

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: INVUE

Report Number: P868817

Luminaire Tested: **EMM2-HSN-SA1B-740-U-T2R**

Issue Date: 08/22/2024



**Test Information**

Test Method: LM-79-08  
Report Number: P868817  
Test Lab: INNOVATION CENTER(G3)  
Issue Date: 08/22/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: INVUE  
Catalog Number: EMM2-HSN-SA1B-740-U-T2R  
Description: EPIC MODERN SHORT HOUSING DISCRETE LED ARRAYS 60W 70CRI 4000K  
FITXURE w/ TYPE II ROADWAY DISTRIBUTION OPTIC  
Light Source: (10) 4000K CCT, 70 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

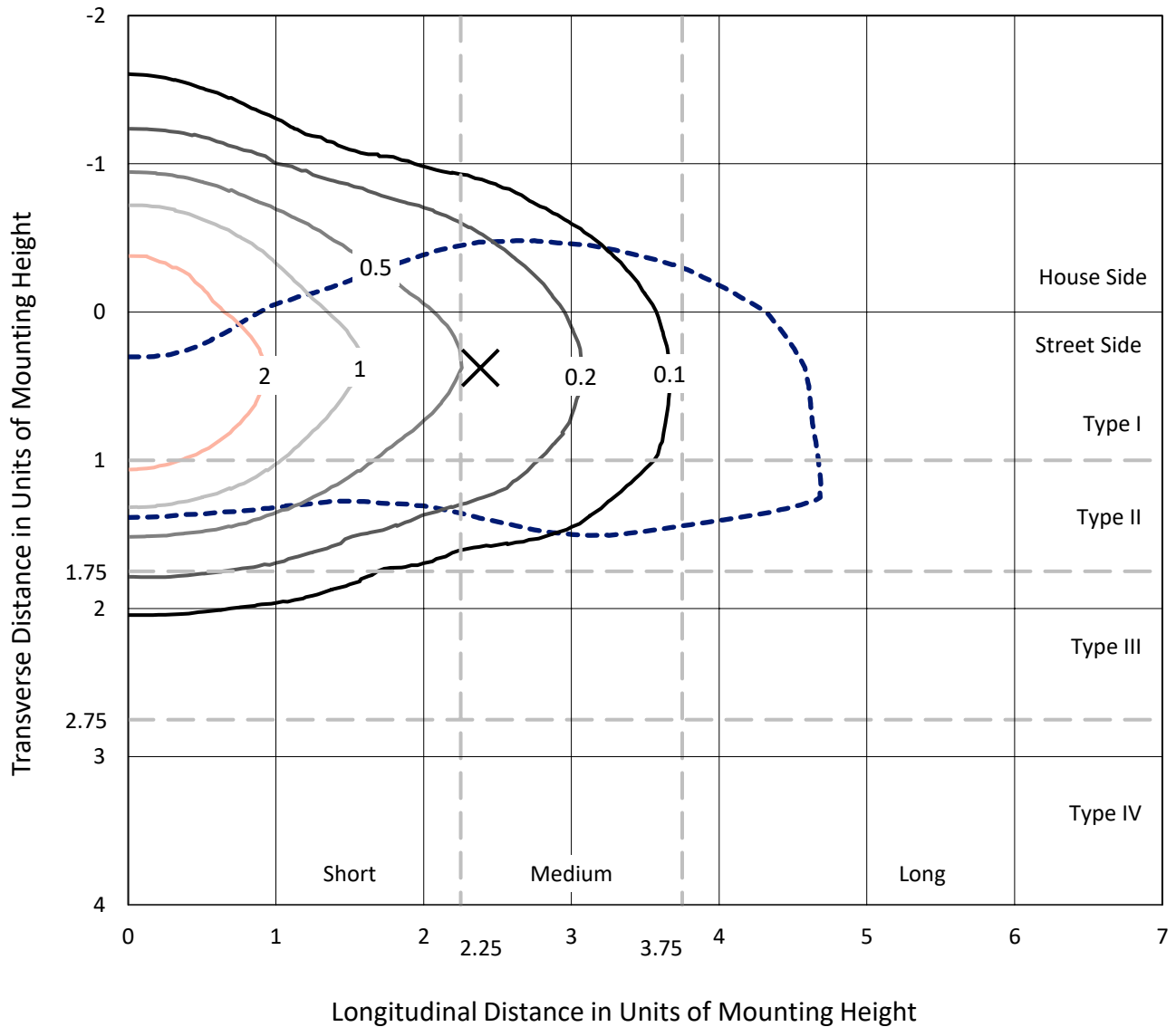
Lumens per Lamp: N/A  
Luminaire Lumens: 6289.3 lumens  
Efficiency: N/A  
Efficacy: 142.9 lumens/watt  
Luminous Opening: Rectangular (W 0.33' x L: 0.33' x H: 0')  
IES Classification: Type II - Medium  
BUG Rating: B2 - U0 - G2

Input Watts (W): 44  
Input Voltage (V): 120  
Input Current (A<sub>in</sub>): NR  
Voltage Rise (V): NR  
Power Factor: 0.99  
Total Harmonic Distortion (THDi): 6.91%  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT

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 CATALOG NUMBER: EMM2-HSN-SA1B-740-U-T2R

### Iso-Footcandle Lines of Horizontal Illumination

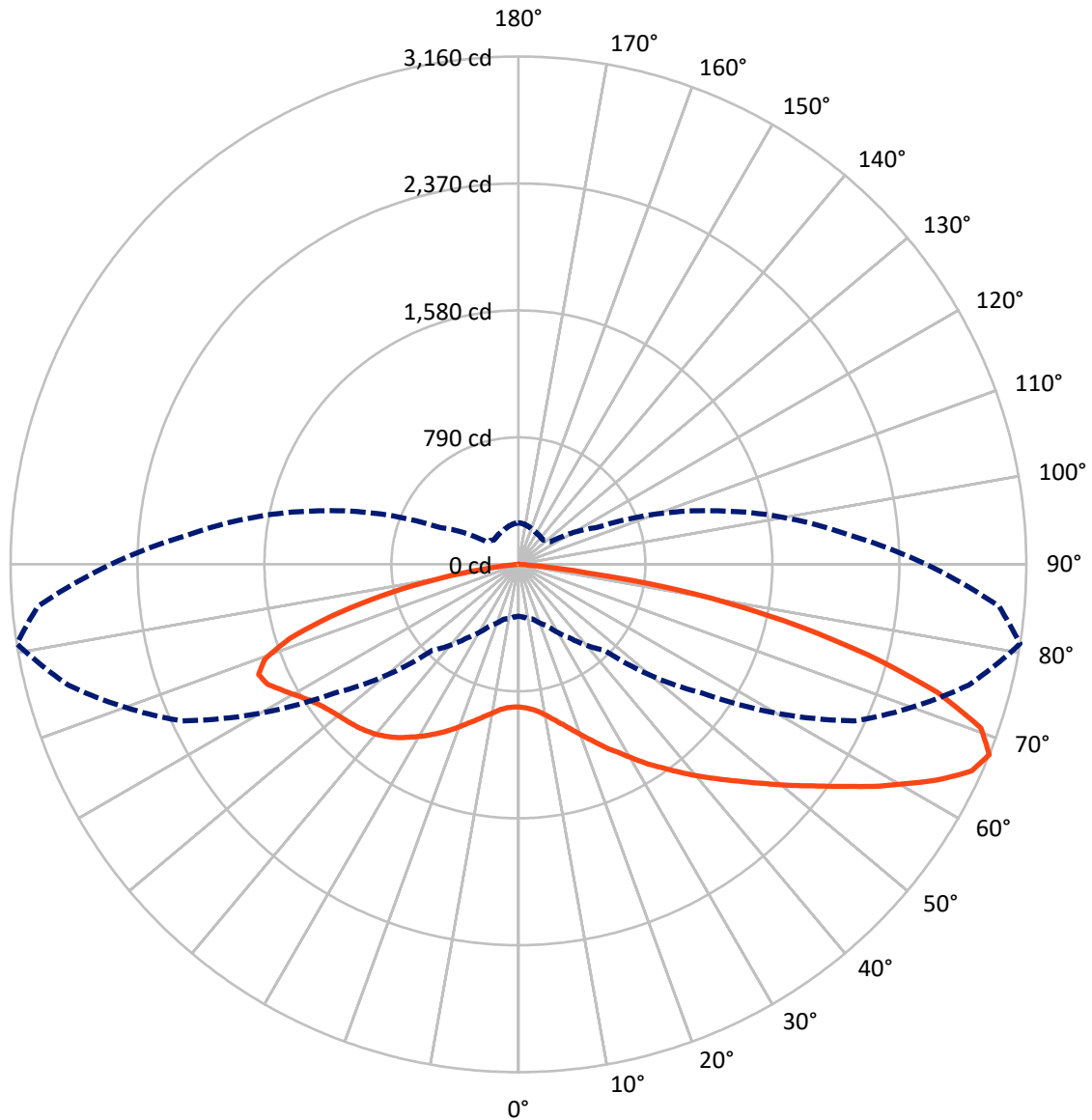
× Max cd  
 - - - 1/2 Max cd



Based on 20 foot mounting height. Maximum calculated value = 4 fc  
 Type II - Medium - N/A

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### Luminous Intensity Polar Plot



— Vertical Plane Through 81-Deg Lateral    - - - Horizontal Cone Through 67.5-Deg Vertical

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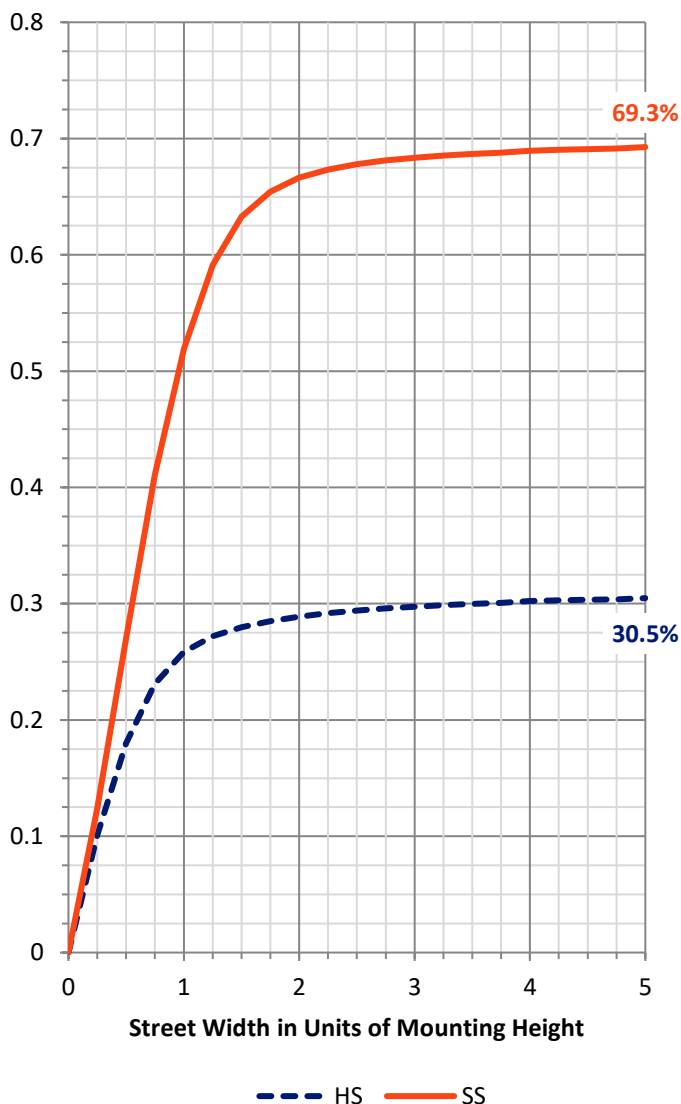
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 1927.2   | 0.0    | 1927.2 |
|                    | % Fixture | 30.6     | 0.0    | 30.6   |
| <b>Street Side</b> | Lumens    | 4362.1   | 0.0    | 4362.1 |
|                    | % Fixture | 69.4     | 0.0    | 69.4   |
| <b>Total</b>       | Lumens    | 6289.3   | 0.0    | 6289.3 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 90.5   | 1.4       |
| 10°-20°   | 321.4  | 5.1       |
| 20°-30°   | 640.2  | 10.2      |
| 30°-40°   | 1005.7 | 16.0      |
| 40°-50°   | 1247.3 | 19.8      |
| 50°-60°   | 1219.3 | 19.4      |
| 60°-70°   | 1025.4 | 16.3      |
| 70°-80°   | 651.5  | 10.4      |
| 80°-90°   | 87.9   | 1.4       |
| 90°-100°  | 0.0    | 0.0       |
| 100°-110° | 0.0    | 0.0       |
| 110°-120° | 0.0    | 0.0       |
| 120°-130° | 0.0    | 0.0       |
| 130°-140° | 0.0    | 0.0       |
| 140°-150° | 0.0    | 0.0       |
| 150°-160° | 0.0    | 0.0       |
| 160°-170° | 0.0    | 0.0       |
| 170°-180° | 0.0    | 0.0       |
| 0°-90°    | 6289.3 | 100.0     |
| 0°-180°   | 6289.3 | 100.0     |

**Coefficient of Utilization**



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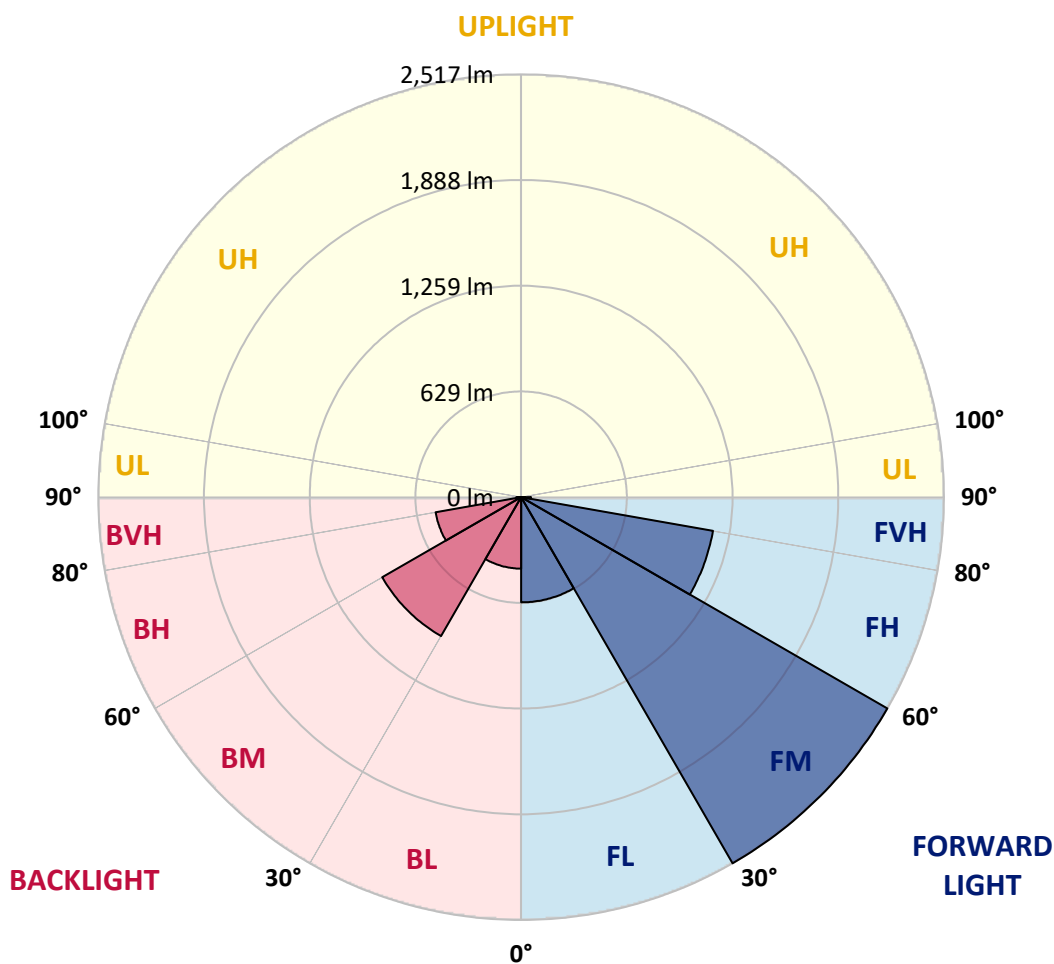
CATALOG NUMBER: EMM2-HSN-SA1B-740-U-T2R

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

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|--------|-----------|-------------------------|------|---------|
|                |        |           | B                       | U    | G       |
| FL (0°-30°)    | 626.5  | 10.0      |                         |      |         |
| FM (30°-60°)   | 2517.2 | 40.0      |                         |      |         |
| FH (60°-80°)   | 1159.5 | 18.4      |                         |      | G1/1800 |
| FVH (80°-90°)  | 58.9   | 0.9       |                         |      | G1/100  |
| BL (0°-30°)    | 425.7  | 6.8       | B1/500                  |      |         |
| BM (30°-60°)   | 955.2  | 15.2      | B1/1000                 |      |         |
| BH (60°-80°)   | 517.3  | 8.2       | B2/1000                 |      | G2/1000 |
| BVH (80°-90°)  | 29.0   | 0.5       |                         |      | G1/100  |
| UL (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B2-U0-G2**

Type II Medium





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CATALOG NUMBER: EMM2-HSN-SA1B-740-U-T2R

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 75°    | 81°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 887.9  | 887.9  | 887.9  | 887.9  | 887.9  | 887.9  | 887.9  | 887.9  | 887.9  | 887.9  | 887.9  |
| 2.5°  | 919.1  | 917.9  | 917.9  | 907.9  | 907.9  | 905.4  | 906.6  | 899.2  | 895.4  | 894.2  | 892.9  |
| 5°    | 985.2  | 985.2  | 977.7  | 971.5  | 959.0  | 947.8  | 937.8  | 922.9  | 911.6  | 906.6  | 902.9  |
| 7.5°  | 1085.0 | 1077.5 | 1075.0 | 1056.3 | 1030.1 | 1007.7 | 987.7  | 955.3  | 934.1  | 926.6  | 921.6  |
| 10°   | 1207.2 | 1197.2 | 1178.5 | 1157.3 | 1123.6 | 1090.0 | 1050.1 | 1006.4 | 971.5  | 956.5  | 950.3  |
| 12.5° | 1333.2 | 1319.4 | 1293.2 | 1273.3 | 1229.6 | 1178.5 | 1122.4 | 1062.5 | 1013.9 | 992.7  | 981.5  |
| 15°   | 1471.6 | 1464.1 | 1432.9 | 1393.0 | 1341.9 | 1269.6 | 1199.7 | 1126.1 | 1063.8 | 1033.8 | 1015.1 |
| 17.5° | 1621.2 | 1610.0 | 1576.3 | 1527.7 | 1455.4 | 1369.3 | 1288.3 | 1193.5 | 1121.1 | 1082.5 | 1061.3 |
| 20°   | 1768.4 | 1765.9 | 1716.0 | 1669.9 | 1585.1 | 1477.8 | 1373.1 | 1273.3 | 1182.3 | 1137.4 | 1109.9 |
| 22.5° | 1933.0 | 1916.8 | 1873.1 | 1808.3 | 1707.3 | 1608.8 | 1485.3 | 1355.6 | 1248.3 | 1196.0 | 1164.8 |
| 25°   | 2103.9 | 2102.6 | 2049.0 | 1969.2 | 1850.7 | 1726.0 | 1592.5 | 1449.1 | 1326.9 | 1263.3 | 1222.2 |
| 27.5° | 2315.9 | 2299.7 | 2231.1 | 2140.0 | 2002.8 | 1859.4 | 1704.8 | 1546.4 | 1401.7 | 1325.7 | 1275.8 |
| 30°   | 2501.7 | 2496.7 | 2419.4 | 2317.1 | 2163.7 | 1992.9 | 1825.8 | 1656.2 | 1490.3 | 1400.5 | 1345.6 |
| 32.5° | 2652.6 | 2646.4 | 2580.3 | 2478.0 | 2313.4 | 2136.3 | 1944.2 | 1759.7 | 1578.8 | 1481.6 | 1409.2 |
| 35°   | 2778.5 | 2768.6 | 2700.0 | 2597.7 | 2455.5 | 2276.0 | 2071.4 | 1868.2 | 1676.1 | 1557.6 | 1489.0 |
| 37.5° | 2828.4 | 2819.7 | 2763.6 | 2678.8 | 2547.8 | 2383.2 | 2186.2 | 1987.9 | 1773.4 | 1643.7 | 1566.4 |
| 40°   | 2809.7 | 2804.7 | 2764.8 | 2706.2 | 2606.4 | 2469.3 | 2295.9 | 2112.6 | 1883.1 | 1734.7 | 1642.4 |
| 42.5° | 2721.2 | 2721.2 | 2696.2 | 2666.3 | 2616.4 | 2517.9 | 2393.2 | 2232.3 | 1989.1 | 1825.8 | 1714.8 |
| 45°   | 2596.5 | 2591.5 | 2582.7 | 2571.5 | 2564.0 | 2526.6 | 2456.8 | 2335.8 | 2106.4 | 1925.5 | 1802.1 |
| 47.5° | 2430.6 | 2434.3 | 2428.1 | 2433.1 | 2464.3 | 2488.0 | 2484.2 | 2431.8 | 2226.1 | 2035.3 | 1888.1 |
| 50°   | 2170.0 | 2187.4 | 2207.4 | 2266.0 | 2329.6 | 2395.7 | 2456.8 | 2500.4 | 2367.0 | 2160.0 | 1987.9 |
| 52.5° | 1847.0 | 1854.4 | 1908.1 | 2046.5 | 2182.4 | 2269.7 | 2385.7 | 2531.6 | 2491.7 | 2289.7 | 2105.1 |
| 55°   | 1449.1 | 1462.9 | 1543.9 | 1739.7 | 1981.6 | 2148.8 | 2284.7 | 2517.9 | 2618.9 | 2438.1 | 2242.3 |
| 57.5° | 1038.8 | 1047.6 | 1177.3 | 1379.3 | 1694.8 | 1975.4 | 2170.0 | 2463.0 | 2721.2 | 2606.4 | 2383.2 |
| 60°   | 738.3  | 754.5  | 838.1  | 1035.1 | 1338.1 | 1736.0 | 2065.2 | 2383.2 | 2816.0 | 2771.1 | 2567.8 |
| 62.5° | 545.0  | 553.7  | 612.3  | 755.7  | 1005.2 | 1409.2 | 1929.3 | 2324.6 | 2878.3 | 2948.2 | 2752.4 |
| 65°   | 410.3  | 414.0  | 453.9  | 552.5  | 752.0  | 1038.8 | 1714.8 | 2313.4 | 2913.2 | 3099.0 | 2915.7 |
| 67.5° | 323.0  | 329.2  | 354.2  | 421.5  | 559.9  | 755.7  | 1396.8 | 2305.9 | 2900.8 | 3160.2 | 3001.8 |
| 70°   | 271.9  | 273.1  | 291.8  | 329.2  | 419.0  | 543.7  | 1043.8 | 2193.7 | 2830.9 | 3052.9 | 2922.0 |
| 72.5° | 235.7  | 235.7  | 244.4  | 274.4  | 336.7  | 411.5  | 710.8  | 1925.5 | 2653.8 | 2727.4 | 2645.1 |
| 75°   | 190.8  | 189.6  | 204.5  | 233.2  | 270.6  | 316.8  | 477.6  | 1457.9 | 2282.2 | 2244.8 | 2177.4 |
| 77.5° | 165.9  | 164.6  | 177.1  | 202.0  | 223.2  | 253.2  | 326.7  | 946.6  | 1795.8 | 1683.6 | 1641.2 |
| 80°   | 142.2  | 138.4  | 148.4  | 172.1  | 183.3  | 197.0  | 225.7  | 551.2  | 1173.5 | 1103.7 | 1052.6 |
| 82.5° | 107.3  | 98.5   | 96.0   | 116.0  | 123.5  | 114.7  | 114.7  | 193.3  | 426.5  | 430.3  | 397.8  |
| 85°   | 8.7    | 10.0   | 12.5   | 15.0   | 21.2   | 23.7   | 24.9   | 41.2   | 63.6   | 61.1   | 62.4   |
| 87.5° | 1.2    | 1.2    | 1.2    | 2.5    | 2.5    | 3.7    | 3.7    | 3.7    | 5.0    | 5.0    | 5.0    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



REPORT NUMBER: P868817

CATALOG NUMBER: EMM2-HSN-SA1B-740-U-T2R

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°  | 175°  | 180°  |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|-------|
| 0°    | 887.9  | 887.9  | 887.9  | 887.9  | 887.9  | 887.9  | 887.9  | 887.9  | 887.9 | 887.9 | 887.9 |
| 2.5°  | 891.7  | 889.2  | 886.7  | 886.7  | 886.7  | 884.2  | 882.9  | 882.9  | 881.7 | 878.0 | 876.7 |
| 5°    | 900.4  | 896.7  | 892.9  | 892.9  | 892.9  | 891.7  | 890.4  | 891.7  | 890.4 | 886.7 | 885.4 |
| 7.5°  | 917.9  | 912.9  | 907.9  | 907.9  | 910.4  | 909.1  | 909.1  | 910.4  | 909.1 | 905.4 | 904.1 |
| 10°   | 942.8  | 935.3  | 932.8  | 932.8  | 935.3  | 934.1  | 932.8  | 932.8  | 931.6 | 925.3 | 927.8 |
| 12.5° | 970.2  | 962.8  | 960.3  | 961.5  | 960.3  | 957.8  | 959.0  | 955.3  | 954.0 | 944.1 | 942.8 |
| 15°   | 1005.2 | 996.4  | 991.4  | 992.7  | 989.0  | 984.0  | 979.0  | 976.5  | 971.5 | 962.8 | 960.3 |
| 17.5° | 1045.1 | 1031.4 | 1025.1 | 1025.1 | 1017.6 | 1007.7 | 1000.2 | 992.7  | 985.2 | 975.2 | 972.7 |
| 20°   | 1083.7 | 1071.3 | 1061.3 | 1058.8 | 1043.8 | 1027.6 | 1013.9 | 1001.4 | 992.7 | 981.5 | 979.0 |
| 22.5° | 1132.4 | 1114.9 | 1101.2 | 1090.0 | 1067.5 | 1041.3 | 1020.1 | 1002.7 | 990.2 | 977.7 | 974.0 |
| 25°   | 1183.5 | 1158.6 | 1136.1 | 1114.9 | 1083.7 | 1046.3 | 1016.4 | 991.4  | 975.2 | 961.5 | 959.0 |
| 27.5° | 1234.6 | 1202.2 | 1169.8 | 1136.1 | 1088.7 | 1040.1 | 997.7  | 967.8  | 946.6 | 929.1 | 926.6 |
| 30°   | 1289.5 | 1249.6 | 1198.5 | 1149.8 | 1087.5 | 1023.9 | 970.2  | 927.8  | 902.9 | 882.9 | 880.5 |
| 32.5° | 1345.6 | 1295.7 | 1225.9 | 1159.8 | 1081.2 | 1000.2 | 930.3  | 885.4  | 854.3 | 831.8 | 825.6 |
| 35°   | 1408.0 | 1346.9 | 1250.8 | 1163.5 | 1063.8 | 965.3  | 887.9  | 831.8  | 795.7 | 773.2 | 768.2 |
| 37.5° | 1471.6 | 1394.3 | 1267.1 | 1161.1 | 1038.8 | 924.1  | 833.1  | 775.7  | 733.3 | 702.1 | 697.1 |
| 40°   | 1536.4 | 1437.9 | 1277.0 | 1148.6 | 1003.9 | 873.0  | 781.9  | 712.1  | 651.0 | 622.3 | 608.6 |
| 42.5° | 1596.3 | 1477.8 | 1282.0 | 1131.1 | 965.3  | 819.3  | 714.6  | 623.6  | 566.2 | 535.0 | 541.2 |
| 45°   | 1658.6 | 1515.2 | 1283.3 | 1109.9 | 914.1  | 750.8  | 629.8  | 545.0  | 487.6 | 463.9 | 461.4 |
| 47.5° | 1712.3 | 1546.4 | 1280.8 | 1080.0 | 856.8  | 672.2  | 541.2  | 460.2  | 417.8 | 395.3 | 392.8 |
| 50°   | 1783.4 | 1581.3 | 1277.0 | 1045.1 | 781.9  | 582.4  | 458.9  | 392.8  | 354.2 | 336.7 | 335.5 |
| 52.5° | 1854.4 | 1620.0 | 1274.5 | 996.4  | 703.4  | 497.6  | 384.1  | 331.7  | 305.5 | 296.8 | 294.3 |
| 55°   | 1948.0 | 1667.4 | 1275.8 | 940.3  | 613.6  | 410.3  | 325.5  | 289.3  | 275.6 | 271.9 | 271.9 |
| 57.5° | 2055.2 | 1728.5 | 1283.3 | 878.0  | 520.0  | 339.2  | 283.1  | 266.9  | 265.6 | 268.1 | 269.4 |
| 60°   | 2184.9 | 1809.5 | 1298.2 | 813.1  | 434.0  | 286.8  | 258.2  | 256.9  | 260.6 | 269.4 | 271.9 |
| 62.5° | 2330.8 | 1898.1 | 1316.9 | 728.3  | 351.7  | 251.9  | 244.4  | 249.4  | 254.4 | 264.4 | 265.6 |
| 65°   | 2459.3 | 1997.9 | 1328.2 | 647.2  | 294.3  | 232.0  | 235.7  | 238.2  | 250.7 | 264.4 | 264.4 |
| 67.5° | 2536.6 | 2070.2 | 1285.8 | 545.0  | 245.7  | 214.5  | 222.0  | 229.5  | 243.2 | 255.7 | 258.2 |
| 70°   | 2510.4 | 2046.5 | 1141.1 | 422.8  | 208.3  | 198.3  | 207.0  | 218.2  | 232.0 | 246.9 | 254.4 |
| 72.5° | 2328.3 | 1878.1 | 926.6  | 308.0  | 180.8  | 183.3  | 194.5  | 209.5  | 222.0 | 238.2 | 248.2 |
| 75°   | 1946.7 | 1567.6 | 668.4  | 222.0  | 158.4  | 168.4  | 185.8  | 198.3  | 207.0 | 210.8 | 212.0 |
| 77.5° | 1477.8 | 1152.3 | 455.2  | 165.9  | 137.2  | 150.9  | 169.6  | 183.3  | 185.8 | 188.3 | 190.8 |
| 80°   | 965.3  | 733.3  | 256.9  | 116.0  | 104.8  | 123.5  | 138.4  | 153.4  | 148.4 | 155.9 | 158.4 |
| 82.5° | 407.8  | 320.5  | 117.2  | 57.4   | 48.6   | 52.4   | 56.1   | 49.9   | 46.1  | 46.1  | 39.9  |
| 85°   | 53.6   | 41.2   | 17.5   | 7.5    | 6.2    | 3.7    | 3.7    | 3.7    | 2.5   | 2.5   | 2.5   |
| 87.5° | 5.0    | 5.0    | 3.7    | 3.7    | 2.5    | 2.5    | 1.2    | 2.5    | 1.2   | 1.2   | 1.2   |
| 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: SP1-2407-157-5

Test Date: 08/07/2024

Luminaire Tested: MEM2-HTN-SA-40-740-U-5WQ-2

Data in this report applies to families of products including MEM2-HTN-SA-40-740-U-5WQ-2

**Test Information**

Test Method: LM-79-2019  
 Report Number: SP1-2407-157-5  
 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-40-740-U-5WQ-2**  
 Description: Epic Modern Light Square 40W 5WQ Optic and Flare Trim

**Spectral Parameters**

CCT (K): 3915  
 CIE u': 0.2262  
 CIE v': 0.5044  
 Duv: 0.0010  
 CIE x: 0.3850  
 CIE y: 0.3816  
 CIE z: 0.2334  
 Peak Wavelength (nm): 449  
 Dominant Wavelength (nm): 578  
 Purity: 30.05482  
 R<sub>f</sub>: 73.2  
 R<sub>g</sub>: 93.9

|           |      |      |       |
|-----------|------|------|-------|
| CRI (Ra): | 71.0 |      |       |
| R1:       | 67.6 | R9:  | -38.4 |
| R2:       | 78.3 | R10: | 48.9  |
| R3:       | 87.1 | R11: | 65.3  |
| R4:       | 69.7 | R12: | 40.4  |
| R5:       | 67.4 | R13: | 69.3  |
| R6:       | 69.3 | R14: | 92.6  |
| R7:       | 79.7 | R15: | 59.9  |
| R8:       | 48.7 |      |       |



**Test Conditions**

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

REPORT NUMBER: SP1-2407-157-5

| 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: SP1-2407-157-5

**CIE 1931 Chromaticity Diagram**



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



Point lies inside the ANSI 4000K 4-step quadrangle

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**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               | 112                         | NR                      | 620               | 618                         | NR                      | 750               | 15                          | NR                      | 880               | 0                           | NR                      |
| 365               | 0                           | NR                      | 495               | 153                         | NR                      | 625               | 563                         | NR                      | 755               | 13                          | NR                      | 885               | 0                           | NR                      |
| 370               | 0                           | NR                      | 500               | 216                         | NR                      | 630               | 510                         | NR                      | 760               | 11                          | NR                      | 890               | 0                           | NR                      |
| 375               | 0                           | NR                      | 505               | 291                         | NR                      | 635               | 456                         | NR                      | 765               | 9                           | NR                      | 895               | 0                           | NR                      |
| 380               | 0                           | NR                      | 510               | 366                         | NR                      | 640               | 407                         | NR                      | 770               | 8                           | NR                      | 900               | 0                           | NR                      |
| 385               | 0                           | NR                      | 515               | 436                         | NR                      | 645               | 359                         | NR                      | 775               | 7                           | NR                      | 905               | 0                           | NR                      |
| 390               | 0                           | NR                      | 520               | 492                         | NR                      | 650               | 316                         | NR                      | 780               | 6                           | NR                      | 910               | 0                           | NR                      |
| 395               | 2                           | NR                      | 525               | 536                         | NR                      | 655               | 277                         | NR                      | 785               | 5                           | NR                      | 915               | 0                           | NR                      |
| 400               | 4                           | NR                      | 530               | 567                         | NR                      | 660               | 240                         | NR                      | 790               | 4                           | NR                      | 920               | 0                           | NR                      |
| 405               | 7                           | NR                      | 535               | 596                         | NR                      | 665               | 208                         | NR                      | 795               | 4                           | NR                      | 925               | 0                           | NR                      |
| 410               | 12                          | NR                      | 540               | 619                         | NR                      | 670               | 179                         | NR                      | 800               | 3                           | NR                      | 930               | 0                           | NR                      |
| 415               | 25                          | NR                      | 545               | 644                         | NR                      | 675               | 154                         | NR                      | 805               | 3                           | NR                      | 935               | 0                           | NR                      |
| 420               | 51                          | NR                      | 550               | 671                         | NR                      | 680               | 133                         | NR                      | 810               | 3                           | NR                      | 940               | 0                           | NR                      |
| 425               | 100                         | NR                      | 555               | 701                         | NR                      | 685               | 114                         | NR                      | 815               | 2                           | NR                      | 945               | 0                           | NR                      |
| 430               | 180                         | NR                      | 560               | 735                         | NR                      | 690               | 98                          | NR                      | 820               | 2                           | NR                      | 950               | 0                           | NR                      |
| 435               | 315                         | NR                      | 565               | 768                         | NR                      | 695               | 83                          | NR                      | 825               | 2                           | NR                      | 955               | 0                           | NR                      |
| 440               | 514                         | NR                      | 570               | 798                         | NR                      | 700               | 71                          | NR                      | 830               | 1                           | NR                      | 960               | 0                           | NR                      |
| 445               | 828                         | NR                      | 575               | 825                         | NR                      | 705               | 61                          | NR                      | 835               | 1                           | NR                      | 965               | 0                           | NR                      |
| 450               | 992                         | NR                      | 580               | 843                         | NR                      | 710               | 52                          | NR                      | 840               | 1                           | NR                      | 970               | 0                           | NR                      |
| 455               | 652                         | NR                      | 585               | 848                         | NR                      | 715               | 44                          | NR                      | 845               | 1                           | NR                      | 975               | 0                           | NR                      |
| 460               | 382                         | NR                      | 590               | 844                         | NR                      | 720               | 38                          | NR                      | 850               | 1                           | NR                      | 980               | 0                           | NR                      |
| 465               | 282                         | NR                      | 595               | 826                         | NR                      | 725               | 32                          | NR                      | 855               | 1                           | NR                      | 985               | 0                           | NR                      |
| 470               | 180                         | NR                      | 600               | 800                         | NR                      | 730               | 28                          | NR                      | 860               | 1                           | NR                      | 990               | 0                           | NR                      |
| 475               | 119                         | NR                      | 605               | 762                         | NR                      | 735               | 24                          | NR                      | 865               | 1                           | NR                      | 995               | 0                           | NR                      |
| 480               | 101                         | NR                      | 610               | 719                         | NR                      | 740               | 20                          | NR                      | 870               | 1                           | NR                      | 1000              | 0                           | NR                      |
| 485               | 98                          | NR                      | 615               | 669                         | NR                      | 745               | 17                          | NR                      | 875               | 0                           | NR                      |                   |                             |                         |

REPORT NUMBER: SP1-2407-157-5

**Scotopic Flux vs. Wavelength**



**Scotopic Lumens: NR**

**S/P: 1.49**

| 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    | 112                      | NR            | 620    | 618                      | NR            | 750    | 15                       | NR            | 880    | 0                        | NR            |
| 365    | 0                        | NR            | 495    | 153                      | NR            | 625    | 563                      | NR            | 755    | 13                       | NR            | 885    | 0                        | NR            |
| 370    | 0                        | NR            | 500    | 216                      | NR            | 630    | 510                      | NR            | 760    | 11                       | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 291                      | NR            | 635    | 456                      | NR            | 765    | 9                        | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 366                      | NR            | 640    | 407                      | NR            | 770    | 8                        | NR            | 900    | 0                        | NR            |
| 385    | 0                        | NR            | 515    | 436                      | NR            | 645    | 359                      | NR            | 775    | 7                        | NR            | 905    | 0                        | NR            |
| 390    | 0                        | NR            | 520    | 492                      | NR            | 650    | 316                      | NR            | 780    | 6                        | NR            | 910    | 0                        | NR            |
| 395    | 2                        | NR            | 525    | 536                      | NR            | 655    | 277                      | NR            | 785    | 5                        | NR            | 915    | 0                        | NR            |
| 400    | 4                        | NR            | 530    | 567                      | NR            | 660    | 240                      | NR            | 790    | 4                        | NR            | 920    | 0                        | NR            |
| 405    | 7                        | NR            | 535    | 596                      | NR            | 665    | 208                      | NR            | 795    | 4                        | NR            | 925    | 0                        | NR            |
| 410    | 12                       | NR            | 540    | 619                      | NR            | 670    | 179                      | NR            | 800    | 3                        | NR            | 930    | 0                        | NR            |
| 415    | 25                       | NR            | 545    | 644                      | NR            | 675    | 154                      | NR            | 805    | 3                        | NR            | 935    | 0                        | NR            |
| 420    | 51                       | NR            | 550    | 671                      | NR            | 680    | 133                      | NR            | 810    | 3                        | NR            | 940    | 0                        | NR            |
| 425    | 100                      | NR            | 555    | 701                      | NR            | 685    | 114                      | NR            | 815    | 2                        | NR            | 945    | 0                        | NR            |
| 430    | 180                      | NR            | 560    | 735                      | NR            | 690    | 98                       | NR            | 820    | 2                        | NR            | 950    | 0                        | NR            |
| 435    | 315                      | NR            | 565    | 768                      | NR            | 695    | 83                       | NR            | 825    | 2                        | NR            | 955    | 0                        | NR            |
| 440    | 514                      | NR            | 570    | 798                      | NR            | 700    | 71                       | NR            | 830    | 1                        | NR            | 960    | 0                        | NR            |
| 445    | 828                      | NR            | 575    | 825                      | NR            | 705    | 61                       | NR            | 835    | 1                        | NR            | 965    | 0                        | NR            |
| 450    | 992                      | NR            | 580    | 843                      | NR            | 710    | 52                       | NR            | 840    | 1                        | NR            | 970    | 0                        | NR            |
| 455    | 652                      | NR            | 585    | 848                      | NR            | 715    | 44                       | NR            | 845    | 1                        | NR            | 975    | 0                        | NR            |
| 460    | 382                      | NR            | 590    | 844                      | NR            | 720    | 38                       | NR            | 850    | 1                        | NR            | 980    | 0                        | NR            |
| 465    | 282                      | NR            | 595    | 826                      | NR            | 725    | 32                       | NR            | 855    | 1                        | NR            | 985    | 0                        | NR            |
| 470    | 180                      | NR            | 600    | 800                      | NR            | 730    | 28                       | NR            | 860    | 1                        | NR            | 990    | 0                        | NR            |
| 475    | 119                      | NR            | 605    | 762                      | NR            | 735    | 24                       | NR            | 865    | 1                        | NR            | 995    | 0                        | NR            |
| 480    | 101                      | NR            | 610    | 719                      | NR            | 740    | 20                       | NR            | 870    | 1                        | NR            | 1000   | 0                        | NR            |
| 485    | 98                       | NR            | 615    | 669                      | NR            | 745    | 17                       | NR            | 875    | 0                        | NR            |        |                          |               |

REPORT NUMBER: SP1-2407-157-5

**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: NR**

**M/P: 2.88**

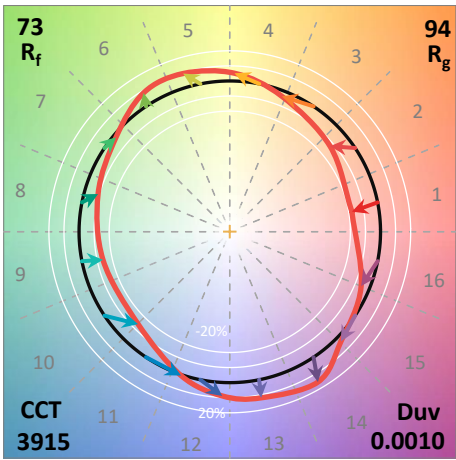
| λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360    | 0                        | NR            | 490    | 112                      | NR            | 620    | 618                      | NR            | 750    | 15                       | NR            | 880    | 0                        | NR            |
| 365    | 0                        | NR            | 495    | 153                      | NR            | 625    | 563                      | NR            | 755    | 13                       | NR            | 885    | 0                        | NR            |
| 370    | 0                        | NR            | 500    | 216                      | NR            | 630    | 510                      | NR            | 760    | 11                       | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 291                      | NR            | 635    | 456                      | NR            | 765    | 9                        | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 366                      | NR            | 640    | 407                      | NR            | 770    | 8                        | NR            | 900    | 0                        | NR            |
| 385    | 0                        | NR            | 515    | 436                      | NR            | 645    | 359                      | NR            | 775    | 7                        | NR            | 905    | 0                        | NR            |
| 390    | 0                        | NR            | 520    | 492                      | NR            | 650    | 316                      | NR            | 780    | 6                        | NR            | 910    | 0                        | NR            |
| 395    | 2                        | NR            | 525    | 536                      | NR            | 655    | 277                      | NR            | 785    | 5                        | NR            | 915    | 0                        | NR            |
| 400    | 4                        | NR            | 530    | 567                      | NR            | 660    | 240                      | NR            | 790    | 4                        | NR            | 920    | 0                        | NR            |
| 405    | 7                        | NR            | 535    | 596                      | NR            | 665    | 208                      | NR            | 795    | 4                        | NR            | 925    | 0                        | NR            |
| 410    | 12                       | NR            | 540    | 619                      | NR            | 670    | 179                      | NR            | 800    | 3                        | NR            | 930    | 0                        | NR            |
| 415    | 25                       | NR            | 545    | 644                      | NR            | 675    | 154                      | NR            | 805    | 3                        | NR            | 935    | 0                        | NR            |
| 420    | 51                       | NR            | 550    | 671                      | NR            | 680    | 133                      | NR            | 810    | 3                        | NR            | 940    | 0                        | NR            |
| 425    | 100                      | NR            | 555    | 701                      | NR            | 685    | 114                      | NR            | 815    | 2                        | NR            | 945    | 0                        | NR            |
| 430    | 180                      | NR            | 560    | 735                      | NR            | 690    | 98                       | NR            | 820    | 2                        | NR            | 950    | 0                        | NR            |
| 435    | 315                      | NR            | 565    | 768                      | NR            | 695    | 83                       | NR            | 825    | 2                        | NR            | 955    | 0                        | NR            |
| 440    | 514                      | NR            | 570    | 798                      | NR            | 700    | 71                       | NR            | 830    | 1                        | NR            | 960    | 0                        | NR            |
| 445    | 828                      | NR            | 575    | 825                      | NR            | 705    | 61                       | NR            | 835    | 1                        | NR            | 965    | 0                        | NR            |
| 450    | 992                      | NR            | 580    | 843                      | NR            | 710    | 52                       | NR            | 840    | 1                        | NR            | 970    | 0                        | NR            |
| 455    | 652                      | NR            | 585    | 848                      | NR            | 715    | 44                       | NR            | 845    | 1                        | NR            | 975    | 0                        | NR            |
| 460    | 382                      | NR            | 590    | 844                      | NR            | 720    | 38                       | NR            | 850    | 1                        | NR            | 980    | 0                        | NR            |
| 465    | 282                      | NR            | 595    | 826                      | NR            | 725    | 32                       | NR            | 855    | 1                        | NR            | 985    | 0                        | NR            |
| 470    | 180                      | NR            | 600    | 800                      | NR            | 730    | 28                       | NR            | 860    | 1                        | NR            | 990    | 0                        | NR            |
| 475    | 119                      | NR            | 605    | 762                      | NR            | 735    | 24                       | NR            | 865    | 1                        | NR            | 995    | 0                        | NR            |
| 480    | 101                      | NR            | 610    | 719                      | NR            | 740    | 20                       | NR            | 870    | 1                        | NR            | 1000   | 0                        | NR            |
| 485    | 98                       | NR            | 615    | 669                      | NR            | 745    | 17                       | NR            | 875    | 0                        | NR            |        |                          |               |

**Summary**

$R_f = 73.2$   
 $R_g = 93.9$   
 $CIE R_a = 71.0$   
 $R_g = -38.4$



**Color Vector Graphics**





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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 61 | CES51 = 88 | CES76 = 50 |
| CES02 = 61 | CES27 = 88 | CES52 = 87 | CES77 = 69 |
| CES03 = 30 | CES28 = 81 | CES53 = 77 | CES78 = 53 |
| CES04 = 70 | CES29 = 65 | CES54 = 84 | CES79 = 81 |
| CES05 = 47 | CES30 = 81 | CES55 = 83 | CES80 = 78 |
| CES06 = 50 | CES31 = 69 | CES56 = 73 | CES81 = 77 |
| CES07 = 40 | CES32 = 60 | CES57 = 72 | CES82 = 91 |
| CES08 = 39 | CES33 = 76 | CES58 = 73 | CES83 = 89 |
| CES09 = 29 | CES34 = 70 | CES59 = 85 | CES84 = 86 |
| CES10 = 74 | CES35 = 83 | CES60 = 89 | CES85 = 77 |
| CES11 = 57 | CES36 = 91 | CES61 = 81 | CES86 = 71 |
| CES12 = 63 | CES37 = 79 | CES62 = 85 | CES87 = 76 |
| CES13 = 42 | CES38 = 92 | CES63 = 72 | CES88 = 80 |
| CES14 = 74 | CES39 = 96 | CES64 = 64 | CES89 = 70 |
| CES15 = 71 | CES40 = 91 | CES65 = 61 | CES90 = 79 |
| CES16 = 46 | CES41 = 93 | CES66 = 57 | CES91 = 74 |
| CES17 = 49 | CES42 = 80 | CES67 = 54 | CES92 = 57 |
| CES18 = 56 | CES43 = 76 | CES68 = 63 | CES93 = 74 |
| CES19 = 72 | CES44 = 99 | CES69 = 73 | CES94 = 51 |
| CES20 = 65 | CES45 = 85 | CES70 = 55 | CES95 = 65 |
| CES21 = 86 | CES46 = 82 | CES71 = 48 | CES96 = 76 |
| CES22 = 78 | CES47 = 86 | CES72 = 83 | CES97 = 84 |
| CES23 = 92 | CES48 = 77 | CES73 = 45 | CES98 = 75 |
| CES24 = 91 | CES49 = 80 | CES74 = 93 | CES99 = 62 |
| CES25 = 72 | CES50 = 88 | CES75 = 51 |            |



Color Rendition by Hue-Angle Bin



Measure Comparisons



(END OF REPORT)