

Signify Classified - Internal  
Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



Scaled data based on original data using  
LM-79-2019 Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Test Report Prepared for

Cooper Lighting Solutions

Brand: McGRAW-EDISON

Report Number: P630033

Luminaire Tested: GWS-SA1C-827-U-T3R-W

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P630033  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-15)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA1C-827-U-T3R-W  
Description: GALLEON WALL SLIM LUMINAIRE. (1) LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III ROADWAY OPTICS  
Light Source: (16) 2700K CCT, 80 CRI LEDS  
Ballast/Driver: -

**Summary**

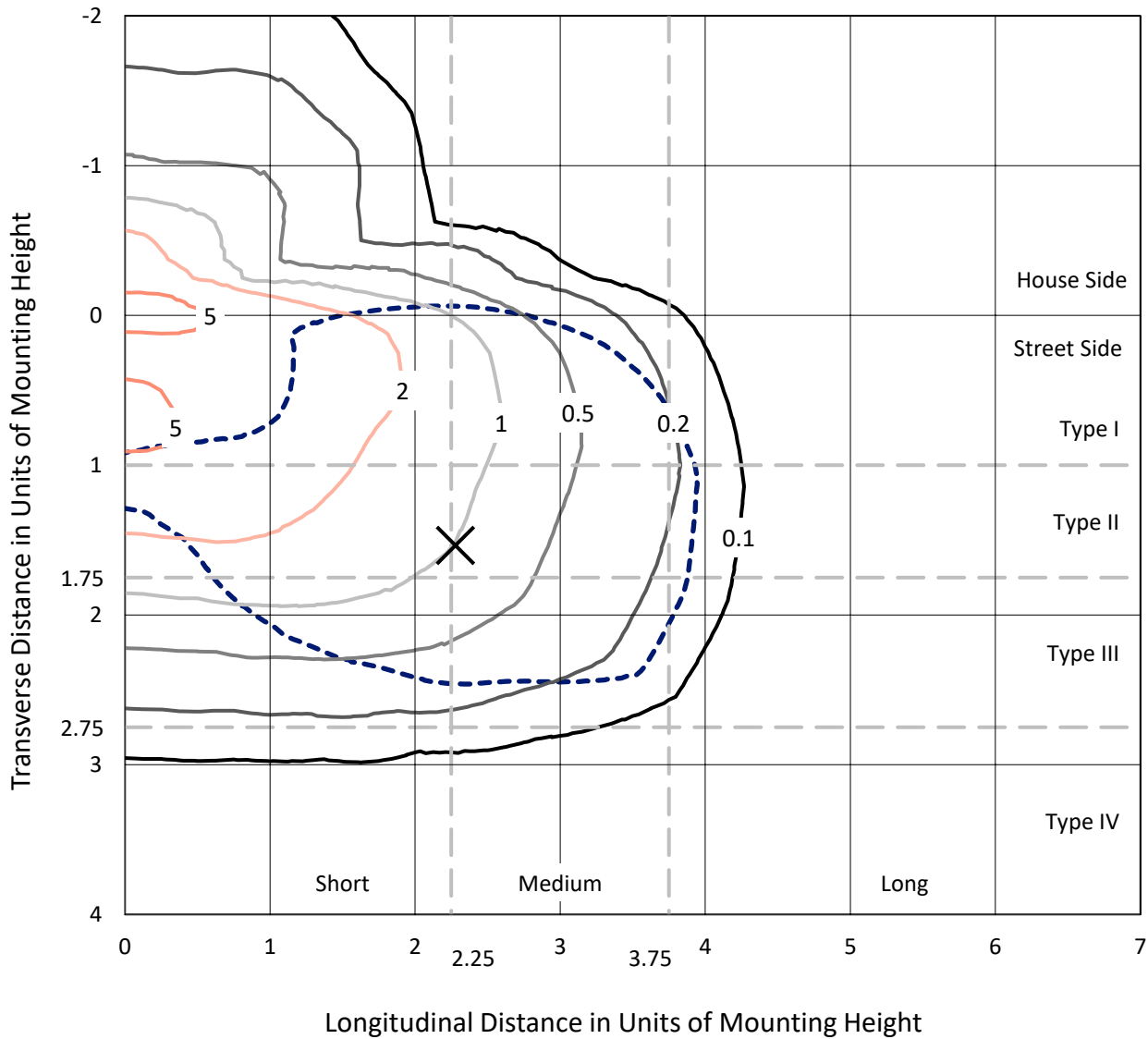
Lumens per Lamp: N/A  
Luminaire Lumens: 3592 lumens  
Efficiency: N/A  
Efficacy: 105.3 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.5' x H: 0')  
IES Classification: Type III - Medium  
BUG Rating: B1 - U0 - G1  
  
Input Watts (W): 34.1  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 0  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT



REPORT NUMBER: P630033  
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### Iso-Footcandle Lines of Horizontal Illumination

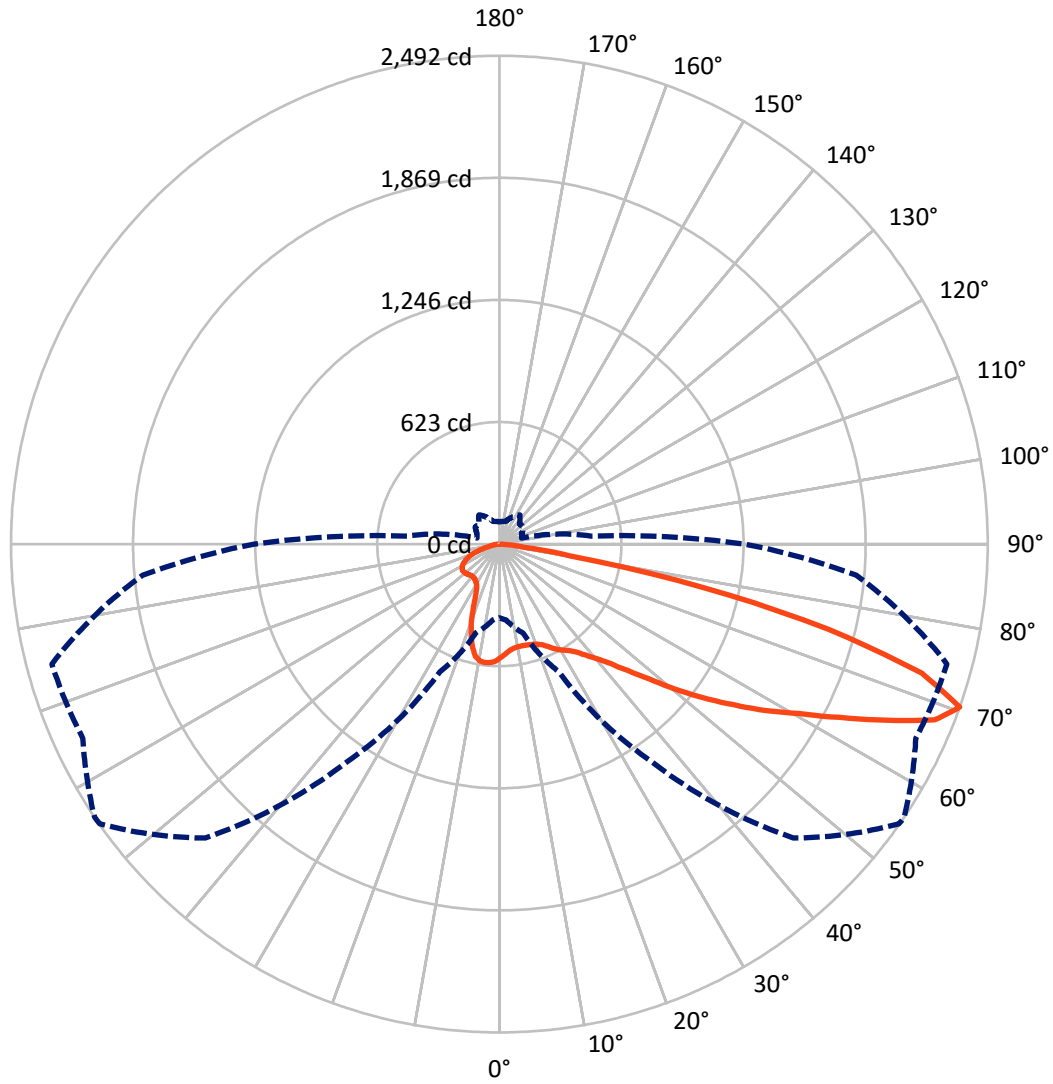
✕ Max cd  
 - - - 1/2 Max cd



Based on 10 foot mounting height. Maximum calculated value = 6 fc  
 Type III - Medium - N/A

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### Luminous Intensity Polar Plot



— Vertical Plane Through 56-Deg Lateral    - - - Horizontal Cone Through 70-Deg Vertical

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**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 690.6    | 0.0    | 690.6  |
|                    | % Fixture | 19.2     | 0.0    | 19.2   |
| <b>Street Side</b> | Lumens    | 2901.4   | 0.0    | 2901.4 |
|                    | % Fixture | 80.8     | 0.0    | 80.8   |
| <b>Total</b>       | Lumens    | 3592.0   | 0.0    | 3592.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 53.7   | 1.5       |
| 10°-20°   | 145.4  | 4.0       |
| 20°-30°   | 240.3  | 6.7       |
| 30°-40°   | 359.4  | 10.0      |
| 40°-50°   | 534.8  | 14.9      |
| 50°-60°   | 760.3  | 21.2      |
| 60°-70°   | 941.6  | 26.2      |
| 70°-80°   | 519.9  | 14.5      |
| 80°-90°   | 36.6   | 1.0       |
| 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°    | 3592.0 | 100.0     |
| 0°-180°   | 3592.0 | 100.0     |

**Coefficient of Utilization**



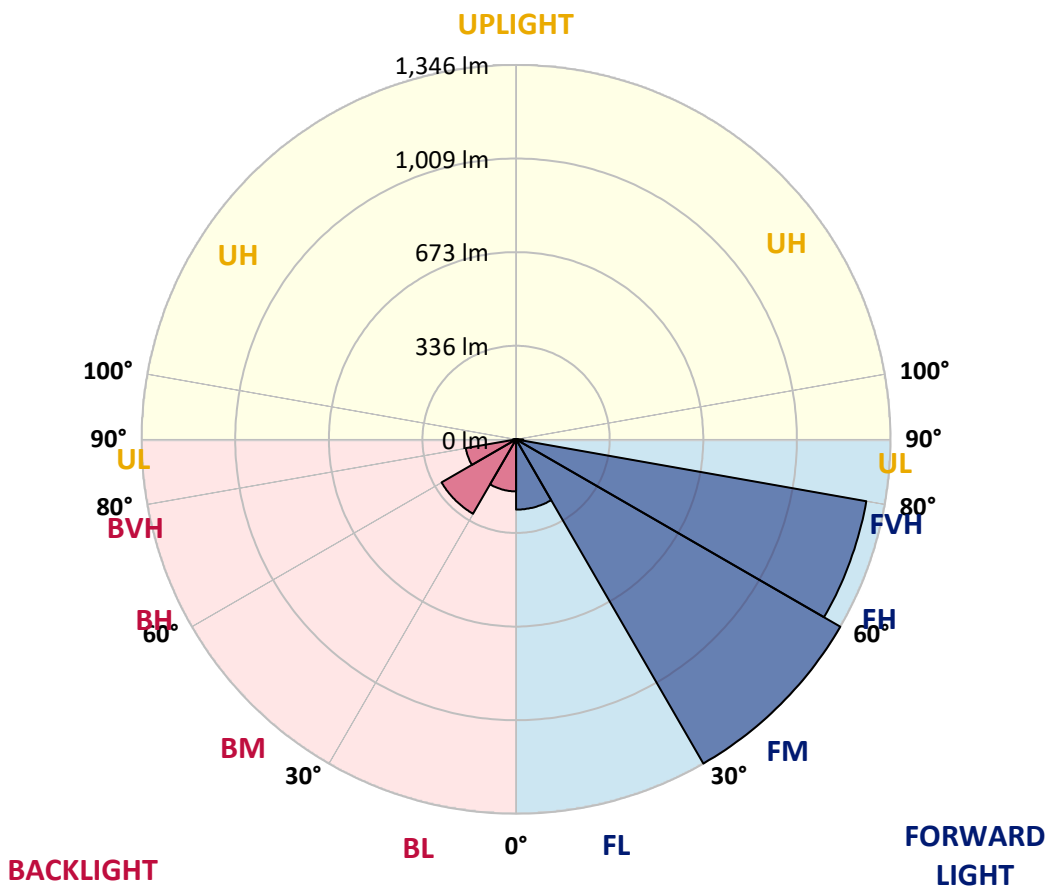
REPORT NUMBER: P630033

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

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|--------|-----------|-------------------------|------|---------|
|                |        |           | B                       | U    | G       |
| FL (0°-30°)    | 252.4  | 7.0       |                         |      |         |
| FM (30°-60°)   | 1345.5 | 37.5      |                         |      |         |
| FH (60°-80°)   | 1278.0 | 35.6      |                         |      | G1/1800 |
| FVH (80°-90°)  | 25.4   | 0.7       |                         |      | G1/100  |
| BL (0°-30°)    | 186.9  | 5.2       | B1/500                  |      |         |
| BM (30°-60°)   | 308.9  | 8.6       | B1/1000                 |      |         |
| BH (60°-80°)   | 183.5  | 5.1       | B1/500                  |      | G1/500  |
| BVH (80°-90°)  | 11.2   | 0.3       |                         |      | 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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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 56°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 579.8  | 579.8  | 579.8  | 579.8  | 579.8  | 579.8  | 579.8  | 579.8  | 579.8  | 579.8  | 579.8  |
| 2.5°  | 542.6  | 539.5  | 543.1  | 544.8  | 549.4  | 556.0  | 561.8  | 562.1  | 565.1  | 572.5  | 579.6  |
| 5°    | 518.0  | 516.5  | 517.5  | 522.8  | 527.6  | 536.0  | 544.8  | 545.6  | 554.2  | 568.7  | 582.8  |
| 7.5°  | 499.0  | 497.0  | 500.8  | 507.6  | 513.7  | 523.1  | 534.7  | 535.7  | 547.9  | 569.7  | 591.5  |
| 10°   | 471.6  | 470.1  | 477.2  | 486.3  | 499.5  | 515.0  | 530.4  | 531.7  | 547.6  | 576.3  | 606.7  |
| 12.5° | 459.7  | 459.7  | 462.8  | 471.4  | 485.8  | 506.3  | 529.7  | 531.7  | 551.7  | 586.4  | 626.2  |
| 15°   | 478.2  | 479.5  | 477.0  | 476.5  | 482.3  | 501.8  | 530.7  | 533.7  | 559.3  | 596.8  | 645.4  |
| 17.5° | 515.5  | 516.7  | 510.1  | 499.8  | 493.9  | 506.1  | 534.5  | 537.8  | 567.4  | 608.2  | 666.2  |
| 20°   | 567.6  | 569.2  | 554.7  | 538.8  | 518.8  | 518.5  | 541.8  | 544.8  | 577.8  | 620.6  | 688.2  |
| 22.5° | 628.7  | 629.7  | 611.5  | 586.1  | 555.5  | 541.6  | 554.5  | 557.5  | 591.2  | 637.8  | 712.0  |
| 25°   | 699.4  | 702.4  | 680.4  | 643.6  | 602.1  | 573.2  | 575.5  | 579.0  | 615.3  | 660.9  | 740.1  |
| 27.5° | 774.8  | 778.6  | 753.3  | 712.8  | 655.5  | 608.2  | 602.6  | 605.6  | 640.8  | 675.0  | 755.1  |
| 30°   | 852.1  | 854.9  | 829.6  | 783.2  | 713.0  | 647.7  | 625.4  | 627.2  | 652.0  | 681.9  | 770.3  |
| 32.5° | 938.0  | 935.7  | 911.4  | 857.9  | 779.4  | 695.1  | 646.7  | 646.2  | 664.4  | 695.6  | 792.1  |
| 35°   | 1018.5 | 1021.8 | 996.0  | 937.0  | 852.4  | 753.6  | 678.6  | 676.6  | 690.7  | 717.9  | 822.7  |
| 37.5° | 1116.0 | 1115.0 | 1084.1 | 1020.3 | 925.6  | 809.5  | 723.4  | 719.9  | 724.9  | 752.6  | 865.5  |
| 40°   | 1185.7 | 1192.8 | 1172.8 | 1113.3 | 1011.2 | 878.4  | 775.9  | 768.0  | 769.3  | 795.4  | 922.8  |
| 42.5° | 1242.7 | 1249.3 | 1251.3 | 1213.3 | 1109.2 | 963.6  | 841.2  | 833.4  | 834.1  | 871.1  | 993.2  |
| 45°   | 1286.5 | 1295.4 | 1324.0 | 1312.9 | 1219.6 | 1061.8 | 929.6  | 921.5  | 922.0  | 963.0  | 1078.3 |
| 47.5° | 1304.5 | 1314.1 | 1372.1 | 1398.7 | 1336.9 | 1179.4 | 1039.5 | 1027.6 | 1029.4 | 1074.8 | 1175.6 |
| 50°   | 1298.7 | 1311.6 | 1390.1 | 1464.8 | 1435.2 | 1298.9 | 1171.0 | 1162.6 | 1155.8 | 1221.7 | 1281.2 |
| 52.5° | 1248.5 | 1262.7 | 1388.3 | 1506.9 | 1515.5 | 1411.9 | 1306.8 | 1302.0 | 1300.4 | 1377.7 | 1399.2 |
| 55°   | 1100.8 | 1124.7 | 1327.3 | 1518.0 | 1578.3 | 1518.3 | 1453.9 | 1445.8 | 1453.7 | 1544.9 | 1518.5 |
| 57.5° | 1019.0 | 1036.8 | 1207.7 | 1505.6 | 1629.7 | 1619.6 | 1600.9 | 1601.6 | 1610.5 | 1726.5 | 1663.2 |
| 60°   | 972.4  | 993.2  | 1141.4 | 1471.7 | 1679.1 | 1742.7 | 1754.6 | 1754.6 | 1770.6 | 1922.3 | 1810.1 |
| 62.5° | 910.6  | 931.6  | 1079.3 | 1406.3 | 1724.7 | 1887.6 | 1947.9 | 1947.1 | 1953.5 | 2132.3 | 1953.7 |
| 65°   | 785.2  | 804.7  | 954.7  | 1303.2 | 1747.0 | 2047.2 | 2167.5 | 2165.2 | 2152.5 | 2319.2 | 2048.7 |
| 67.5° | 570.2  | 588.7  | 731.3  | 1107.2 | 1666.7 | 2175.8 | 2393.7 | 2394.7 | 2319.0 | 2437.0 | 2053.8 |
| 70°   | 375.9  | 388.6  | 470.1  | 719.1  | 1355.4 | 2120.4 | 2488.4 | 2491.5 | 2344.5 | 2363.5 | 1827.8 |
| 72.5° | 234.6  | 243.4  | 293.6  | 428.8  | 800.9  | 1678.4 | 2245.3 | 2253.6 | 2109.2 | 2077.1 | 1501.8 |
| 75°   | 155.8  | 161.9  | 195.3  | 250.0  | 370.6  | 908.3  | 1706.7 | 1733.6 | 1690.5 | 1628.2 | 1046.4 |
| 77.5° | 93.7   | 98.8   | 124.4  | 158.8  | 164.1  | 354.9  | 996.2  | 1065.6 | 1071.7 | 850.1  | 438.2  |
| 80°   | 42.8   | 48.6   | 68.6   | 90.7   | 87.4   | 123.6  | 351.3  | 367.5  | 433.6  | 270.0  | 138.3  |
| 82.5° | 25.3   | 27.9   | 45.6   | 45.1   | 37.2   | 60.0   | 126.4  | 129.7  | 110.2  | 98.8   | 59.0   |
| 85°   | 10.1   | 11.9   | 19.3   | 17.0   | 13.7   | 19.5   | 47.6   | 49.9   | 47.9   | 43.1   | 21.8   |
| 87.5° | 0.0    | 0.0    | 0.0    | 0.0    | 0.3    | 0.5    | 4.3    | 4.6    | 6.6    | 11.9   | 6.6    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



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**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°   | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 579.8  | 579.8 | 579.8 | 579.8 | 579.8 | 579.8 | 579.8 | 579.8 | 579.8 | 579.8 | 579.8 |
| 2.5°  | 584.1  | 582.6 | 590.2 | 596.0 | 598.5 | 601.1 | 598.8 | 598.0 | 598.0 | 593.0 | 590.4 |
| 5°    | 590.4  | 591.2 | 601.6 | 606.4 | 606.4 | 604.4 | 598.3 | 594.0 | 592.5 | 585.9 | 584.1 |
| 7.5°  | 602.3  | 605.6 | 615.3 | 615.0 | 607.9 | 596.8 | 581.6 | 569.9 | 559.3 | 554.7 | 551.9 |
| 10°   | 621.9  | 626.2 | 632.7 | 622.1 | 602.3 | 573.0 | 540.8 | 515.5 | 500.3 | 488.1 | 488.1 |
| 12.5° | 644.1  | 648.2 | 646.9 | 622.4 | 581.6 | 526.6 | 480.3 | 451.1 | 429.9 | 418.7 | 418.7 |
| 15°   | 666.4  | 669.7 | 656.0 | 610.7 | 538.3 | 465.1 | 414.4 | 379.4 | 361.0 | 350.6 | 350.6 |
| 17.5° | 689.0  | 688.7 | 659.8 | 583.9 | 481.8 | 396.9 | 347.3 | 320.2 | 313.8 | 312.1 | 311.8 |
| 20°   | 710.8  | 704.9 | 655.0 | 539.0 | 416.2 | 328.3 | 296.9 | 298.6 | 308.0 | 312.1 | 312.6 |
| 22.5° | 735.3  | 720.9 | 640.8 | 481.8 | 341.7 | 280.7 | 282.7 | 297.4 | 311.1 | 317.1 | 317.9 |
| 25°   | 760.4  | 734.6 | 617.0 | 414.7 | 279.4 | 263.2 | 278.9 | 295.3 | 310.8 | 318.7 | 319.4 |
| 27.5° | 770.5  | 734.6 | 576.5 | 336.9 | 246.2 | 255.8 | 273.1 | 289.0 | 305.2 | 314.3 | 316.1 |
| 30°   | 778.9  | 728.2 | 519.8 | 266.7 | 232.5 | 248.7 | 263.7 | 278.4 | 294.3 | 305.5 | 307.5 |
| 32.5° | 790.5  | 722.7 | 451.1 | 224.2 | 226.2 | 241.9 | 252.3 | 264.7 | 279.1 | 286.5 | 285.7 |
| 35°   | 804.2  | 714.1 | 368.3 | 203.9 | 220.9 | 236.1 | 243.4 | 250.8 | 244.2 | 243.9 | 244.7 |
| 37.5° | 823.7  | 706.5 | 296.1 | 194.8 | 217.3 | 232.0 | 238.1 | 222.4 | 213.3 | 209.5 | 208.0 |
| 40°   | 851.8  | 703.4 | 233.5 | 189.5 | 216.8 | 231.8 | 227.5 | 203.1 | 190.7 | 177.6 | 177.3 |
| 42.5° | 887.3  | 701.1 | 193.0 | 186.9 | 218.6 | 237.6 | 212.8 | 190.5 | 164.9 | 159.1 | 158.6 |
| 45°   | 932.9  | 697.6 | 172.8 | 186.4 | 222.9 | 242.2 | 211.3 | 173.0 | 155.5 | 153.0 | 153.0 |
| 47.5° | 987.9  | 692.0 | 163.6 | 186.4 | 227.7 | 240.1 | 206.7 | 169.2 | 151.2 | 154.0 | 155.8 |
| 50°   | 1050.9 | 684.9 | 158.8 | 185.9 | 232.5 | 240.1 | 197.1 | 168.4 | 150.2 | 164.6 | 170.5 |
| 52.5° | 1118.3 | 676.8 | 155.5 | 183.9 | 235.8 | 240.4 | 197.6 | 171.0 | 151.2 | 167.2 | 172.0 |
| 55°   | 1192.8 | 675.6 | 151.0 | 179.6 | 236.8 | 233.8 | 198.8 | 176.6 | 152.7 | 151.5 | 151.7 |
| 57.5° | 1286.8 | 690.7 | 147.7 | 173.3 | 232.8 | 220.4 | 201.4 | 180.6 | 151.0 | 151.2 | 153.0 |
| 60°   | 1385.0 | 719.4 | 150.5 | 167.2 | 224.4 | 207.7 | 203.1 | 178.6 | 142.4 | 138.3 | 138.8 |
| 62.5° | 1468.6 | 741.2 | 152.7 | 164.4 | 212.3 | 196.6 | 201.4 | 174.0 | 137.5 | 136.5 | 138.8 |
| 65°   | 1503.6 | 723.2 | 147.2 | 158.6 | 194.5 | 182.9 | 197.6 | 168.2 | 133.5 | 129.7 | 129.9 |
| 67.5° | 1464.8 | 638.8 | 136.3 | 145.6 | 174.5 | 165.4 | 191.5 | 160.6 | 127.9 | 123.4 | 122.3 |
| 70°   | 1251.3 | 469.4 | 117.5 | 125.1 | 150.2 | 144.9 | 182.1 | 150.7 | 119.1 | 115.8 | 113.5 |
| 72.5° | 1008.4 | 332.3 | 97.5  | 99.5  | 117.8 | 122.1 | 165.9 | 138.3 | 108.9 | 99.5  | 96.3  |
| 75°   | 701.9  | 208.7 | 81.3  | 79.3  | 85.1  | 93.2  | 129.4 | 114.7 | 94.0  | 84.1  | 81.1  |
| 77.5° | 301.9  | 107.1 | 63.6  | 62.6  | 56.7  | 64.6  | 99.3  | 95.7  | 78.8  | 67.4  | 65.6  |
| 80°   | 101.1  | 62.1  | 45.8  | 44.1  | 37.7  | 45.3  | 69.9  | 76.5  | 61.8  | 49.9  | 46.9  |
| 82.5° | 50.7   | 36.0  | 29.1  | 26.3  | 25.3  | 28.6  | 41.3  | 47.6  | 42.8  | 34.4  | 29.1  |
| 85°   | 24.8   | 20.5  | 16.0  | 15.7  | 13.2  | 12.4  | 17.2  | 20.3  | 19.3  | 14.2  | 13.4  |
| 87.5° | 9.1    | 8.1   | 5.1   | 4.1   | 2.5   | 1.8   | 1.0   | 1.0   | 0.8   | 0.8   | 0.8   |
| 90°   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |



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Peachtree City, GA 30269



LM-79-2019: Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Report Prepared for

Cooper Lighting Solutions

Invue

Report Number: SP1-2407-157-9

Test Date: 10/03/2024

Luminaire Tested: EMM2-HTN-SA1A-827-U-5WQ

Data applicable to all product families utilizing light square engine

**Test Information**

Test Method: LM-79-2019  
 Report Number: SP1-2407-157-9  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry: 4π  
 Issue Date: 10/03/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: Invue  
 Catalog Number: **EMM2-HTN-SA1A-827-U-5WQ**  
 Description: Epic Modern Light Square 40W 5WQ Optic

**Spectral Parameters**

CCT (K): 2764  
 CIE u': 0.2591  
 CIE v': 0.5290  
 Duv: 0.0020  
 CIE x: 0.4581  
 CIE y: 0.4156  
 CIE z: 0.1263  
 Peak Wavelength (nm): 603  
 Dominant Wavelength (nm): 583  
 Purity: 62.2537  
 Rf: 84.7  
 Rg: 94.6

|           |      |      |      |
|-----------|------|------|------|
| CRI (Ra): | 80.9 |      |      |
| R1:       | 78.8 | R9:  | -1.5 |
| R2:       | 89.9 | R10: | 77.9 |
| R3:       | 96.2 | R11: | 78.9 |
| R4:       | 79.1 | R12: | 71.6 |
| R5:       | 79.1 | R13: | 81.2 |
| R6:       | 88.8 | R14: | 98.5 |
| R7:       | 81.3 | R15: | 69.9 |
| R8:       | 54.3 |      |      |



**Test Conditions**

Stabilization Time: 81M  
 Operation Time: 2H 21M  
 Sphere Temperature (°C): 25.2

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| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 6/18/2024        | 12/18/2024           |
| Power Meter                    | INXT2011004           | 2/8/2024         | 2/8/2025             |
| AC Power Source                | IN0063                | 10/24/2023       | 10/24/2024           |
| DC Power Source                | IN0208                | 10/24/2023       | 10/24/2024           |
| Sphere Thermometer             | IN0085                | 10/24/2023       | 10/24/2024           |
| Room Thermometer               | IN0046                | 10/24/2023       | 10/24/2024           |

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CIE 1931 Chromaticity Diagram



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



Point lies inside the ANSI 2700K 4-step quadrangle

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**Photopic Flux vs. Wavelength**



**Photopic Lumens: 4337.9**

| $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|
| 360               | 0                                    | 0.0                            | 490               | 18018                                | 2.6                            | 620               | 87426                                | 22.8                           | 750               | 2680                                 | 0.0                            | 880               | 58                                   | 0.0                            |
| 365               | 0                                    | 0.0                            | 495               | 22295                                | 3.9                            | 625               | 83013                                | 18.2                           | 755               | 2287                                 | 0.0                            | 885               | 46                                   | 0.0                            |
| 370               | 0                                    | 0.0                            | 500               | 26478                                | 5.8                            | 630               | 78077                                | 14.1                           | 760               | 1944                                 | 0.0                            | 890               | 45                                   | 0.0                            |
| 375               | 0                                    | 0.0                            | 505               | 30524                                | 8.5                            | 635               | 72080                                | 10.7                           | 765               | 1653                                 | 0.0                            | 895               | 41                                   | 0.0                            |
| 380               | 0                                    | 0.0                            | 510               | 33611                                | 11.5                           | 640               | 66249                                | 7.9                            | 770               | 1413                                 | 0.0                            | 900               | 38                                   | 0.0                            |
| 385               | 0                                    | 0.0                            | 515               | 36490                                | 15.2                           | 645               | 59973                                | 5.7                            | 775               | 1198                                 | 0.0                            | 905               | 33                                   | 0.0                            |
| 390               | 0                                    | 0.0                            | 520               | 38610                                | 18.7                           | 650               | 53972                                | 3.9                            | 780               | 1025                                 | 0.0                            | 910               | 30                                   | 0.0                            |
| 395               | 0                                    | 0.0                            | 525               | 40511                                | 21.9                           | 655               | 48369                                | 2.7                            | 785               | 874                                  | 0.0                            | 915               | 23                                   | 0.0                            |
| 400               | 48                                   | 0.0                            | 530               | 42223                                | 24.9                           | 660               | 42641                                | 1.8                            | 790               | 747                                  | 0.0                            | 920               | 24                                   | 0.0                            |
| 405               | 201                                  | 0.0                            | 535               | 44137                                | 27.6                           | 665               | 37602                                | 1.1                            | 795               | 639                                  | 0.0                            | 925               | 22                                   | 0.0                            |
| 410               | 457                                  | 0.0                            | 540               | 46032                                | 30.0                           | 670               | 32798                                | 0.7                            | 800               | 547                                  | 0.0                            | 930               | 22                                   | 0.0                            |
| 415               | 925                                  | 0.0                            | 545               | 48553                                | 32.5                           | 675               | 28558                                | 0.5                            | 805               | 473                                  | 0.0                            | 935               | 17                                   | 0.0                            |
| 420               | 1816                                 | 0.0                            | 550               | 51408                                | 34.9                           | 680               | 24782                                | 0.3                            | 810               | 401                                  | 0.0                            | 940               | 13                                   | 0.0                            |
| 425               | 3217                                 | 0.0                            | 555               | 54711                                | 37.4                           | 685               | 21386                                | 0.2                            | 815               | 351                                  | 0.0                            | 945               | 6                                    | 0.0                            |
| 430               | 5520                                 | 0.0                            | 560               | 58847                                | 40.0                           | 690               | 18413                                | 0.1                            | 820               | 307                                  | 0.0                            | 950               | 10                                   | 0.0                            |
| 435               | 9225                                 | 0.1                            | 565               | 63386                                | 42.4                           | 695               | 15721                                | 0.1                            | 825               | 261                                  | 0.0                            | 955               | 11                                   | 0.0                            |
| 440               | 15522                                | 0.2                            | 570               | 68196                                | 44.3                           | 700               | 13432                                | 0.0                            | 830               | 228                                  | 0.0                            | 960               | 8                                    | 0.0                            |
| 445               | 27642                                | 0.6                            | 575               | 73613                                | 46.0                           | 705               | 11513                                | 0.0                            | 835               | 193                                  | 0.0                            | 965               | 12                                   | 0.0                            |
| 450               | 36602                                | 0.9                            | 580               | 79207                                | 47.1                           | 710               | 9780                                 | 0.0                            | 840               | 174                                  | 0.0                            | 970               | 3                                    | 0.0                            |
| 455               | 28292                                | 0.9                            | 585               | 84248                                | 47.0                           | 715               | 8356                                 | 0.0                            | 845               | 151                                  | 0.0                            | 975               | 8                                    | 0.0                            |
| 460               | 21166                                | 0.9                            | 590               | 88397                                | 45.7                           | 720               | 7161                                 | 0.0                            | 850               | 123                                  | 0.0                            | 980               | 2                                    | 0.0                            |
| 465               | 19092                                | 1.0                            | 595               | 91428                                | 43.4                           | 725               | 6067                                 | 0.0                            | 855               | 106                                  | 0.0                            | 985               | 13                                   | 0.0                            |
| 470               | 14951                                | 0.9                            | 600               | 93452                                | 40.3                           | 730               | 5164                                 | 0.0                            | 860               | 95                                   | 0.0                            | 990               | 16                                   | 0.0                            |
| 475               | 12606                                | 1.0                            | 605               | 93959                                | 36.4                           | 735               | 4393                                 | 0.0                            | 865               | 82                                   | 0.0                            | 995               | 20                                   | 0.0                            |
| 480               | 13323                                | 1.3                            | 610               | 93079                                | 32.0                           | 740               | 3694                                 | 0.0                            | 870               | 77                                   | 0.0                            | 1000              | 0                                    | 0.0                            |
| 485               | 15164                                | 1.8                            | 615               | 90707                                | 27.3                           | 745               | 3157                                 | 0.0                            | 875               | 65                                   | 0.0                            |                   |                                      |                                |

REPORT NUMBER: SP1-2407-157-9

**Scotopic Flux vs. Wavelength**



**Scotopic Lumens: 5286.7**

**S/P: 1.22**

| $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|
| 360               | 0                                    | 0.0                            | 490               | 18018                                | 75.9                           | 620               | 87426                                | 0.4                            | 750               | 2680                                 | 0.0                            | 880               | 58                                   | 0.0                            |
| 365               | 0                                    | 0.0                            | 495               | 22295                                | 93.2                           | 625               | 83013                                | 0.2                            | 755               | 2287                                 | 0.0                            | 885               | 46                                   | 0.0                            |
| 370               | 0                                    | 0.0                            | 500               | 26478                                | 107.8                          | 630               | 78077                                | 0.1                            | 760               | 1944                                 | 0.0                            | 890               | 45                                   | 0.0                            |
| 375               | 0                                    | 0.0                            | 505               | 30524                                | 118.7                          | 635               | 72080                                | 0.1                            | 765               | 1653                                 | 0.0                            | 895               | 41                                   | 0.0                            |
| 380               | 0                                    | 0.0                            | 510               | 33611                                | 122.2                          | 640               | 66249                                | 0.1                            | 770               | 1413                                 | 0.0                            | 900               | 38                                   | 0.0                            |
| 385               | 0                                    | 0.0                            | 515               | 36490                                | 120.8                          | 645               | 59973                                | 0.0                            | 775               | 1198                                 | 0.0                            | 905               | 33                                   | 0.0                            |
| 390               | 0                                    | 0.0                            | 520               | 38610                                | 113.9                          | 650               | 53972                                | 0.0                            | 780               | 1025                                 | 0.0                            | 910               | 30                                   | 0.0                            |
| 395               | 0                                    | 0.0                            | 525               | 40511                                | 104.1                          | 655               | 48369                                | 0.0                            | 785               | 874                                  | 0.0                            | 915               | 23                                   | 0.0                            |
| 400               | 48                                   | 0.0                            | 530               | 42223                                | 92.4                           | 660               | 42641                                | 0.0                            | 790               | 747                                  | 0.0                            | 920               | 24                                   | 0.0                            |
| 405               | 201                                  | 0.0                            | 535               | 44137                                | 80.5                           | 665               | 37602                                | 0.0                            | 795               | 639                                  | 0.0                            | 925               | 22                                   | 0.0                            |
| 410               | 457                                  | 0.1                            | 540               | 46032                                | 68.2                           | 670               | 32798                                | 0.0                            | 800               | 547                                  | 0.0                            | 930               | 22                                   | 0.0                            |
| 415               | 925                                  | 0.3                            | 545               | 48553                                | 57.1                           | 675               | 28558                                | 0.0                            | 805               | 473                                  | 0.0                            | 935               | 17                                   | 0.0                            |
| 420               | 1816                                 | 1.1                            | 550               | 51408                                | 46.7                           | 680               | 24782                                | 0.0                            | 810               | 401                                  | 0.0                            | 940               | 13                                   | 0.0                            |
| 425               | 3217                                 | 2.5                            | 555               | 54711                                | 37.4                           | 685               | 21386                                | 0.0                            | 815               | 351                                  | 0.0                            | 945               | 6                                    | 0.0                            |
| 430               | 5520                                 | 5.9                            | 560               | 58847                                | 29.4                           | 690               | 18413                                | 0.0                            | 820               | 307                                  | 0.0                            | 950               | 10                                   | 0.0                            |
| 435               | 9225                                 | 12.5                           | 565               | 63386                                | 22.5                           | 695               | 15721                                | 0.0                            | 825               | 261                                  | 0.0                            | 955               | 11                                   | 0.0                            |
| 440               | 15522                                | 26.3                           | 570               | 68196                                | 16.9                           | 700               | 13432                                | 0.0                            | 830               | 228                                  | 0.0                            | 960               | 8                                    | 0.0                            |
| 445               | 27642                                | 55.2                           | 575               | 73613                                | 12.4                           | 705               | 11513                                | 0.0                            | 835               | 193                                  | 0.0                            | 965               | 12                                   | 0.0                            |
| 450               | 36602                                | 85.4                           | 580               | 79207                                | 9.0                            | 710               | 9780                                 | 0.0                            | 840               | 174                                  | 0.0                            | 970               | 3                                    | 0.0                            |
| 455               | 28292                                | 75.1                           | 585               | 84248                                | 6.3                            | 715               | 8356                                 | 0.0                            | 845               | 151                                  | 0.0                            | 975               | 8                                    | 0.0                            |
| 460               | 21166                                | 63.2                           | 590               | 88397                                | 4.4                            | 720               | 7161                                 | 0.0                            | 850               | 123                                  | 0.0                            | 980               | 2                                    | 0.0                            |
| 465               | 19092                                | 63.2                           | 595               | 91428                                | 3.0                            | 725               | 6067                                 | 0.0                            | 855               | 106                                  | 0.0                            | 985               | 13                                   | 0.0                            |
| 470               | 14951                                | 54.2                           | 600               | 93452                                | 2.0                            | 730               | 5164                                 | 0.0                            | 860               | 95                                   | 0.0                            | 990               | 16                                   | 0.0                            |
| 475               | 12606                                | 48.8                           | 605               | 93959                                | 1.3                            | 735               | 4393                                 | 0.0                            | 865               | 82                                   | 0.0                            | 995               | 20                                   | 0.0                            |
| 480               | 13323                                | 54.2                           | 610               | 93079                                | 0.9                            | 740               | 3694                                 | 0.0                            | 870               | 77                                   | 0.0                            | 1000              | 0                                    | 0.0                            |
| 485               | 15164                                | 63.3                           | 615               | 90707                                | 0.5                            | 745               | 3157                                 | 0.0                            | 875               | 65                                   | 0.0                            |                   |                                      |                                |

REPORT NUMBER: SP1-2407-157-9

Melanopic Flux vs. Wavelength



Melanopic Lumens: 9797

M/P: 2.26

| λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) |
|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|
| 360    | 0             | 0.0           | 490    | 18018         | 27.7          | 620    | 87426         | 1.1           | 750    | 2680          | 0.0           | 880    | 58            | 0.0           |
| 365    | 0             | 0.0           | 495    | 22295         | 36.0          | 625    | 83013         | 0.7           | 755    | 2287          | 0.0           | 885    | 46            | 0.0           |
| 370    | 0             | 0.0           | 500    | 26478         | 44.2          | 630    | 78077         | 0.4           | 760    | 1944          | 0.0           | 890    | 45            | 0.0           |
| 375    | 0             | 0.0           | 505    | 30524         | 51.8          | 635    | 72080         | 0.3           | 765    | 1653          | 0.0           | 895    | 41            | 0.0           |
| 380    | 0             | 0.0           | 510    | 33611         | 57.0          | 640    | 66249         | 0.2           | 770    | 1413          | 0.0           | 900    | 38            | 0.0           |
| 385    | 0             | 0.0           | 515    | 36490         | 60.5          | 645    | 59973         | 0.1           | 775    | 1198          | 0.0           | 905    | 33            | 0.0           |
| 390    | 0             | 0.0           | 520    | 38610         | 61.4          | 650    | 53972         | 0.1           | 780    | 1025          | 0.0           | 910    | 30            | 0.0           |
| 395    | 0             | 0.0           | 525    | 40511         | 60.6          | 655    | 48369         | 0.0           | 785    | 874           | 0.0           | 915    | 23            | 0.0           |
| 400    | 48            | 0.0           | 530    | 42223         | 58.2          | 660    | 42641         | 0.0           | 790    | 747           | 0.0           | 920    | 24            | 0.0           |
| 405    | 201           | 0.0           | 535    | 44137         | 55.0          | 665    | 37602         | 0.0           | 795    | 639           | 0.0           | 925    | 22            | 0.0           |
| 410    | 457           | 0.0           | 540    | 46032         | 50.9          | 670    | 32798         | 0.0           | 800    | 547           | 0.0           | 930    | 22            | 0.0           |
| 415    | 925           | 0.1           | 545    | 48553         | 46.6          | 675    | 28558         | 0.0           | 805    | 473           | 0.0           | 935    | 17            | 0.0           |
| 420    | 1816          | 0.3           | 550    | 51408         | 42.0          | 680    | 24782         | 0.0           | 810    | 401           | 0.0           | 940    | 13            | 0.0           |
| 425    | 3217          | 0.8           | 555    | 54711         | 37.4          | 685    | 21386         | 0.0           | 815    | 351           | 0.0           | 945    | 6             | 0.0           |
| 430    | 5520          | 1.9           | 560    | 58847         | 32.9          | 690    | 18413         | 0.0           | 820    | 307           | 0.0           | 950    | 10            | 0.0           |
| 435    | 9225          | 4.1           | 565    | 63386         | 28.4          | 695    | 15721         | 0.0           | 825    | 261           | 0.0           | 955    | 11            | 0.0           |
| 440    | 15522         | 8.7           | 570    | 68196         | 24.1          | 700    | 13432         | 0.0           | 830    | 228           | 0.0           | 960    | 8             | 0.0           |
| 445    | 27642         | 18.5          | 575    | 73613         | 20.0          | 705    | 11513         | 0.0           | 835    | 193           | 0.0           | 965    | 12            | 0.0           |
| 450    | 36602         | 28.3          | 580    | 79207         | 16.3          | 710    | 9780          | 0.0           | 840    | 174           | 0.0           | 970    | 3             | 0.0           |
| 455    | 28292         | 24.7          | 585    | 84248         | 12.9          | 715    | 8356          | 0.0           | 845    | 151           | 0.0           | 975    | 8             | 0.0           |
| 460    | 21166         | 20.4          | 590    | 88397         | 9.8           | 720    | 7161          | 0.0           | 850    | 123           | 0.0           | 980    | 2             | 0.0           |
| 465    | 19092         | 20.1          | 595    | 91428         | 7.3           | 725    | 6067          | 0.0           | 855    | 106           | 0.0           | 985    | 13            | 0.0           |
| 470    | 14951         | 17.2          | 600    | 93452         | 5.3           | 730    | 5164          | 0.0           | 860    | 95            | 0.0           | 990    | 16            | 0.0           |
| 475    | 12606         | 15.7          | 605    | 93959         | 3.7           | 735    | 4393          | 0.0           | 865    | 82            | 0.0           | 995    | 20            | 0.0           |
| 480    | 13323         | 18.0          | 610    | 93079         | 2.5           | 740    | 3694          | 0.0           | 870    | 77            | 0.0           | 1000   | 0             | 0.0           |
| 485    | 15164         | 21.9          | 615    | 90707         | 1.7           | 745    | 3157          | 0.0           | 875    | 65            | 0.0           |        |               |               |

**Summary**

$R_f = 84.7$   
 $R_g = 94.6$   
 CIE  $R_a = 80.9$   
 $R_g = -1.5$



**Color Vector Graphics**





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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 84 | CES51 = 95 | CES76 = 81 |
| CES02 = 63 | CES27 = 95 | CES52 = 94 | CES77 = 84 |
| CES03 = 31 | CES28 = 94 | CES53 = 89 | CES78 = 81 |
| CES04 = 71 | CES29 = 87 | CES54 = 91 | CES79 = 89 |
| CES05 = 50 | CES30 = 94 | CES55 = 90 | CES80 = 89 |
| CES06 = 52 | CES31 = 89 | CES56 = 86 | CES81 = 69 |
| CES07 = 43 | CES32 = 82 | CES57 = 85 | CES82 = 96 |
| CES08 = 41 | CES33 = 91 | CES58 = 86 | CES83 = 93 |
| CES09 = 29 | CES34 = 92 | CES59 = 91 | CES84 = 92 |
| CES10 = 77 | CES35 = 96 | CES60 = 94 | CES85 = 76 |
| CES11 = 60 | CES36 = 90 | CES61 = 89 | CES86 = 65 |
| CES12 = 66 | CES37 = 96 | CES62 = 94 | CES87 = 84 |
| CES13 = 44 | CES38 = 98 | CES63 = 87 | CES88 = 86 |
| CES14 = 74 | CES39 = 98 | CES64 = 82 | CES89 = 73 |
| CES15 = 72 | CES40 = 95 | CES65 = 78 | CES90 = 88 |
| CES16 = 48 | CES41 = 96 | CES66 = 81 | CES91 = 82 |
| CES17 = 50 | CES42 = 97 | CES67 = 80 | CES92 = 64 |
| CES18 = 57 | CES43 = 91 | CES68 = 83 | CES93 = 78 |
| CES19 = 73 | CES44 = 99 | CES69 = 88 | CES94 = 59 |
| CES20 = 67 | CES45 = 93 | CES70 = 80 | CES95 = 74 |
| CES21 = 87 | CES46 = 89 | CES71 = 79 | CES96 = 83 |
| CES22 = 79 | CES47 = 92 | CES72 = 92 | CES97 = 88 |
| CES23 = 92 | CES48 = 83 | CES73 = 75 | CES98 = 83 |
| CES24 = 91 | CES49 = 90 | CES74 = 91 | CES99 = 74 |
| CES25 = 72 | CES50 = 94 | CES75 = 81 |            |



Color Rendition by Hue-Angle Bin



Measure Comparisons



(END OF REPORT)