4 | 621.3 | 618.8 | 620.5 |
| 15°   | 749.7  | 731.0 | 698.7 | 670.6 | 647.7 | 629.0 | 614.5 | 604.3 | 600.9 | 599.2 | 598.4 |
| 17.5° | 753.1  | 730.1 | 691.9 | 657.9 | 630.7 | 609.4 | 596.7 | 586.5 | 582.2 | 580.5 | 582.2 |
| 20°   | 758.2  | 731.0 | 684.2 | 645.1 | 615.4 | 594.1 | 579.7 | 569.5 | 566.1 | 565.2 | 564.4 |
| 22.5° | 765.0  | 732.7 | 678.3 | 633.2 | 598.4 | 577.1 | 562.7 | 555.9 | 553.3 | 554.2 | 554.2 |
| 25°   | 771.8  | 734.4 | 669.8 | 617.1 | 580.5 | 558.4 | 548.2 | 543.1 | 544.8 | 548.2 | 548.2 |
| 27.5° | 777.7  | 733.5 | 657.9 | 600.1 | 559.3 | 538.9 | 531.2 | 532.1 | 536.3 | 542.3 | 543.1 |
| 30°   | 785.4  | 733.5 | 645.1 | 578.8 | 535.5 | 515.9 | 514.2 | 521.0 | 527.8 | 533.8 | 533.8 |
| 32.5° | 797.3  | 738.6 | 634.9 | 557.6 | 510.8 | 495.5 | 503.2 | 512.5 | 520.2 | 526.1 | 527.8 |
| 35°   | 817.7  | 749.7 | 628.1 | 536.3 | 487.0 | 476.0 | 490.4 | 505.7 | 510.8 | 515.1 | 515.9 |
| 37.5° | 837.2  | 759.9 | 619.6 | 515.9 | 462.4 | 458.1 | 477.7 | 493.8 | 494.7 | 497.2 | 497.2 |
| 40°   | 855.9  | 767.5 | 608.6 | 493.8 | 438.6 | 438.6 | 461.5 | 475.1 | 473.4 | 470.9 | 471.7 |
| 42.5° | 876.3  | 771.8 | 595.8 | 473.4 | 419.0 | 419.0 | 437.7 | 449.6 | 448.8 | 452.2 | 454.7 |
| 45°   | 901.0  | 780.3 | 578.8 | 454.7 | 398.6 | 395.2 | 410.5 | 420.7 | 433.5 | 448.8 | 453.0 |
| 47.5° | 935.0  | 792.2 | 565.2 | 434.3 | 381.6 | 369.7 | 375.7 | 396.9 | 411.4 | 424.1 | 425.8 |
| 50°   | 970.7  | 809.2 | 553.3 | 413.1 | 361.2 | 340.0 | 345.1 | 368.9 | 377.4 | 382.5 | 385.0 |
| 52.5° | 1008.9 | 822.8 | 543.1 | 395.2 | 340.0 | 309.4 | 316.2 | 339.1 | 345.1 | 349.3 | 350.2 |
| 55°   | 1042.1 | 833.8 | 530.4 | 378.2 | 317.0 | 280.5 | 289.0 | 311.1 | 317.0 | 322.1 | 322.1 |
| 57.5° | 1076.9 | 844.0 | 521.9 | 363.8 | 292.4 | 256.7 | 262.6 | 284.7 | 293.2 | 294.9 | 297.5 |
| 60°   | 1105.8 | 853.4 | 514.2 | 350.2 | 269.4 | 235.4 | 239.7 | 259.2 | 269.4 | 270.3 | 272.0 |
| 62.5° | 1126.2 | 859.3 | 510.0 | 333.2 | 246.5 | 214.2 | 217.6 | 237.1 | 249.0 | 251.6 | 252.4 |
| 65°   | 1139.0 | 862.7 | 502.3 | 311.1 | 226.9 | 196.3 | 196.3 | 215.9 | 227.8 | 233.7 | 235.4 |
| 67.5° | 1133.0 | 856.8 | 481.9 | 285.6 | 209.1 | 178.5 | 177.6 | 197.2 | 207.4 | 210.8 | 211.6 |
| 70°   | 1087.1 | 821.9 | 440.3 | 254.1 | 190.4 | 162.3 | 160.6 | 178.5 | 187.8 | 180.2 | 181.0 |
| 72.5° | 993.6  | 742.9 | 383.3 | 222.7 | 170.8 | 147.0 | 145.3 | 160.6 | 161.5 | 161.5 | 160.6 |
| 75°   | 837.2  | 606.9 | 306.0 | 189.5 | 150.4 | 130.9 | 131.7 | 143.6 | 144.5 | 148.7 | 146.2 |
| 77.5° | 641.7  | 449.6 | 238.8 | 151.3 | 127.5 | 116.4 | 120.7 | 124.9 | 130.9 | 136.8 | 130.9 |
| 80°   | 466.6  | 310.2 | 165.7 | 113.0 | 98.6  | 98.6  | 100.3 | 104.5 | 113.0 | 119.0 | 113.0 |
| 82.5° | 199.7  | 136.8 | 76.5  | 56.1  | 48.4  | 47.6  | 48.4  | 48.4  | 59.5  | 61.2  | 53.5  |
| 85°   | 15.3   | 12.7  | 9.3   | 9.3   | 7.6   | 4.2   | 4.2   | 3.4   | 2.5   | 2.5   | 2.5   |
| 87.5° | 3.4    | 2.5   | 2.5   | 2.5   | 1.7   | 1.7   | 1.7   | 1.7   | 1.7   | 1.7   | 1.7   |
| 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: SP1-2407-157-2

Test Date: 08/07/2024

Luminaire Tested: MEM2-HTN-SA-40-722-U-5WQ-2

Data in this report applies to families of products including MEM2-HTN-SA-40-722-U-5WQ-2

**Test Information**

Test Method: LM-79-2019  
 Report Number: SP1-2407-157-2  
 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-40-722-U-5WQ-2**  
 Description: Epic Modern Light Square 40W 5WQ Optic and Flare Trim

**Spectral Parameters**

CCT (K): 2253  
 CIE u': 0.2868  
 CIE v': 0.5332  
 Duv: -0.0014  
 CIE x: 0.4974  
 CIE y: 0.4110  
 CIE z: 0.0915  
 Peak Wavelength (nm): 603  
 Dominant Wavelength (nm): 587  
 Purity: 72.69432  
 Rf: 76.9  
 Rg: 92.7

|           |      |      |       |
|-----------|------|------|-------|
| CRI (Ra): | 70.6 |      |       |
| R1:       | 68.4 | R9:  | -36.0 |
| R2:       | 88.7 | R10: | 78.2  |
| R3:       | 85.4 | R11: | 61.0  |
| R4:       | 63.5 | R12: | 74.2  |
| R5:       | 69.0 | R13: | 72.8  |
| R6:       | 88.9 | R14: | 92.2  |
| R7:       | 68.5 | R15: | 58.0  |
| R8:       | 32.0 |      |       |



**Test Conditions**

Stabilization Time: 29M  
 Operation Time: 1H 29M  
 Sphere Temperature (°C): 24.1

REPORT NUMBER: SP1-2407-157-2

| 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: SP1-2407-157-2

**CIE 1931 Chromaticity Diagram**



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



Point lies inside the ANSI 2200K 4-step quadrangle

REPORT NUMBER: SP1-2407-157-2

**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               | 117                         | NR                      | 620               | 896                         | NR                      | 750               | 20                          | NR                      | 880               | 0                           | NR                      |
| 365               | 0                           | NR                      | 495               | 137                         | NR                      | 625               | 838                         | NR                      | 755               | 17                          | NR                      | 885               | 0                           | NR                      |
| 370               | 0                           | NR                      | 500               | 160                         | NR                      | 630               | 774                         | NR                      | 760               | 14                          | NR                      | 890               | 0                           | NR                      |
| 375               | 0                           | NR                      | 505               | 183                         | NR                      | 635               | 704                         | NR                      | 765               | 12                          | NR                      | 895               | 0                           | NR                      |
| 380               | 0                           | NR                      | 510               | 202                         | NR                      | 640               | 635                         | NR                      | 770               | 10                          | NR                      | 900               | 0                           | NR                      |
| 385               | 0                           | NR                      | 515               | 219                         | NR                      | 645               | 565                         | NR                      | 775               | 9                           | NR                      | 905               | 0                           | NR                      |
| 390               | 0                           | NR                      | 520               | 235                         | NR                      | 650               | 501                         | NR                      | 780               | 7                           | NR                      | 910               | 0                           | NR                      |
| 395               | 0                           | NR                      | 525               | 249                         | NR                      | 655               | 440                         | NR                      | 785               | 6                           | NR                      | 915               | 0                           | NR                      |
| 400               | 0                           | NR                      | 530               | 263                         | NR                      | 660               | 383                         | NR                      | 790               | 5                           | NR                      | 920               | 0                           | NR                      |
| 405               | 0                           | NR                      | 535               | 281                         | NR                      | 665               | 332                         | NR                      | 795               | 5                           | NR                      | 925               | 0                           | NR                      |
| 410               | 1                           | NR                      | 540               | 302                         | NR                      | 670               | 286                         | NR                      | 800               | 4                           | NR                      | 930               | 0                           | NR                      |
| 415               | 3                           | NR                      | 545               | 331                         | NR                      | 675               | 245                         | NR                      | 805               | 3                           | NR                      | 935               | 0                           | NR                      |
| 420               | 6                           | NR                      | 550               | 366                         | NR                      | 680               | 210                         | NR                      | 810               | 3                           | NR                      | 940               | 0                           | NR                      |
| 425               | 12                          | NR                      | 555               | 411                         | NR                      | 685               | 178                         | NR                      | 815               | 3                           | NR                      | 945               | 0                           | NR                      |
| 430               | 21                          | NR                      | 560               | 469                         | NR                      | 690               | 152                         | NR                      | 820               | 2                           | NR                      | 950               | 0                           | NR                      |
| 435               | 38                          | NR                      | 565               | 536                         | NR                      | 695               | 129                         | NR                      | 825               | 2                           | NR                      | 955               | 0                           | NR                      |
| 440               | 66                          | NR                      | 570               | 614                         | NR                      | 700               | 109                         | NR                      | 830               | 2                           | NR                      | 960               | 0                           | NR                      |
| 445               | 122                         | NR                      | 575               | 701                         | NR                      | 705               | 92                          | NR                      | 835               | 1                           | NR                      | 965               | 0                           | NR                      |
| 450               | 215                         | NR                      | 580               | 785                         | NR                      | 710               | 77                          | NR                      | 840               | 1                           | NR                      | 970               | 0                           | NR                      |
| 455               | 236                         | NR                      | 585               | 863                         | NR                      | 715               | 66                          | NR                      | 845               | 1                           | NR                      | 975               | 0                           | NR                      |
| 460               | 170                         | NR                      | 590               | 928                         | NR                      | 720               | 55                          | NR                      | 850               | 1                           | NR                      | 980               | 0                           | NR                      |
| 465               | 148                         | NR                      | 595               | 971                         | NR                      | 725               | 47                          | NR                      | 855               | 1                           | NR                      | 985               | 0                           | NR                      |
| 470               | 132                         | NR                      | 600               | 994                         | NR                      | 730               | 40                          | NR                      | 860               | 1                           | NR                      | 990               | 0                           | NR                      |
| 475               | 104                         | NR                      | 605               | 996                         | NR                      | 735               | 33                          | NR                      | 865               | 1                           | NR                      | 995               | 0                           | NR                      |
| 480               | 97                          | NR                      | 610               | 979                         | NR                      | 740               | 28                          | NR                      | 870               | 1                           | NR                      | 1000              | 0                           | NR                      |
| 485               | 105                         | NR                      | 615               | 943                         | NR                      | 745               | 24                          | NR                      | 875               | 0                           | NR                      |                   |                             |                         |

REPORT NUMBER: SP1-2407-157-2

**Scotopic Flux vs. Wavelength**



**Scotopic Lumens: NR**

**S/P: 0.96**

| 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    | 117                      | NR            | 620    | 896                      | NR            | 750    | 20                       | NR            | 880    | 0                        | NR            |
| 365    | 0                        | NR            | 495    | 137                      | NR            | 625    | 838                      | NR            | 755    | 17                       | NR            | 885    | 0                        | NR            |
| 370    | 0                        | NR            | 500    | 160                      | NR            | 630    | 774                      | NR            | 760    | 14                       | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 183                      | NR            | 635    | 704                      | NR            | 765    | 12                       | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 202                      | NR            | 640    | 635                      | NR            | 770    | 10                       | NR            | 900    | 0                        | NR            |
| 385    | 0                        | NR            | 515    | 219                      | NR            | 645    | 565                      | NR            | 775    | 9                        | NR            | 905    | 0                        | NR            |
| 390    | 0                        | NR            | 520    | 235                      | NR            | 650    | 501                      | NR            | 780    | 7                        | NR            | 910    | 0                        | NR            |
| 395    | 0                        | NR            | 525    | 249                      | NR            | 655    | 440                      | NR            | 785    | 6                        | NR            | 915    | 0                        | NR            |
| 400    | 0                        | NR            | 530    | 263                      | NR            | 660    | 383                      | NR            | 790    | 5                        | NR            | 920    | 0                        | NR            |
| 405    | 0                        | NR            | 535    | 281                      | NR            | 665    | 332                      | NR            | 795    | 5                        | NR            | 925    | 0                        | NR            |
| 410    | 1                        | NR            | 540    | 302                      | NR            | 670    | 286                      | NR            | 800    | 4                        | NR            | 930    | 0                        | NR            |
| 415    | 3                        | NR            | 545    | 331                      | NR            | 675    | 245                      | NR            | 805    | 3                        | NR            | 935    | 0                        | NR            |
| 420    | 6                        | NR            | 550    | 366                      | NR            | 680    | 210                      | NR            | 810    | 3                        | NR            | 940    | 0                        | NR            |
| 425    | 12                       | NR            | 555    | 411                      | NR            | 685    | 178                      | NR            | 815    | 3                        | NR            | 945    | 0                        | NR            |
| 430    | 21                       | NR            | 560    | 469                      | NR            | 690    | 152                      | NR            | 820    | 2                        | NR            | 950    | 0                        | NR            |
| 435    | 38                       | NR            | 565    | 536                      | NR            | 695    | 129                      | NR            | 825    | 2                        | NR            | 955    | 0                        | NR            |
| 440    | 66                       | NR            | 570    | 614                      | NR            | 700    | 109                      | NR            | 830    | 2                        | NR            | 960    | 0                        | NR            |
| 445    | 122                      | NR            | 575    | 701                      | NR            | 705    | 92                       | NR            | 835    | 1                        | NR            | 965    | 0                        | NR            |
| 450    | 215                      | NR            | 580    | 785                      | NR            | 710    | 77                       | NR            | 840    | 1                        | NR            | 970    | 0                        | NR            |
| 455    | 236                      | NR            | 585    | 863                      | NR            | 715    | 66                       | NR            | 845    | 1                        | NR            | 975    | 0                        | NR            |
| 460    | 170                      | NR            | 590    | 928                      | NR            | 720    | 55                       | NR            | 850    | 1                        | NR            | 980    | 0                        | NR            |
| 465    | 148                      | NR            | 595    | 971                      | NR            | 725    | 47                       | NR            | 855    | 1                        | NR            | 985    | 0                        | NR            |
| 470    | 132                      | NR            | 600    | 994                      | NR            | 730    | 40                       | NR            | 860    | 1                        | NR            | 990    | 0                        | NR            |
| 475    | 104                      | NR            | 605    | 996                      | NR            | 735    | 33                       | NR            | 865    | 1                        | NR            | 995    | 0                        | NR            |
| 480    | 97                       | NR            | 610    | 979                      | NR            | 740    | 28                       | NR            | 870    | 1                        | NR            | 1000   | 0                        | NR            |
| 485    | 105                      | NR            | 615    | 943                      | NR            | 745    | 24                       | NR            | 875    | 0                        | NR            |        |                          |               |

REPORT NUMBER: SP1-2407-157-2

**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: NR**

**M/P: 1.71**

| 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    | 117                      | NR            | 620    | 896                      | NR            | 750    | 20                       | NR            | 880    | 0                        | NR            |
| 365    | 0                        | NR            | 495    | 137                      | NR            | 625    | 838                      | NR            | 755    | 17                       | NR            | 885    | 0                        | NR            |
| 370    | 0                        | NR            | 500    | 160                      | NR            | 630    | 774                      | NR            | 760    | 14                       | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 183                      | NR            | 635    | 704                      | NR            | 765    | 12                       | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 202                      | NR            | 640    | 635                      | NR            | 770    | 10                       | NR            | 900    | 0                        | NR            |
| 385    | 0                        | NR            | 515    | 219                      | NR            | 645    | 565                      | NR            | 775    | 9                        | NR            | 905    | 0                        | NR            |
| 390    | 0                        | NR            | 520    | 235                      | NR            | 650    | 501                      | NR            | 780    | 7                        | NR            | 910    | 0                        | NR            |
| 395    | 0                        | NR            | 525    | 249                      | NR            | 655    | 440                      | NR            | 785    | 6                        | NR            | 915    | 0                        | NR            |
| 400    | 0                        | NR            | 530    | 263                      | NR            | 660    | 383                      | NR            | 790    | 5                        | NR            | 920    | 0                        | NR            |
| 405    | 0                        | NR            | 535    | 281                      | NR            | 665    | 332                      | NR            | 795    | 5                        | NR            | 925    | 0                        | NR            |
| 410    | 1                        | NR            | 540    | 302                      | NR            | 670    | 286                      | NR            | 800    | 4                        | NR            | 930    | 0                        | NR            |
| 415    | 3                        | NR            | 545    | 331                      | NR            | 675    | 245                      | NR            | 805    | 3                        | NR            | 935    | 0                        | NR            |
| 420    | 6                        | NR            | 550    | 366                      | NR            | 680    | 210                      | NR            | 810    | 3                        | NR            | 940    | 0                        | NR            |
| 425    | 12                       | NR            | 555    | 411                      | NR            | 685    | 178                      | NR            | 815    | 3                        | NR            | 945    | 0                        | NR            |
| 430    | 21                       | NR            | 560    | 469                      | NR            | 690    | 152                      | NR            | 820    | 2                        | NR            | 950    | 0                        | NR            |
| 435    | 38                       | NR            | 565    | 536                      | NR            | 695    | 129                      | NR            | 825    | 2                        | NR            | 955    | 0                        | NR            |
| 440    | 66                       | NR            | 570    | 614                      | NR            | 700    | 109                      | NR            | 830    | 2                        | NR            | 960    | 0                        | NR            |
| 445    | 122                      | NR            | 575    | 701                      | NR            | 705    | 92                       | NR            | 835    | 1                        | NR            | 965    | 0                        | NR            |
| 450    | 215                      | NR            | 580    | 785                      | NR            | 710    | 77                       | NR            | 840    | 1                        | NR            | 970    | 0                        | NR            |
| 455    | 236                      | NR            | 585    | 863                      | NR            | 715    | 66                       | NR            | 845    | 1                        | NR            | 975    | 0                        | NR            |
| 460    | 170                      | NR            | 590    | 928                      | NR            | 720    | 55                       | NR            | 850    | 1                        | NR            | 980    | 0                        | NR            |
| 465    | 148                      | NR            | 595    | 971                      | NR            | 725    | 47                       | NR            | 855    | 1                        | NR            | 985    | 0                        | NR            |
| 470    | 132                      | NR            | 600    | 994                      | NR            | 730    | 40                       | NR            | 860    | 1                        | NR            | 990    | 0                        | NR            |
| 475    | 104                      | NR            | 605    | 996                      | NR            | 735    | 33                       | NR            | 865    | 1                        | NR            | 995    | 0                        | NR            |
| 480    | 97                       | NR            | 610    | 979                      | NR            | 740    | 28                       | NR            | 870    | 1                        | NR            | 1000   | 0                        | NR            |
| 485    | 105                      | NR            | 615    | 943                      | NR            | 745    | 24                       | NR            | 875    | 0                        | NR            |        |                          |               |

**Summary**

$R_f = 76.9$   
 $R_g = 92.7$   
 $CIE R_a = 70.6$   
 $R_9 = -36.0$



**Color Vector Graphics**





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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 87 | CES26 = 76 | CES51 = 88 | CES76 = 78 |
| CES02 = 65 | CES27 = 94 | CES52 = 85 | CES77 = 75 |
| CES03 = 32 | CES28 = 93 | CES53 = 80 | CES78 = 79 |
| CES04 = 72 | CES29 = 81 | CES54 = 86 | CES79 = 82 |
| CES05 = 51 | CES30 = 91 | CES55 = 83 | CES80 = 81 |
| CES06 = 52 | CES31 = 83 | CES56 = 77 | CES81 = 51 |
| CES07 = 44 | CES32 = 75 | CES57 = 75 | CES82 = 92 |
| CES08 = 42 | CES33 = 88 | CES58 = 76 | CES83 = 88 |
| CES09 = 29 | CES34 = 88 | CES59 = 84 | CES84 = 90 |
| CES10 = 79 | CES35 = 94 | CES60 = 91 | CES85 = 65 |
| CES11 = 62 | CES36 = 90 | CES61 = 82 | CES86 = 48 |
| CES12 = 68 | CES37 = 97 | CES62 = 91 | CES87 = 76 |
| CES13 = 45 | CES38 = 98 | CES63 = 86 | CES88 = 78 |
| CES14 = 75 | CES39 = 97 | CES64 = 70 | CES89 = 61 |
| CES15 = 72 | CES40 = 94 | CES65 = 71 | CES90 = 80 |
| CES16 = 48 | CES41 = 95 | CES66 = 71 | CES91 = 80 |
| CES17 = 51 | CES42 = 89 | CES67 = 70 | CES92 = 51 |
| CES18 = 57 | CES43 = 80 | CES68 = 74 | CES93 = 68 |
| CES19 = 74 | CES44 = 99 | CES69 = 84 | CES94 = 44 |
| CES20 = 68 | CES45 = 83 | CES70 = 72 | CES95 = 66 |
| CES21 = 88 | CES46 = 81 | CES71 = 75 | CES96 = 75 |
| CES22 = 81 | CES47 = 88 | CES72 = 89 | CES97 = 76 |
| CES23 = 92 | CES48 = 73 | CES73 = 68 | CES98 = 72 |
| CES24 = 92 | CES49 = 82 | CES74 = 85 | CES99 = 63 |
| CES25 = 73 | CES50 = 87 | CES75 = 80 |            |



Color Rendition by Hue-Angle Bin



Measure Comparisons



(END OF REPORT)