

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



Scaled data based on original data using  
LM-79-08 Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Test Report Prepared for  
Cooper Lighting Solutions  
(formerly Eaton)

Brand: INVUE

Report Number: P869250

Luminaire Tested: **EMM2-HSN-SA2A-AMB-U-T5W**

Issue Date: 08/22/2024



**Test Information**

Test Method: LM-79-08  
Report Number: P869250  
Test Lab: INNOVATION CENTER(G3)  
Issue Date: 08/22/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: INVUE  
Catalog Number: EMM2-HSN-SA2A-AMB-U-T5W  
Description: EPIC MODERN SHORT HOUSING DISCRETE LED ARRAYS 30W OCRI 1540K  
FITXURE w/ TYPE V SQUARE WIDE DISTRIBUTION OPTIC  
Light Source: (20) 1540K CCT, 0 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

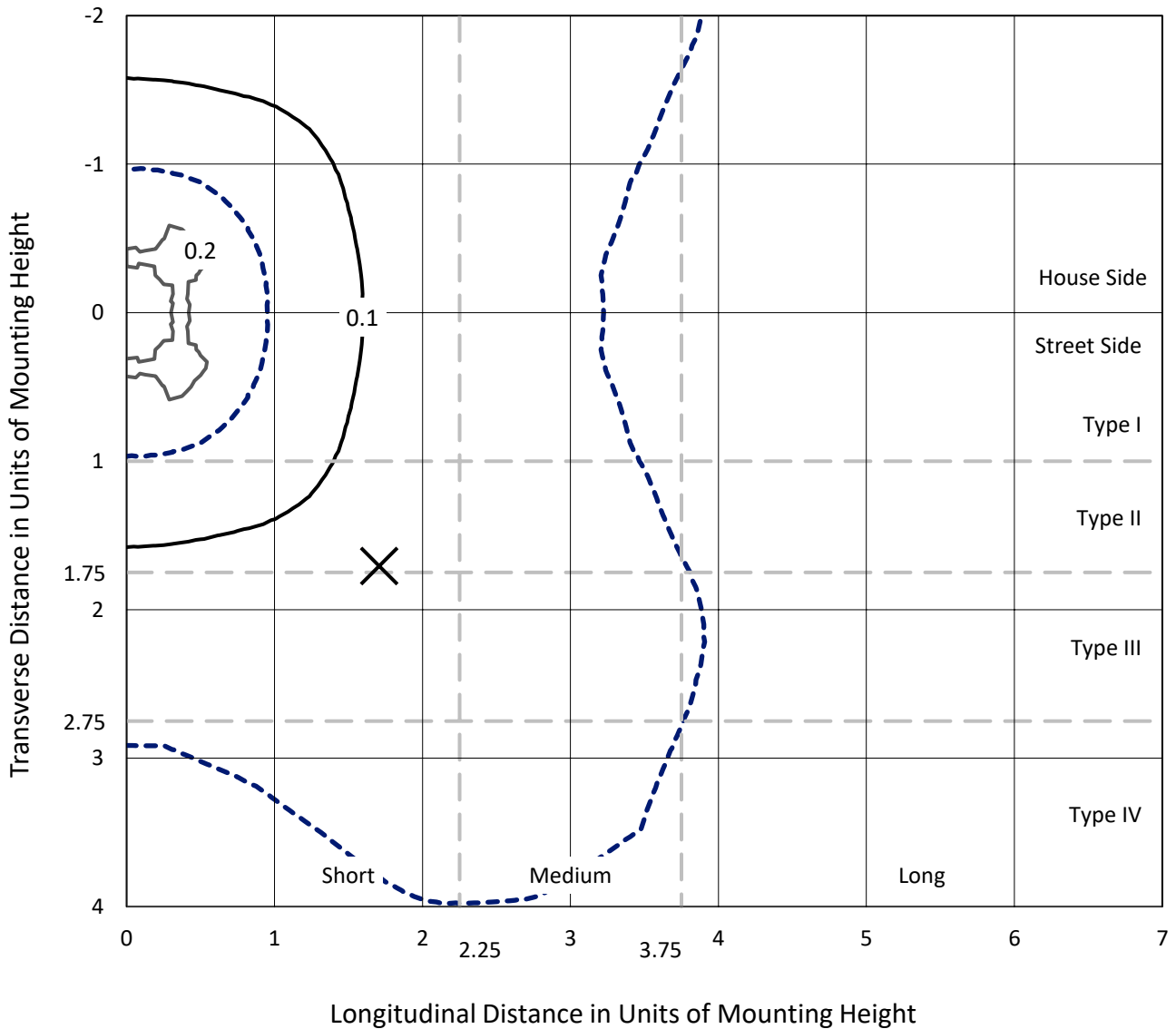
Lumens per Lamp: N/A  
Luminaire Lumens: 1113.4 lumens  
Efficiency: N/A  
Efficacy: 37.1 lumens/watt  
Luminous Opening: Rectangular (W 0.67' x L: 0.33' x H: 0')  
IES Classification: Type V - Short  
BUG Rating: B1 - U0 - G1

Input Watts (W): 30  
Input Voltage (V): 120  
Input Current (A<sub>in</sub>): NR  
Voltage Rise (V): NR  
Power Factor: 0.98  
Total Harmonic Distortion (THDi): 9.04%  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT

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 CATALOG NUMBER: EMM2-HSN-SA2A-AMB-U-T5W

### Iso-Footcandle Lines of Horizontal Illumination

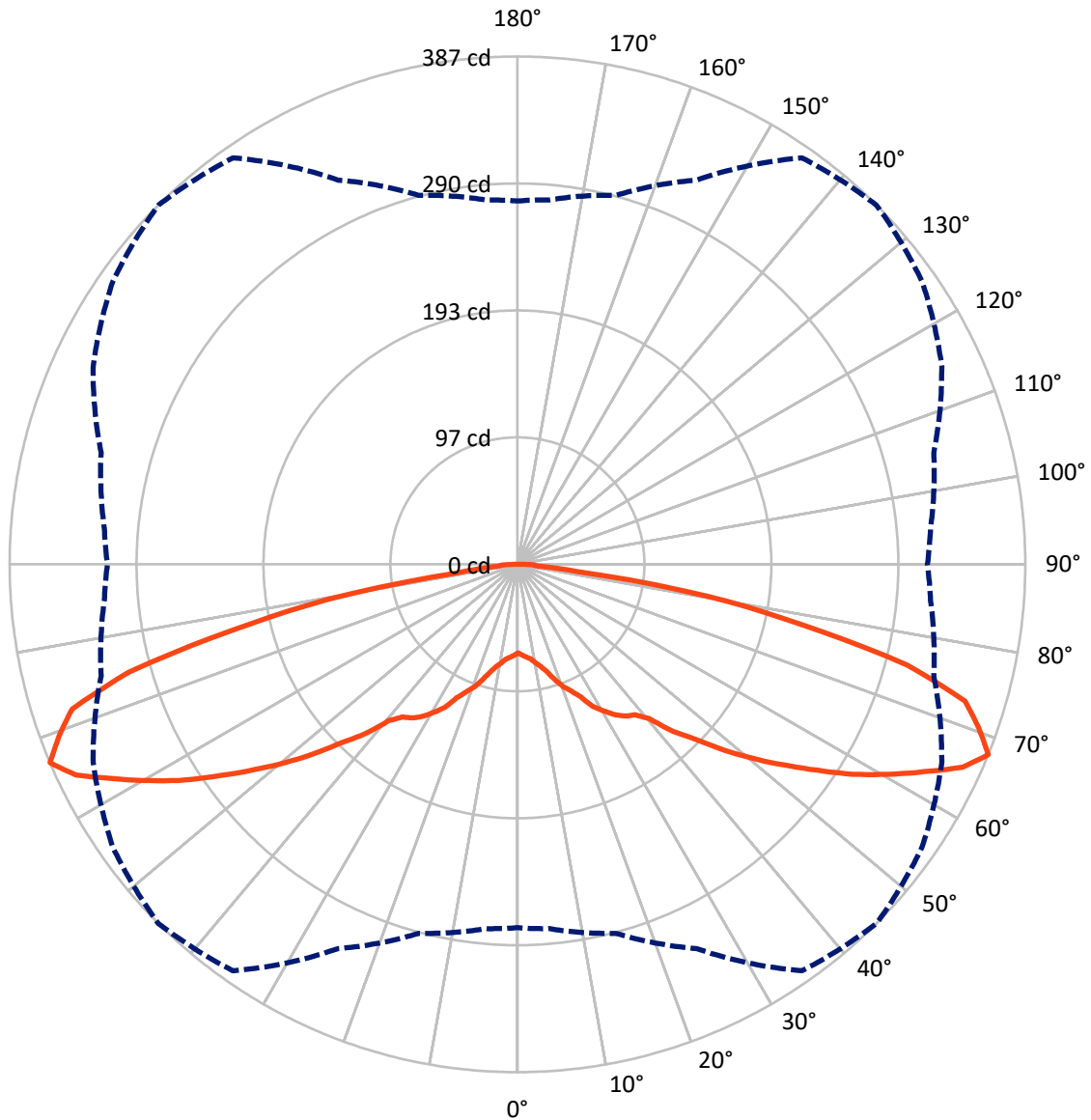
× Max cd  
 - - - 1/2 Max cd



Based on 20 foot mounting height. Maximum calculated value = 0.2 fc  
 Type V - Short - N/A

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### Luminous Intensity Polar Plot



— Vertical Plane Through 45-Deg Lateral    - - - Horizontal Cone Through 67.5-Deg Vertical

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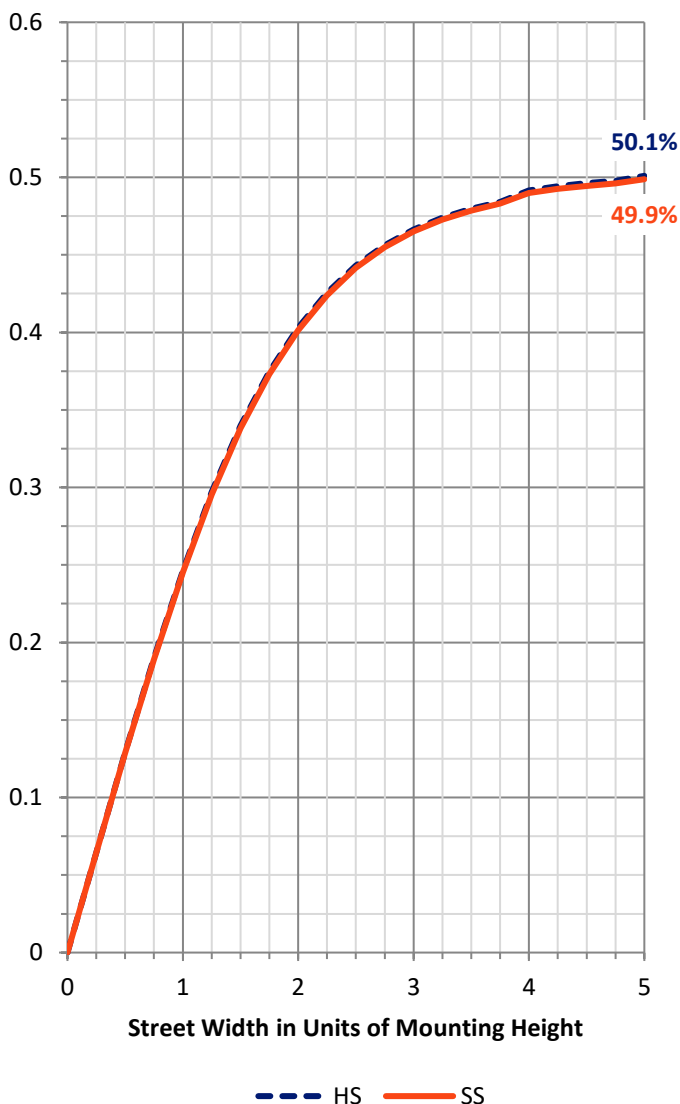
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 556.7    | 0.0    | 556.7  |
|                    | % Fixture | 50.0     | 0.0    | 50.0   |
| <b>Street Side</b> | Lumens    | 556.7    | 0.0    | 556.7  |
|                    | % Fixture | 50.0     | 0.0    | 50.0   |
| <b>Total</b>       | Lumens    | 1113.4   | 0.0    | 1113.4 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 6.8    | 0.6       |
| 10°-20°   | 24.9   | 2.2       |
| 20°-30°   | 50.5   | 4.5       |
| 30°-40°   | 88.8   | 8.0       |
| 40°-50°   | 152.3  | 13.7      |
| 50°-60°   | 237.0  | 21.3      |
| 60°-70°   | 317.0  | 28.5      |
| 70°-80°   | 215.1  | 19.3      |
| 80°-90°   | 21.0   | 1.9       |
| 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°    | 1113.4 | 100.0     |
| 0°-180°   | 1113.4 | 100.0     |

**Coefficient of Utilization**



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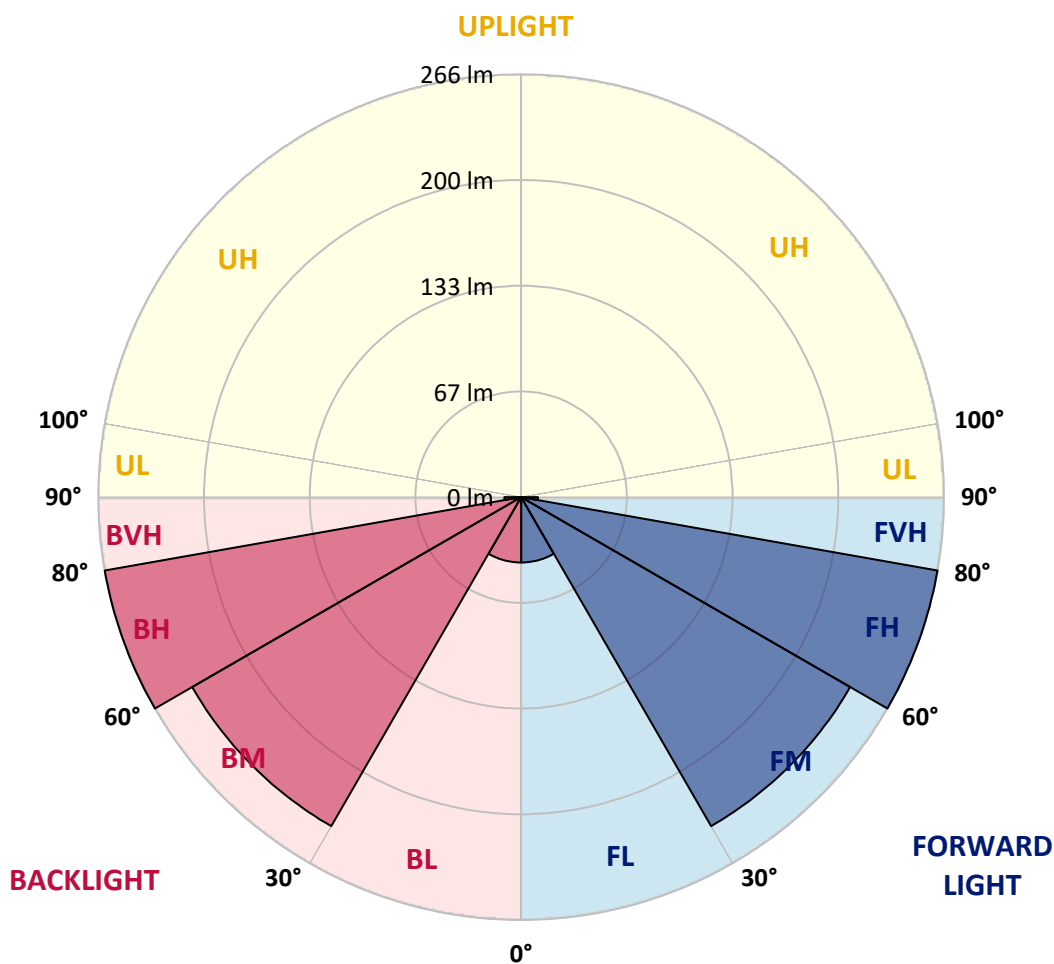
CATALOG NUMBER: EMM2-HSN-SA2A-AMB-U-T5W

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

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |      |        |
|----------------|--------|-----------|-------------------------|------|--------|
|                |        |           | B                       | U    | G      |
| FL (0°-30°)    | 41.1   | 3.7       |                         |      |        |
| FM (30°-60°)   | 239.0  | 21.5      |                         |      |        |
| FH (60°-80°)   | 266.0  | 23.9      |                         |      | G0/660 |
| FVH (80°-90°)  | 10.5   | 0.9       |                         |      | G1/100 |
| BL (0°-30°)    | 41.1   | 3.7       | B0/110                  |      |        |
| BM (30°-60°)   | 239.0  | 21.5      | B1/1000                 |      |        |
| BH (60°-80°)   | 266.0  | 23.9      | B1/500                  |      | G0/660 |
| BVH (80°-90°)  | 10.5   | 0.9       |                         |      | G1/100 |
| UL (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |        |
| UH (100°-180°) | 0.0    | 0.0       |                         | U0/0 |        |

**BUG Rating: B1-U0-G1**

Type V Short





REPORT NUMBER: P869250

CATALOG NUMBER: EMM2-HSN-SA2A-AMB-U-T5W

**CANDELA DISTRIBUTION (FULL):**

|        | 0°    | 5°    | 15°   | 25°   | 35°   | 45°   | 55°   | 65°   | 75°   | 85°   | 90°   |
|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°     | 67.4  | 67.4  | 67.4  | 67.4  | 67.4  | 67.4  | 67.4  | 67.4  | 67.4  | 67.4  | 67.4  |
| 2.5°   | 69.2  | 69.2  | 69.2  | 69.2  | 69.2  | 69.2  | 69.2  | 69.2  | 69.2  | 69.2  | 69.2  |
| 5°     | 69.2  | 69.2  | 69.2  | 70.9  | 70.9  | 70.9  | 70.9  | 70.9  | 70.9  | 70.9  | 70.9  |
| 7.5°   | 70.9  | 70.9  | 70.9  | 70.9  | 72.7  | 72.7  | 72.7  | 70.9  | 70.9  | 70.9  | 70.9  |
| 10°    | 72.7  | 74.5  | 74.5  | 74.5  | 76.3  | 76.3  | 74.5  | 74.5  | 72.7  | 72.7  | 72.7  |
| 12.5°  | 79.8  | 79.8  | 79.8  | 79.8  | 79.8  | 79.8  | 79.8  | 78.0  | 79.8  | 79.8  | 79.8  |
| 15°    | 86.9  | 86.9  | 86.9  | 85.1  | 85.1  | 85.1  | 85.1  | 85.1  | 86.9  | 88.7  | 88.7  |
| 17.5°  | 94.0  | 94.0  | 94.0  | 92.2  | 92.2  | 92.2  | 92.2  | 94.0  | 95.8  | 95.8  | 95.8  |
| 20°    | 101.1 | 101.1 | 99.3  | 99.3  | 99.3  | 99.3  | 97.5  | 99.3  | 101.1 | 101.1 | 101.1 |
| 22.5°  | 102.9 | 102.9 | 102.9 | 102.9 | 102.9 | 104.6 | 102.9 | 102.9 | 102.9 | 102.9 | 102.9 |
| 25°    | 104.6 | 104.6 | 106.4 | 108.2 | 111.7 | 111.7 | 111.7 | 106.4 | 104.6 | 104.6 | 104.6 |
| 27.5°  | 106.4 | 106.4 | 109.9 | 115.3 | 120.6 | 122.4 | 117.0 | 113.5 | 108.2 | 104.6 | 102.9 |
| 30°    | 118.8 | 117.0 | 115.3 | 120.6 | 129.5 | 129.5 | 127.7 | 120.6 | 113.5 | 109.9 | 111.7 |
| 32.5°  | 124.1 | 125.9 | 127.7 | 131.2 | 136.5 | 136.5 | 134.8 | 129.5 | 127.7 | 122.4 | 122.4 |
| 35°    | 136.5 | 136.5 | 141.9 | 145.4 | 143.6 | 141.9 | 141.9 | 140.1 | 138.3 | 138.3 | 138.3 |
| 37.5°  | 152.5 | 152.5 | 150.7 | 150.7 | 150.7 | 145.4 | 147.2 | 150.7 | 150.7 | 149.0 | 145.4 |
| 40°    | 164.9 | 166.7 | 166.7 | 163.1 | 159.6 | 154.3 | 157.8 | 163.1 | 164.9 | 163.1 | 163.1 |
| 42.5°  | 180.9 | 180.9 | 180.9 | 177.3 | 172.0 | 173.8 | 173.8 | 175.6 | 180.9 | 182.7 | 182.7 |
| 45°    | 198.6 | 196.8 | 193.3 | 189.7 | 189.7 | 189.7 | 193.3 | 195.1 | 198.6 | 202.2 | 203.9 |
| 47.5°  | 216.3 | 214.6 | 211.0 | 207.5 | 209.3 | 211.0 | 211.0 | 216.3 | 219.9 | 221.7 | 223.4 |
| 50°    | 230.5 | 230.5 | 225.2 | 227.0 | 230.5 | 232.3 | 235.9 | 235.9 | 237.6 | 239.4 | 237.6 |
| 52.5°  | 235.9 | 237.6 | 244.7 | 244.7 | 251.8 | 253.6 | 255.4 | 253.6 | 250.0 | 246.5 | 244.7 |
| 55°    | 255.4 | 251.8 | 255.4 | 264.2 | 271.3 | 276.6 | 276.6 | 269.5 | 260.7 | 253.6 | 251.8 |
| 57.5°  | 260.7 | 260.7 | 266.0 | 274.9 | 292.6 | 301.5 | 296.1 | 280.2 | 269.5 | 266.0 | 262.5 |
| 60°    | 264.2 | 264.2 | 271.3 | 290.8 | 313.9 | 324.5 | 315.7 | 296.1 | 280.2 | 278.4 | 280.2 |
| 62.5°  | 276.6 | 276.6 | 282.0 | 301.5 | 336.9 | 347.6 | 336.9 | 315.7 | 301.5 | 297.9 | 296.1 |
| 65°    | 269.5 | 269.5 | 285.5 | 321.0 | 360.0 | 372.4 | 363.5 | 336.9 | 319.2 | 313.9 | 312.1 |
| 67.5°  | 276.6 | 278.4 | 290.8 | 322.7 | 377.7 | 386.6 | 375.9 | 356.4 | 328.1 | 315.7 | 312.1 |
| 70°    | 218.1 | 219.9 | 260.7 | 310.3 | 360.0 | 372.4 | 367.1 | 340.5 | 299.7 | 276.6 | 269.5 |
| 72.5°  | 156.1 | 157.8 | 203.9 | 280.2 | 328.1 | 356.4 | 338.7 | 276.6 | 218.1 | 193.3 | 195.1 |
| 75°    | 97.5  | 104.6 | 149.0 | 227.0 | 301.5 | 306.8 | 276.6 | 221.7 | 179.1 | 161.4 | 157.8 |
| 77.5°  | 42.6  | 42.6  | 102.9 | 179.1 | 221.7 | 221.7 | 207.5 | 177.3 | 115.3 | 97.5  | 101.1 |
| 80°    | 21.3  | 21.3  | 31.9  | 81.6  | 124.1 | 147.2 | 92.2  | 49.7  | 33.7  | 24.8  | 23.1  |
| 82.5°  | 14.2  | 14.2  | 16.0  | 23.1  | 31.9  | 46.1  | 26.6  | 16.0  | 16.0  | 12.4  | 12.4  |
| 85°    | 10.6  | 10.6  | 12.4  | 16.0  | 16.0  | 14.2  | 14.2  | 12.4  | 12.4  | 8.9   | 7.1   |
| 87.5°  | 3.5   | 5.3   | 5.3   | 8.9   | 16.0  | 12.4  | 10.6  | 7.1   | 5.3   | 3.5   | 3.5   |
| 90°    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 92.5°  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 95°    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 97.5°  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 100°   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 102.5° | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 105°   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 107.5° | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 110°   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |



REPORT NUMBER: P869250  
 CATALOG NUMBER: EMM2-HSN-SA2A-AMB-U-T5W

**CANDELA DISTRIBUTION (continued):**

|        | 0°  | 5°  | 15° | 25° | 35° | 45° | 55° | 65° | 75° | 85° | 90° |
|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 112.5° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 115°   | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 117.5° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 120°   | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 122.5° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 125°   | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 127.5° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 130°   | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 132.5° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 135°   | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 137.5° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 140°   | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 142.5° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 145°   | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 147.5° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 150°   | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 152.5° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 155°   | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 157.5° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 160°   | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 162.5° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 165°   | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 167.5° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 170°   | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 172.5° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 175°   | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 177.5° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 180°   | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |



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

Report Prepared for

Cooper Lighting Solutions

Streetworks

Report Number: SP1-2407-157-1

Test Date: 08/06/2024

Luminaire Tested: MEM2-HTN-SA-45-AMB-U-5WQ-2

Data in this report applies to families of products including MEM2-HTN-SA-45-AMB-U-5WQ-2

**Test Information**

Test Method: LM-79-2019  
 Report Number: SP1-2407-157-1  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 08/20/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: Streetworks  
 Catalog Number: **MEM2-HTN-SA-45-AMB-U-5WQ-2**  
 Description: Epic Modern Light Square 45W 5WQ Optic and Flare Trim AMBER LED

**Spectral Parameters**

CCT (K): 1538  
 CIE u': 0.3530  
 CIE v': 0.5469  
 Duv: 0.0116  
 CIE x: 0.5918  
 CIE y: 0.4076  
 CIE z: 0.0006  
 Peak Wavelength (nm): 597  
 Dominant Wavelength (nm): 592  
 Purity: 99.98881  
 R<sub>f</sub>: 1.1  
 R<sub>g</sub>: 0

|           |        |      |        |
|-----------|--------|------|--------|
| CRI (Ra): | -21.8  |      |        |
| R1:       | -34.3  | R9:  | -386.6 |
| R2:       | 52.3   | R10: | 28.9   |
| R3:       | 17.0   | R11: | -95.5  |
| R4:       | -68.4  | R12: | -10.5  |
| R5:       | -40.8  | R13: | -15.5  |
| R6:       | 41.5   | R14: | 45.9   |
| R7:       | -7.2   | R15: | -67.7  |
| R8:       | -134.5 |      |        |



**Test Conditions**

Stabilization Time: 20M  
 Operation Time: 1H 20M  
 Sphere Temperature (°C): 24.2

REPORT NUMBER: SP1-2407-157-1

| 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: SP1-2407-157-1

CIE 1931 Chromaticity Diagram



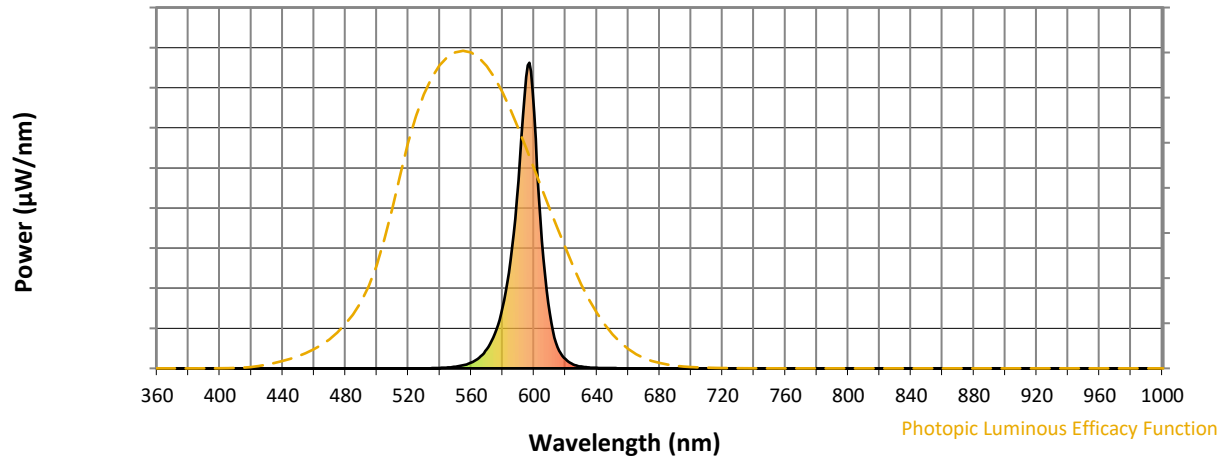
CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles



Point lies outside the range

REPORT NUMBER: SP1-2407-157-1

**Photopic Flux vs. Wavelength**

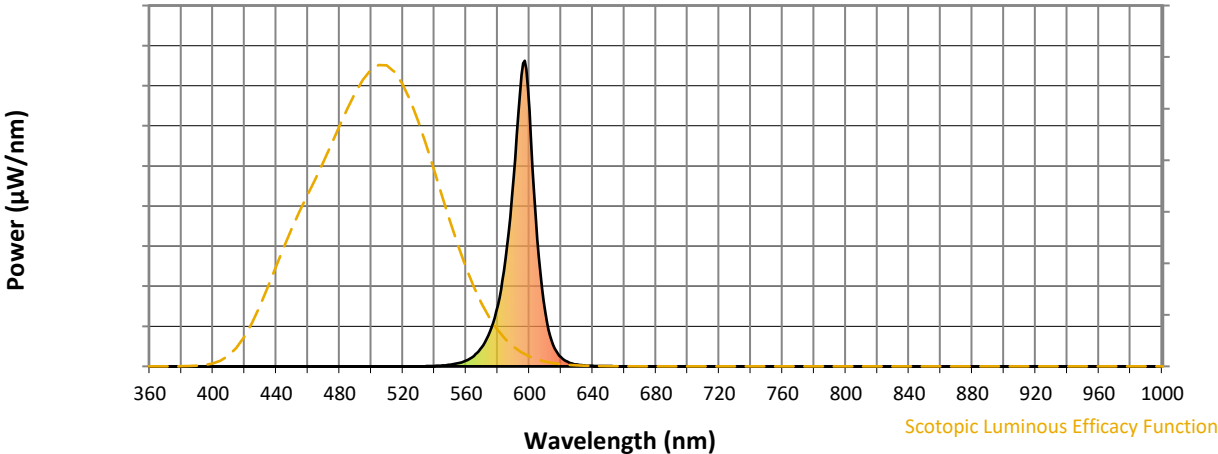


**Photopic Lumens: NR**

| λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360    | 0                        | NR            | 490    | 0                        | NR            | 620    | 30                       | NR            | 750    | 0                        | NR            | 880    | 0                        | NR            |
| 365    | 0                        | NR            | 495    | 0                        | NR            | 625    | 13                       | NR            | 755    | 0                        | NR            | 885    | 0                        | NR            |
| 370    | 0                        | NR            | 500    | 0                        | NR            | 630    | 6                        | NR            | 760    | 0                        | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 0                        | NR            | 635    | 3                        | NR            | 765    | 0                        | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 0                        | NR            | 640    | 2                        | NR            | 770    | 0                        | NR            | 900    | 0                        | NR            |
| 385    | 0                        | NR            | 515    | 0                        | NR            | 645    | 1                        | NR            | 775    | 0                        | NR            | 905    | 0                        | NR            |
| 390    | 0                        | NR            | 520    | 0                        | NR            | 650    | 1                        | NR            | 780    | 0                        | NR            | 910    | 0                        | NR            |
| 395    | 0                        | NR            | 525    | 0                        | NR            | 655    | 0                        | NR            | 785    | 0                        | NR            | 915    | 0                        | NR            |
| 400    | 0                        | NR            | 530    | 0                        | NR            | 660    | 0                        | NR            | 790    | 0                        | NR            | 920    | 0                        | NR            |
| 405    | 0                        | NR            | 535    | 1                        | NR            | 665    | 0                        | NR            | 795    | 0                        | NR            | 925    | 0                        | NR            |
| 410    | 0                        | NR            | 540    | 1                        | NR            | 670    | 0                        | NR            | 800    | 0                        | NR            | 930    | 0                        | NR            |
| 415    | 0                        | NR            | 545    | 3                        | NR            | 675    | 0                        | NR            | 805    | 0                        | NR            | 935    | 0                        | NR            |
| 420    | 0                        | NR            | 550    | 5                        | NR            | 680    | 0                        | NR            | 810    | 0                        | NR            | 940    | 0                        | NR            |
| 425    | 0                        | NR            | 555    | 10                       | NR            | 685    | 0                        | NR            | 815    | 0                        | NR            | 945    | 0                        | NR            |
| 430    | 0                        | NR            | 560    | 19                       | NR            | 690    | 0                        | NR            | 820    | 0                        | NR            | 950    | 0                        | NR            |
| 435    | 0                        | NR            | 565    | 34                       | NR            | 695    | 0                        | NR            | 825    | 0                        | NR            | 955    | 0                        | NR            |
| 440    | 0                        | NR            | 570    | 63                       | NR            | 700    | 0                        | NR            | 830    | 0                        | NR            | 960    | 0                        | NR            |
| 445    | 0                        | NR            | 575    | 113                      | NR            | 705    | 0                        | NR            | 835    | 0                        | NR            | 965    | 0                        | NR            |
| 450    | 0                        | NR            | 580    | 199                      | NR            | 710    | 0                        | NR            | 840    | 0                        | NR            | 970    | 0                        | NR            |
| 455    | 0                        | NR            | 585    | 352                      | NR            | 715    | 0                        | NR            | 845    | 0                        | NR            | 975    | 0                        | NR            |
| 460    | 0                        | NR            | 590    | 614                      | NR            | 720    | 0                        | NR            | 850    | 0                        | NR            | 980    | 0                        | NR            |
| 465    | 0                        | NR            | 595    | 954                      | NR            | 725    | 0                        | NR            | 855    | 0                        | NR            | 985    | 0                        | NR            |
| 470    | 0                        | NR            | 600    | 837                      | NR            | 730    | 0                        | NR            | 860    | 0                        | NR            | 990    | 0                        | NR            |
| 475    | 0                        | NR            | 605    | 417                      | NR            | 735    | 0                        | NR            | 865    | 0                        | NR            | 995    | 0                        | NR            |
| 480    | 0                        | NR            | 610    | 179                      | NR            | 740    | 0                        | NR            | 870    | 0                        | NR            | 1000   | 0                        | NR            |
| 485    | 0                        | NR            | 615    | 69                       | NR            | 745    | 0                        | NR            | 875    | 0                        | NR            |        |                          |               |

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**Scotopic Flux vs. Wavelength**



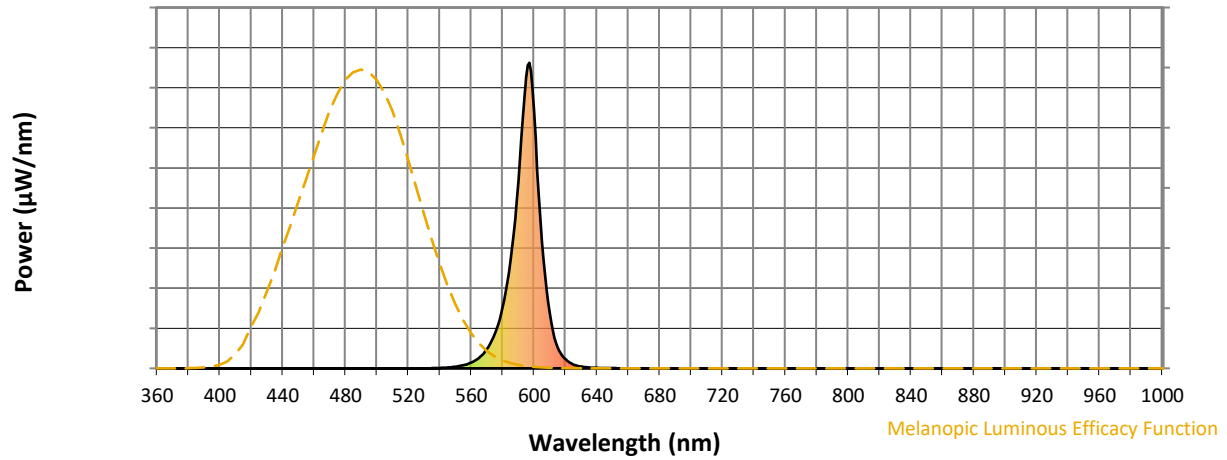
**Scotopic Lumens: NR**

**S/P: 0.22**

| λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360    | 0                        | NR            | 490    | 0                        | NR            | 620    | 30                       | NR            | 750    | 0                        | NR            | 880    | 0                        | NR            |
| 365    | 0                        | NR            | 495    | 0                        | NR            | 625    | 13                       | NR            | 755    | 0                        | NR            | 885    | 0                        | NR            |
| 370    | 0                        | NR            | 500    | 0                        | NR            | 630    | 6                        | NR            | 760    | 0                        | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 0                        | NR            | 635    | 3                        | NR            | 765    | 0                        | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 0                        | NR            | 640    | 2                        | NR            | 770    | 0                        | NR            | 900    | 0                        | NR            |
| 385    | 0                        | NR            | 515    | 0                        | NR            | 645    | 1                        | NR            | 775    | 0                        | NR            | 905    | 0                        | NR            |
| 390    | 0                        | NR            | 520    | 0                        | NR            | 650    | 1                        | NR            | 780    | 0                        | NR            | 910    | 0                        | NR            |
| 395    | 0                        | NR            | 525    | 0                        | NR            | 655    | 0                        | NR            | 785    | 0                        | NR            | 915    | 0                        | NR            |
| 400    | 0                        | NR            | 530    | 0                        | NR            | 660    | 0                        | NR            | 790    | 0                        | NR            | 920    | 0                        | NR            |
| 405    | 0                        | NR            | 535    | 1                        | NR            | 665    | 0                        | NR            | 795    | 0                        | NR            | 925    | 0                        | NR            |
| 410    | 0                        | NR            | 540    | 1                        | NR            | 670    | 0                        | NR            | 800    | 0                        | NR            | 930    | 0                        | NR            |
| 415    | 0                        | NR            | 545    | 3                        | NR            | 675    | 0                        | NR            | 805    | 0                        | NR            | 935    | 0                        | NR            |
| 420    | 0                        | NR            | 550    | 5                        | NR            | 680    | 0                        | NR            | 810    | 0                        | NR            | 940    | 0                        | NR            |
| 425    | 0                        | NR            | 555    | 10                       | NR            | 685    | 0                        | NR            | 815    | 0                        | NR            | 945    | 0                        | NR            |
| 430    | 0                        | NR            | 560    | 19                       | NR            | 690    | 0                        | NR            | 820    | 0                        | NR            | 950    | 0                        | NR            |
| 435    | 0                        | NR            | 565    | 34                       | NR            | 695    | 0                        | NR            | 825    | 0                        | NR            | 955    | 0                        | NR            |
| 440    | 0                        | NR            | 570    | 63                       | NR            | 700    | 0                        | NR            | 830    | 0                        | NR            | 960    | 0                        | NR            |
| 445    | 0                        | NR            | 575    | 113                      | NR            | 705    | 0                        | NR            | 835    | 0                        | NR            | 965    | 0                        | NR            |
| 450    | 0                        | NR            | 580    | 199                      | NR            | 710    | 0                        | NR            | 840    | 0                        | NR            | 970    | 0                        | NR            |
| 455    | 0                        | NR            | 585    | 352                      | NR            | 715    | 0                        | NR            | 845    | 0                        | NR            | 975    | 0                        | NR            |
| 460    | 0                        | NR            | 590    | 614                      | NR            | 720    | 0                        | NR            | 850    | 0                        | NR            | 980    | 0                        | NR            |
| 465    | 0                        | NR            | 595    | 954                      | NR            | 725    | 0                        | NR            | 855    | 0                        | NR            | 985    | 0                        | NR            |
| 470    | 0                        | NR            | 600    | 837                      | NR            | 730    | 0                        | NR            | 860    | 0                        | NR            | 990    | 0                        | NR            |
| 475    | 0                        | NR            | 605    | 417                      | NR            | 735    | 0                        | NR            | 865    | 0                        | NR            | 995    | 0                        | NR            |
| 480    | 0                        | NR            | 610    | 179                      | NR            | 740    | 0                        | NR            | 870    | 0                        | NR            | 1000   | 0                        | NR            |
| 485    | 0                        | NR            | 615    | 69                       | NR            | 745    | 0                        | NR            | 875    | 0                        | NR            |        |                          |               |

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**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: NR**

**M/P: 0.12**

| λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360    | 0                        | NR            | 490    | 0                        | NR            | 620    | 30                       | NR            | 750    | 0                        | NR            | 880    | 0                        | NR            |
| 365    | 0                        | NR            | 495    | 0                        | NR            | 625    | 13                       | NR            | 755    | 0                        | NR            | 885    | 0                        | NR            |
| 370    | 0                        | NR            | 500    | 0                        | NR            | 630    | 6                        | NR            | 760    | 0                        | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 0                        | NR            | 635    | 3                        | NR            | 765    | 0                        | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 0                        | NR            | 640    | 2                        | NR            | 770    | 0                        | NR            | 900    | 0                        | NR            |
| 385    | 0                        | NR            | 515    | 0                        | NR            | 645    | 1                        | NR            | 775    | 0                        | NR            | 905    | 0                        | NR            |
| 390    | 0                        | NR            | 520    | 0                        | NR            | 650    | 1                        | NR            | 780    | 0                        | NR            | 910    | 0                        | NR            |
| 395    | 0                        | NR            | 525    | 0                        | NR            | 655    | 0                        | NR            | 785    | 0                        | NR            | 915    | 0                        | NR            |
| 400    | 0                        | NR            | 530    | 0                        | NR            | 660    | 0                        | NR            | 790    | 0                        | NR            | 920    | 0                        | NR            |
| 405    | 0                        | NR            | 535    | 1                        | NR            | 665    | 0                        | NR            | 795    | 0                        | NR            | 925    | 0                        | NR            |
| 410    | 0                        | NR            | 540    | 1                        | NR            | 670    | 0                        | NR            | 800    | 0                        | NR            | 930    | 0                        | NR            |
| 415    | 0                        | NR            | 545    | 3                        | NR            | 675    | 0                        | NR            | 805    | 0                        | NR            | 935    | 0                        | NR            |
| 420    | 0                        | NR            | 550    | 5                        | NR            | 680    | 0                        | NR            | 810    | 0                        | NR            | 940    | 0                        | NR            |
| 425    | 0                        | NR            | 555    | 10                       | NR            | 685    | 0                        | NR            | 815    | 0                        | NR            | 945    | 0                        | NR            |
| 430    | 0                        | NR            | 560    | 19                       | NR            | 690    | 0                        | NR            | 820    | 0                        | NR            | 950    | 0                        | NR            |
| 435    | 0                        | NR            | 565    | 34                       | NR            | 695    | 0                        | NR            | 825    | 0                        | NR            | 955    | 0                        | NR            |
| 440    | 0                        | NR            | 570    | 63                       | NR            | 700    | 0                        | NR            | 830    | 0                        | NR            | 960    | 0                        | NR            |
| 445    | 0                        | NR            | 575    | 113                      | NR            | 705    | 0                        | NR            | 835    | 0                        | NR            | 965    | 0                        | NR            |
| 450    | 0                        | NR            | 580    | 199                      | NR            | 710    | 0                        | NR            | 840    | 0                        | NR            | 970    | 0                        | NR            |
| 455    | 0                        | NR            | 585    | 352                      | NR            | 715    | 0                        | NR            | 845    | 0                        | NR            | 975    | 0                        | NR            |
| 460    | 0                        | NR            | 590    | 614                      | NR            | 720    | 0                        | NR            | 850    | 0                        | NR            | 980    | 0                        | NR            |
| 465    | 0                        | NR            | 595    | 954                      | NR            | 725    | 0                        | NR            | 855    | 0                        | NR            | 985    | 0                        | NR            |
| 470    | 0                        | NR            | 600    | 837                      | NR            | 730    | 0                        | NR            | 860    | 0                        | NR            | 990    | 0                        | NR            |
| 475    | 0                        | NR            | 605    | 417                      | NR            | 735    | 0                        | NR            | 865    | 0                        | NR            | 995    | 0                        | NR            |
| 480    | 0                        | NR            | 610    | 179                      | NR            | 740    | 0                        | NR            | 870    | 0                        | NR            | 1000   | 0                        | NR            |
| 485    | 0                        | NR            | 615    | 69                       | NR            | 745    | 0                        | NR            | 875    | 0                        | NR            |        |                          |               |

**Summary**

$R_f = 1.1$   
 $R_g = 0$   
 $CIE R_a = -21.8$   
 $R_g = -386.6$



**Color Vector Graphics**



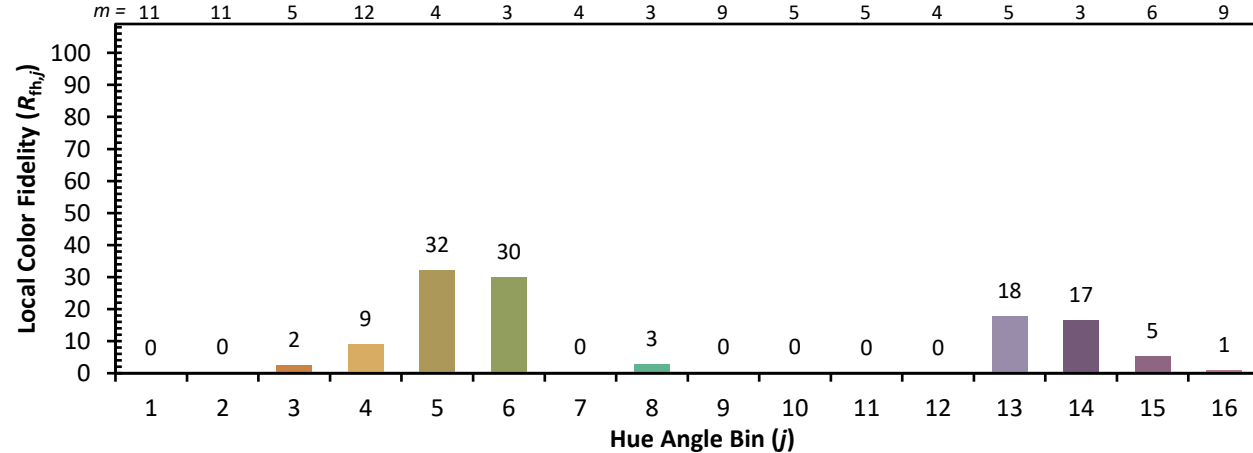
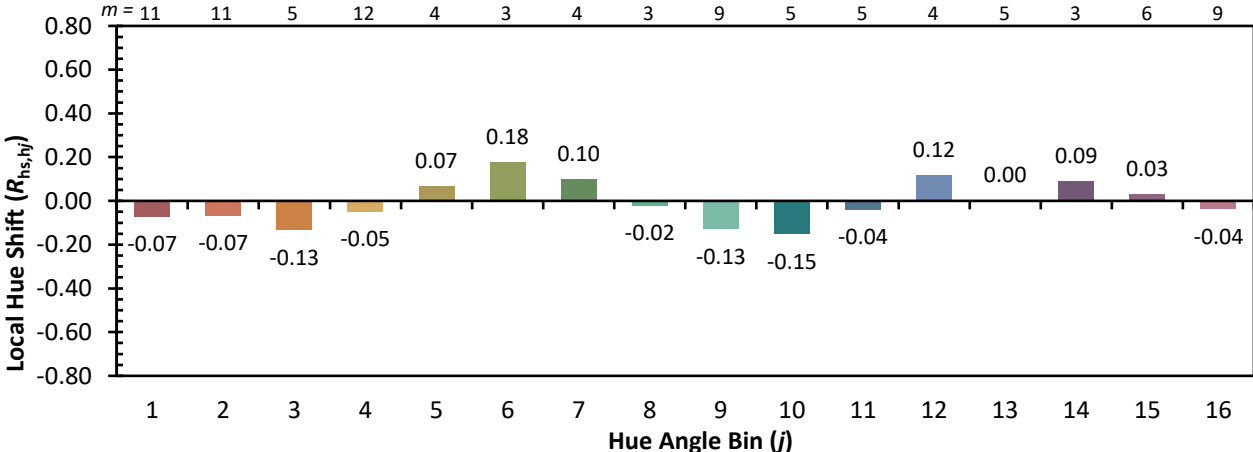
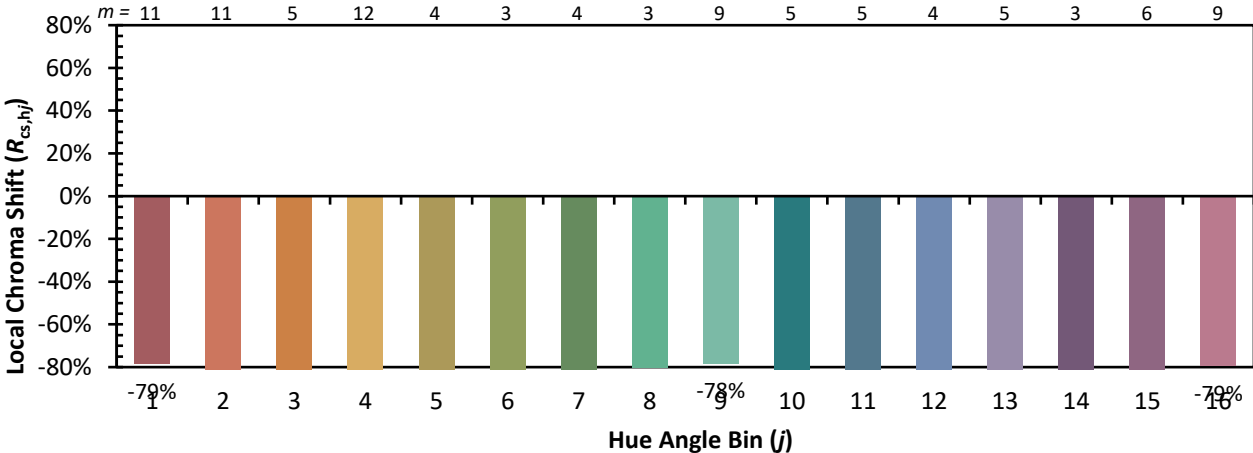


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

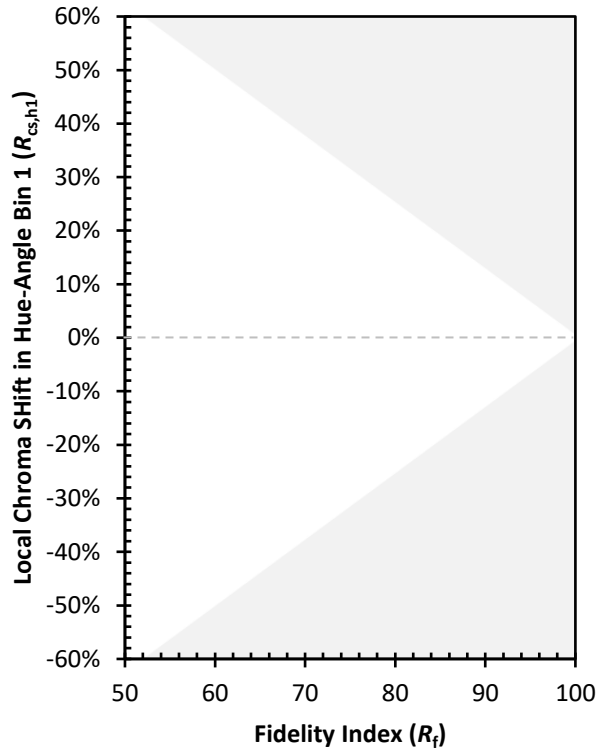
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 90 | CES26 = 0  | CES51 = 17 | CES76 = 0  |
| CES02 = 70 | CES27 = 32 | CES52 = 2  | CES77 = 0  |
| CES03 = 31 | CES28 = 24 | CES53 = 0  | CES78 = 0  |
| CES04 = 77 | CES29 = 1  | CES54 = 12 | CES79 = 2  |
| CES05 = 52 | CES30 = 31 | CES55 = 6  | CES80 = 1  |
| CES06 = 56 | CES31 = 1  | CES56 = 0  | CES81 = 0  |
| CES07 = 41 | CES32 = 0  | CES57 = 0  | CES82 = 50 |
| CES08 = 38 | CES33 = 21 | CES58 = 0  | CES83 = 21 |
| CES09 = 29 | CES34 = 0  | CES59 = 9  | CES84 = 54 |
| CES10 = 87 | CES35 = 23 | CES60 = 60 | CES85 = 9  |
| CES11 = 70 | CES36 = 77 | CES61 = 13 | CES86 = 0  |
| CES12 = 76 | CES37 = 5  | CES62 = 53 | CES87 = 2  |
| CES13 = 47 | CES38 = 41 | CES63 = 68 | CES88 = 1  |
| CES14 = 77 | CES39 = 75 | CES64 = 0  | CES89 = 0  |
| CES15 = 74 | CES40 = 49 | CES65 = 0  | CES90 = 2  |
| CES16 = 49 | CES41 = 75 | CES66 = 0  | CES91 = 57 |
| CES17 = 56 | CES42 = 0  | CES67 = 0  | CES92 = 0  |
| CES18 = 60 | CES43 = 0  | CES68 = 0  | CES93 = 2  |
| CES19 = 80 | CES44 = 95 | CES69 = 27 | CES94 = 0  |
| CES20 = 71 | CES45 = 1  | CES70 = 0  | CES95 = 0  |
| CES21 = 94 | CES46 = 5  | CES71 = 0  | CES96 = 2  |
| CES22 = 87 | CES47 = 70 | CES72 = 42 | CES97 = 1  |
| CES23 = 94 | CES48 = 0  | CES73 = 0  | CES98 = 0  |
| CES24 = 95 | CES49 = 5  | CES74 = 62 | CES99 = 0  |
| CES25 = 79 | CES50 = 9  | CES75 = 0  |            |



Color Rendition by Hue-Angle Bin



Measure Comparisons



(END OF REPORT)