

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: P629033

Luminaire Tested: GWS-SA1A-827-U-T2-W

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P629033  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-19)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA1A-827-U-T2-W  
Description: GALLEON WALL SLIM LUMINAIRE. (1) LIGHTSQUARES WITH 16 LEDS EACH AND TYPE II OPTICS  
Light Source: (16) 2700K CCT, 80 CRI LEDS  
Ballast/Driver: -

**Summary**

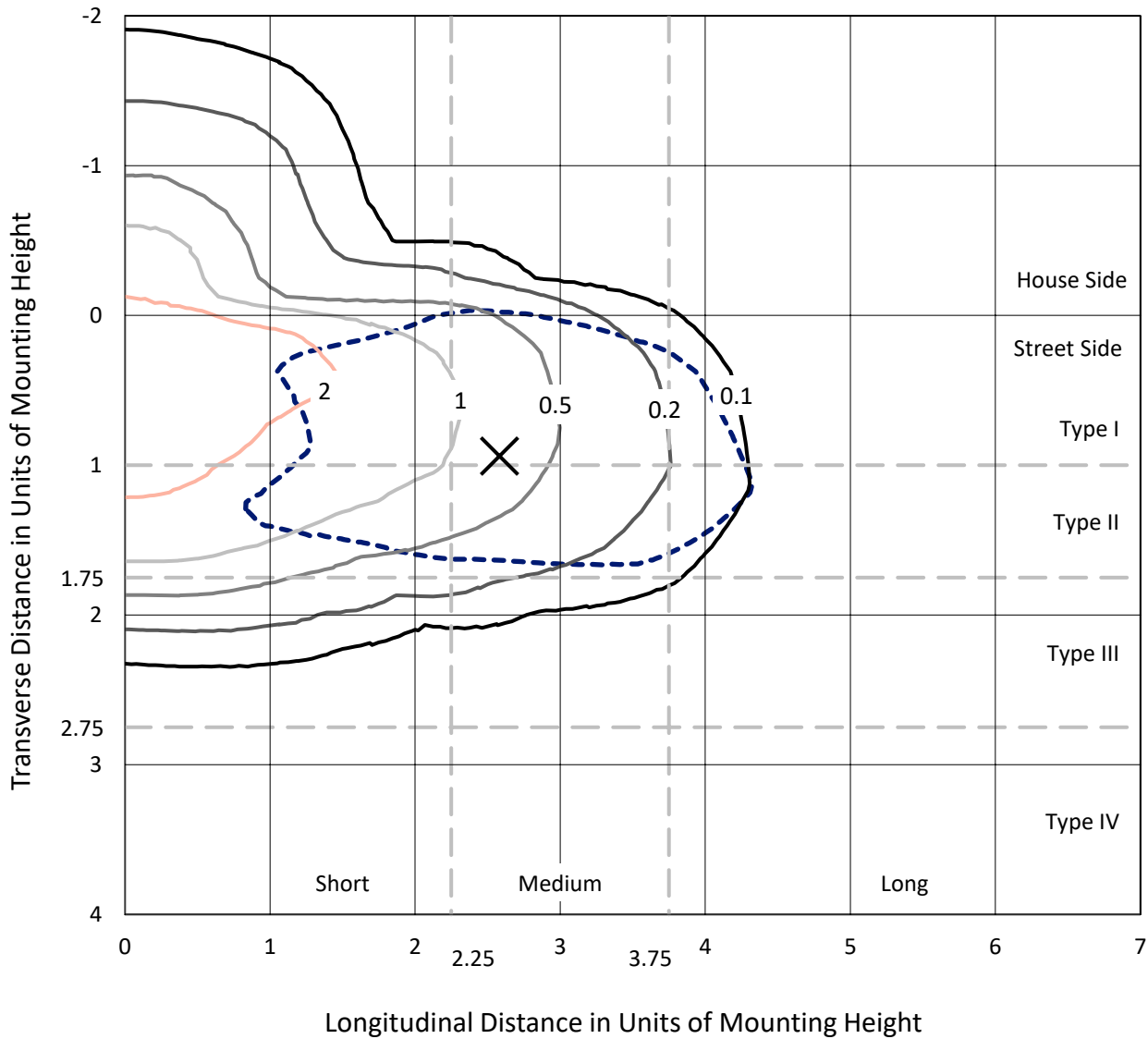
Lumens per Lamp: N/A  
Luminaire Lumens: 2074.1 lumens  
Efficiency: N/A  
Efficacy: 105.3 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.5' x H: 0')  
IES Classification: Type II - Medium  
BUG Rating: B1 - U0 - G1  
  
Input Watts (W): 19.7  
Input Voltage (V): 120  
Input Current (Ain): 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



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### Iso-Footcandle Lines of Horizontal Illumination

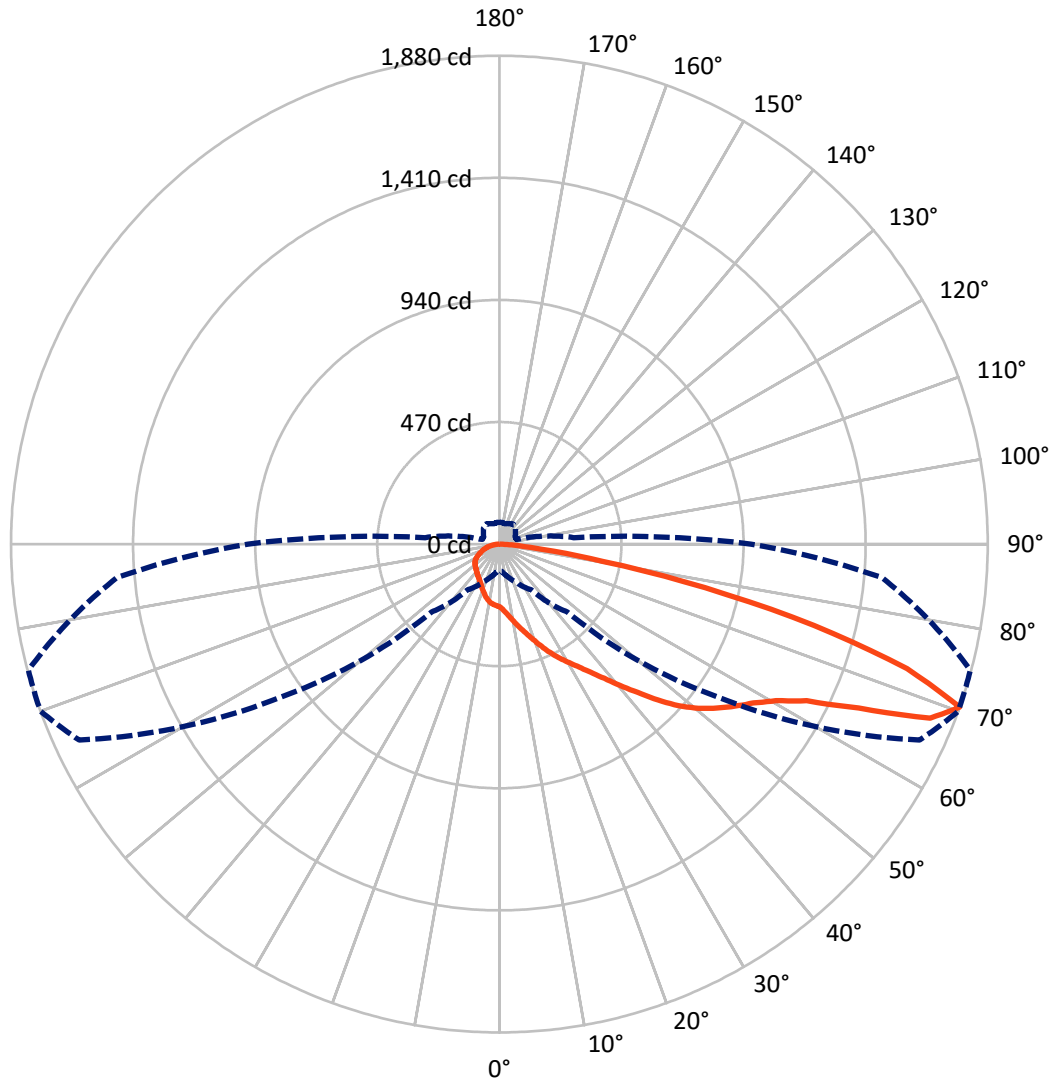
✕ Max cd  
 - - - 1/2 Max cd



Based on 10 foot mounting height. Maximum calculated value = 3.5 fc  
 Type II - Medium - N/A

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### Luminous Intensity Polar Plot



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

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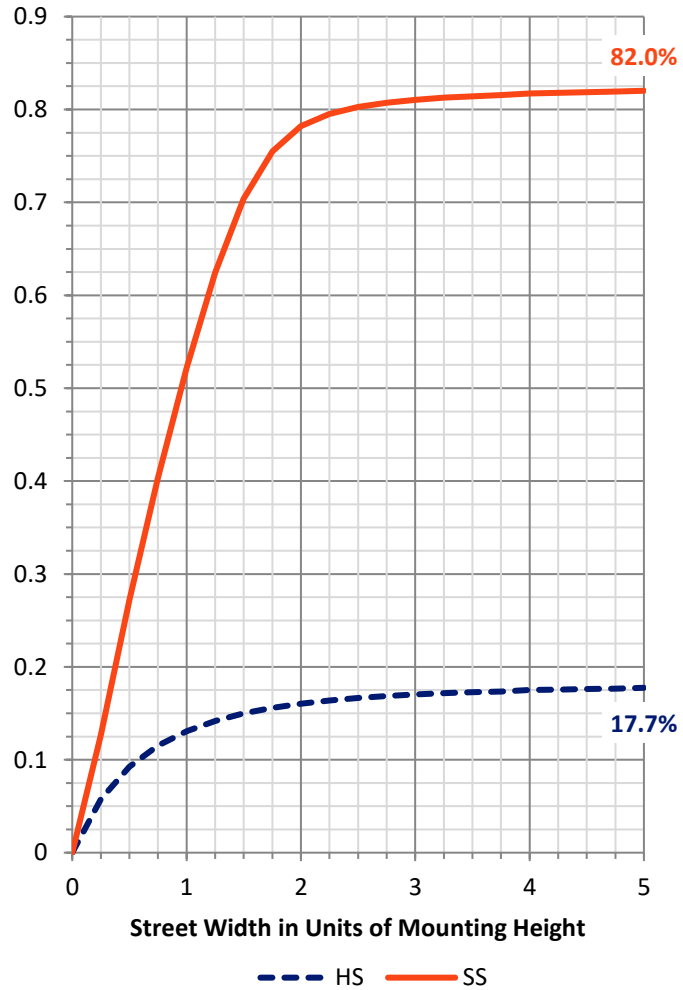
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 371.7    | 0.0    | 371.7  |
|                    | % Fixture | 17.9     | 0.0    | 17.9   |
| <b>Street Side</b> | Lumens    | 1702.4   | 0.0    | 1702.4 |
|                    | % Fixture | 82.1     | 0.0    | 82.1   |
| <b>Total</b>       | Lumens    | 2074.1   | 0.0    | 2074.1 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 24.6   | 1.2       |
| 10°-20°   | 80.0   | 3.9       |
| 20°-30°   | 141.7  | 6.8       |
| 30°-40°   | 213.2  | 10.3      |
| 40°-50°   | 322.6  | 15.6      |
| 50°-60°   | 462.1  | 22.3      |
| 60°-70°   | 510.8  | 24.6      |
| 70°-80°   | 288.3  | 13.9      |
| 80°-90°   | 30.8   | 1.5       |
| 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°    | 2074.1 | 100.0     |
| 0°-180°   | 2074.1 | 100.0     |

**Coefficient of Utilization**



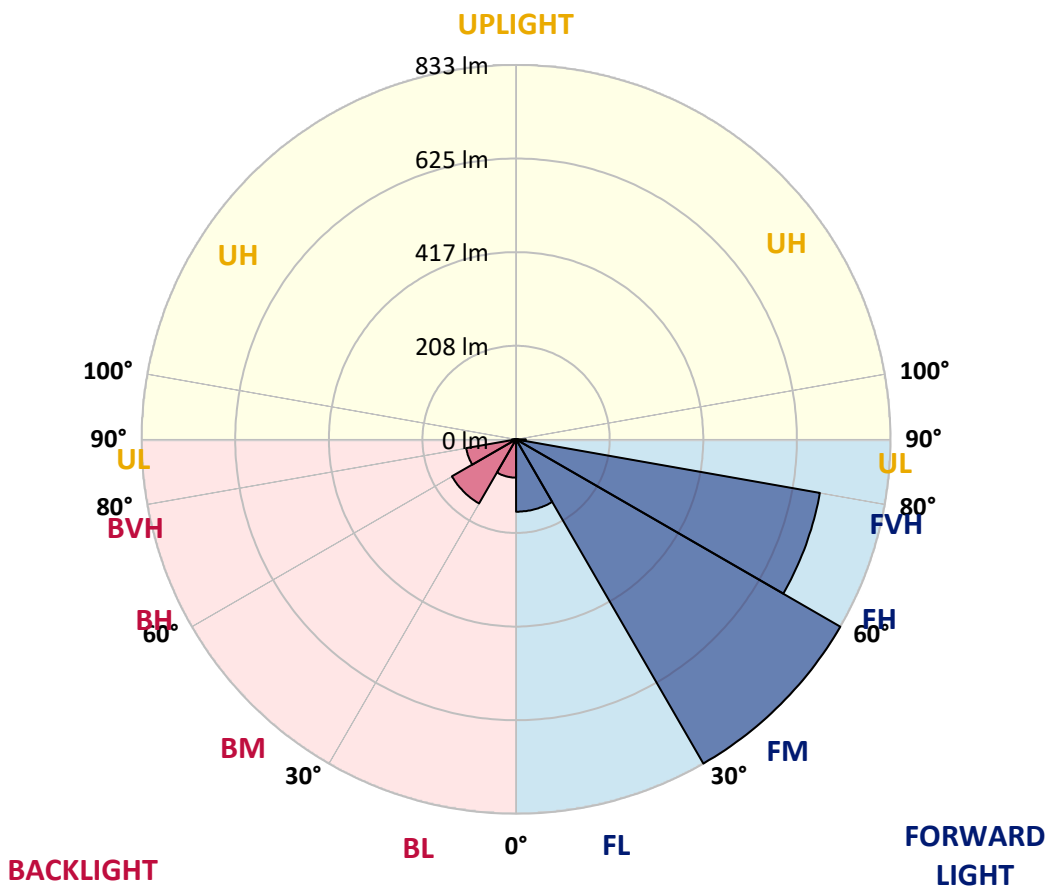
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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|--------|-----------|-------------------------|------|---------|
|                |        |           | B                       | U    | G       |
| FL (0°-30°)    | 161.0  | 7.8       |                         |      |         |
| FM (30°-60°)   | 833.2  | 40.2      |                         |      |         |
| FH (60°-80°)   | 686.4  | 33.1      |                         |      | G1/1800 |
| FVH (80°-90°)  | 21.8   | 1.1       |                         |      | G1/100  |
| BL (0°-30°)    | 85.2   | 4.1       | B0/110                  |      |         |
| BM (30°-60°)   | 164.8  | 7.9       | B0/220                  |      |         |
| BH (60°-80°)   | 112.7  | 5.4       | B1/500                  |      | G1/500  |
| BVH (80°-90°)  | 9.0    | 0.4       |                         |      | G0/10   |
| UL (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B1-U0-G1**  
 Type II Medium





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°    | 5°    | 15°   | 25°   | 35°   | 45°    | 55°    | 65°    | 70°    | 75°    | 85°    |
|-------|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|--------|
| 0°    | 241.9 | 241.9 | 241.9 | 241.9 | 241.9 | 241.9  | 241.9  | 241.9  | 241.9  | 241.9  | 241.9  |
| 2.5°  | 268.0 | 267.5 | 267.8 | 267.5 | 265.9 | 261.8  | 258.5  | 254.3  | 251.5  | 249.8  | 245.9  |
| 5°    | 299.4 | 299.0 | 297.9 | 296.4 | 293.4 | 287.9  | 279.6  | 270.5  | 265.0  | 260.8  | 252.5  |
| 7.5°  | 322.1 | 322.1 | 321.9 | 320.1 | 318.0 | 312.2  | 302.4  | 290.4  | 282.3  | 275.2  | 261.7  |
| 10°   | 333.6 | 334.4 | 335.4 | 337.9 | 337.5 | 334.4  | 325.2  | 312.3  | 302.1  | 293.7  | 273.7  |
| 12.5° | 339.9 | 340.3 | 342.1 | 347.4 | 352.8 | 353.5  | 348.1  | 334.6  | 323.6  | 312.3  | 287.0  |
| 15°   | 348.0 | 348.1 | 350.5 | 356.8 | 364.8 | 372.7  | 371.4  | 357.9  | 346.5  | 334.1  | 301.8  |
| 17.5° | 354.3 | 355.3 | 359.7 | 367.0 | 376.9 | 387.9  | 394.4  | 386.1  | 372.0  | 357.7  | 318.0  |
| 20°   | 356.5 | 357.3 | 363.0 | 374.2 | 387.7 | 403.1  | 417.8  | 415.6  | 401.3  | 384.6  | 336.3  |
| 22.5° | 364.6 | 364.6 | 368.8 | 378.3 | 394.1 | 416.6  | 440.5  | 446.3  | 433.7  | 414.1  | 355.9  |
| 25°   | 382.5 | 381.9 | 383.8 | 387.7 | 399.7 | 427.4  | 462.8  | 480.3  | 466.2  | 444.2  | 375.6  |
| 27.5° | 406.9 | 406.6 | 406.4 | 407.0 | 411.1 | 436.9  | 481.7  | 512.1  | 498.0  | 473.1  | 393.1  |
| 30°   | 433.4 | 432.5 | 434.5 | 432.7 | 431.8 | 448.1  | 497.7  | 540.6  | 529.6  | 501.7  | 407.6  |
| 32.5° | 469.5 | 467.9 | 467.4 | 461.6 | 458.0 | 465.6  | 510.6  | 572.9  | 564.2  | 532.6  | 424.0  |
| 35°   | 517.2 | 515.7 | 508.0 | 498.8 | 488.1 | 491.7  | 526.6  | 604.6  | 605.2  | 571.3  | 445.4  |
| 37.5° | 565.3 | 565.6 | 559.6 | 537.7 | 526.8 | 524.7  | 551.1  | 643.1  | 656.0  | 617.4  | 473.1  |
| 40°   | 605.3 | 607.1 | 607.1 | 584.0 | 567.7 | 565.7  | 585.4  | 688.8  | 714.4  | 674.1  | 508.2  |
| 42.5° | 635.7 | 637.4 | 642.6 | 626.0 | 608.8 | 615.5  | 627.0  | 734.6  | 780.6  | 744.1  | 552.6  |
| 45°   | 669.1 | 670.5 | 673.3 | 663.8 | 653.7 | 671.7  | 674.2  | 789.5  | 856.5  | 822.6  | 604.1  |
| 47.5° | 713.5 | 712.3 | 712.6 | 705.6 | 697.8 | 726.8  | 726.2  | 835.7  | 929.8  | 908.6  | 660.0  |
| 50°   | 768.7 | 770.9 | 768.8 | 754.9 | 745.7 | 772.3  | 775.7  | 886.8  | 994.2  | 993.8  | 716.4  |
| 52.5° | 821.7 | 822.6 | 833.7 | 834.3 | 815.6 | 810.0  | 819.0  | 938.3  | 1048.6 | 1071.7 | 770.5  |
| 55°   | 824.4 | 827.9 | 861.1 | 885.1 | 915.4 | 870.9  | 862.8  | 987.5  | 1101.2 | 1148.0 | 826.7  |
| 57.5° | 767.0 | 772.6 | 829.1 | 880.8 | 965.0 | 975.3  | 937.7  | 1051.0 | 1153.8 | 1223.1 | 891.7  |
| 60°   | 644.4 | 656.0 | 732.7 | 811.8 | 942.7 | 1050.4 | 1091.0 | 1137.3 | 1222.9 | 1299.8 | 970.7  |
| 62.5° | 411.5 | 416.0 | 523.6 | 656.1 | 842.1 | 1043.1 | 1258.0 | 1289.4 | 1328.1 | 1399.7 | 1092.4 |
| 65°   | 206.1 | 220.5 | 283.5 | 391.6 | 607.3 | 919.1  | 1342.3 | 1568.0 | 1520.7 | 1570.9 | 1289.6 |
| 67.5° | 139.8 | 144.5 | 176.4 | 235.3 | 356.1 | 651.2  | 1290.0 | 1802.7 | 1788.8 | 1797.0 | 1499.9 |
| 70°   | 103.1 | 106.1 | 131.3 | 166.7 | 215.4 | 369.7  | 1027.0 | 1785.0 | 1880.2 | 1877.2 | 1477.8 |
| 72.5° | 75.2  | 76.7  | 95.8  | 127.2 | 159.6 | 191.2  | 627.2  | 1442.0 | 1641.3 | 1727.8 | 1292.4 |
| 75°   | 54.7  | 56.5  | 66.5  | 95.2  | 124.1 | 119.3  | 309.6  | 1041.6 | 1251.7 | 1418.0 | 1053.0 |
| 77.5° | 40.8  | 43.0  | 47.7  | 59.6  | 86.9  | 85.4   | 133.8  | 676.3  | 809.6  | 926.2  | 639.6  |
| 80°   | 29.4  | 29.8  | 32.5  | 38.2  | 55.2  | 50.1   | 63.7   | 352.6  | 404.3  | 443.0  | 250.7  |
| 82.5° | 17.8  | 18.3  | 21.7  | 23.5  | 34.2  | 31.5   | 33.1   | 114.2  | 163.7  | 173.7  | 93.7   |
| 85°   | 5.2   | 5.5   | 9.9   | 10.8  | 14.2  | 13.5   | 13.3   | 46.5   | 55.5   | 70.9   | 36.9   |
| 87.5° | 0.0   | 0.0   | 0.0   | 0.0   | 0.1   | 0.9    | 1.6    | 8.2    | 12.4   | 17.2   | 9.0    |
| 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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 CATALOG NUMBER: GWS-SA1A-827-U-T2-W

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°   | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 241.9  | 241.9 | 241.9 | 241.9 | 241.9 | 241.9 | 241.9 | 241.9 | 241.9 | 241.9 | 241.9 |
| 2.5°  | 244.4  | 241.0 | 239.2 | 236.0 | 233.8 | 231.5 | 229.3 | 227.2 | 226.3 | 224.9 | 225.2 |
| 5°    | 248.8  | 243.4 | 238.0 | 231.8 | 226.6 | 222.3 | 218.4 | 214.9 | 213.4 | 212.1 | 212.7 |
| 7.5°  | 255.4  | 247.3 | 236.9 | 225.7 | 217.5 | 211.5 | 207.4 | 205.0 | 204.3 | 203.2 | 203.2 |
| 10°   | 263.8  | 251.6 | 233.5 | 217.5 | 207.6 | 202.8 | 201.0 | 200.8 | 201.6 | 201.7 | 201.4 |
| 12.5° | 273.1  | 255.8 | 228.4 | 207.7 | 199.3 | 197.8 | 199.2 | 201.7 | 204.3 | 205.6 | 205.3 |
| 15°   | 282.6  | 258.5 | 219.7 | 198.4 | 193.3 | 195.3 | 199.6 | 204.7 | 209.7 | 212.2 | 212.1 |
| 17.5° | 291.6  | 259.1 | 208.5 | 189.4 | 188.1 | 193.0 | 200.5 | 208.5 | 215.2 | 218.8 | 219.0 |
| 20°   | 301.7  | 258.1 | 196.9 | 181.3 | 182.8 | 190.9 | 200.8 | 210.4 | 218.4 | 222.0 | 222.9 |
| 22.5° | 310.8  | 254.5 | 185.7 | 173.7 | 178.3 | 188.4 | 198.4 | 207.4 | 214.5 | 217.9 | 219.1 |
| 25°   | 319.1  | 247.6 | 173.4 | 167.2 | 174.9 | 184.8 | 192.4 | 198.7 | 203.7 | 205.8 | 207.4 |
| 27.5° | 323.6  | 237.2 | 164.1 | 162.2 | 171.6 | 179.7 | 183.9 | 185.8 | 187.5 | 186.9 | 188.1 |
| 30°   | 324.5  | 224.3 | 156.0 | 158.1 | 166.7 | 172.6 | 173.5 | 171.6 | 168.7 | 164.1 | 165.2 |
| 32.5° | 323.6  | 209.5 | 149.3 | 153.8 | 161.1 | 164.7 | 163.5 | 158.4 | 151.5 | 144.3 | 144.8 |
| 35°   | 323.9  | 194.5 | 143.7 | 149.0 | 154.7 | 156.6 | 153.6 | 146.6 | 139.2 | 132.6 | 132.3 |
| 37.5° | 327.2  | 181.9 | 139.1 | 144.3 | 148.4 | 148.7 | 145.4 | 138.0 | 134.3 | 129.3 | 128.7 |
| 40°   | 336.3  | 172.6 | 134.9 | 139.7 | 142.2 | 142.1 | 138.3 | 133.1 | 135.6 | 134.0 | 133.5 |
| 42.5° | 351.3  | 167.0 | 131.4 | 134.7 | 136.5 | 136.8 | 133.8 | 130.5 | 136.1 | 134.0 | 133.2 |
| 45°   | 375.4  | 166.7 | 129.0 | 129.8 | 132.6 | 134.7 | 132.6 | 128.9 | 131.0 | 120.8 | 118.8 |
| 47.5° | 404.0  | 171.7 | 127.2 | 125.4 | 130.4 | 134.1 | 130.8 | 124.8 | 120.5 | 111.2 | 109.9 |
| 50°   | 438.5  | 182.1 | 125.6 | 120.8 | 127.1 | 131.9 | 128.6 | 120.3 | 113.7 | 108.8 | 108.1 |
| 52.5° | 479.4  | 195.7 | 123.5 | 115.5 | 122.1 | 130.7 | 128.6 | 119.9 | 111.2 | 106.7 | 106.0 |
| 55°   | 522.3  | 211.5 | 121.1 | 109.3 | 116.6 | 131.0 | 129.6 | 116.7 | 109.3 | 106.9 | 106.3 |
| 57.5° | 575.5  | 230.3 | 116.7 | 101.9 | 111.6 | 128.3 | 125.4 | 114.9 | 107.9 | 106.0 | 105.4 |
| 60°   | 644.6  | 258.4 | 108.5 | 94.4  | 106.0 | 123.5 | 121.7 | 111.9 | 104.3 | 102.7 | 102.2 |
| 62.5° | 754.0  | 305.9 | 98.5  | 87.2  | 99.2  | 113.4 | 116.1 | 106.3 | 99.8  | 99.7  | 99.5  |
| 65°   | 932.3  | 363.0 | 86.6  | 80.8  | 92.2  | 105.2 | 108.8 | 100.4 | 95.2  | 96.8  | 96.7  |
| 67.5° | 1057.3 | 367.9 | 76.9  | 74.0  | 83.9  | 96.2  | 101.5 | 94.4  | 88.7  | 91.9  | 91.7  |
| 70°   | 968.4  | 287.0 | 68.5  | 67.0  | 75.1  | 86.5  | 93.5  | 86.9  | 81.2  | 84.2  | 83.6  |
| 72.5° | 816.8  | 220.0 | 60.5  | 59.6  | 66.1  | 76.3  | 83.3  | 79.4  | 73.4  | 73.4  | 72.1  |
| 75°   | 656.4  | 181.5 | 52.2  | 51.7  | 56.0  | 65.9  | 73.9  | 67.3  | 61.7  | 61.4  | 60.5  |
| 77.5° | 376.5  | 119.0 | 43.8  | 43.5  | 44.8  | 55.2  | 57.4  | 56.0  | 51.9  | 49.9  | 49.3  |
| 80°   | 150.0  | 61.9  | 34.5  | 32.5  | 33.9  | 40.5  | 45.3  | 43.0  | 39.4  | 37.0  | 35.7  |
| 82.5° | 58.1   | 31.0  | 24.3  | 21.3  | 23.2  | 29.2  | 32.8  | 32.1  | 29.7  | 24.3  | 22.8  |
| 85°   | 23.7   | 15.1  | 14.5  | 12.3  | 13.5  | 15.7  | 18.9  | 16.3  | 13.5  | 9.6   | 9.1   |
| 87.5° | 6.3    | 5.5   | 5.4   | 3.3   | 2.5   | 0.7   | 0.1   | 0.0   | 0.0   | 0.0   | 0.0   |
| 90°   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |



Cooper Lighting Solutions Photometric Lab  
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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



CCT = 2764K  
 CIE x = 0.4581  
 CIE y = 0.4156  
 Duv = 0.0020

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**

| 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         | 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**

| $\lambda$<br>(nm) | Power<br>( $\mu$ W/nm) | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>( $\mu$ W/nm) | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>( $\mu$ W/nm) | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>( $\mu$ W/nm) | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>( $\mu$ W/nm) | Lumens<br>( $\phi$ /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)