

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: P868573

Luminaire Tested: **EMM2-HTN-SA2A-740-U-T3-HSS**

Issue Date: 08/22/2024



**Test Information**

Test Method: LM-79-08  
Report Number: P868573  
Test Lab: INNOVATION CENTER(G3)  
Issue Date: 08/22/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: INVUE  
Catalog Number: EMM2-HTN-SA2A-740-U-T3-HSS  
Description: EPIC MODERN TALL HOUSING DISCRETE LED ARRAYS 70W 70CRI 4000K  
FIXTURE w/ TYPE III DISTRIBUTION OPTIC AND HOUSE SIDE SHIELD  
Light Source: (20) 4000K CCT, 70 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

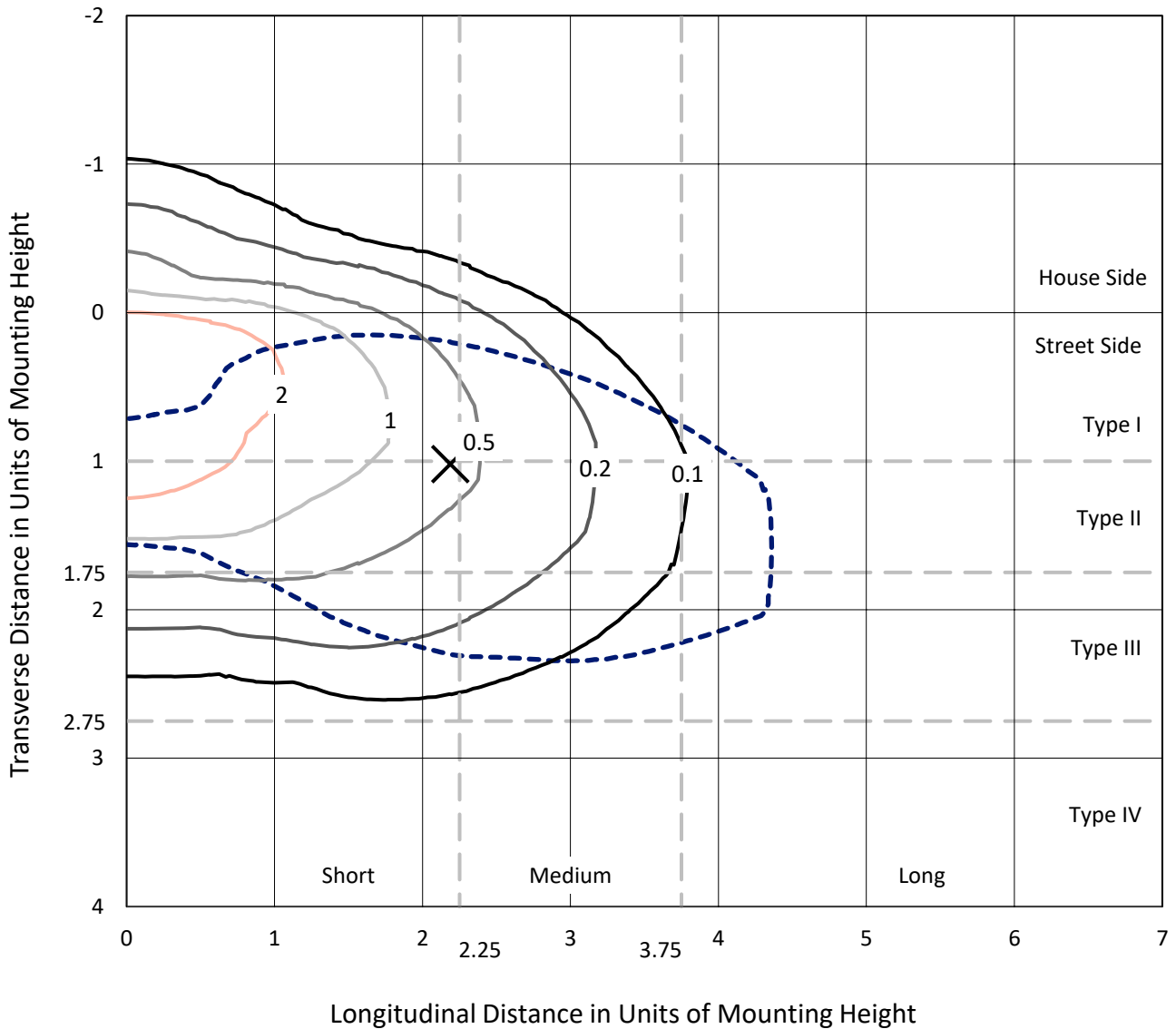
Lumens per Lamp: N/A  
Luminaire Lumens: 6525.9 lumens  
Efficiency: N/A  
Efficacy: 107.0 lumens/watt  
Luminous Opening: Rectangular (W 0.67' x L: 0.33' x H: 0')  
IES Classification: Type III - Short  
BUG Rating: B1 - U0 - G2

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

REPORT NUMBER: P868573  
 CATALOG NUMBER: EMM2-HTN-SA2A-740-U-T3-HSS

### Iso-Footcandle Lines of Horizontal Illumination

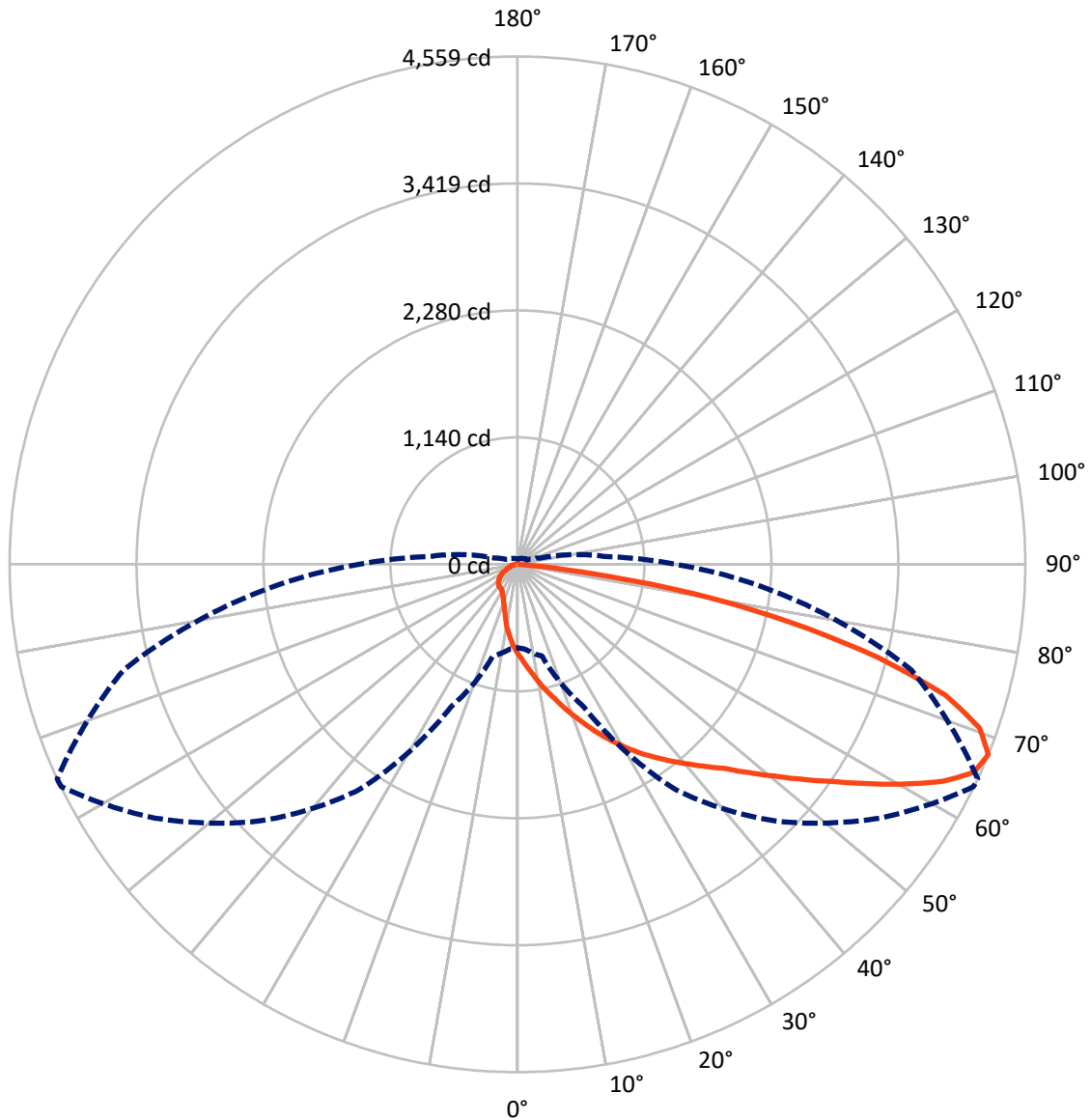
✕ Max cd  
 - - - 1/2 Max cd



Based on 20 foot mounting height. Maximum calculated value = 3.7 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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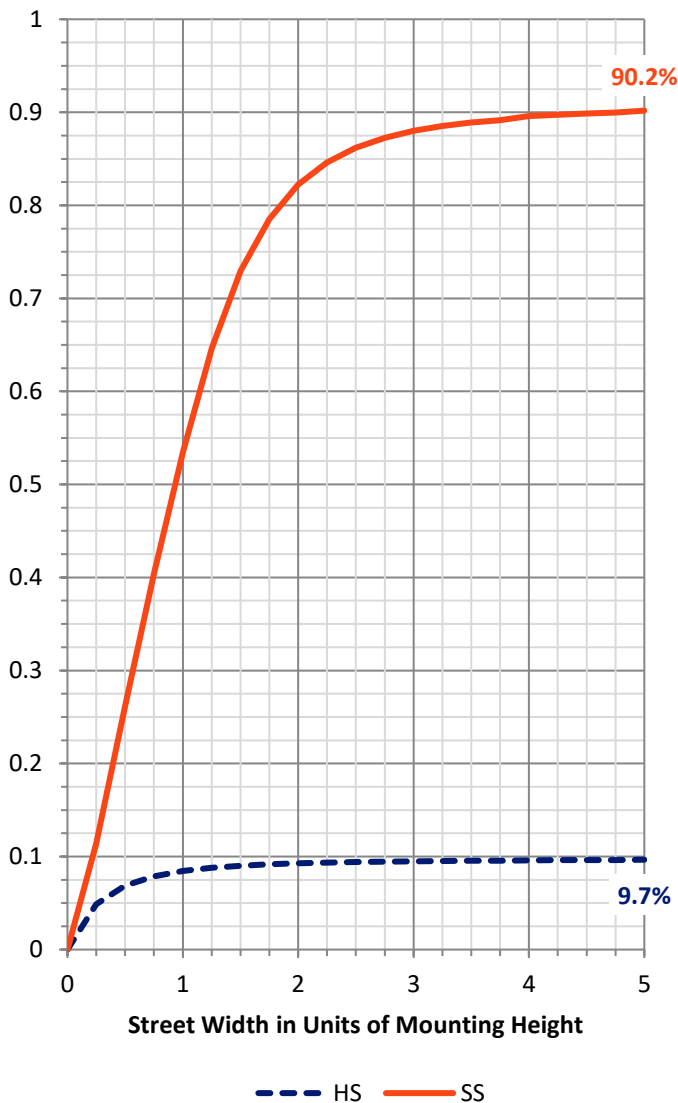
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 635.2    | 0.0    | 635.2  |
|                    | % Fixture | 9.7      | 0.0    | 9.7    |
| <b>Street Side</b> | Lumens    | 5890.7   | 0.0    | 5890.7 |
|                    | % Fixture | 90.3     | 0.0    | 90.3   |
| <b>Total</b>       | Lumens    | 6525.9   | 0.0    | 6525.9 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 78.9   | 1.2       |
| 10°-20°   | 261.9  | 4.0       |
| 20°-30°   | 476.6  | 7.3       |
| 30°-40°   | 737.6  | 11.3      |
| 40°-50°   | 1115.0 | 17.1      |
| 50°-60°   | 1450.5 | 22.2      |
| 60°-70°   | 1430.9 | 21.9      |
| 70°-80°   | 871.0  | 13.3      |
| 80°-90°   | 103.5  | 1.6       |
| 90°-100°  | 0.0    | 0.0       |
| 100°-110° | 0.0    | 0.0       |
| 110°-120° | 0.0    | 0.0       |
| 120°-130° | 0.0    | 0.0       |
| 130°-140° | 0.0    | 0.0       |
| 140°-150° | 0.0    | 0.0       |
| 150°-160° | 0.0    | 0.0       |
| 160°-170° | 0.0    | 0.0       |
| 170°-180° | 0.0    | 0.0       |
| 0°-90°    | 6525.9 | 100.0     |
| 0°-180°   | 6525.9 | 100.0     |

**Coefficient of Utilization**



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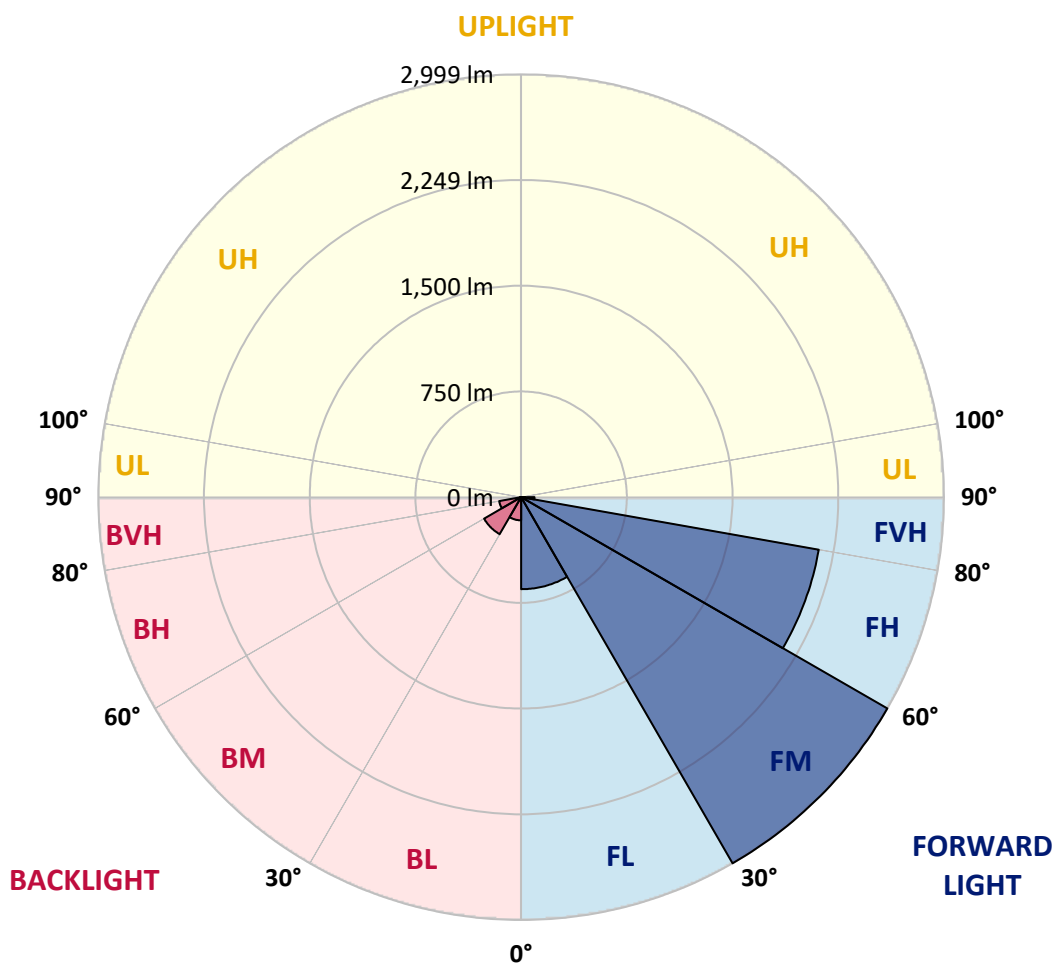
CATALOG NUMBER: EMM2-HTN-SA2A-740-U-T3-HSS

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

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|--------|-----------|-------------------------|------|---------|
|                |        |           | B                       | U    | G       |
| FL (0°-30°)    | 653.0  | 10.0      |                         |      |         |
| FM (30°-60°)   | 2999.3 | 46.0      |                         |      |         |
| FH (60°-80°)   | 2143.8 | 32.9      |                         |      | G2/5000 |
| FVH (80°-90°)  | 94.7   | 1.5       |                         |      | G1/100  |
| BL (0°-30°)    | 164.4  | 2.5       | B1/500                  |      |         |
| BM (30°-60°)   | 303.8  | 4.7       | B1/1000                 |      |         |
| BH (60°-80°)   | 158.2  | 2.4       | B1/500                  |      | G1/500  |
| BVH (80°-90°)  | 8.9    | 0.1       |                         |      | G0/10   |
| UL (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

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

Type III Short





REPORT NUMBER: P868573

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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 64°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 806.4  | 806.4  | 806.4  | 806.4  | 806.4  | 806.4  | 806.4  | 806.4  | 806.4  | 806.4  | 806.4  |
| 2.5°  | 942.3  | 934.9  | 940.5  | 927.4  | 912.5  | 901.4  | 879.0  | 860.4  | 858.5  | 839.9  | 819.4  |
| 5°    | 1123.0 | 1098.8 | 1100.6 | 1074.6 | 1042.9 | 1009.4 | 974.0  | 927.4  | 927.4  | 882.7  | 836.2  |
| 7.5°  | 1285.0 | 1281.3 | 1264.5 | 1223.6 | 1186.3 | 1134.2 | 1069.0 | 1009.4 | 996.3  | 927.4  | 854.8  |
| 10°   | 1441.4 | 1435.9 | 1421.0 | 1389.3 | 1326.0 | 1268.2 | 1186.3 | 1096.9 | 1080.2 | 981.5  | 877.2  |
| 12.5° | 1566.2 | 1568.1 | 1551.3 | 1525.3 | 1469.4 | 1400.5 | 1292.5 | 1180.7 | 1165.8 | 1033.6 | 899.5  |
| 15°   | 1676.1 | 1674.2 | 1670.5 | 1648.2 | 1594.2 | 1530.8 | 1404.2 | 1273.8 | 1249.6 | 1089.5 | 921.9  |
| 17.5° | 1759.9 | 1756.2 | 1748.7 | 1730.1 | 1704.0 | 1642.6 | 1521.5 | 1372.5 | 1352.1 | 1154.6 | 947.9  |
| 20°   | 1784.1 | 1782.3 | 1782.3 | 1795.3 | 1784.1 | 1746.9 | 1638.9 | 1475.0 | 1452.6 | 1223.6 | 983.3  |
| 22.5° | 1828.8 | 1826.9 | 1825.1 | 1838.1 | 1845.6 | 1841.8 | 1748.7 | 1579.3 | 1558.8 | 1303.6 | 1028.0 |
| 25°   | 1886.5 | 1882.8 | 1877.2 | 1890.3 | 1899.6 | 1921.9 | 1858.6 | 1702.2 | 1678.0 | 1396.8 | 1072.7 |
| 27.5° | 1962.9 | 1966.6 | 1959.2 | 1957.3 | 1957.3 | 1970.3 | 1955.5 | 1812.1 | 1789.7 | 1486.1 | 1124.8 |
| 30°   | 2063.5 | 2069.1 | 2056.0 | 2046.7 | 2029.9 | 2028.1 | 2031.8 | 1935.0 | 1903.3 | 1583.0 | 1178.9 |
| 32.5° | 2162.2 | 2167.8 | 2160.3 | 2147.3 | 2104.4 | 2087.7 | 2102.6 | 2039.3 | 2018.8 | 1689.1 | 1247.8 |
| 35°   | 2242.3 | 2255.3 | 2255.3 | 2229.2 | 2169.6 | 2160.3 | 2184.5 | 2141.7 | 2126.8 | 1813.9 | 1329.7 |
| 37.5° | 2350.3 | 2357.7 | 2350.3 | 2301.8 | 2227.4 | 2238.5 | 2275.8 | 2249.7 | 2240.4 | 1948.0 | 1426.5 |
| 40°   | 2581.2 | 2590.5 | 2542.1 | 2426.6 | 2307.4 | 2320.5 | 2385.6 | 2370.8 | 2355.9 | 2080.2 | 1515.9 |
| 42.5° | 2903.4 | 2881.0 | 2871.7 | 2614.7 | 2430.3 | 2422.9 | 2504.8 | 2484.4 | 2482.5 | 2214.3 | 1597.9 |
| 45°   | 3115.7 | 3123.1 | 3076.6 | 2832.6 | 2689.2 | 2549.5 | 2637.1 | 2629.6 | 2614.7 | 2350.3 | 1696.6 |
| 47.5° | 3262.8 | 3246.0 | 3130.6 | 3013.3 | 3041.2 | 2715.3 | 2784.2 | 2802.8 | 2793.5 | 2504.8 | 1817.6 |
| 50°   | 3324.3 | 3307.5 | 3231.1 | 3152.9 | 3186.5 | 2905.2 | 2935.0 | 2996.5 | 2987.2 | 2661.3 | 1920.1 |
| 52.5° | 3247.9 | 3227.4 | 3233.0 | 3253.5 | 3236.7 | 3054.2 | 3121.3 | 3218.1 | 3206.9 | 2843.8 | 2039.3 |
| 55°   | 2761.8 | 2815.8 | 3024.4 | 3233.0 | 3227.4 | 3167.8 | 3320.5 | 3462.1 | 3439.7 | 3033.7 | 2141.7 |
| 57.5° | 2227.4 | 2257.1 | 2521.6 | 3085.9 | 3197.6 | 3262.8 | 3547.7 | 3722.8 | 3715.4 | 3223.7 | 2234.8 |
| 60°   | 1771.1 | 1802.7 | 2003.9 | 2780.5 | 3128.7 | 3361.5 | 3780.5 | 4011.5 | 4004.0 | 3415.5 | 2301.8 |
| 62.5° | 1407.9 | 1407.9 | 1586.7 | 2341.0 | 2996.5 | 3419.2 | 3964.9 | 4302.0 | 4289.0 | 3570.1 | 2318.6 |
| 65°   | 1013.1 | 1026.1 | 1160.2 | 1882.8 | 2782.3 | 3404.3 | 4054.3 | 4508.7 | 4501.3 | 3657.6 | 2283.2 |
| 67.5° | 748.7  | 763.6  | 852.9  | 1411.6 | 2465.7 | 3255.4 | 3972.4 | 4555.3 | 4559.0 | 3659.5 | 2167.8 |
| 70°   | 584.8  | 588.5  | 655.5  | 981.5  | 2020.6 | 2923.9 | 3665.1 | 4400.7 | 4400.7 | 3568.2 | 1996.4 |
| 72.5° | 445.1  | 448.8  | 506.6  | 668.6  | 1488.0 | 2417.3 | 3205.1 | 3991.0 | 4018.9 | 3326.1 | 1743.1 |
| 75°   | 344.5  | 352.0  | 391.1  | 480.5  | 933.0  | 1718.9 | 2633.3 | 3268.4 | 3344.8 | 2856.8 | 1435.9 |
| 77.5° | 266.3  | 273.8  | 305.4  | 352.0  | 543.8  | 1059.7 | 1851.2 | 2443.4 | 2512.3 | 2249.7 | 1108.1 |
| 80°   | 214.2  | 217.9  | 238.4  | 264.5  | 329.6  | 545.7  | 1130.4 | 1605.3 | 1625.8 | 1529.0 | 733.8  |
| 82.5° | 98.7   | 106.2  | 128.5  | 145.3  | 163.9  | 253.3  | 482.3  | 594.1  | 620.2  | 607.1  | 301.7  |
| 85°   | 11.2   | 11.2   | 13.0   | 14.9   | 16.8   | 26.1   | 33.5   | 29.8   | 29.8   | 35.4   | 31.7   |
| 87.5° | 0.0    | 0.0    | 0.0    | 1.9    | 3.7    | 3.7    | 5.6    | 5.6    | 5.6    | 5.6    | 5.6    |
| 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: P868573

CATALOG NUMBER: EMM2-HTN-SA2A-740-U-T3-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°   | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 806.4  | 806.4 | 806.4 | 806.4 | 806.4 | 806.4 | 806.4 | 806.4 | 806.4 | 806.4 | 806.4 |
| 2.5°  | 808.3  | 795.2 | 771.0 | 750.5 | 731.9 | 713.3 | 704.0 | 681.6 | 676.0 | 679.8 | 666.7 |
| 5°    | 812.0  | 785.9 | 735.6 | 689.1 | 650.0 | 612.7 | 581.0 | 547.5 | 540.1 | 528.9 | 523.3 |
| 7.5°  | 817.6  | 778.5 | 700.2 | 627.6 | 568.0 | 514.0 | 474.9 | 448.8 | 428.3 | 422.7 | 420.9 |
| 10°   | 825.0  | 769.1 | 661.1 | 569.9 | 487.9 | 432.1 | 396.7 | 378.1 | 370.6 | 365.0 | 366.9 |
| 12.5° | 830.6  | 759.8 | 623.9 | 504.7 | 424.6 | 374.3 | 357.6 | 342.7 | 338.9 | 337.1 | 337.1 |
| 15°   | 838.1  | 750.5 | 579.2 | 447.0 | 370.6 | 340.8 | 324.0 | 318.5 | 318.5 | 316.6 | 316.6 |
| 17.5° | 847.4  | 743.1 | 541.9 | 402.3 | 338.9 | 311.0 | 303.6 | 296.1 | 296.1 | 296.1 | 294.2 |
| 20°   | 866.0  | 739.3 | 508.4 | 365.0 | 311.0 | 292.4 | 281.2 | 275.6 | 273.8 | 271.9 | 271.9 |
| 22.5° | 884.6  | 739.3 | 471.2 | 337.1 | 292.4 | 271.9 | 260.7 | 255.1 | 253.3 | 253.3 | 253.3 |
| 25°   | 910.7  | 737.5 | 441.4 | 312.9 | 275.6 | 251.4 | 240.2 | 234.7 | 230.9 | 230.9 | 229.1 |
| 27.5° | 940.5  | 737.5 | 415.3 | 294.2 | 257.0 | 232.8 | 219.8 | 214.2 | 208.6 | 208.6 | 206.7 |
| 30°   | 970.3  | 741.2 | 393.0 | 279.4 | 238.4 | 216.0 | 199.3 | 191.8 | 188.1 | 186.2 | 186.2 |
| 32.5° | 1009.4 | 752.4 | 378.1 | 268.2 | 221.6 | 199.3 | 182.5 | 175.1 | 171.3 | 169.5 | 169.5 |
| 35°   | 1069.0 | 780.3 | 379.9 | 262.6 | 210.4 | 184.4 | 167.6 | 158.3 | 156.4 | 156.4 | 154.6 |
| 37.5° | 1132.3 | 806.4 | 385.5 | 258.9 | 199.3 | 173.2 | 156.4 | 147.1 | 145.3 | 145.3 | 145.3 |
| 40°   | 1186.3 | 828.7 | 393.0 | 257.0 | 190.0 | 162.0 | 147.1 | 139.7 | 136.0 | 136.0 | 136.0 |
| 42.5° | 1240.3 | 841.8 | 394.8 | 251.4 | 184.4 | 152.7 | 139.7 | 132.2 | 128.5 | 130.4 | 130.4 |
| 45°   | 1294.3 | 851.1 | 389.2 | 244.0 | 178.8 | 145.3 | 132.2 | 124.8 | 121.1 | 121.1 | 121.1 |
| 47.5° | 1359.5 | 871.6 | 379.9 | 232.8 | 175.1 | 139.7 | 124.8 | 117.3 | 115.5 | 115.5 | 115.5 |
| 50°   | 1424.7 | 888.3 | 372.5 | 219.8 | 165.7 | 132.2 | 119.2 | 109.9 | 108.0 | 108.0 | 108.0 |
| 52.5° | 1478.7 | 895.8 | 363.2 | 203.0 | 156.4 | 124.8 | 111.7 | 102.4 | 98.7  | 98.7  | 98.7  |
| 55°   | 1519.7 | 897.6 | 350.1 | 190.0 | 143.4 | 117.3 | 104.3 | 95.0  | 91.3  | 89.4  | 89.4  |
| 57.5° | 1553.2 | 895.8 | 337.1 | 176.9 | 132.2 | 108.0 | 95.0  | 87.5  | 81.9  | 80.1  | 80.1  |
| 60°   | 1571.8 | 890.2 | 318.5 | 160.2 | 117.3 | 98.7  | 87.5  | 78.2  | 74.5  | 72.6  | 72.6  |
| 62.5° | 1560.6 | 875.3 | 292.4 | 134.1 | 106.2 | 89.4  | 80.1  | 72.6  | 67.0  | 65.2  | 65.2  |
| 65°   | 1508.5 | 845.5 | 258.9 | 109.9 | 95.0  | 80.1  | 72.6  | 65.2  | 57.7  | 55.9  | 55.9  |
| 67.5° | 1417.2 | 795.2 | 214.2 | 93.1  | 87.5  | 72.6  | 65.2  | 57.7  | 52.1  | 48.4  | 48.4  |
| 70°   | 1290.6 | 728.2 | 167.6 | 80.1  | 78.2  | 67.0  | 59.6  | 52.1  | 46.6  | 42.8  | 42.8  |
| 72.5° | 1110.0 | 618.3 | 124.8 | 68.9  | 68.9  | 61.5  | 54.0  | 48.4  | 42.8  | 39.1  | 39.1  |
| 75°   | 897.6  | 467.4 | 95.0  | 63.3  | 61.5  | 55.9  | 48.4  | 42.8  | 39.1  | 35.4  | 35.4  |
| 77.5° | 655.5  | 311.0 | 78.2  | 57.7  | 57.7  | 50.3  | 44.7  | 39.1  | 35.4  | 33.5  | 33.5  |
| 80°   | 398.5  | 178.8 | 55.9  | 44.7  | 44.7  | 42.8  | 37.2  | 33.5  | 31.7  | 27.9  | 26.1  |
| 82.5° | 162.0  | 68.9  | 29.8  | 22.3  | 22.3  | 20.5  | 13.0  | 11.2  | 11.2  | 11.2  | 9.3   |
| 85°   | 16.8   | 11.2  | 7.4   | 5.6   | 5.6   | 5.6   | 3.7   | 3.7   | 3.7   | 3.7   | 3.7   |
| 87.5° | 5.6    | 5.6   | 3.7   | 3.7   | 3.7   | 3.7   | 1.9   | 1.9   | 1.9   | 1.9   | 1.9   |
| 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: SP1-2407-157-5

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:  $4\pi$   
 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  
 Rf: 73.2  
 Rg: 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

REPORT NUMBER: SP1-2407-157-5

**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

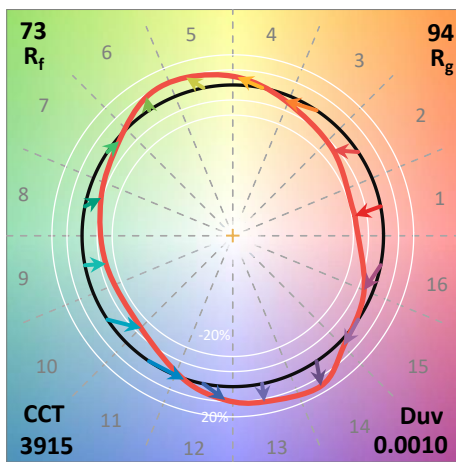
| λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 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)