

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: P640383

Luminaire Tested: GWS-SA5D-827-U-5NQ-W

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P640383  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-7)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA5D-827-U-5NQ-W  
Description: GALLEON WALL SLIM LUMINAIRE. (5) LIGHTSQUARES WITH 16 LEDS EACH AND TYPE V NARROW OPTICS  
Light Source: (80) 2700K CCT, 80 CRI LEDS  
Ballast/Driver: -

**Summary**

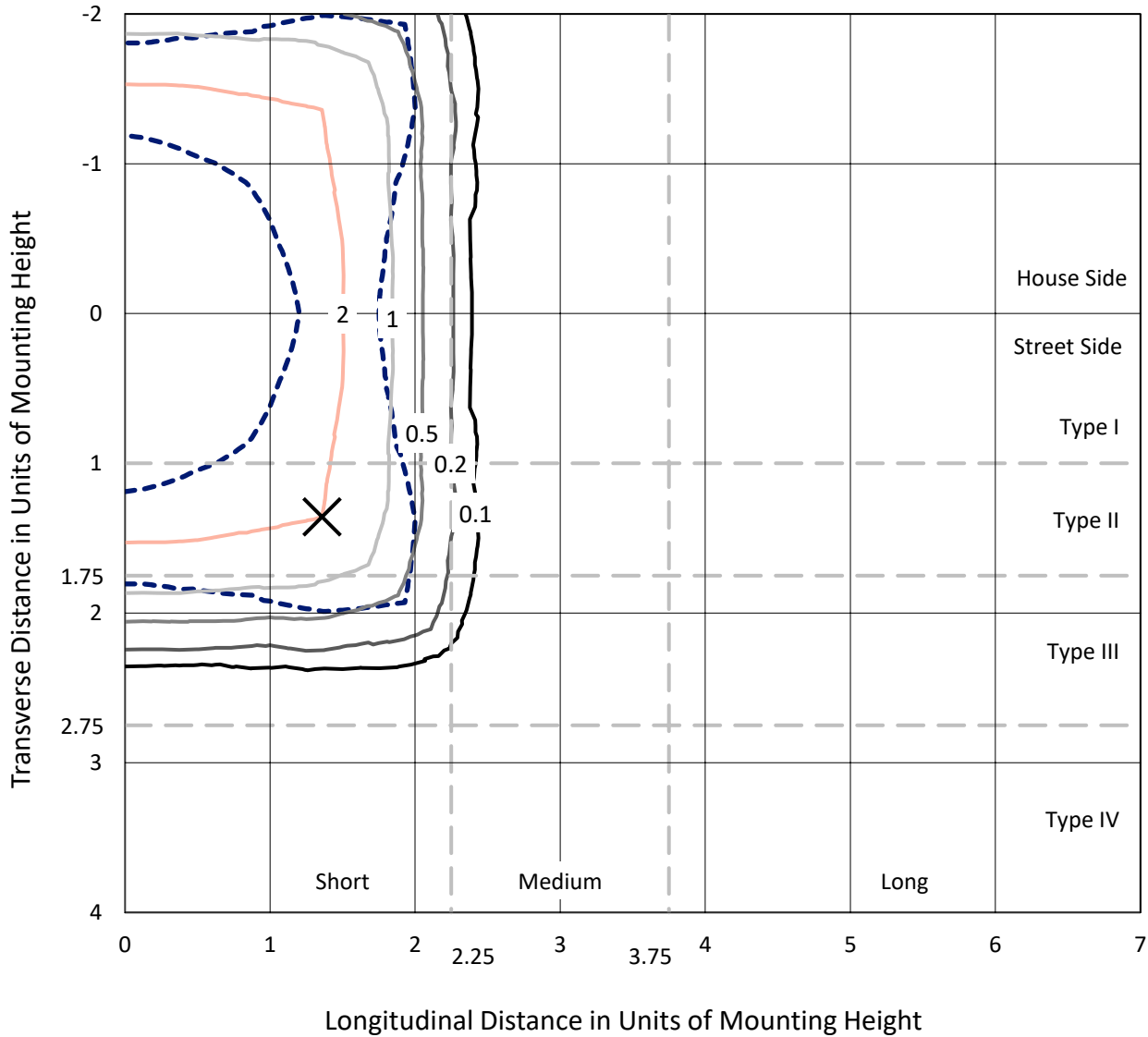
Lumens per Lamp: N/A  
Luminaire Lumens: 23081.7 lumens  
Efficiency: N/A  
Efficacy: 112.8 lumens/watt  
Luminous Opening: Rectangular (W 1.5' x L: 1' x H: 0')  
IES Classification: Type V - Short  
BUG Rating: B4 - U0 - G2  
  
Input Watts (W): 204.6  
Input Voltage (V): 120  
Input Current (Ain): 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: P640383  
 CATALOG NUMBER: GWS-SA5D-827-U-5NQ-W

### Iso-Footcandle Lines of Horizontal Illumination

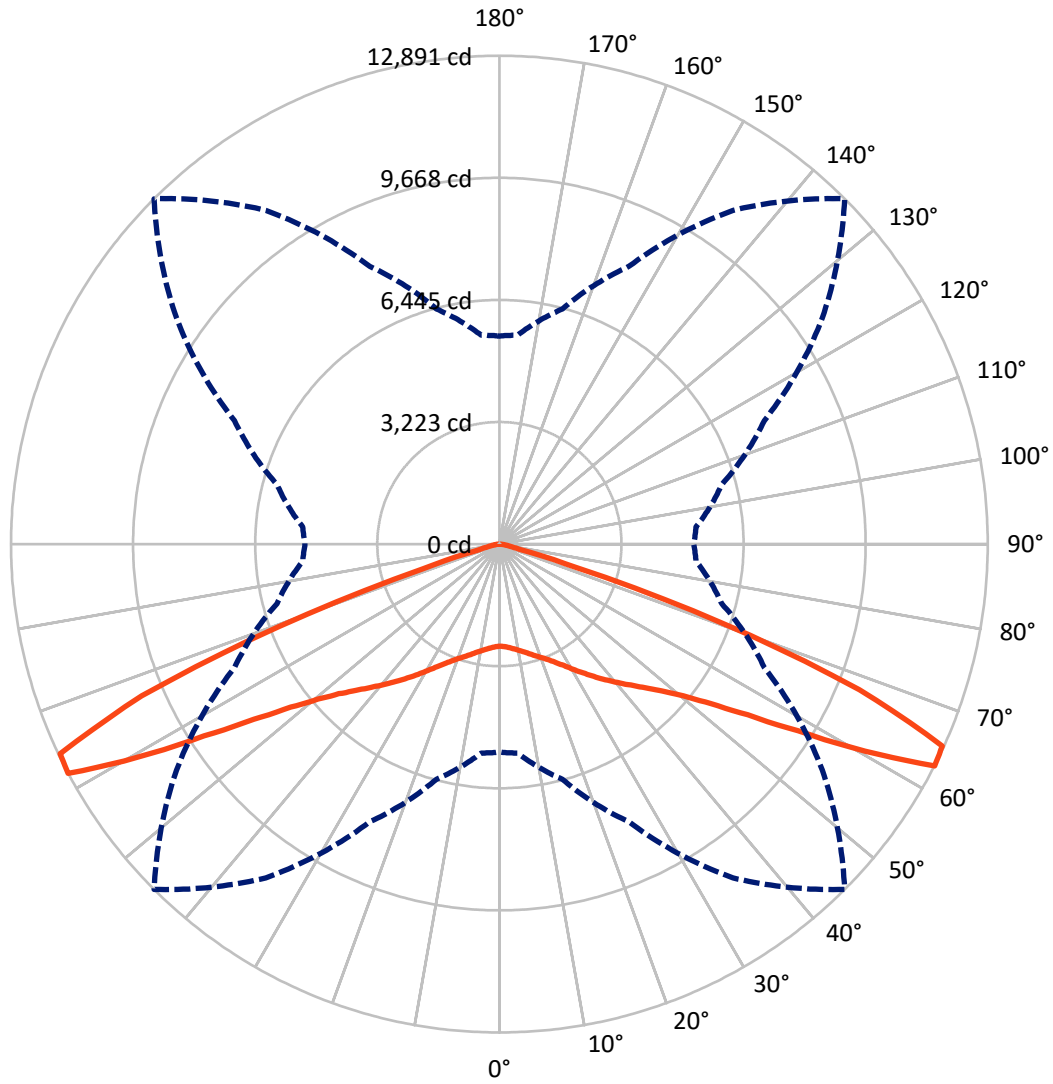
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 4.4 fc  
 Type V - Short - N/A

REPORT NUMBER: P640383  
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### Luminous Intensity Polar Plot



— Vertical Plane Through 45-Deg Lateral    - - - Horizontal Cone Through 62.5-Deg Vertical

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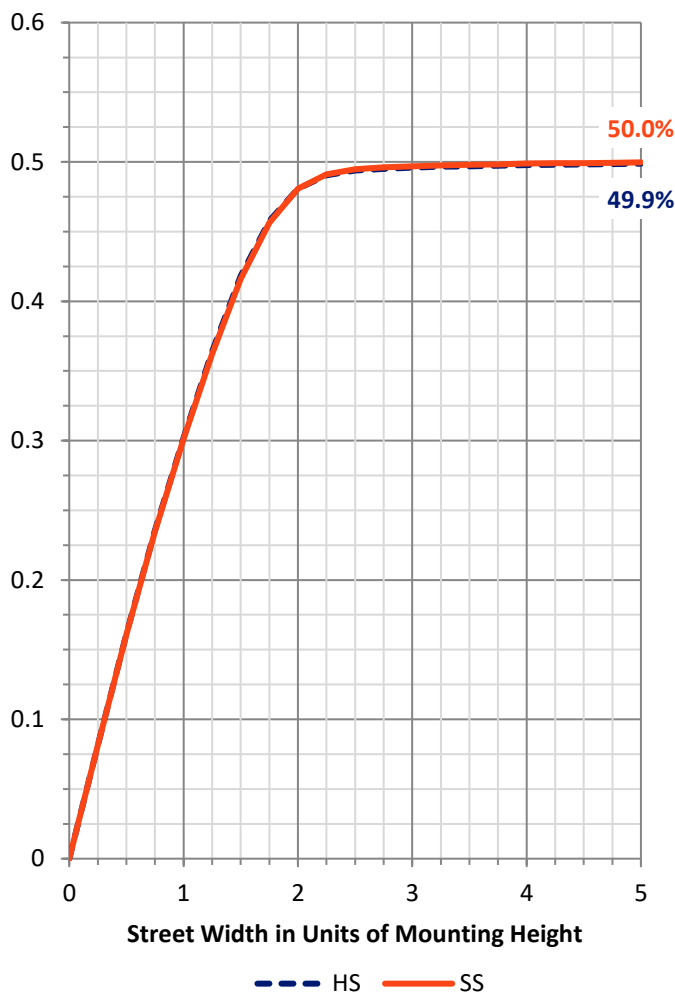
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 11540.9  | 0.0    | 11540.9 |
|                    | % Fixture | 50.0     | 0.0    | 50.0    |
| <b>Street Side</b> | Lumens    | 11540.9  | 0.0    | 11540.9 |
|                    | % Fixture | 50.0     | 0.0    | 50.0    |
| <b>Total</b>       | Lumens    | 23081.7  | 0.0    | 23081.7 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 264.2   | 1.1       |
| 10°-20°   | 852.0   | 3.7       |
| 20°-30°   | 1611.9  | 7.0       |
| 30°-40°   | 2713.0  | 11.8      |
| 40°-50°   | 4334.6  | 18.8      |
| 50°-60°   | 6987.2  | 30.3      |
| 60°-70°   | 5700.8  | 24.7      |
| 70°-80°   | 553.6   | 2.4       |
| 80°-90°   | 64.4    | 0.3       |
| 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°    | 23081.7 | 100.0     |
| 0°-180°   | 23081.7 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P640383

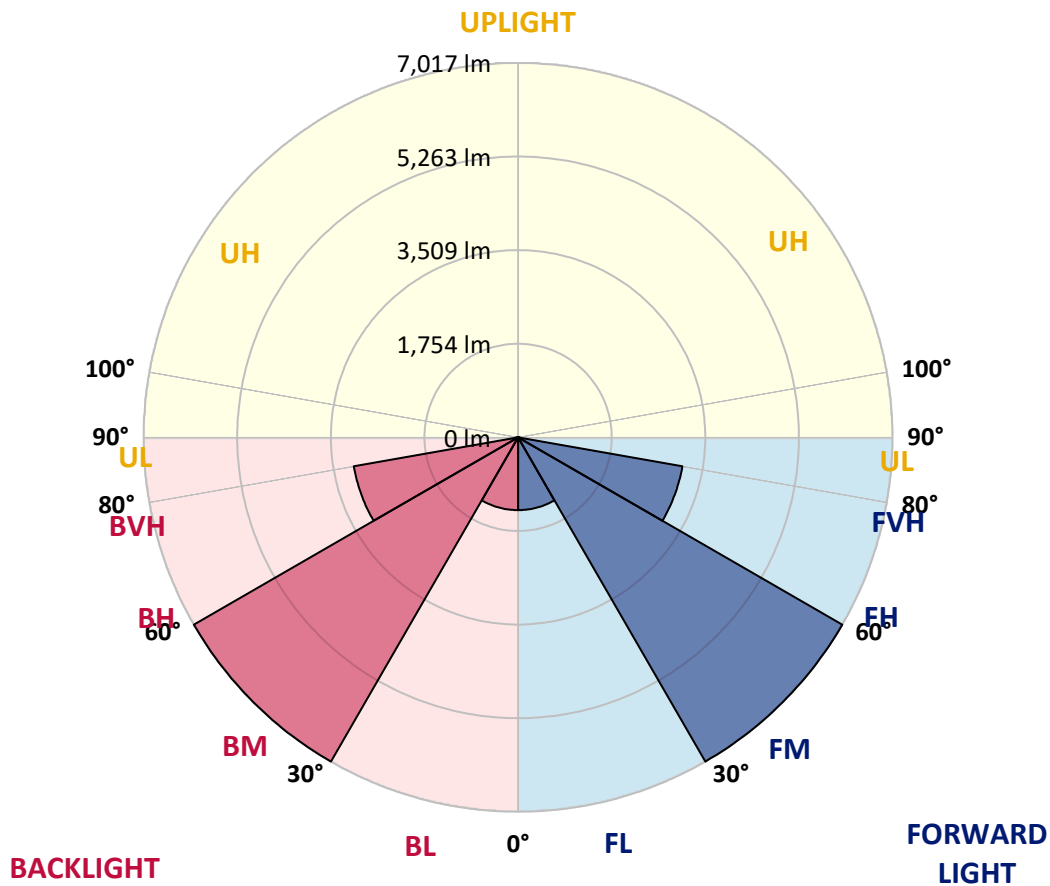
CATALOG NUMBER: GWS-SA5D-827-U-5NQ-W

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

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|--------|-----------|-------------------------|------|---------|
|                |        |           | B                       | U    | G       |
| FL (0°-30°)    | 1364.0 | 5.9       |                         |      |         |
| FM (30°-60°)   | 7017.4 | 30.4      |                         |      |         |
| FH (60°-80°)   | 3127.2 | 13.5      |                         |      | G2/5000 |
| FVH (80°-90°)  | 32.2   | 0.1       |                         |      | G1/100  |
| BL (0°-30°)    | 1364.0 | 5.9       | B3/2500                 |      |         |
| BM (30°-60°)   | 7017.4 | 30.4      | B4/8500                 |      |         |
| BH (60°-80°)   | 3127.2 | 13.5      | B4/5000                 |      | G2/5000 |
| BVH (80°-90°)  | 32.2   | 0.1       |                         |      | G1/100  |
| UL (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B4-U0-G2**

Type V Short





REPORT NUMBER: P640383  
 CATALOG NUMBER: GWS-SA5D-827-U-5NQ-W

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°     | 45°     | 55°     | 65°    | 75°    | 85°    | 90°    |
|-------|--------|--------|--------|--------|---------|---------|---------|--------|--------|--------|--------|
| 0°    | 2692.8 | 2692.8 | 2692.8 | 2692.8 | 2692.8  | 2692.8  | 2692.8  | 2692.8 | 2692.8 | 2692.8 | 2692.8 |
| 2.5°  | 2689.6 | 2689.6 | 2696.0 | 2700.7 | 2697.5  | 2710.2  | 2708.6  | 2705.5 | 2703.9 | 2699.1 | 2713.4 |
| 5°    | 2726.0 | 2726.0 | 2730.8 | 2735.5 | 2727.6  | 2743.4  | 2737.1  | 2734.0 | 2732.4 | 2726.0 | 2738.7 |
| 7.5°  | 2767.2 | 2771.9 | 2773.5 | 2781.4 | 2776.7  | 2794.1  | 2789.4  | 2783.0 | 2779.9 | 2771.9 | 2783.0 |
| 10°   | 2813.1 | 2816.3 | 2817.9 | 2832.1 | 2833.7  | 2854.3  | 2849.5  | 2841.6 | 2835.3 | 2827.4 | 2843.2 |
| 12.5° | 2874.8 | 2876.4 | 2881.2 | 2898.6 | 2903.3  | 2919.2  | 2917.6  | 2906.5 | 2898.6 | 2887.5 | 2904.9 |
| 15°   | 2954.0 | 2955.6 | 2963.5 | 2980.9 | 2988.8  | 3007.8  | 3001.5  | 2984.1 | 2973.0 | 2960.3 | 2974.6 |
| 17.5° | 3036.3 | 3042.6 | 3050.6 | 3068.0 | 3079.1  | 3101.2  | 3093.3  | 3074.3 | 3064.8 | 3052.1 | 3061.6 |
| 20°   | 3142.4 | 3144.0 | 3148.7 | 3167.7 | 3175.6  | 3201.0  | 3202.5  | 3183.5 | 3178.8 | 3166.1 | 3180.4 |
| 22.5° | 3259.5 | 3261.1 | 3265.9 | 3286.4 | 3300.7  | 3316.5  | 3326.0  | 3314.9 | 3307.0 | 3291.2 | 3308.6 |
| 25°   | 3389.3 | 3405.2 | 3409.9 | 3435.2 | 3451.1  | 3460.6  | 3471.7  | 3466.9 | 3455.8 | 3436.8 | 3444.7 |
| 27.5° | 3571.4 | 3574.6 | 3582.5 | 3611.0 | 3620.5  | 3630.0  | 3641.0  | 3642.6 | 3626.8 | 3604.6 | 3615.7 |
| 30°   | 3778.8 | 3777.2 | 3794.6 | 3816.8 | 3824.7  | 3832.6  | 3848.4  | 3857.9 | 3837.3 | 3813.6 | 3824.7 |
| 32.5° | 3990.9 | 4009.9 | 4032.1 | 4052.6 | 4047.9  | 4051.1  | 4076.4  | 4093.8 | 4065.3 | 4022.6 | 4032.1 |
| 35°   | 4229.9 | 4242.6 | 4271.1 | 4301.2 | 4294.9  | 4290.1  | 4305.9  | 4323.3 | 4283.8 | 4228.4 | 4242.6 |
| 37.5° | 4475.3 | 4494.3 | 4537.1 | 4573.5 | 4564.0  | 4541.8  | 4559.2  | 4578.2 | 4540.2 | 4476.9 | 4470.6 |
| 40°   | 4749.2 | 4779.3 | 4841.0 | 4871.1 | 4845.8  | 4803.0  | 4833.1  | 4879.0 | 4841.0 | 4768.2 | 4750.8 |
| 42.5° | 5070.6 | 5107.0 | 5168.7 | 5214.6 | 5159.2  | 5089.6  | 5140.2  | 5206.7 | 5197.2 | 5100.6 | 5070.6 |
| 45°   | 5467.9 | 5491.6 | 5567.6 | 5589.8 | 5507.5  | 5410.9  | 5502.7  | 5604.0 | 5580.3 | 5475.8 | 5436.2 |
| 47.5° | 5900.1 | 5936.5 | 6003.0 | 6044.1 | 5911.2  | 5790.8  | 5919.1  | 6055.2 | 6029.9 | 5931.7 | 5885.8 |
| 50°   | 6451.0 | 6498.5 | 6585.5 | 6620.4 | 6436.7  | 6299.0  | 6463.6  | 6636.2 | 6587.1 | 6455.7 | 6395.6 |
| 52.5° | 7051.0 | 7089.0 | 7237.8 | 7307.4 | 7134.9  | 6986.1  | 7130.1  | 7299.5 | 7195.0 | 7020.9 | 6940.2 |
| 55°   | 7579.7 | 7617.7 | 7836.2 | 8067.3 | 8059.4  | 7956.5  | 8029.3  | 8032.5 | 7749.1 | 7461.0 | 7375.5 |
| 57.5° | 7693.7 | 7731.7 | 8148.0 | 8752.8 | 9180.2  | 9298.9  | 9085.2  | 8635.6 | 7921.7 | 7416.7 | 7320.1 |
| 60°   | 7085.8 | 7128.5 | 7790.3 | 8895.2 | 10301.0 | 11094.1 | 10109.4 | 8622.9 | 7388.2 | 6704.3 | 6612.5 |
| 62.5° | 5490.1 | 5536.0 | 6425.7 | 8084.7 | 10753.8 | 12890.9 | 10407.1 | 7715.9 | 6077.4 | 5211.4 | 5130.7 |
| 65°   | 2621.6 | 2621.6 | 3751.9 | 5798.8 | 9851.4  | 12848.1 | 9545.9  | 5708.5 | 3658.5 | 2809.9 | 2740.3 |
| 67.5° | 649.1  | 652.2  | 965.7  | 2257.4 | 6701.1  | 10253.5 | 6810.3  | 2740.3 | 1288.6 | 911.8  | 888.1  |
| 70°   | 405.3  | 403.7  | 448.0  | 611.1  | 2344.5  | 6223.0  | 2784.6  | 826.4  | 524.0  | 462.3  | 459.1  |
| 72.5° | 315.0  | 315.0  | 337.2  | 391.0  | 614.2   | 2119.7  | 812.1   | 459.1  | 379.9  | 341.9  | 341.9  |
| 75°   | 248.5  | 248.5  | 264.4  | 292.9  | 362.5   | 546.2   | 432.2   | 340.4  | 294.4  | 269.1  | 266.0  |
| 77.5° | 185.2  | 188.4  | 201.0  | 220.0  | 247.0   | 307.1   | 273.9   | 256.5  | 229.5  | 210.5  | 204.2  |
| 80°   | 120.3  | 125.1  | 140.9  | 152.0  | 161.5   | 202.6   | 178.9   | 186.8  | 174.1  | 152.0  | 148.8  |
| 82.5° | 64.9   | 66.5   | 85.5   | 88.7   | 91.8    | 110.8   | 114.0   | 118.7  | 123.5  | 96.6   | 90.2   |
| 85°   | 23.7   | 23.7   | 28.5   | 33.2   | 36.4    | 39.6    | 53.8    | 66.5   | 69.7   | 55.4   | 53.8   |
| 87.5° | 4.7    | 4.7    | 4.7    | 3.2    | 3.2     | 3.2     | 9.5     | 17.4   | 28.5   | 22.2   | 22.2   |
| 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**

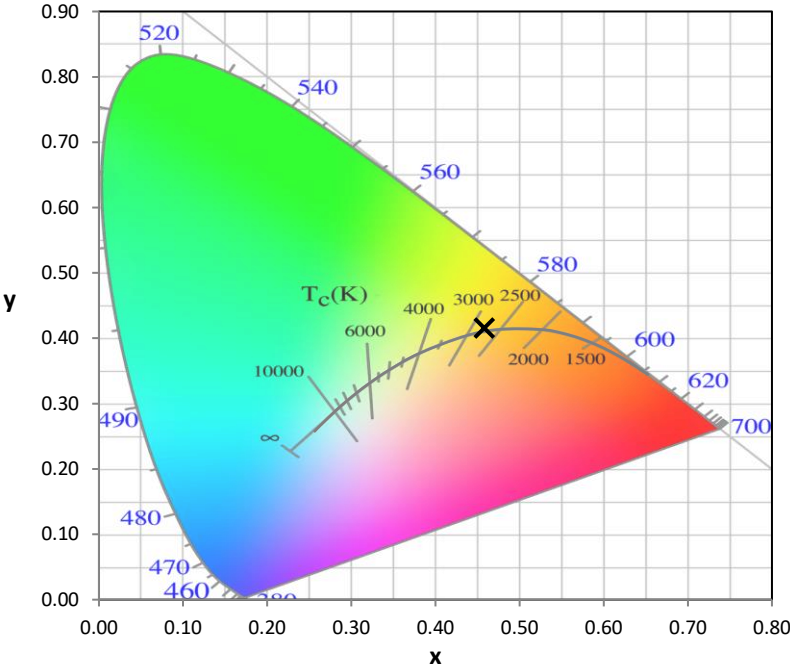
Stabilization Time: 81M  
 Operation Time: 2H 21M  
 Sphere Temperature (°C): 25.2

REPORT NUMBER: SP1-2407-157-9

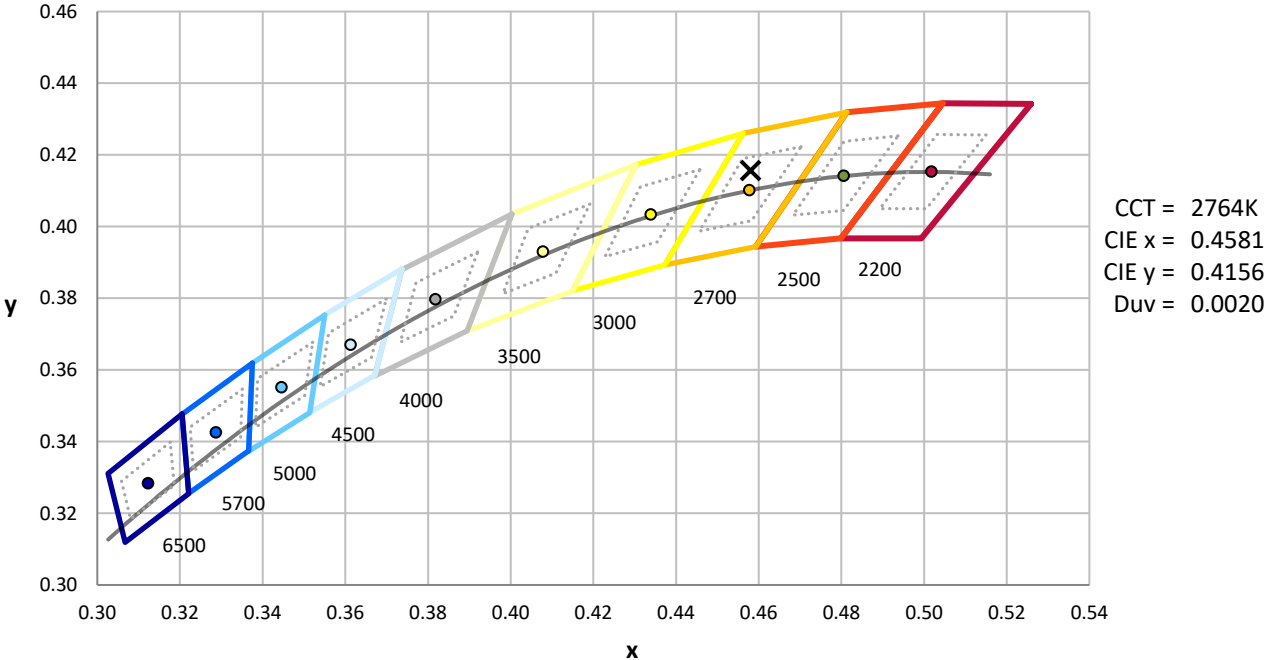
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| 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           |

REPORT NUMBER: SP1-2407-157-9

CIE 1931 Chromaticity Diagram



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

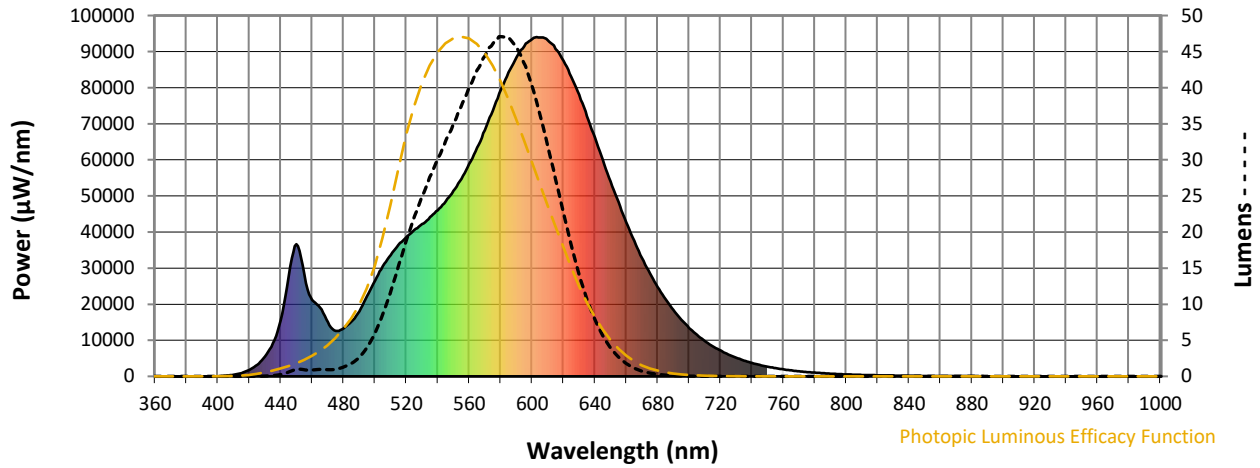


CCT = 2764K  
 CIE x = 0.4581  
 CIE y = 0.4156  
 Duv = 0.0020

Point lies inside the ANSI 2700K 4-step quadrangle

REPORT NUMBER: SP1-2407-157-9

**Photopic Flux vs. Wavelength**

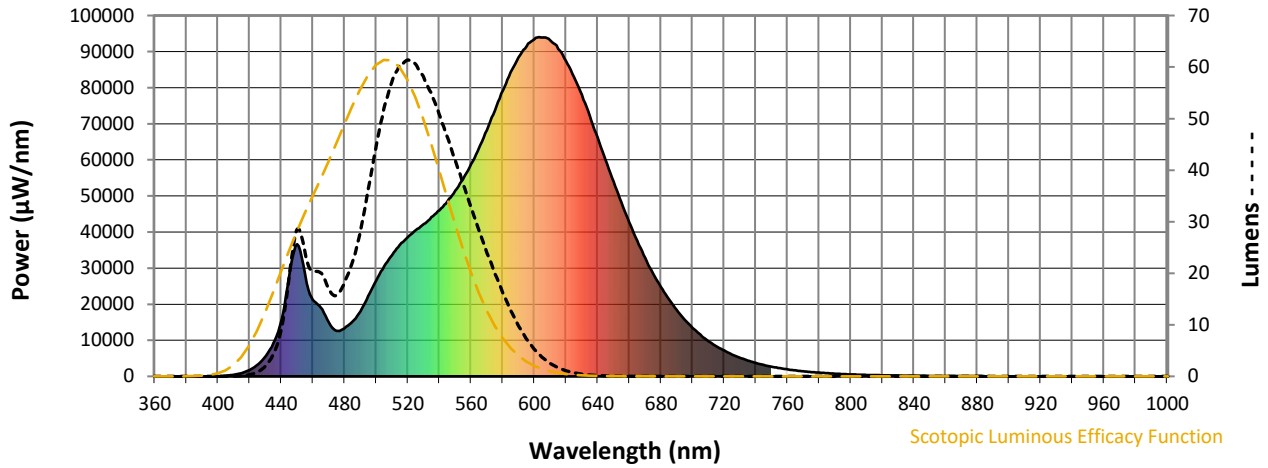


**Photopic Lumens: 4337.9**

| 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**



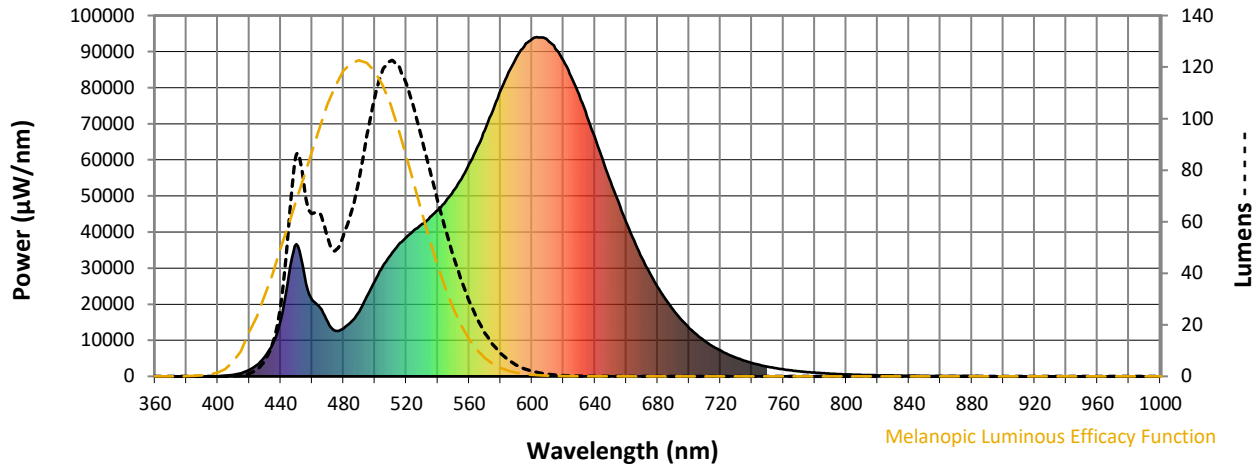
**Scotopic Lumens: 5286.7**

**S/P: 1.22**

| 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**



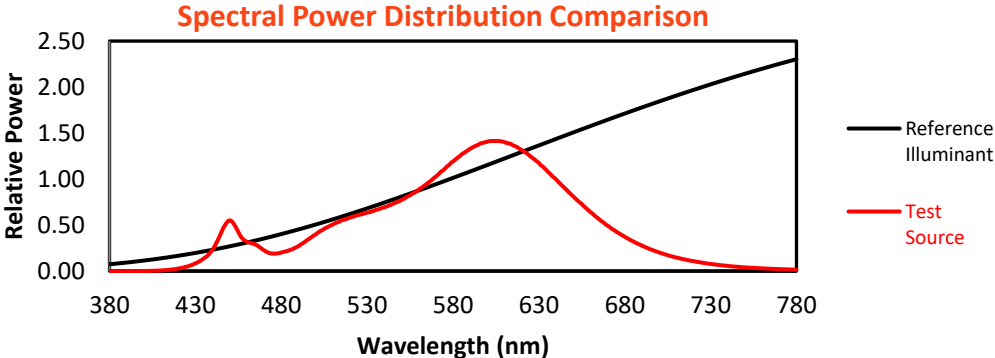
**Melanopic Lumens: 9797**

**M/P: 2.26**

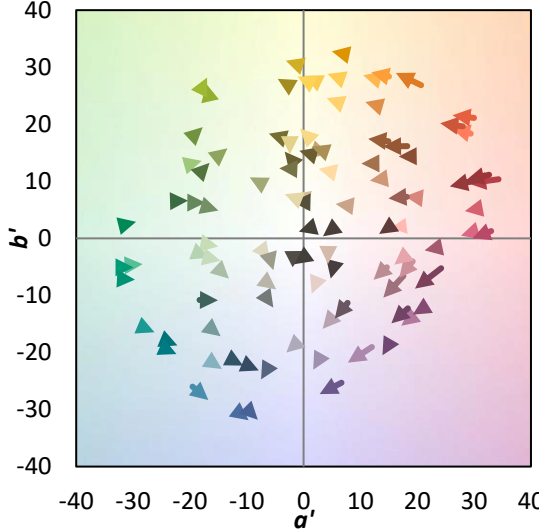
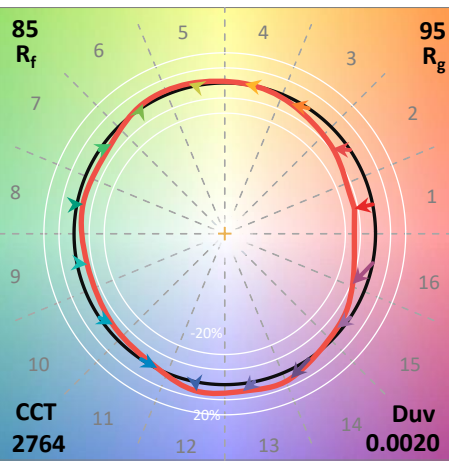
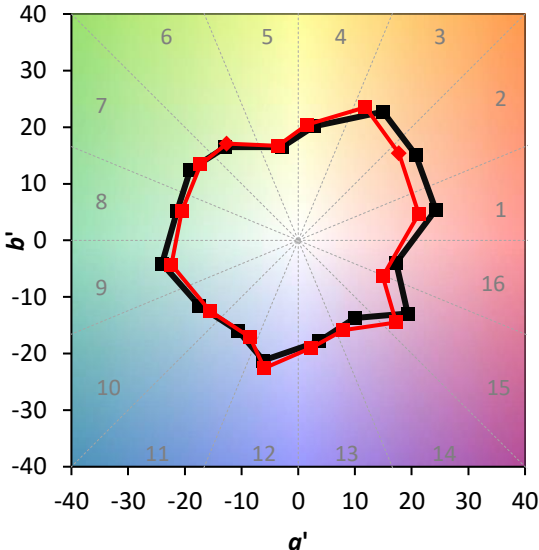
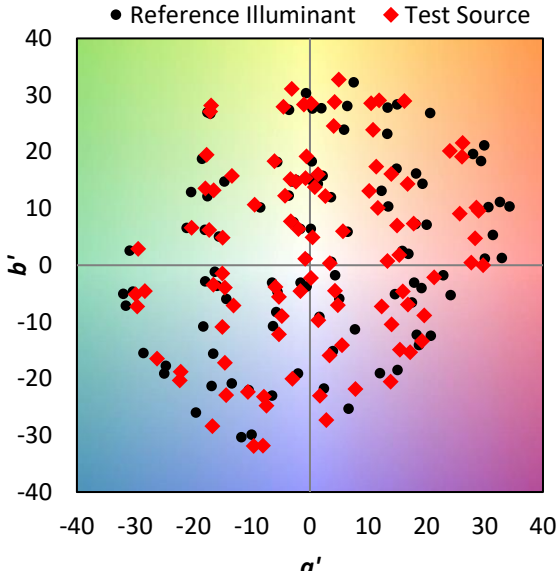
| λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) |
|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|
| 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  $R_a = 80.9$   
 $R_9 = -1.5$

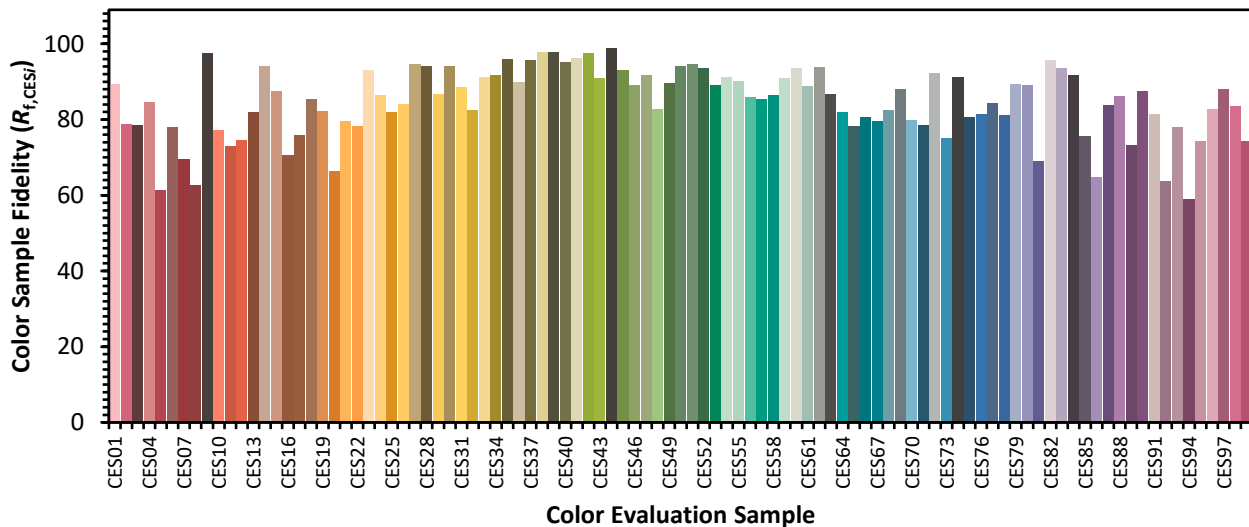


**Color Vector Graphics**



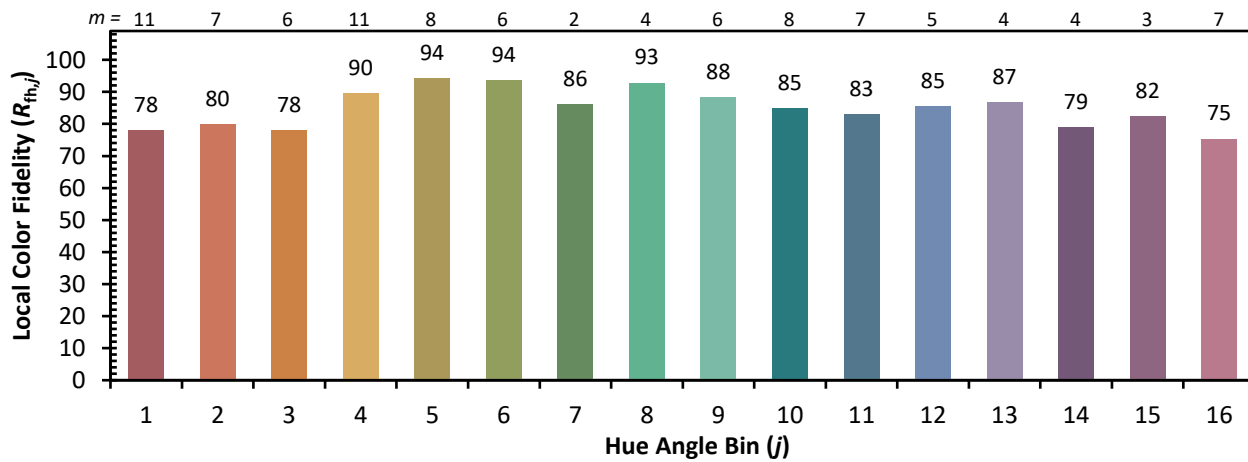
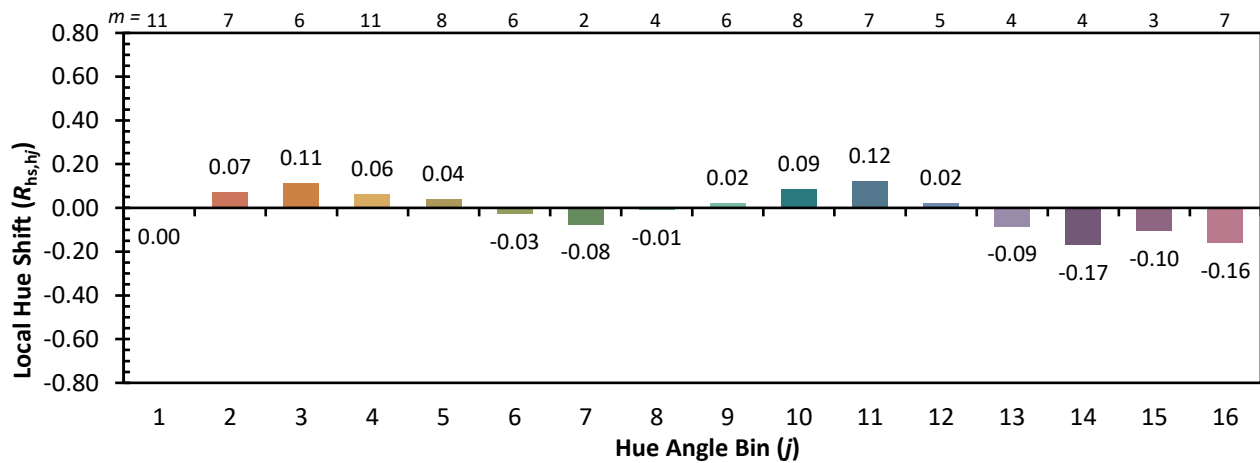
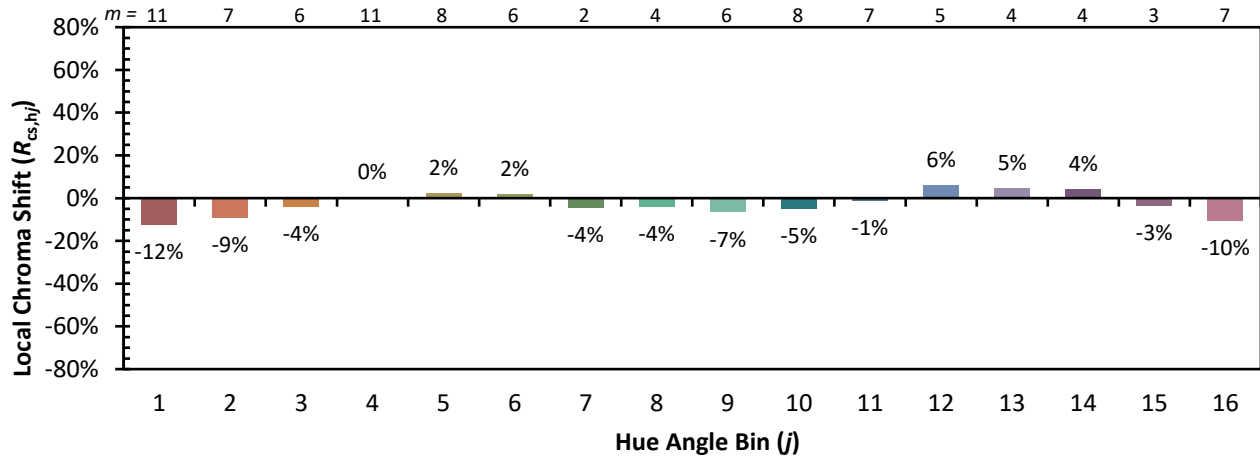
**Individual Sample Fidelity Index ( $R_{f,i}$ )**

|            |            |            |            |
|------------|------------|------------|------------|
| 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 |            |

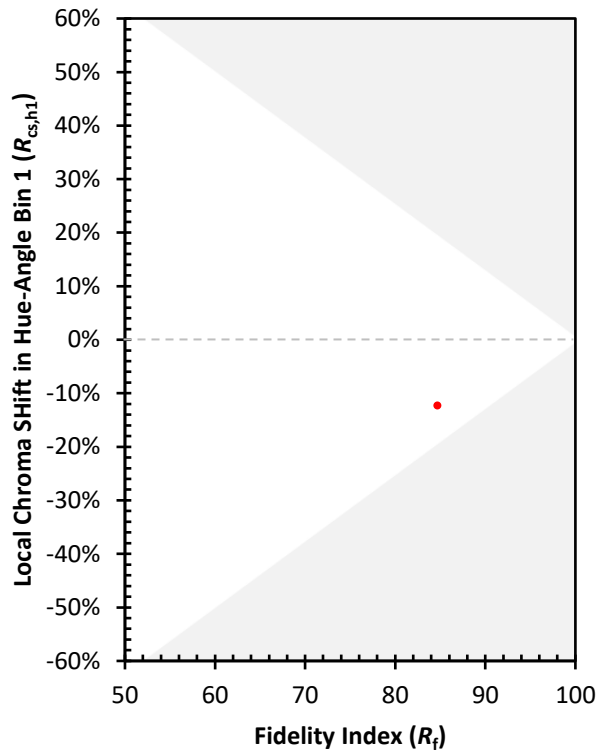
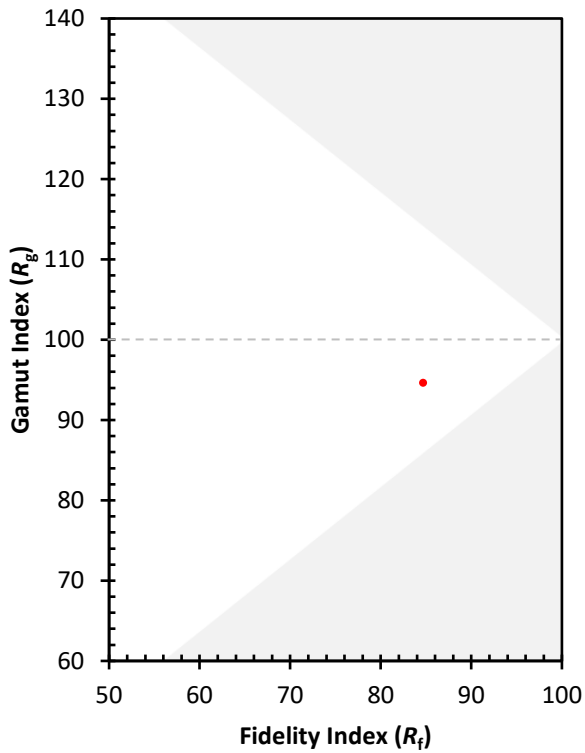




Color Rendition by Hue-Angle Bin



Measure Comparisons



(END OF REPORT)