

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: STREETWORKS

Report Number: P868272

Luminaire Tested: **MEM2-HSN-SA-30-AMB-U-T2R**

Issue Date: 08/22/2024



**Test Information**

Test Method: LM-79-08  
Report Number: P868272  
Test Lab: INNOVATION CENTER(G3)  
Issue Date: 08/22/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: STREETWORKS  
Catalog Number: MEM2-HSN-SA-30-AMB-U-T2R  
Description: EPIC MODERN SHORT HOUSING DISCRETE LED ARRAYS 30W OCRI 1540K  
FITURE w/ TYPE II ROADWAY DISTRIBUTION OPTIC  
Light Source: (20) 1540K CCT, 0 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

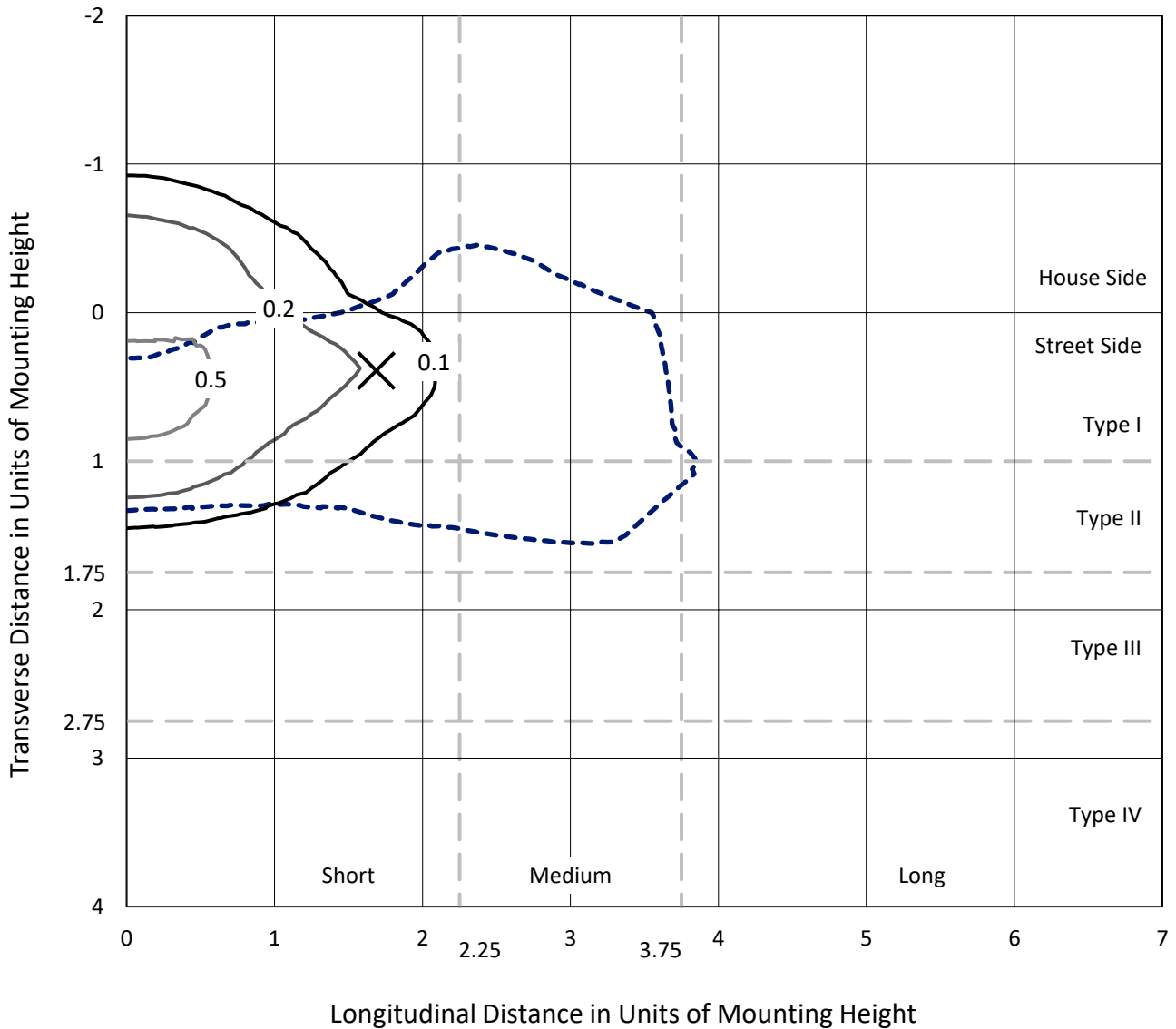
Lumens per Lamp: N/A  
Luminaire Lumens: 1077.5 lumens  
Efficiency: N/A  
Efficacy: 35.9 lumens/watt  
Luminous Opening: Rectangular (W 0.67' x L: 0.33' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B0 - U0 - G1

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

REPORT NUMBER: P868272  
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### Iso-Footcandle Lines of Horizontal Illumination

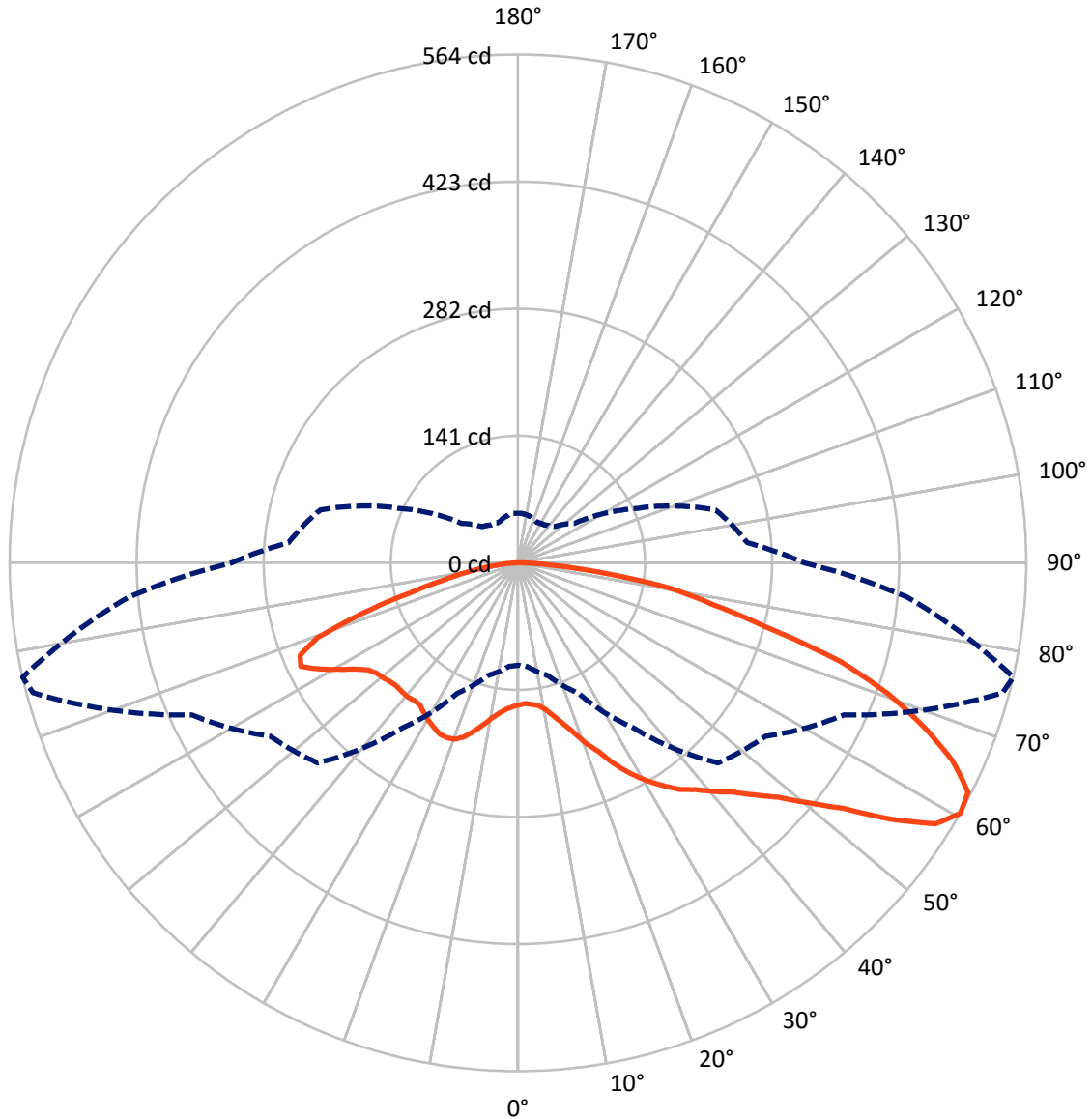
× Max cd  
 - - - 1/2 Max cd



Based on 20 foot mounting height. Maximum calculated value = 0.7 fc  
 Type II - Short - N/A

REPORT NUMBER: P868272  
CATALOG NUMBER: MEM2-HSN-SA-30-AMB-U-T2R

### Luminous Intensity Polar Plot



— Vertical Plane Through 77-Deg Lateral      - - - Horizontal Cone Through 60-Deg Vertical

REPORT NUMBER: P868272  
 CATALOG NUMBER: MEM2-HSN-SA-30-AMB-U-T2R

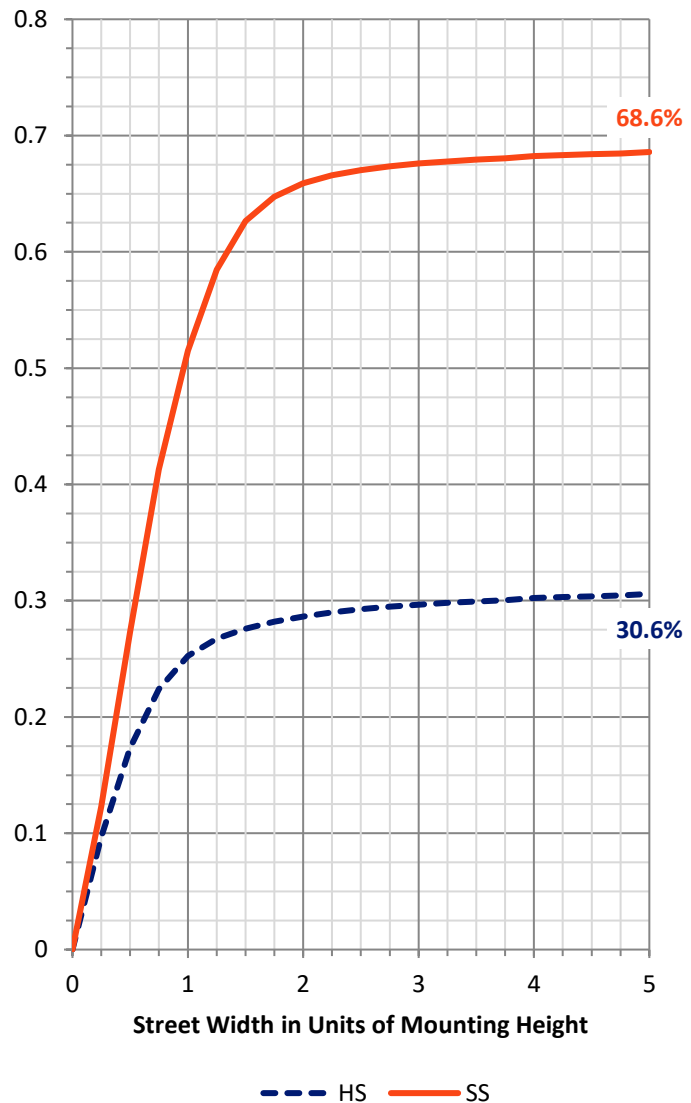
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 335.1    | 0.0    | 335.1  |
|                    | % Fixture | 31.1     | 0.0    | 31.1   |
| <b>Street Side</b> | Lumens    | 742.4    | 0.0    | 742.4  |
|                    | % Fixture | 68.9     | 0.0    | 68.9   |
| <b>Total</b>       | Lumens    | 1077.5   | 0.0    | 1077.5 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**Coefficient of Utilization**

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 16.2   | 1.5       |
| 10°-20°   | 59.7   | 5.5       |
| 20°-30°   | 113.5  | 10.5      |
| 30°-40°   | 170.8  | 15.9      |
| 40°-50°   | 208.3  | 19.3      |
| 50°-60°   | 203.1  | 18.8      |
| 60°-70°   | 178.7  | 16.6      |
| 70°-80°   | 102.5  | 9.5       |
| 80°-90°   | 24.8   | 2.3       |
| 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°    | 1077.5 | 100.0     |
| 0°-180°   | 1077.5 | 100.0     |



REPORT NUMBER: P868272

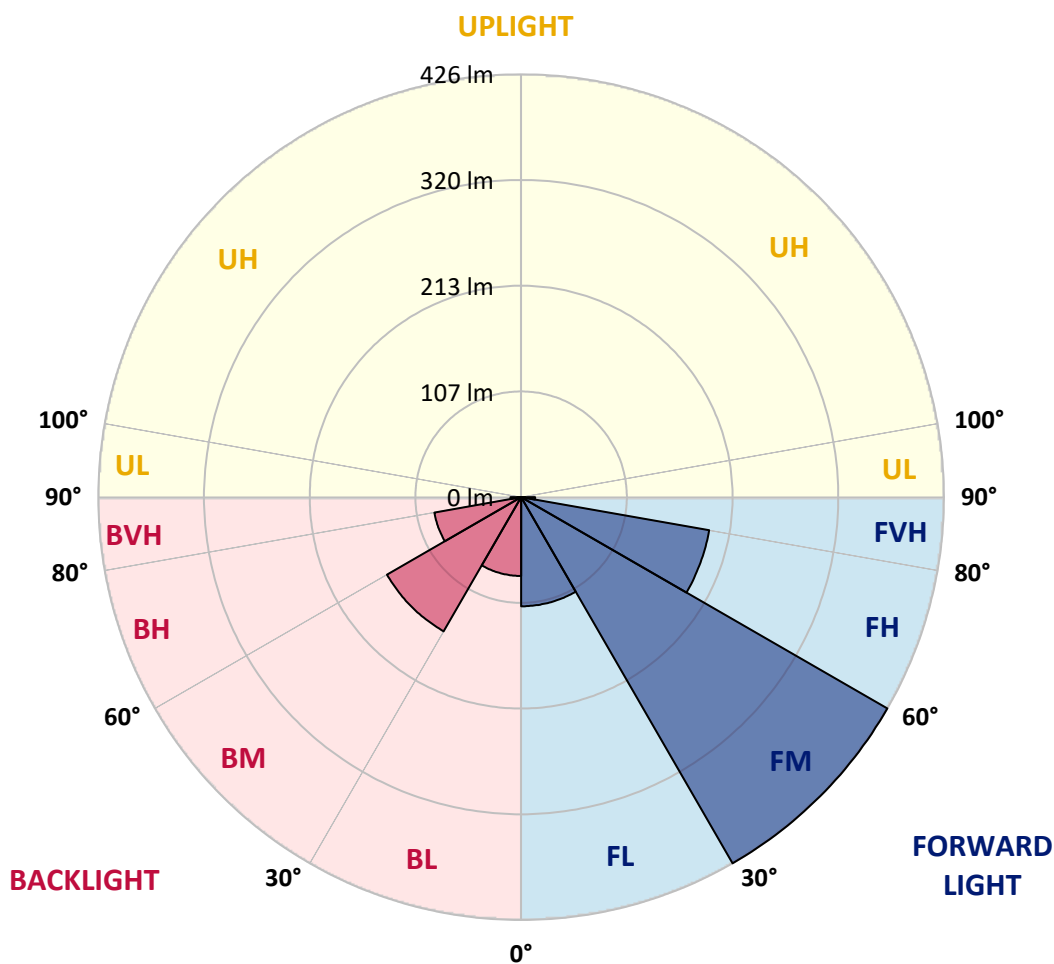
CATALOG NUMBER: MEM2-HSN-SA-30-AMB-U-T2R

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

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |      |        |
|----------------|--------|-----------|-------------------------|------|--------|
|                |        |           | B                       | U    | G      |
| FL (0°-30°)    | 110.0  | 10.2      |                         |      |        |
| FM (30°-60°)   | 426.0  | 39.5      |                         |      |        |
| FH (60°-80°)   | 192.4  | 17.9      |                         |      | G0/660 |
| FVH (80°-90°)  | 14.0   | 1.3       |                         |      | G1/100 |
| BL (0°-30°)    | 79.4   | 7.4       | B0/110                  |      |        |
| BM (30°-60°)   | 156.1  | 14.5      | B0/220                  |      |        |
| BH (60°-80°)   | 88.8   | 8.2       | B0/110                  |      | G0/110 |
| BVH (80°-90°)  | 10.7   | 1.0       |                         |      | G1/100 |
| UL (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |        |
| UH (100°-180°) | 0.0    | 0.0       |                         | U0/0 |        |

**BUG Rating: B0-U0-G1**

Type II Short





REPORT NUMBER: P868272

CATALOG NUMBER: MEM2-HSN-SA-30-AMB-U-T2R

**CANDELA DISTRIBUTION (FULL):**

|       | 0°    | 5°    | 15°   | 25°   | 35°   | 45°   | 55°   | 65°   | 75°   | 77°   | 85°   |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 157.8 | 157.8 | 157.8 | 157.8 | 157.8 | 157.8 | 157.8 | 157.8 | 157.8 | 157.8 | 157.8 |
| 2.5°  | 154.3 | 154.3 | 154.3 | 154.3 | 154.3 | 156.1 | 156.1 | 156.1 | 156.1 | 156.1 | 157.8 |
| 5°    | 159.6 | 159.6 | 157.8 | 157.8 | 157.8 | 157.8 | 156.1 | 156.1 | 157.8 | 157.8 | 159.6 |
| 7.5°  | 172.0 | 172.0 | 172.0 | 168.5 | 166.7 | 163.2 | 161.4 | 159.6 | 159.6 | 159.6 | 161.4 |
| 10°   | 196.8 | 196.8 | 195.1 | 188.0 | 182.7 | 175.6 | 170.2 | 166.7 | 164.9 | 164.9 | 166.7 |
| 12.5° | 232.3 | 230.5 | 227.0 | 218.1 | 205.7 | 196.8 | 184.4 | 177.3 | 173.8 | 173.8 | 173.8 |
| 15°   | 266.0 | 264.2 | 260.7 | 250.0 | 237.6 | 219.9 | 203.9 | 191.5 | 186.2 | 184.4 | 184.4 |
| 17.5° | 287.3 | 287.3 | 285.5 | 278.4 | 267.8 | 248.3 | 227.0 | 207.5 | 196.8 | 196.8 | 196.8 |
| 20°   | 305.0 | 303.2 | 301.5 | 296.2 | 289.1 | 276.6 | 253.6 | 228.8 | 212.8 | 212.8 | 209.3 |
| 22.5° | 326.3 | 324.5 | 317.4 | 310.3 | 305.0 | 297.9 | 278.4 | 250.0 | 230.5 | 227.0 | 221.7 |
| 25°   | 352.9 | 349.4 | 340.5 | 329.8 | 321.0 | 315.7 | 297.9 | 271.3 | 250.0 | 246.5 | 234.1 |
| 27.5° | 379.5 | 376.0 | 365.3 | 352.9 | 338.7 | 324.5 | 312.1 | 292.6 | 269.6 | 264.2 | 244.7 |
| 30°   | 400.8 | 397.2 | 390.1 | 376.0 | 358.2 | 342.3 | 326.3 | 310.3 | 285.5 | 280.2 | 255.4 |
| 32.5° | 434.5 | 432.7 | 418.5 | 397.2 | 383.1 | 363.5 | 344.0 | 328.1 | 299.7 | 294.4 | 264.2 |
| 35°   | 477.0 | 471.7 | 461.1 | 427.4 | 402.6 | 384.8 | 367.1 | 344.0 | 313.9 | 308.6 | 271.3 |
| 37.5° | 482.4 | 480.6 | 480.6 | 461.1 | 430.9 | 406.1 | 388.4 | 365.3 | 328.1 | 319.2 | 276.6 |
| 40°   | 461.1 | 459.3 | 464.6 | 462.9 | 448.7 | 429.2 | 409.7 | 388.4 | 342.3 | 333.4 | 283.7 |
| 42.5° | 427.4 | 427.4 | 436.3 | 438.0 | 438.0 | 446.9 | 436.3 | 409.7 | 360.0 | 347.6 | 282.0 |
| 45°   | 404.3 | 400.8 | 404.3 | 407.9 | 411.4 | 434.5 | 455.8 | 430.9 | 379.5 | 367.1 | 285.5 |
| 47.5° | 379.5 | 377.7 | 377.7 | 379.5 | 383.1 | 404.3 | 454.0 | 462.9 | 404.3 | 388.4 | 294.4 |
| 50°   | 354.7 | 349.4 | 349.4 | 352.9 | 358.2 | 365.3 | 430.9 | 484.1 | 436.3 | 418.5 | 308.6 |
| 52.5° | 297.9 | 301.5 | 313.9 | 328.1 | 342.3 | 338.7 | 390.1 | 480.6 | 475.3 | 452.2 | 328.1 |
| 55°   | 225.2 | 219.9 | 244.7 | 287.3 | 324.5 | 326.3 | 347.6 | 459.3 | 519.6 | 501.9 | 354.7 |
| 57.5° | 159.6 | 161.4 | 177.3 | 218.1 | 290.8 | 324.5 | 329.8 | 427.4 | 549.7 | 546.2 | 390.1 |
| 60°   | 113.5 | 115.3 | 129.5 | 159.6 | 223.4 | 313.9 | 335.2 | 399.0 | 556.8 | 563.9 | 432.7 |
| 62.5° | 85.1  | 85.1  | 92.2  | 113.5 | 159.6 | 264.2 | 356.4 | 395.5 | 546.2 | 560.4 | 469.9 |
| 65°   | 65.6  | 67.4  | 70.9  | 86.9  | 115.3 | 184.4 | 361.8 | 425.6 | 519.6 | 530.2 | 484.1 |
| 67.5° | 53.2  | 55.0  | 58.5  | 65.6  | 83.3  | 124.1 | 303.2 | 468.2 | 468.2 | 485.9 | 462.9 |
| 70°   | 46.1  | 46.1  | 47.9  | 55.0  | 65.6  | 88.7  | 212.8 | 462.9 | 423.8 | 436.3 | 407.9 |
| 72.5° | 39.0  | 40.8  | 42.6  | 46.1  | 53.2  | 67.4  | 138.3 | 367.1 | 390.1 | 374.2 | 333.4 |
| 75°   | 31.9  | 31.9  | 35.5  | 39.0  | 42.6  | 53.2  | 86.9  | 267.8 | 312.1 | 283.7 | 269.6 |
| 77.5° | 28.4  | 28.4  | 30.1  | 33.7  | 37.2  | 40.8  | 60.3  | 163.2 | 234.1 | 219.9 | 200.4 |
| 80°   | 23.1  | 24.8  | 24.8  | 28.4  | 30.1  | 31.9  | 39.0  | 88.7  | 164.9 | 172.0 | 124.1 |
| 82.5° | 21.3  | 21.3  | 21.3  | 23.1  | 24.8  | 24.8  | 28.4  | 46.1  | 90.4  | 101.1 | 63.8  |
| 85°   | 16.0  | 16.0  | 16.0  | 17.7  | 17.7  | 17.7  | 19.5  | 23.1  | 40.8  | 44.3  | 31.9  |
| 87.5° | 7.1   | 7.1   | 7.1   | 8.9   | 8.9   | 8.9   | 10.6  | 8.9   | 14.2  | 16.0  | 12.4  |
| 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: P868272

CATALOG NUMBER: MEM2-HSN-SA-30-AMB-U-T2R

**CANDELA DISTRIBUTION (continued):**

|       | 90°   | 95°   | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 157.8 | 157.8 | 157.8 | 157.8 | 157.8 | 157.8 | 157.8 | 157.8 | 157.8 | 157.8 | 157.8 |
| 2.5°  | 157.8 | 159.6 | 159.6 | 161.4 | 163.2 | 163.2 | 163.2 | 163.2 | 164.9 | 164.9 | 164.9 |
| 5°    | 159.6 | 161.4 | 163.2 | 166.7 | 168.5 | 170.2 | 172.0 | 172.0 | 173.8 | 173.8 | 172.0 |
| 7.5°  | 163.2 | 164.9 | 168.5 | 172.0 | 177.3 | 179.1 | 180.9 | 180.9 | 180.9 | 180.9 | 180.9 |
| 10°   | 168.5 | 170.2 | 175.6 | 180.9 | 184.4 | 188.0 | 189.8 | 188.0 | 188.0 | 188.0 | 188.0 |
| 12.5° | 177.3 | 179.1 | 184.4 | 189.8 | 193.3 | 196.8 | 195.1 | 195.1 | 193.3 | 193.3 | 193.3 |
| 15°   | 188.0 | 188.0 | 193.3 | 198.6 | 200.4 | 202.2 | 198.6 | 196.8 | 196.8 | 195.1 | 196.8 |
| 17.5° | 198.6 | 198.6 | 202.2 | 203.9 | 203.9 | 200.4 | 198.6 | 195.1 | 195.1 | 195.1 | 195.1 |
| 20°   | 207.5 | 207.5 | 207.5 | 203.9 | 200.4 | 196.8 | 195.1 | 191.5 | 191.5 | 193.3 | 193.3 |
| 22.5° | 219.9 | 216.4 | 207.5 | 202.2 | 195.1 | 191.5 | 188.0 | 184.4 | 184.4 | 186.2 | 186.2 |
| 25°   | 228.8 | 221.7 | 205.7 | 196.8 | 189.8 | 182.7 | 179.1 | 175.6 | 175.6 | 175.6 | 177.3 |
| 27.5° | 234.1 | 223.4 | 200.4 | 189.8 | 182.7 | 175.6 | 170.2 | 166.7 | 163.2 | 163.2 | 163.2 |
| 30°   | 239.4 | 225.2 | 195.1 | 184.4 | 179.1 | 170.2 | 161.4 | 156.1 | 152.5 | 150.7 | 149.0 |
| 32.5° | 243.0 | 223.4 | 189.8 | 179.1 | 175.6 | 166.7 | 154.3 | 145.4 | 140.1 | 138.3 | 138.3 |
| 35°   | 246.5 | 219.9 | 184.4 | 177.3 | 175.6 | 161.4 | 147.2 | 136.6 | 131.2 | 127.7 | 129.5 |
| 37.5° | 246.5 | 218.1 | 184.4 | 179.1 | 172.0 | 156.1 | 140.1 | 129.5 | 124.1 | 118.8 | 118.8 |
| 40°   | 248.3 | 218.1 | 186.2 | 179.1 | 166.7 | 149.0 | 134.8 | 120.6 | 113.5 | 108.2 | 108.2 |
| 42.5° | 246.5 | 216.4 | 186.2 | 179.1 | 161.4 | 141.9 | 124.1 | 111.7 | 104.6 | 101.1 | 101.1 |
| 45°   | 244.7 | 214.6 | 186.2 | 175.6 | 152.5 | 131.2 | 111.7 | 99.3  | 95.8  | 94.0  | 92.2  |
| 47.5° | 244.7 | 214.6 | 188.0 | 173.8 | 141.9 | 115.3 | 95.8  | 88.7  | 85.1  | 81.6  | 79.8  |
| 50°   | 251.8 | 216.4 | 191.5 | 172.0 | 127.7 | 99.3  | 81.6  | 74.5  | 70.9  | 69.2  | 69.2  |
| 52.5° | 260.7 | 221.7 | 193.3 | 166.7 | 113.5 | 86.9  | 70.9  | 63.8  | 62.1  | 60.3  | 60.3  |
| 55°   | 274.9 | 227.0 | 198.6 | 157.8 | 101.1 | 74.5  | 62.1  | 56.7  | 55.0  | 55.0  | 55.0  |
| 57.5° | 294.4 | 237.6 | 211.0 | 150.7 | 90.4  | 63.8  | 55.0  | 51.4  | 53.2  | 55.0  | 55.0  |
| 60°   | 317.4 | 255.4 | 227.0 | 141.9 | 76.3  | 56.7  | 51.4  | 49.7  | 53.2  | 55.0  | 55.0  |
| 62.5° | 345.8 | 282.0 | 243.0 | 133.0 | 65.6  | 49.7  | 47.9  | 49.7  | 51.4  | 55.0  | 55.0  |
| 65°   | 379.5 | 312.1 | 255.4 | 122.4 | 55.0  | 44.3  | 46.1  | 47.9  | 49.7  | 55.0  | 55.0  |
| 67.5° | 395.5 | 326.3 | 246.5 | 106.4 | 46.1  | 40.8  | 44.3  | 46.1  | 49.7  | 53.2  | 53.2  |
| 70°   | 368.9 | 299.7 | 221.7 | 81.6  | 39.0  | 39.0  | 40.8  | 42.6  | 46.1  | 51.4  | 51.4  |
| 72.5° | 308.6 | 250.0 | 164.9 | 55.0  | 33.7  | 35.5  | 37.2  | 40.8  | 44.3  | 49.7  | 49.7  |
| 75°   | 266.0 | 200.4 | 104.6 | 37.2  | 28.4  | 31.9  | 35.5  | 39.0  | 40.8  | 46.1  | 46.1  |
| 77.5° | 212.8 | 159.6 | 65.6  | 28.4  | 24.8  | 28.4  | 31.9  | 35.5  | 37.2  | 39.0  | 39.0  |
| 80°   | 140.1 | 118.8 | 42.6  | 21.3  | 21.3  | 24.8  | 28.4  | 31.9  | 31.9  | 35.5  | 35.5  |
| 82.5° | 70.9  | 69.2  | 28.4  | 17.7  | 17.7  | 21.3  | 24.8  | 26.6  | 28.4  | 31.9  | 31.9  |
| 85°   | 31.9  | 33.7  | 17.7  | 12.4  | 12.4  | 17.7  | 19.5  | 21.3  | 23.1  | 21.3  | 21.3  |
| 87.5° | 10.6  | 10.6  | 8.9   | 5.3   | 7.1   | 8.9   | 10.6  | 12.4  | 12.4  | 8.9   | 8.9   |
| 90°   | 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

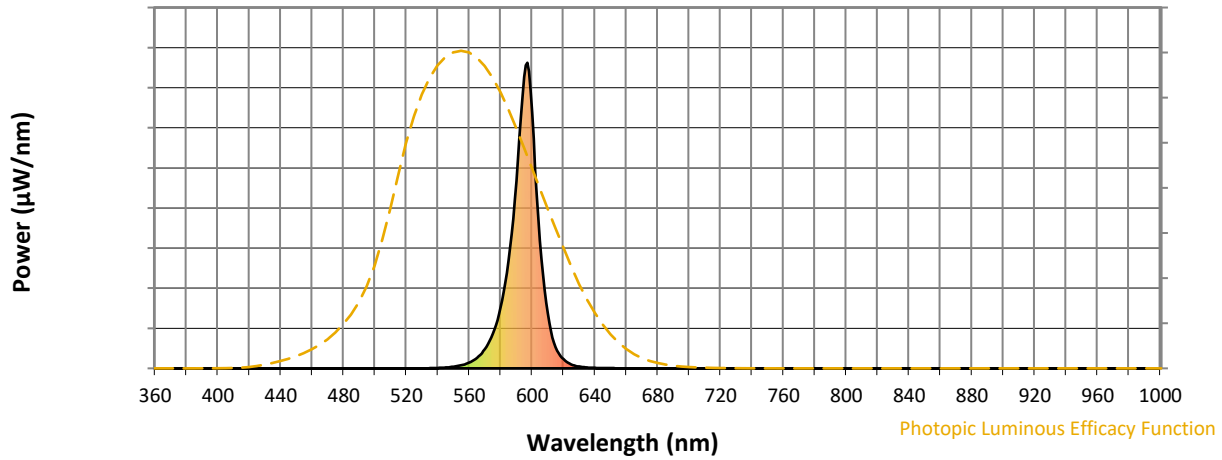


CCT = 1538K  
 CIE x = 0.5918  
 CIE y = 0.4076  
 Duv = 0.0116

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            |        |                          |               |

REPORT NUMBER: SP1-2407-157-1

**Scotopic Flux vs. Wavelength**



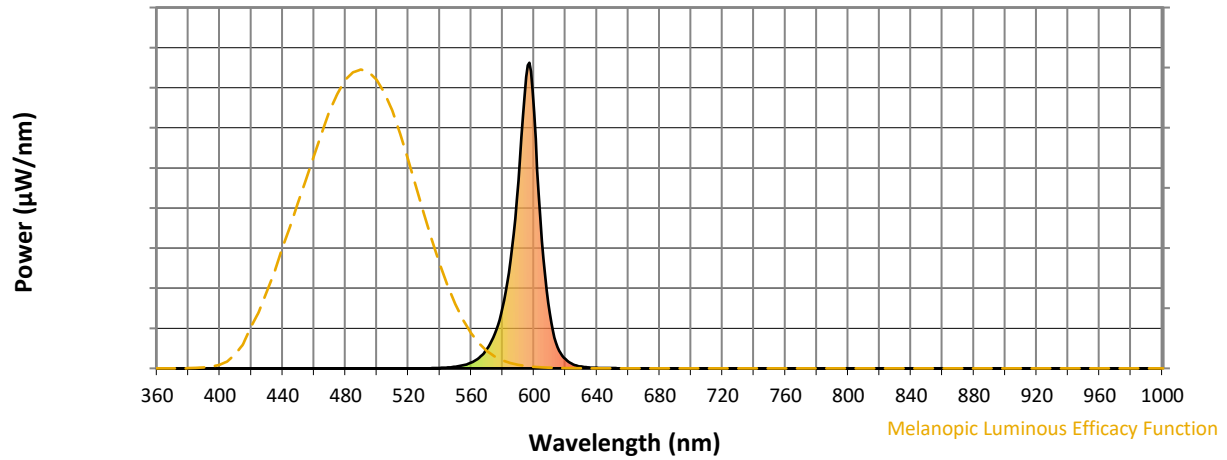
**Scotopic Lumens: NR**

**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            |        |                          |               |

REPORT NUMBER: SP1-2407-157-1

**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**

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



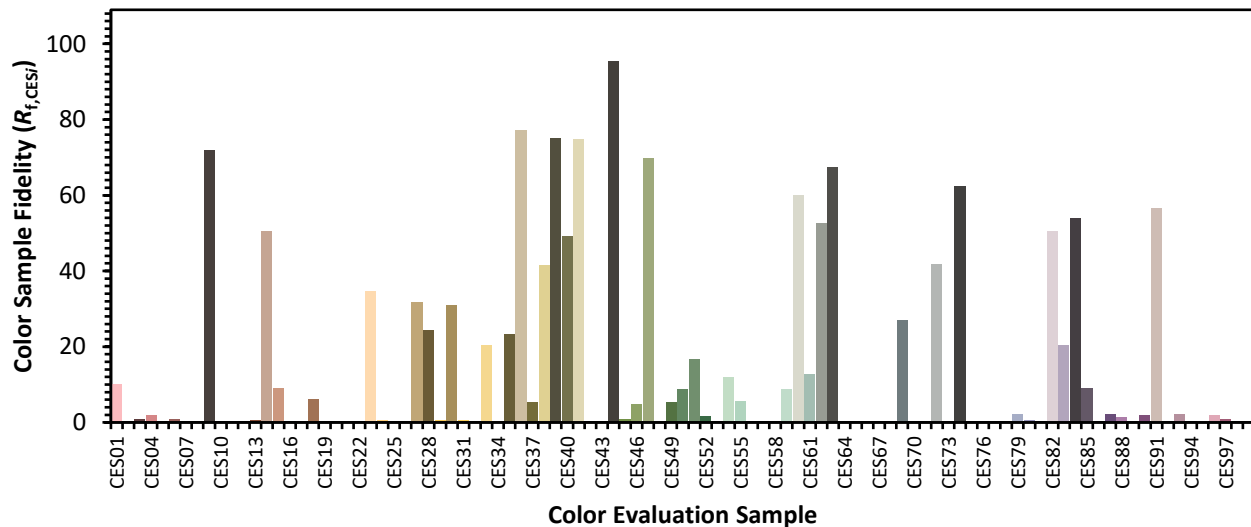
**Color Vector Graphics**





**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)