

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: P629041

Luminaire Tested: GWS-SA1A-827-U-T3-W

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P629041  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-23)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA1A-827-U-T3-W  
Description: GALLEON WALL SLIM LUMINAIRE. (1) LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III OPTICS  
Light Source: (16) 2700K CCT, 80 CRI LEDS  
Ballast/Driver: -

**Summary**

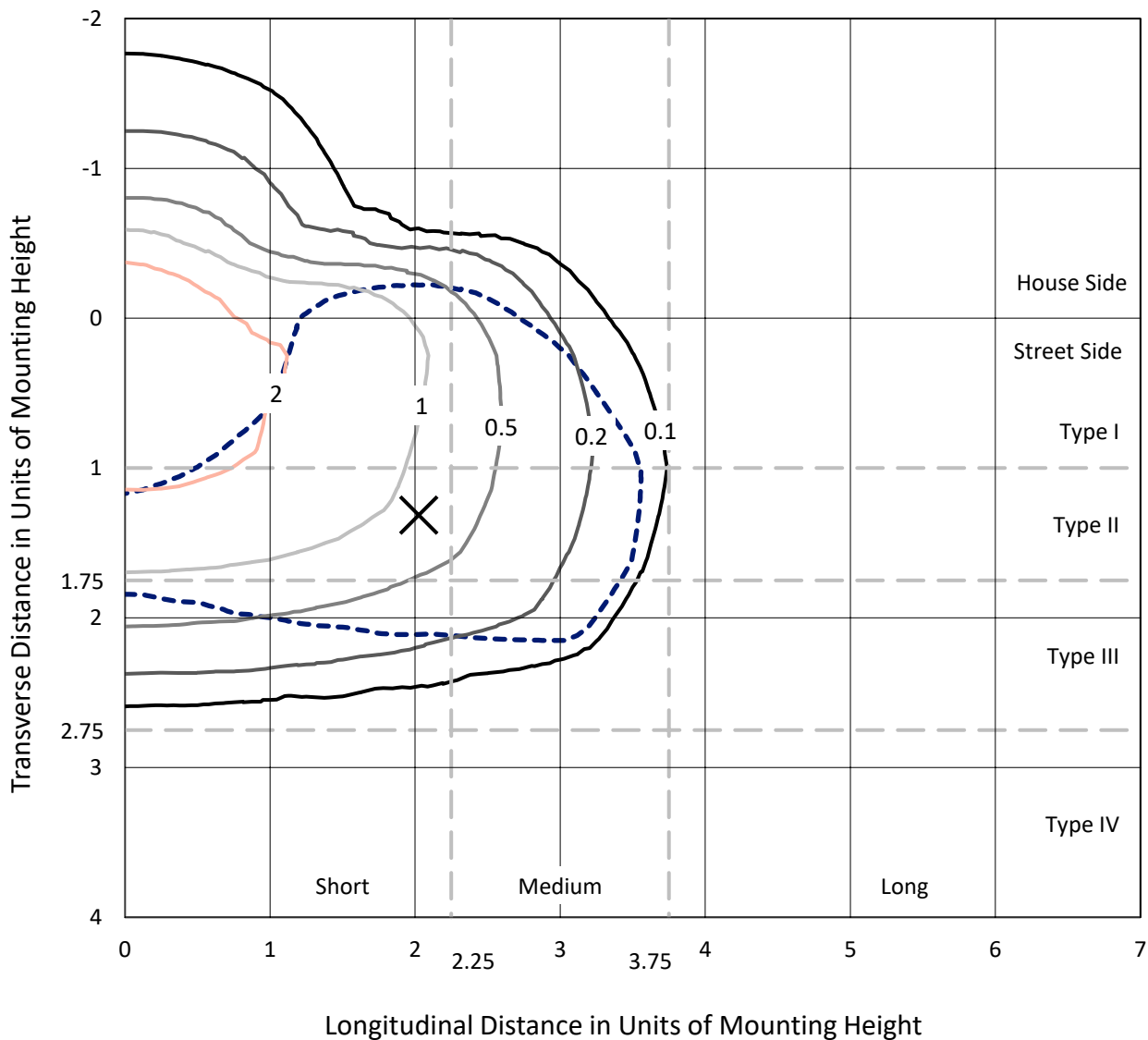
Lumens per Lamp: N/A  
Luminaire Lumens: 2091.9 lumens  
Efficiency: N/A  
Efficacy: 106.2 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.5' x H: 0')  
IES Classification: Type III - Short  
BUG Rating: B1 - U0 - G1  
  
Input Watts (W): 19.7  
Input Voltage (V): 120  
Input Current (Ain): 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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 CATALOG NUMBER: GWS-SA1A-827-U-T3-W

### Iso-Footcandle Lines of Horizontal Illumination

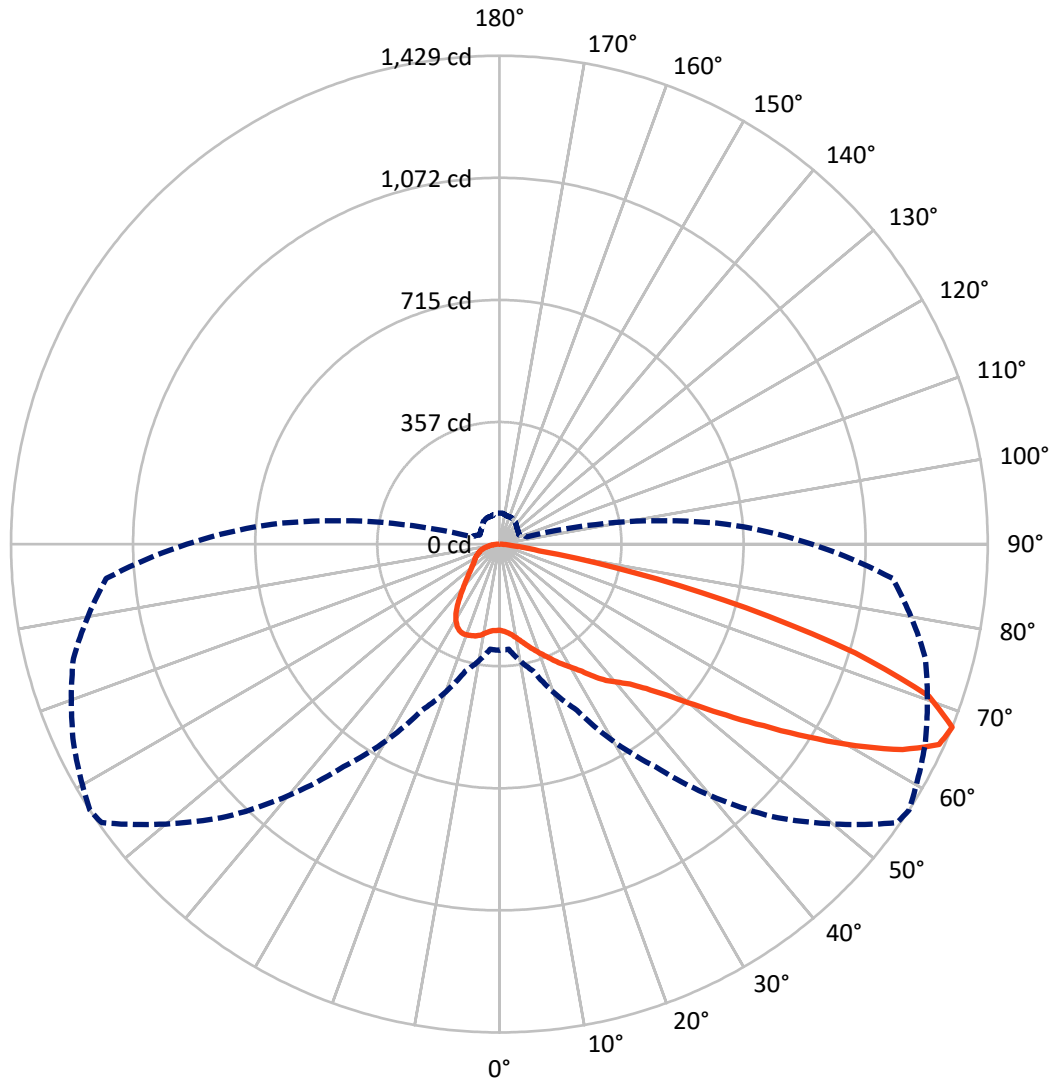
✕ Max cd  
 - - - 1/2 Max cd



Based on 10 foot mounting height. Maximum calculated value = 3 fc  
 Type III - Short - N/A

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### Luminous Intensity Polar Plot



— Vertical Plane Through 57-Deg Lateral    - - - Horizontal Cone Through 67.5-Deg Vertical

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**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 459.9    | 0.0    | 459.9  |
|                    | % Fixture | 22.0     | 0.0    | 22.0   |
| <b>Street Side</b> | Lumens    | 1632.0   | 0.0    | 1632.0 |
|                    | % Fixture | 78.0     | 0.0    | 78.0   |
| <b>Total</b>       | Lumens    | 2091.9   | 0.0    | 2091.9 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 25.0   | 1.2       |
| 10°-20°   | 82.8   | 4.0       |
| 20°-30°   | 147.5  | 7.1       |
| 30°-40°   | 214.5  | 10.3      |
| 40°-50°   | 310.5  | 14.8      |
| 50°-60°   | 485.9  | 23.2      |
| 60°-70°   | 566.8  | 27.1      |
| 70°-80°   | 236.6  | 11.3      |
| 80°-90°   | 22.3   | 1.1       |
| 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°    | 2091.9 | 100.0     |
| 0°-180°   | 2091.9 | 100.0     |

**Coefficient of Utilization**



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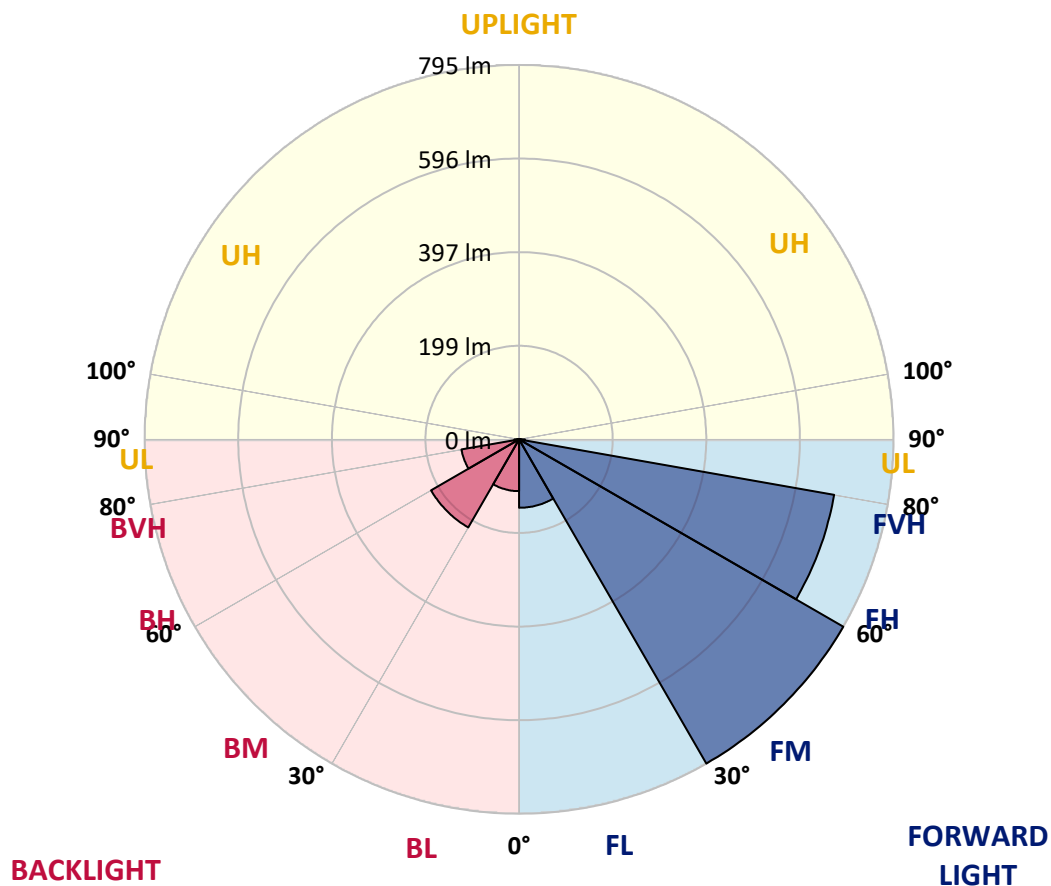
CATALOG NUMBER: GWS-SA1A-827-U-T3-W

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

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|--------|-----------|-------------------------|------|---------|
|                |        |           | B                       | U    | G       |
| FL (0°-30°)    | 145.3  | 6.9       |                         |      |         |
| FM (30°-60°)   | 794.9  | 38.0      |                         |      |         |
| FH (60°-80°)   | 679.3  | 32.5      |                         |      | G1/1800 |
| FVH (80°-90°)  | 12.4   | 0.6       |                         |      | G1/100  |
| BL (0°-30°)    | 110.0  | 5.3       | B0/110                  |      |         |
| BM (30°-60°)   | 215.9  | 10.3      | B0/220                  |      |         |
| BH (60°-80°)   | 124.1  | 5.9       | B1/500                  |      | G1/500  |
| BVH (80°-90°)  | 9.9    | 0.5       |                         |      | 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 III Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°    | 5°    | 15°   | 25°   | 35°    | 45°    | 55°    | 57°    | 65°    | 75°    | 85°    |
|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 252.1 | 252.1 | 252.1 | 252.1 | 252.1  | 252.1  | 252.1  | 252.1  | 252.1  | 252.1  | 252.1  |
| 2.5°  | 255.7 | 255.4 | 255.2 | 256.1 | 255.8  | 255.7  | 255.7  | 255.5  | 255.2  | 254.0  | 252.4  |
| 5°    | 262.7 | 262.1 | 261.5 | 262.2 | 261.7  | 261.1  | 260.9  | 260.6  | 259.6  | 257.8  | 255.2  |
| 7.5°  | 270.0 | 269.4 | 269.6 | 270.0 | 269.6  | 269.3  | 268.8  | 268.5  | 266.9  | 264.0  | 260.6  |
| 10°   | 280.4 | 280.4 | 280.7 | 281.1 | 281.3  | 280.8  | 279.9  | 279.5  | 277.5  | 273.9  | 269.1  |
| 12.5° | 295.4 | 295.1 | 295.1 | 294.8 | 295.2  | 294.8  | 293.9  | 293.1  | 290.7  | 286.1  | 279.2  |
| 15°   | 315.1 | 314.0 | 312.9 | 311.0 | 310.4  | 308.7  | 309.0  | 308.6  | 306.3  | 300.0  | 291.3  |
| 17.5° | 336.3 | 336.1 | 334.5 | 330.6 | 326.7  | 324.0  | 324.6  | 324.4  | 323.2  | 314.7  | 303.6  |
| 20°   | 354.9 | 355.6 | 354.1 | 351.1 | 345.9  | 340.8  | 340.5  | 341.2  | 339.7  | 331.2  | 315.7  |
| 22.5° | 375.7 | 375.1 | 373.6 | 369.7 | 365.8  | 360.4  | 358.6  | 358.0  | 357.4  | 347.7  | 328.2  |
| 25°   | 395.5 | 397.3 | 395.3 | 391.7 | 385.7  | 379.9  | 378.4  | 379.0  | 377.3  | 364.5  | 341.5  |
| 27.5° | 420.5 | 421.2 | 420.0 | 415.1 | 410.0  | 401.8  | 398.9  | 398.9  | 398.3  | 380.2  | 352.0  |
| 30°   | 447.2 | 449.3 | 447.2 | 443.1 | 437.9  | 426.0  | 419.9  | 419.3  | 417.5  | 396.4  | 364.3  |
| 32.5° | 474.0 | 475.5 | 474.0 | 470.1 | 464.1  | 453.8  | 444.9  | 443.6  | 441.2  | 414.1  | 376.9  |
| 35°   | 497.8 | 499.2 | 498.9 | 499.8 | 494.8  | 481.8  | 476.4  | 475.8  | 469.5  | 437.1  | 394.0  |
| 37.5° | 523.9 | 525.5 | 523.3 | 525.1 | 523.2  | 510.9  | 509.2  | 506.2  | 497.2  | 458.9  | 412.0  |
| 40°   | 553.6 | 555.1 | 551.5 | 552.2 | 550.0  | 543.1  | 534.7  | 530.6  | 517.3  | 482.4  | 440.3  |
| 42.5° | 585.3 | 588.8 | 590.4 | 589.1 | 583.8  | 579.9  | 565.3  | 560.2  | 549.1  | 524.8  | 486.9  |
| 45°   | 631.3 | 636.4 | 638.8 | 635.4 | 633.1  | 627.6  | 609.6  | 603.5  | 597.6  | 584.6  | 551.9  |
| 47.5° | 681.0 | 685.6 | 693.2 | 694.7 | 696.5  | 692.3  | 667.0  | 661.0  | 662.1  | 660.6  | 631.9  |
| 50°   | 720.5 | 724.4 | 741.6 | 760.1 | 775.4  | 776.6  | 744.2  | 737.7  | 743.4  | 748.2  | 728.3  |
| 52.5° | 749.3 | 752.7 | 775.5 | 813.6 | 848.2  | 873.8  | 838.9  | 831.6  | 836.2  | 847.0  | 837.9  |
| 55°   | 772.7 | 777.5 | 801.3 | 859.7 | 929.7  | 970.2  | 947.8  | 938.6  | 936.6  | 949.9  | 955.2  |
| 57.5° | 785.0 | 786.5 | 819.9 | 895.8 | 989.5  | 1064.7 | 1074.5 | 1064.0 | 1045.4 | 1052.7 | 1080.0 |
| 60°   | 756.9 | 759.5 | 805.2 | 905.1 | 1036.7 | 1158.5 | 1207.4 | 1198.7 | 1159.1 | 1163.2 | 1193.3 |
| 62.5° | 679.5 | 683.0 | 738.0 | 860.9 | 1040.6 | 1221.2 | 1330.1 | 1324.6 | 1271.5 | 1249.7 | 1258.7 |
| 65°   | 545.0 | 546.2 | 603.2 | 751.5 | 963.1  | 1229.0 | 1415.7 | 1414.4 | 1350.1 | 1298.8 | 1260.3 |
| 67.5° | 310.8 | 308.7 | 384.8 | 536.0 | 794.8  | 1127.7 | 1421.2 | 1429.2 | 1375.5 | 1290.7 | 1155.4 |
| 70°   | 134.7 | 135.0 | 170.1 | 264.5 | 514.5  | 911.4  | 1320.1 | 1333.7 | 1301.8 | 1156.0 | 919.2  |
| 72.5° | 62.3  | 63.2  | 78.4  | 114.5 | 219.7  | 565.4  | 1076.4 | 1088.7 | 1061.3 | 925.2  | 668.8  |
| 75°   | 44.1  | 44.8  | 52.3  | 65.6  | 101.0  | 220.3  | 720.1  | 745.8  | 759.2  | 692.0  | 440.7  |
| 77.5° | 33.4  | 34.5  | 38.2  | 45.6  | 62.3   | 78.1   | 344.5  | 406.0  | 483.6  | 430.5  | 227.0  |
| 80°   | 21.3  | 21.3  | 25.3  | 30.4  | 38.1   | 40.6   | 99.5   | 117.9  | 236.6  | 177.4  | 89.2   |
| 82.5° | 14.4  | 14.8  | 17.2  | 19.3  | 21.9   | 23.1   | 42.7   | 45.6   | 68.3   | 60.4   | 36.7   |
| 85°   | 7.6   | 7.9   | 9.0   | 8.8   | 10.5   | 9.1    | 18.0   | 17.8   | 25.0   | 27.4   | 13.9   |
| 87.5° | 0.0   | 0.0   | 0.1   | 0.1   | 0.3    | 0.4    | 1.9    | 2.1    | 5.2    | 8.4    | 4.6    |
| 90°   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



REPORT NUMBER: P629041  
 CATALOG NUMBER: GWS-SA1A-827-U-T3-W

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°   | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 252.1  | 252.1 | 252.1 | 252.1 | 252.1 | 252.1 | 252.1 | 252.1 | 252.1 | 252.1 | 252.1 |
| 2.5°  | 253.3  | 251.5 | 252.4 | 252.1 | 253.0 | 253.0 | 251.3 | 250.9 | 251.0 | 249.2 | 248.6 |
| 5°    | 255.5  | 253.4 | 253.9 | 253.3 | 254.2 | 254.9 | 254.2 | 254.2 | 255.1 | 253.7 | 253.0 |
| 7.5°  | 260.6  | 258.2 | 258.2 | 257.5 | 258.5 | 259.1 | 258.5 | 259.4 | 261.1 | 259.7 | 259.0 |
| 10°   | 268.7  | 265.8 | 266.0 | 265.1 | 265.5 | 265.2 | 262.8 | 262.1 | 262.5 | 261.4 | 260.8 |
| 12.5° | 279.2  | 275.3 | 275.3 | 273.5 | 272.4 | 269.3 | 264.3 | 262.5 | 262.8 | 261.8 | 261.4 |
| 15°   | 289.2  | 285.6 | 284.9 | 281.3 | 276.5 | 270.6 | 266.1 | 264.9 | 265.2 | 264.2 | 263.4 |
| 17.5° | 301.1  | 296.4 | 293.7 | 287.1 | 278.3 | 272.3 | 267.8 | 264.9 | 262.5 | 260.2 | 259.6 |
| 20°   | 312.0  | 306.2 | 301.2 | 291.0 | 280.2 | 272.0 | 263.6 | 256.6 | 250.7 | 247.6 | 246.8 |
| 22.5° | 323.2  | 315.7 | 307.1 | 293.7 | 280.1 | 266.6 | 251.2 | 240.5 | 231.8 | 227.2 | 228.1 |
| 25°   | 333.9  | 324.4 | 312.6 | 296.3 | 275.3 | 254.6 | 233.6 | 217.7 | 207.9 | 204.3 | 203.2 |
| 27.5° | 342.7  | 331.0 | 317.7 | 295.1 | 265.4 | 237.4 | 209.7 | 192.0 | 182.4 | 178.3 | 177.3 |
| 30°   | 352.6  | 339.4 | 325.0 | 289.5 | 249.8 | 213.2 | 182.5 | 168.1 | 161.2 | 157.3 | 157.5 |
| 32.5° | 364.0  | 350.2 | 335.4 | 278.9 | 229.9 | 187.2 | 160.2 | 150.3 | 144.8 | 140.9 | 140.3 |
| 35°   | 379.3  | 365.7 | 342.3 | 262.8 | 204.6 | 163.2 | 144.9 | 136.8 | 129.9 | 124.8 | 123.8 |
| 37.5° | 398.2  | 388.9 | 343.0 | 241.4 | 177.4 | 146.7 | 134.0 | 125.3 | 116.9 | 110.1 | 109.4 |
| 40°   | 430.5  | 419.9 | 336.9 | 214.6 | 154.4 | 136.1 | 124.8 | 114.8 | 105.0 | 97.6  | 96.5  |
| 42.5° | 476.7  | 454.8 | 323.7 | 184.3 | 137.0 | 127.7 | 116.1 | 103.4 | 93.5  | 88.3  | 87.5  |
| 45°   | 535.4  | 493.8 | 303.9 | 155.9 | 124.1 | 119.4 | 107.0 | 93.7  | 88.4  | 84.7  | 83.9  |
| 47.5° | 607.4  | 539.2 | 281.1 | 133.7 | 114.0 | 111.9 | 97.7  | 90.4  | 85.7  | 82.6  | 81.8  |
| 50°   | 693.4  | 597.0 | 262.4 | 116.3 | 105.0 | 103.3 | 94.7  | 88.4  | 84.7  | 82.1  | 81.5  |
| 52.5° | 791.5  | 661.3 | 253.3 | 103.9 | 97.3  | 95.5  | 93.7  | 88.0  | 84.8  | 82.9  | 82.1  |
| 55°   | 893.4  | 729.1 | 244.7 | 94.3  | 90.7  | 91.7  | 93.8  | 89.5  | 87.1  | 84.5  | 83.8  |
| 57.5° | 991.9  | 792.6 | 223.7 | 86.8  | 85.9  | 89.9  | 94.6  | 91.0  | 88.1  | 85.6  | 84.7  |
| 60°   | 1059.8 | 827.4 | 188.2 | 80.8  | 82.3  | 87.7  | 92.6  | 88.7  | 85.1  | 84.1  | 83.6  |
| 62.5° | 1078.1 | 823.2 | 146.1 | 74.6  | 77.9  | 82.7  | 87.5  | 85.0  | 81.2  | 82.9  | 83.0  |
| 65°   | 1035.4 | 778.2 | 109.7 | 68.6  | 72.2  | 76.3  | 82.3  | 81.2  | 79.9  | 84.4  | 84.5  |
| 67.5° | 914.4  | 667.8 | 83.6  | 63.4  | 66.4  | 71.3  | 80.6  | 85.0  | 85.3  | 91.0  | 90.4  |
| 70°   | 691.9  | 498.9 | 65.5  | 58.4  | 61.9  | 71.3  | 85.9  | 87.8  | 84.2  | 89.5  | 88.3  |
| 72.5° | 478.3  | 329.2 | 55.7  | 54.1  | 56.3  | 68.0  | 85.7  | 85.7  | 81.8  | 81.8  | 79.6  |
| 75°   | 297.2  | 193.6 | 48.6  | 48.6  | 48.6  | 59.5  | 83.3  | 79.0  | 72.1  | 68.9  | 67.1  |
| 77.5° | 146.7  | 94.1  | 40.8  | 42.3  | 40.6  | 49.8  | 68.0  | 64.6  | 60.4  | 57.1  | 55.9  |
| 80°   | 62.6   | 47.1  | 33.0  | 34.6  | 32.7  | 37.5  | 53.9  | 53.2  | 49.2  | 44.8  | 43.5  |
| 82.5° | 28.8   | 24.3  | 26.4  | 27.1  | 23.8  | 28.2  | 39.4  | 39.4  | 37.2  | 31.2  | 28.9  |
| 85°   | 12.3   | 12.9  | 18.3  | 18.3  | 15.0  | 15.9  | 21.1  | 20.1  | 18.0  | 14.7  | 13.5  |
| 87.5° | 4.2    | 6.3   | 9.3   | 8.1   | 3.1   | 1.3   | 0.7   | 0.3   | 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

REPORT NUMBER: SP1-2407-157-9

| 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**

| 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         | 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  $R_a = 80.9$   
 $R_9 = -1.5$



**Color Vector Graphics**



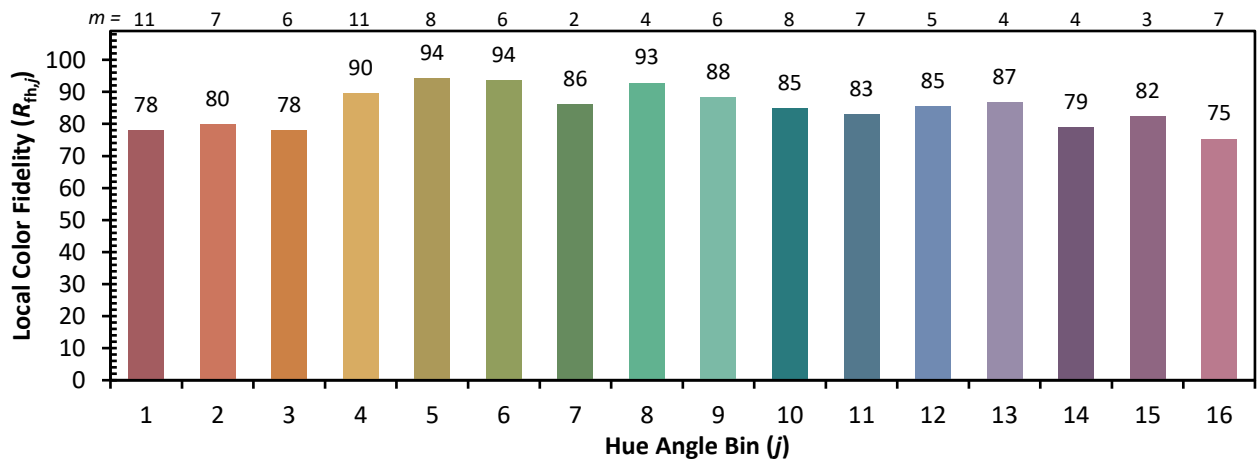


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

|            |            |            |            |
|------------|------------|------------|------------|
| 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)