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: P868282

Luminaire Tested: **MEM2-HSN-SA-46-AMB-U-T2U-HSS**

Issue Date: 08/22/2024

Report Generated By 670245763

Cooper Lighting Solutions Photometric Lab
1121 Highway 74 South
Peachtree City, GA 30269

Scaled Data Report

**Test Information**

| | |
|---|---|
| Test Method: | LM-79-08 |
| Report Number: | P868282 |
| Test Lab: | INNOVATION CENTER(G3) |
| Issue Date: | 08/22/2024 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS (FORMERLY EATON) |
| Product Line: | STREETWORKS |
| Catalog Number: | MEM2-HSN-SA-46-AMB-U-T2U-HSS |
| Description: | EPIC MODERN SHORT HOUSING DISCRETE LED ARRAYS 46W 0CRI 1540K FIXTURE w/ TYPE II URBAN DISTRIBUTION OPTIC AND HOUSE SIDE SHIELD |
| Light Source: | (30) 1540K CCT, 0 CRI LEDS |
| Ballast/Driver: | ELECTRONIC DRIVER |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 958.5 lumens |
| Efficiency: | N/A |
| Efficacy: | 20.8 lumens/watt |
| Luminous Opening: | Rectangular (W 1' x L: 0.33' x H: 0') |
| IES Classification: | Type II - Short |
| BUG Rating: | B0 - U0 - G1 |

| | |
|---|---|
| Input Watts (W): | 46 |
| Input Voltage (V): | 120 |
| Input Current (Ain): | NR |
| Voltage Rise (V): | NR |
| Power Factor: | 0.98 |
| Total Harmonic Distortion (THDi): | 6.75% |
| Frequency (hertz): | 60 |
| Stabilization Time: | NR |
| Operation Time: | NR |
| Ambient Temperature (°C): | NR |
| Test Distance: | 24 FT |

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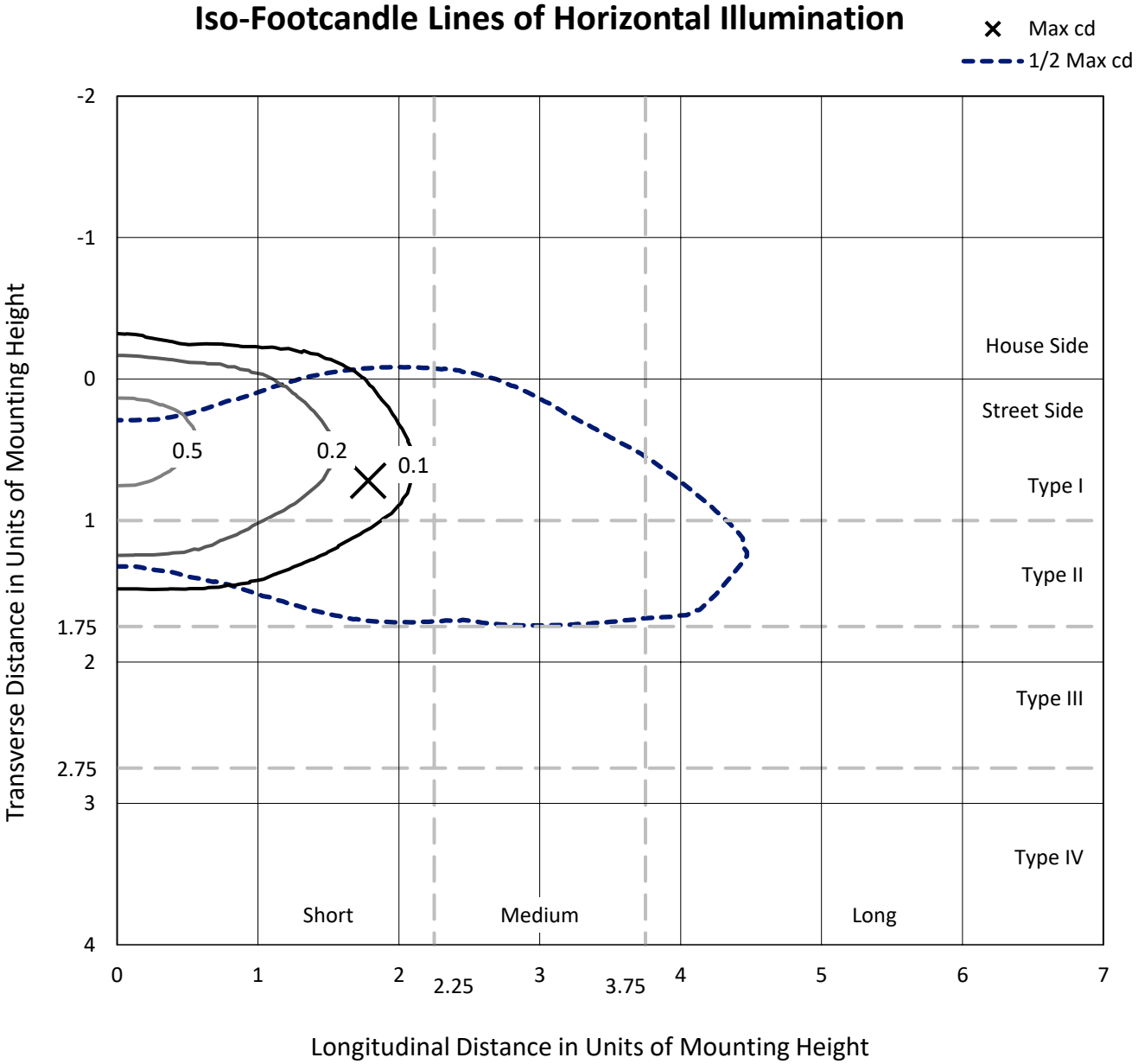
Scaled Data Report

REPORT NUMBER: P868282
CATALOG NUMBER: MEM2-HSN-SA-46-AMB-U-T2U-HSS

## Iso-Footcandle Lines of Horizontal Illumination




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

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REPORT NUMBER: P868282
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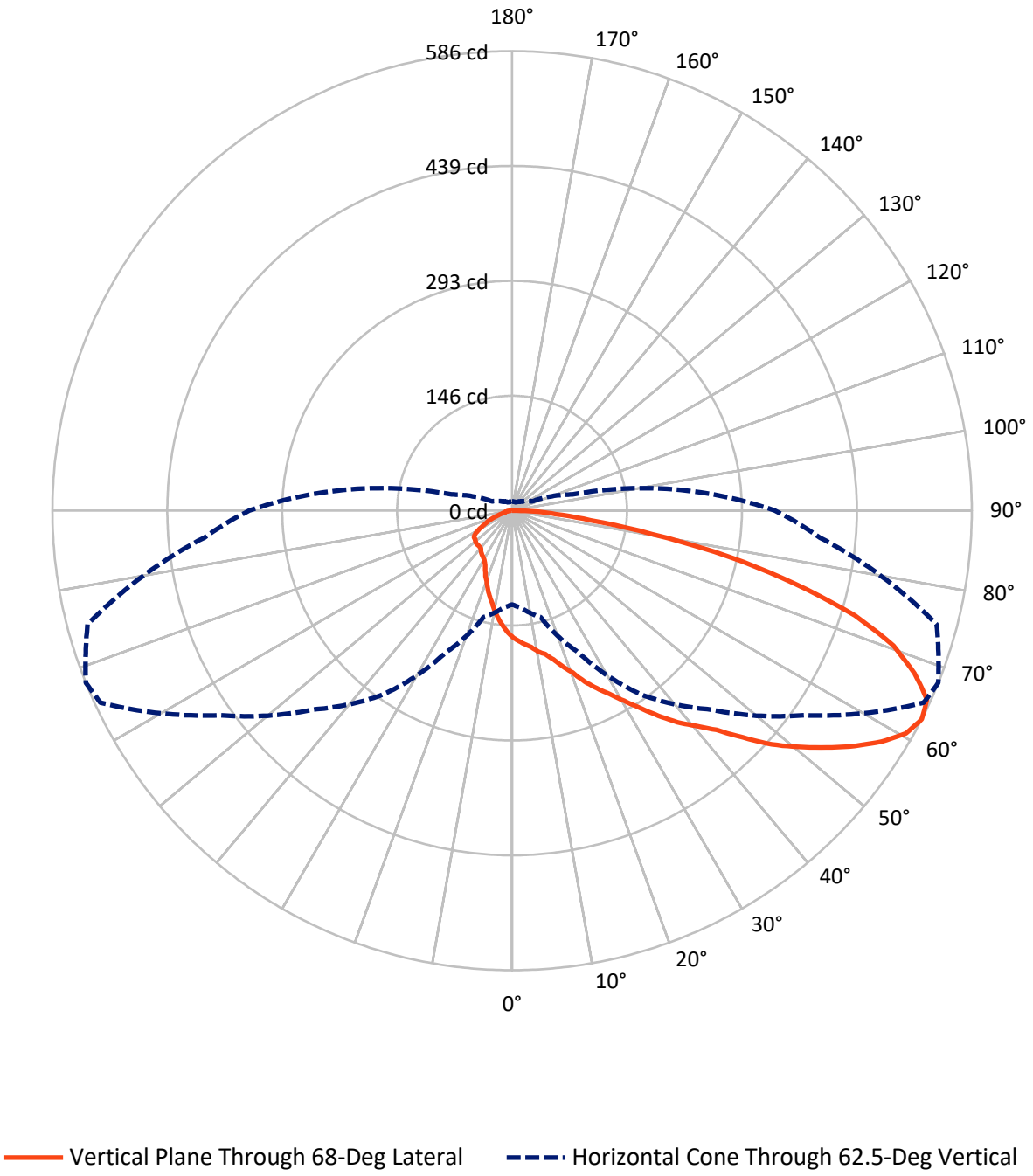
## Luminous Intensity Polar Plot



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REPORT NUMBER: P868282
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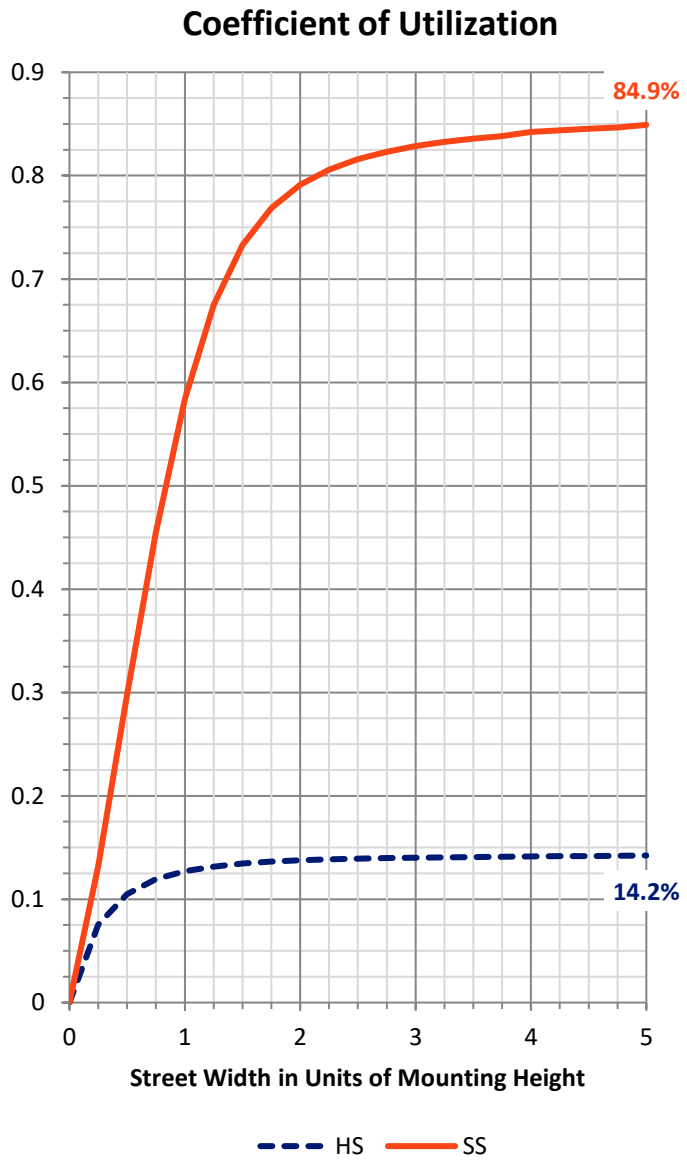
**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 138.1 | 0.0 | 138.1 |
| | % Fixture | 14.4 | 0.0 | 14.4 |
| **Street Side** | Lumens | 820.4 | 0.0 | 820.4 |
| | % Fixture | 85.6 | 0.0 | 85.6 |
| **Total** | Lumens | 958.5 | 0.0 | 958.5 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 14.9 | 1.5 |
| 10°-20° | 45.9 | 4.8 |
| 20°-30° | 82.4 | 8.6 |
| 30°-40° | 126.3 | 13.2 |
| 40°-50° | 177.0 | 18.5 |
| 50°-60° | 200.6 | 20.9 |
| 60°-70° | 180.1 | 18.8 |
| 70°-80° | 106.2 | 11.1 |
| 80°-90° | 25.2 | 2.6 |
| 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° | 958.5 | 100.0 |
| 0°-180° | 958.5 | 100.0 |



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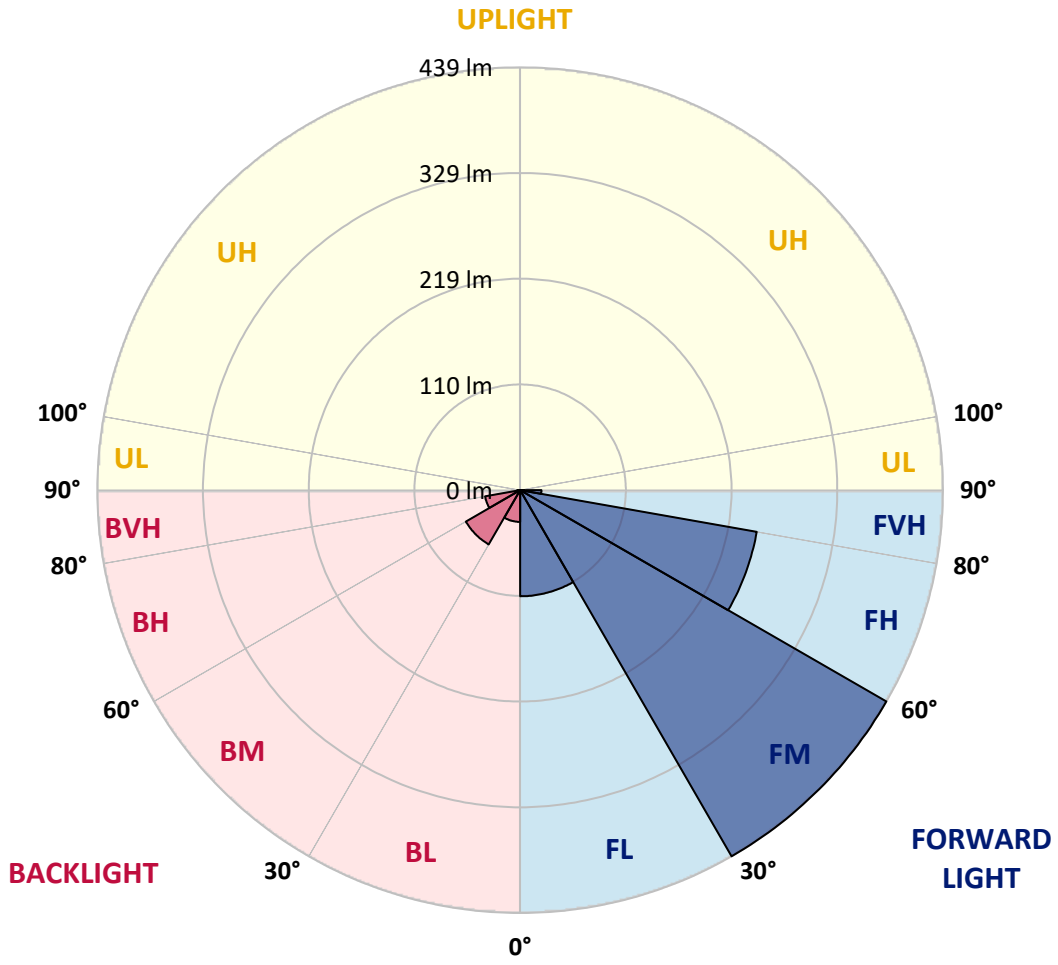
REPORT NUMBER: P868282
CATALOG NUMBER: MEM2-HSN-SA-46-AMB-U-T2U-HSS

## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 110.1 | 11.5 | | | |
| FM | (30°-60°) | 438.9 | 45.8 | | | |
| FH | (60°-80°) | 249.3 | 26.0 | | | G0/660 |
| FVH | (80°-90°) | 22.1 | 2.3 | | | G1/100 |
| BL | (0°-30°) | 33.0 | 3.4 | B0/110 | | |
| BM | (30°-60°) | 65.0 | 6.8 | B0/220 | | |
| BH | (60°-80°) | 36.9 | 3.9 | B0/110 | | G0/110 |
| BVH | (80°-90°) | 3.2 | 0.3 | | | G0/10 |
| 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



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REPORT NUMBER: P868282
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**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 65° | 68° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 161.7 | 161.7 | 161.7 | 161.7 | 161.7 | 161.7 | 161.7 | 161.7 | *161.7* | 161.7 | 161.7 |
| 2.5° | 175.7 | 175.7 | 175.7 | 175.7 | 173.4 | 173.4 | 171.1 | 168.7 | *166.4* | 166.4 | 164.0 |
| 5° | 185.1 | 185.1 | 185.1 | 185.1 | 182.8 | 180.4 | 178.1 | 173.4 | *171.1* | 168.7 | 164.0 |
| 7.5° | 203.9 | 203.9 | 203.9 | 196.8 | 194.5 | 189.8 | 185.1 | 178.1 | *175.7* | 173.4 | 166.4 |
| 10° | 229.6 | 232.0 | 227.3 | 222.6 | 213.2 | 203.9 | 192.2 | 185.1 | *182.8* | 175.7 | 168.7 |
| 12.5° | 257.8 | 255.4 | 253.1 | 246.0 | 234.3 | 222.6 | 206.2 | 192.2 | *187.5* | 180.4 | 171.1 |
| 15° | 283.5 | 283.5 | 281.2 | 269.5 | 257.8 | 241.4 | 222.6 | 203.9 | *196.8* | 187.5 | 173.4 |
| 17.5° | 311.7 | 311.7 | 304.6 | 292.9 | 278.9 | 257.8 | 239.0 | 215.6 | *208.6* | 192.2 | 178.1 |
| 20° | 328.1 | 328.1 | 325.7 | 316.3 | 302.3 | 278.9 | 255.4 | 229.6 | *220.3* | 201.5 | 180.4 |
| 22.5° | 335.1 | 335.1 | 335.1 | 330.4 | 318.7 | 299.9 | 271.8 | 246.0 | *236.7* | 210.9 | 187.5 |
| 25° | 335.1 | 335.1 | 337.4 | 339.8 | 335.1 | 318.7 | 292.9 | 260.1 | *250.7* | 222.6 | 192.2 |
| 27.5° | 330.4 | 330.4 | 335.1 | 337.4 | 339.8 | 332.8 | 311.7 | 276.5 | *264.8* | 236.7 | 199.2 |
| 30° | 339.8 | 339.8 | 339.8 | 339.8 | 344.5 | 344.5 | 328.1 | 292.9 | *281.2* | 250.7 | 206.2 |
| 32.5° | 363.2 | 363.2 | 363.2 | 356.2 | 351.5 | 353.8 | 344.5 | 311.7 | *299.9* | 267.1 | 215.6 |
| 35° | 382.0 | 379.6 | 382.0 | 382.0 | 370.2 | 365.6 | 360.9 | 330.4 | *321.0* | 290.6 | 229.6 |
| 37.5° | 396.0 | 398.4 | 398.4 | 400.7 | 396.0 | 386.6 | 377.3 | 353.8 | *342.1* | 309.3 | 243.7 |
| 40° | 405.4 | 407.7 | 414.8 | 417.1 | 412.4 | 407.7 | 398.4 | 372.6 | *360.9* | 325.7 | 253.1 |
| 42.5° | 407.7 | 414.8 | 426.5 | 433.5 | 421.8 | 419.5 | 414.8 | 393.7 | *382.0* | 351.5 | 267.1 |
| 45° | 405.4 | 407.7 | 431.2 | 433.5 | 428.8 | 428.8 | 435.9 | 419.5 | *412.4* | 379.6 | 283.5 |
| 47.5° | 389.0 | 389.0 | 403.1 | 421.8 | 424.1 | 435.9 | 454.6 | 449.9 | *445.2* | 410.1 | 304.6 |
| 50° | 358.5 | 356.2 | 382.0 | 400.7 | 412.4 | 438.2 | 471.0 | 480.4 | *473.4* | 440.5 | 323.4 |
| 52.5° | 297.6 | 299.9 | 332.8 | 377.3 | 398.4 | 435.9 | 482.7 | 508.5 | *501.5* | 468.7 | 339.8 |
| 55° | 248.4 | 250.7 | 283.5 | 342.1 | 382.0 | 426.5 | 492.1 | 534.3 | *529.6* | 494.4 | 358.5 |
| 57.5° | 196.8 | 201.5 | 232.0 | 292.9 | 353.8 | 403.1 | 494.4 | 557.7 | *555.4* | 522.6 | 374.9 |
| 60° | 152.3 | 157.0 | 180.4 | 246.0 | 323.4 | 384.3 | 482.7 | 571.8 | *576.5* | 546.0 | 386.6 |
| 62.5° | *119.5* | *124.2* | *140.6* | *199.2* | *285.9* | *358.5* | *454.6* | *578.8* | *585.8* | *560.1* | *393.7* |
| 65° | 96.1 | 98.4 | 110.1 | 159.3 | 250.7 | 328.1 | 419.5 | 557.7 | *581.1* | 560.1 | 393.7 |
| 67.5° | 77.3 | 82.0 | 91.4 | 124.2 | 210.9 | 290.6 | 374.9 | 520.2 | *553.0* | 550.7 | 379.6 |
| 70° | 65.6 | 65.6 | 75.0 | 98.4 | 173.4 | 241.4 | 321.0 | 468.7 | *515.5* | 520.2 | 344.5 |
| 72.5° | 53.9 | 53.9 | 60.9 | 79.7 | 140.6 | 192.2 | 264.8 | 403.1 | *456.9* | 473.4 | 299.9 |
| 75° | 46.9 | 46.9 | 51.6 | 65.6 | 110.1 | 147.6 | 201.5 | 323.4 | *372.6* | 400.7 | 246.0 |
| 77.5° | 39.8 | 39.8 | 44.5 | 51.6 | 77.3 | 110.1 | 154.7 | 243.7 | *283.5* | 309.3 | 185.1 |
| 80° | 32.8 | 32.8 | 37.5 | 42.2 | 56.2 | 72.6 | 103.1 | 161.7 | *180.4* | 194.5 | 119.5 |
| 82.5° | 30.5 | 30.5 | 30.5 | 35.1 | 42.2 | 49.2 | 65.6 | 89.0 | *100.8* | 112.5 | 75.0 |
| 85° | 23.4 | 23.4 | 23.4 | 28.1 | 30.5 | 35.1 | 42.2 | 51.6 | *56.2* | 68.0 | 44.5 |
| 87.5° | 14.1 | 14.1 | 14.1 | 16.4 | 18.7 | 21.1 | 23.4 | 25.8 | *28.1* | 32.8 | 18.7 |
| 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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Scaled Data Report

REPORT NUMBER: P868282
CATALOG NUMBER: MEM2-HSN-SA-46-AMB-U-T2U-HSS

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 161.7 | 161.7 | 161.7 | 161.7 | 161.7 | 161.7 | 161.7 | 161.7 | 161.7 | 161.7 | 161.7 |
| 2.5° | 161.7 | 161.7 | 157.0 | 154.7 | 152.3 | 150.0 | 147.6 | 145.3 | 142.9 | 145.3 | 142.9 |
| 5° | 161.7 | 159.3 | 152.3 | 145.3 | 138.3 | 131.2 | 126.5 | 121.9 | 119.5 | 117.2 | 117.2 |
| 7.5° | 161.7 | 157.0 | 147.6 | 135.9 | 124.2 | 114.8 | 105.4 | 98.4 | 96.1 | 93.7 | 93.7 |
| 10° | 161.7 | 154.7 | 140.6 | 126.5 | 110.1 | 98.4 | 89.0 | 82.0 | 77.3 | 75.0 | 75.0 |
| 12.5° | 164.0 | 154.7 | 135.9 | 114.8 | 96.1 | 84.4 | 72.6 | 65.6 | 63.3 | 60.9 | 60.9 |
| 15° | 164.0 | 154.7 | 131.2 | 105.4 | 84.4 | 70.3 | 60.9 | 56.2 | 53.9 | 51.6 | 51.6 |
| 17.5° | 166.4 | 154.7 | 126.5 | 96.1 | 72.6 | 60.9 | 53.9 | 49.2 | 46.9 | 44.5 | 44.5 |
| 20° | 168.7 | 154.7 | 119.5 | 86.7 | 63.3 | 51.6 | 46.9 | 42.2 | 39.8 | 39.8 | 39.8 |
| 22.5° | 173.4 | 157.0 | 114.8 | 79.7 | 56.2 | 46.9 | 42.2 | 39.8 | 37.5 | 37.5 | 37.5 |
| 25° | 178.1 | 157.0 | 110.1 | 70.3 | 51.6 | 42.2 | 37.5 | 35.1 | 35.1 | 32.8 | 32.8 |
| 27.5° | 180.4 | 159.3 | 105.4 | 63.3 | 44.5 | 37.5 | 35.1 | 32.8 | 32.8 | 32.8 | 32.8 |
| 30° | 187.5 | 161.7 | 103.1 | 58.6 | 42.2 | 35.1 | 32.8 | 30.5 | 30.5 | 30.5 | 30.5 |
| 32.5° | 196.8 | 168.7 | 100.8 | 56.2 | 39.8 | 32.8 | 30.5 | 28.1 | 28.1 | 28.1 | 28.1 |
| 35° | 203.9 | 173.4 | 100.8 | 53.9 | 37.5 | 30.5 | 28.1 | 28.1 | 28.1 | 28.1 | 28.1 |
| 37.5° | 215.6 | 182.8 | 98.4 | 51.6 | 37.5 | 30.5 | 28.1 | 25.8 | 25.8 | 25.8 | 25.8 |
| 40° | 220.3 | 185.1 | 93.7 | 49.2 | 37.5 | 28.1 | 25.8 | 25.8 | 25.8 | 23.4 | 23.4 |
| 42.5° | 232.0 | 192.2 | 91.4 | 49.2 | 35.1 | 28.1 | 23.4 | 23.4 | 23.4 | 23.4 | 23.4 |
| 45° | 248.4 | 203.9 | 91.4 | 49.2 | 35.1 | 28.1 | 23.4 | 21.1 | 21.1 | 21.1 | 21.1 |
| 47.5° | 262.5 | 215.6 | 91.4 | 49.2 | 35.1 | 25.8 | 23.4 | 21.1 | 21.1 | 18.7 | 18.7 |
| 50° | 276.5 | 225.0 | 89.0 | 49.2 | 32.8 | 25.8 | 21.1 | 18.7 | 18.7 | 18.7 | 18.7 |
| 52.5° | 292.9 | 232.0 | 89.0 | 46.9 | 32.8 | 23.4 | 18.7 | 18.7 | 16.4 | 16.4 | 16.4 |
| 55° | 309.3 | 239.0 | 89.0 | 46.9 | 30.5 | 21.1 | 18.7 | 16.4 | 16.4 | 14.1 | 14.1 |
| 57.5° | 321.0 | 246.0 | 86.7 | 44.5 | 28.1 | 21.1 | 16.4 | 16.4 | 14.1 | 14.1 | 14.1 |
| 60° | 330.4 | 250.7 | 82.0 | 37.5 | 23.4 | 18.7 | 16.4 | 14.1 | 11.7 | 11.7 | 11.7 |
| 62.5° | *335.1* | *250.7* | *79.7* | *28.1* | *21.1* | *16.4* | *14.1* | *11.7* | *11.7* | *11.7* | *11.7* |
| 65° | 330.4 | 241.4 | 72.6 | 21.1 | 18.7 | 16.4 | 14.1 | 11.7 | 9.4 | 9.4 | 9.4 |
| 67.5° | 318.7 | 229.6 | 60.9 | 18.7 | 16.4 | 14.1 | 11.7 | 9.4 | 9.4 | 9.4 | 9.4 |
| 70° | 285.9 | 206.2 | 44.5 | 14.1 | 14.1 | 11.7 | 11.7 | 9.4 | 7.0 | 7.0 | 7.0 |
| 72.5° | 250.7 | 173.4 | 30.5 | 11.7 | 11.7 | 9.4 | 9.4 | 7.0 | 7.0 | 7.0 | 7.0 |
| 75° | 199.2 | 131.2 | 21.1 | 9.4 | 9.4 | 9.4 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 |
| 77.5° | 142.9 | 84.4 | 16.4 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 4.7 | 4.7 |
| 80° | 89.0 | 49.2 | 11.7 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 4.7 | 4.7 |
| 82.5° | 51.6 | 28.1 | 9.4 | 4.7 | 4.7 | 4.7 | 7.0 | 7.0 | 7.0 | 4.7 | 4.7 |
| 85° | 25.8 | 14.1 | 7.0 | 4.7 | 4.7 | 4.7 | 4.7 | 4.7 | 4.7 | 4.7 | 4.7 |
| 87.5° | 9.4 | 4.7 | 2.3 | 2.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 90° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

Cooper Lighting Solutions Photometric Lab
1121 Highway 74 South
Peachtree City, GA 30269

# 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

Report Generated By FNC07603 / LDUCLS01DT446
Version: v7.04

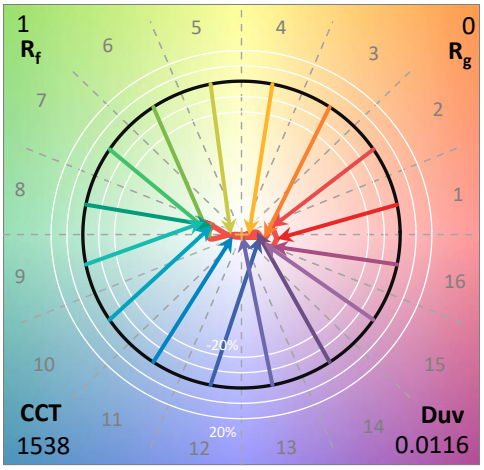
## Test Information

| | |
|---|---|
| Test Method: | LM-79-2019 |
| Report Number: | SP1-2407-157-1 |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Photometer: | SP1 - 76IN SPHERE |
| Measurement Geometry: | 4π |
| 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 |
| Rf: | 1.1 |
| Rg: | 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

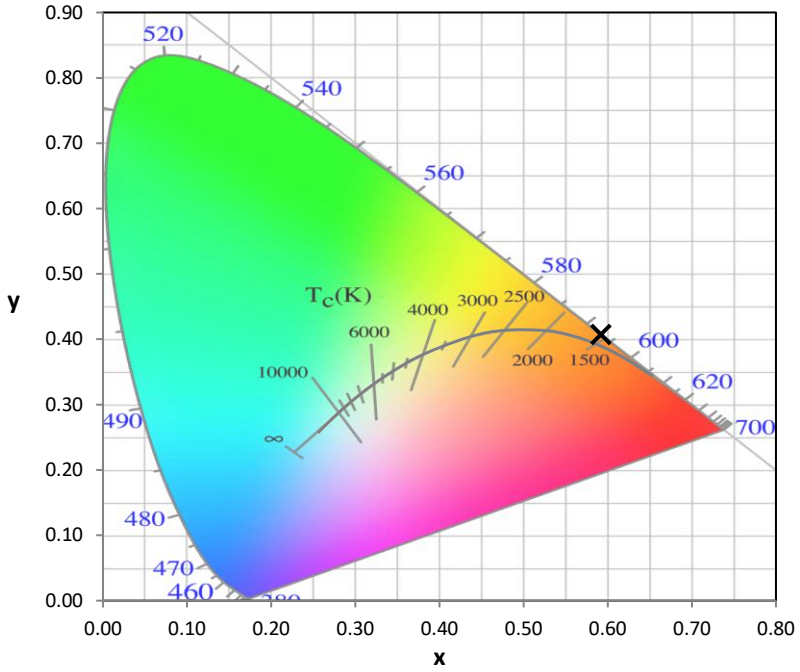
| | |
|---|---|
| Stabilization Time: | 20M |
| Operation Time: | 1H 20M |
| Sphere Temperature (°C): | 24.2 |

REPORT NUMBER: SP1-2407-157-1

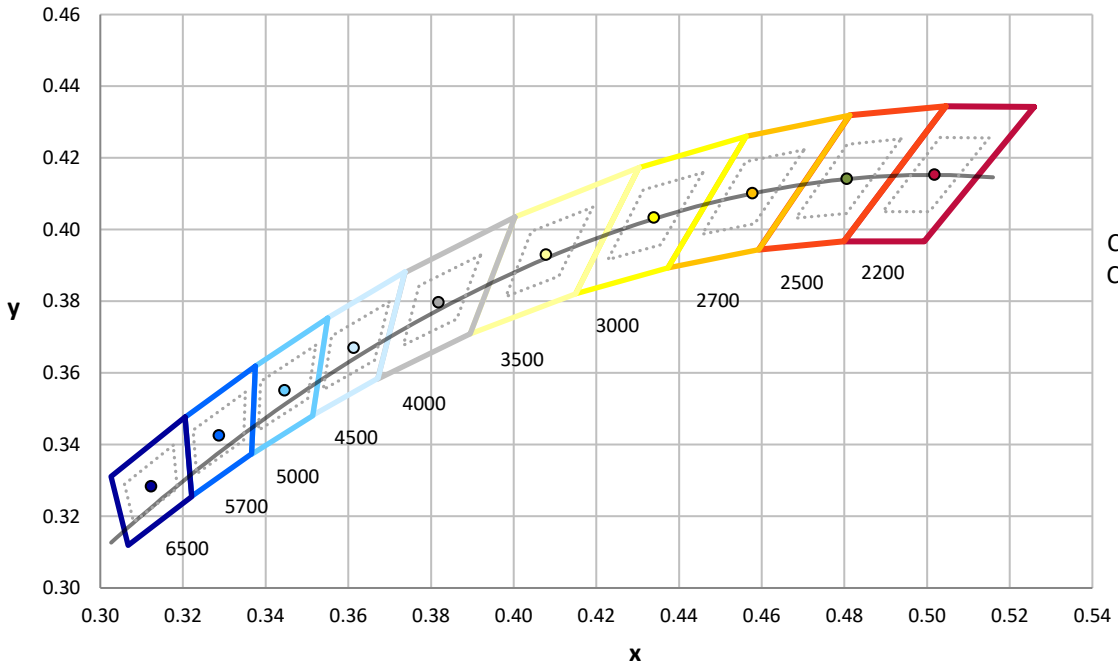
| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 6/18/2024 | 12/18/2024 |
| Power Meter | INXT2011004 | 2/8/2024 | 2/8/2025 |
| AC Power Source | IN0063 | 10/24/2023 | 10/24/2024 |
| DC 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

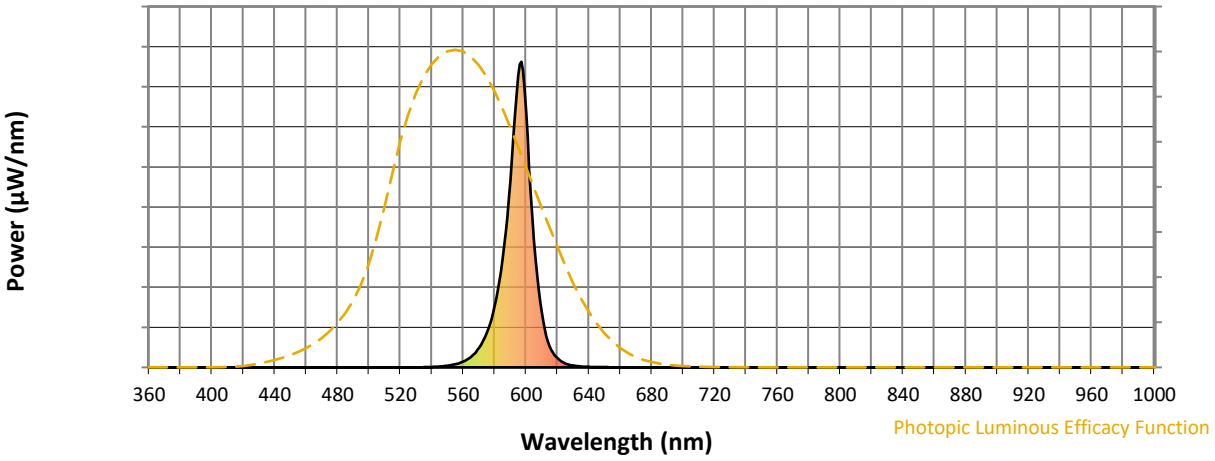



CCT = 1538K
CIE x = 0.5918
CIE y = 0.4076
Duv = 0.0116

Point lies outside the range

REPORT NUMBER: SP1-2407-157-1

## Photopic Flux vs. Wavelength

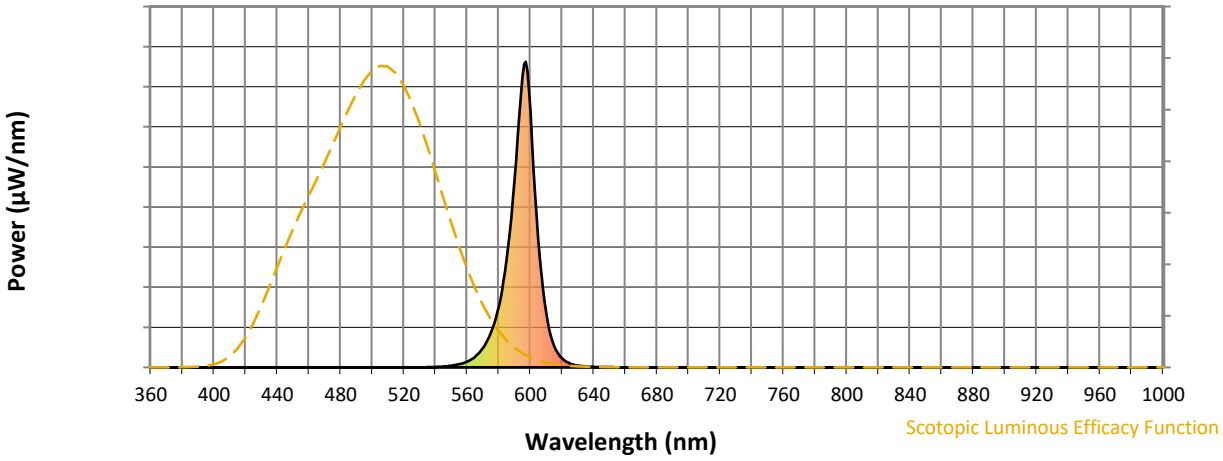



## Photopic Lumens: NR

| λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/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

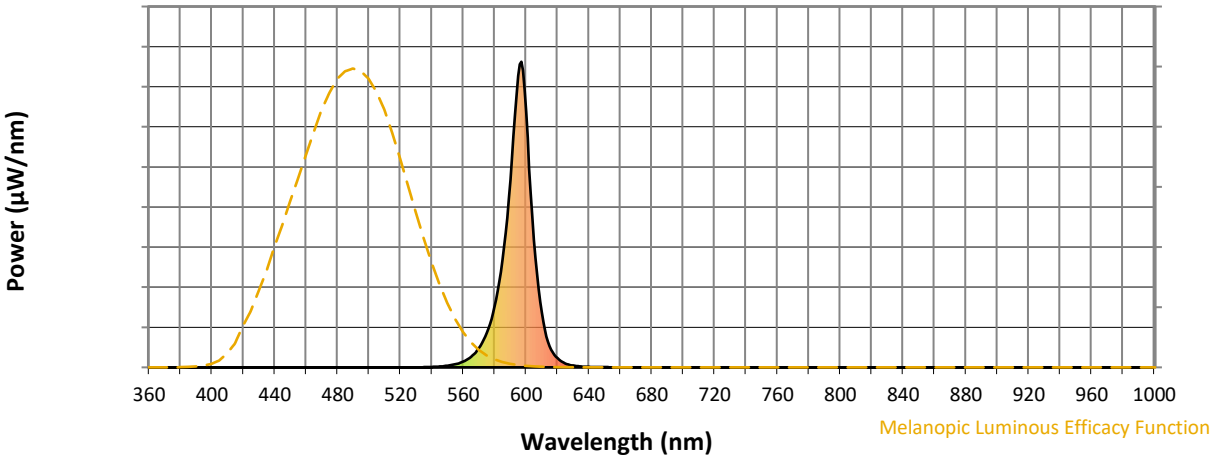



**Scotopic Lumens: NR** **S/P: 0.22**

| λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/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^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/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 | | | |

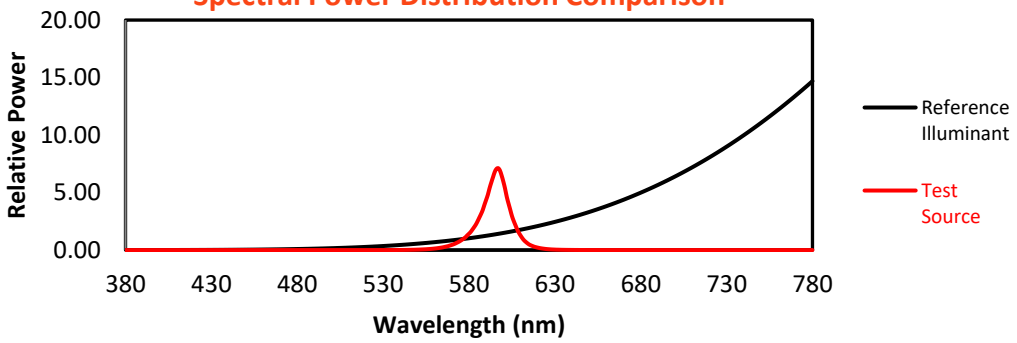
REPORT NUMBER: SP1-2407-157-1

# TM-30-18

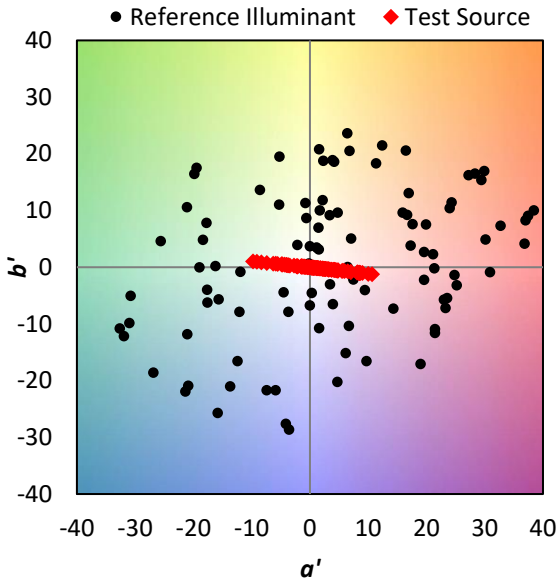
## Summary

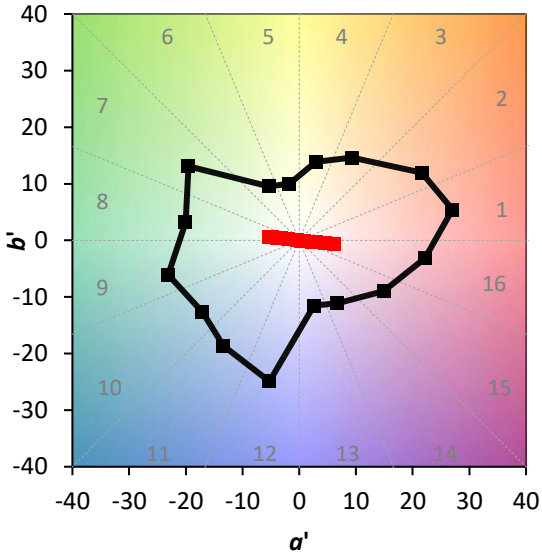
$R_f$ = 1.1
$R_g$ = 0
CIE $R_a$ = -21.8
$R_9$ = -386.6

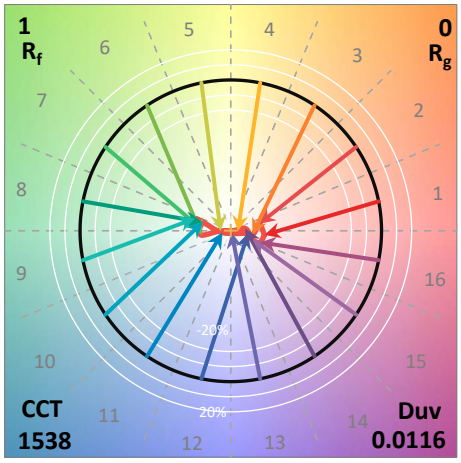
## Spectral Power Distribution Comparison

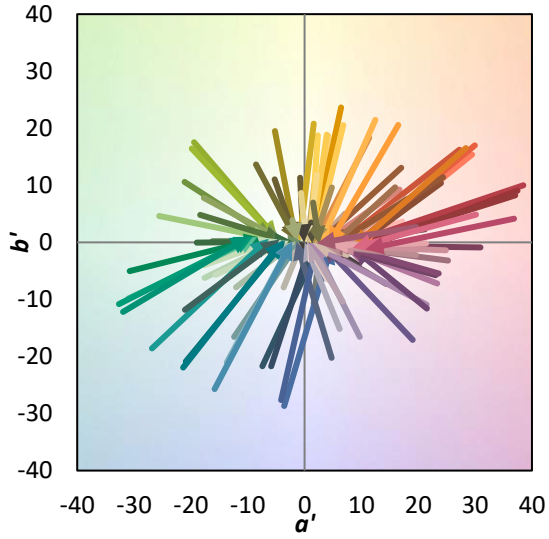



## Color Vector Graphics



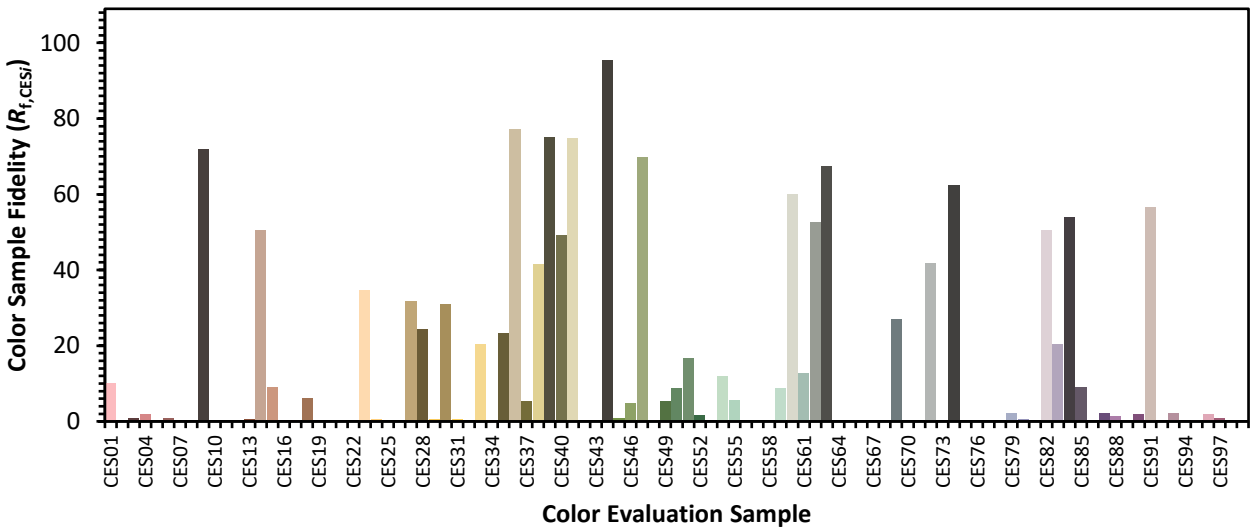



REPORT NUMBER: SP1-2407-157-1

# TM-30-18

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

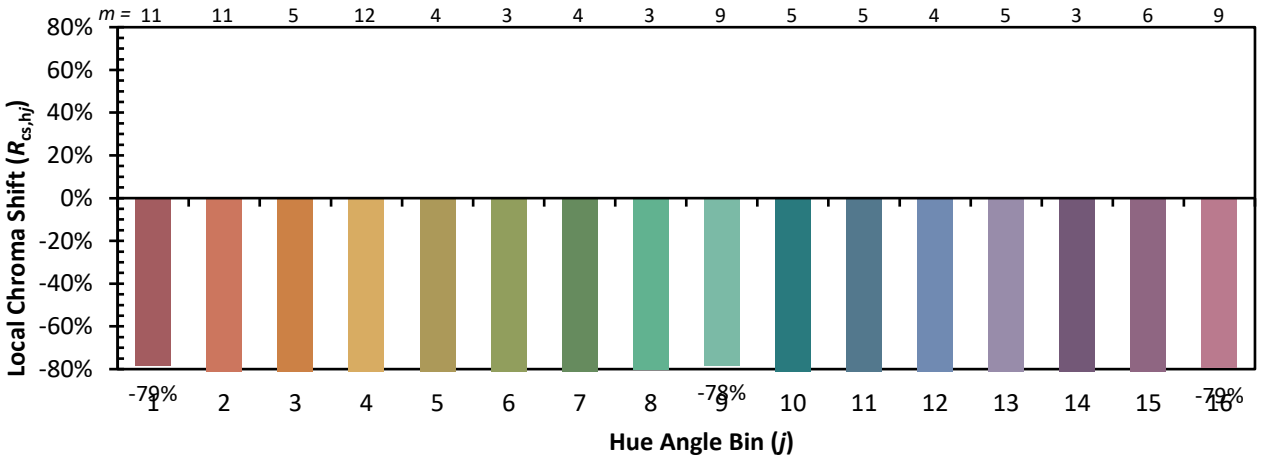
| | | | |
|---|---|---|---|
| CES01 = 90 | CES26 = 0 | CES51 = 17 | CES76 = 0 |
| CES02 = 70 | CES27 = 32 | CES52 = 2 | CES77 = 0 |
| CES03 = 31 | CES28 = 24 | CES53 = 0 | CES78 = 0 |
| CES04 = 77 | CES29 = 1 | CES54 = 12 | CES79 = 2 |
| CES05 = 52 | CES30 = 31 | CES55 = 6 | CES80 = 1 |
| CES06 = 56 | 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 | |

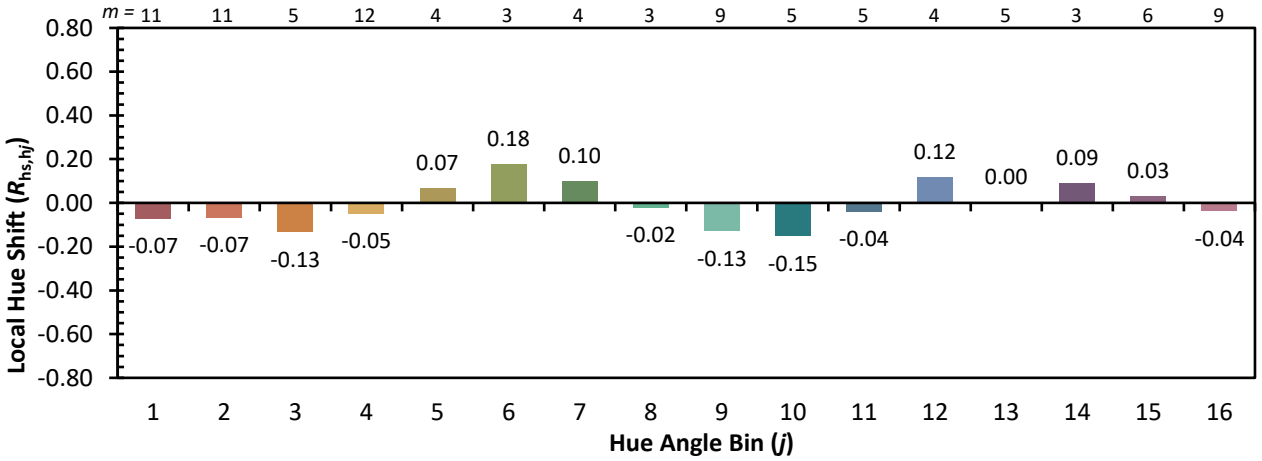


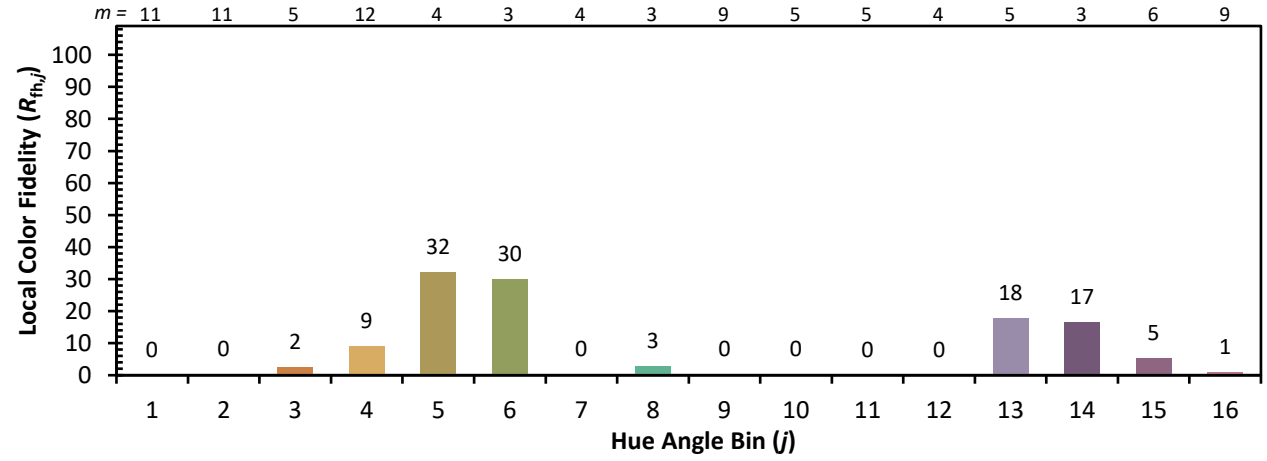
REPORT NUMBER: SP1-2407-157-1

# TM-30-18

## Color Rendition by Hue-Angle Bin



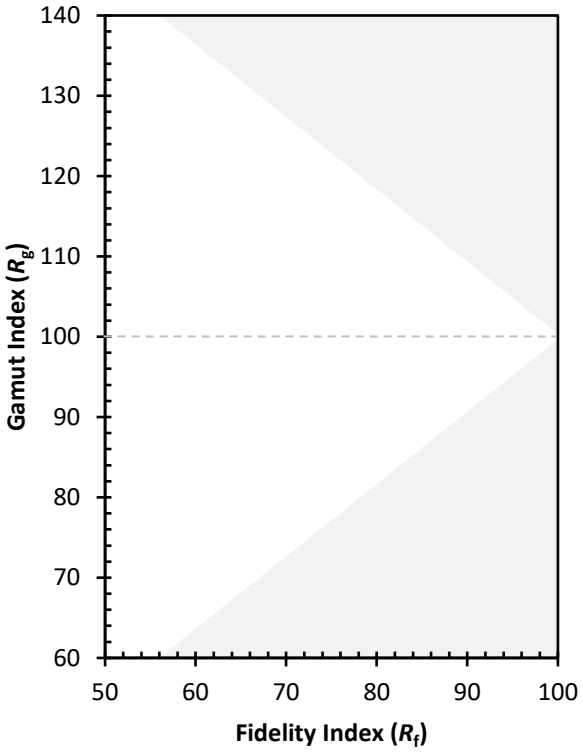



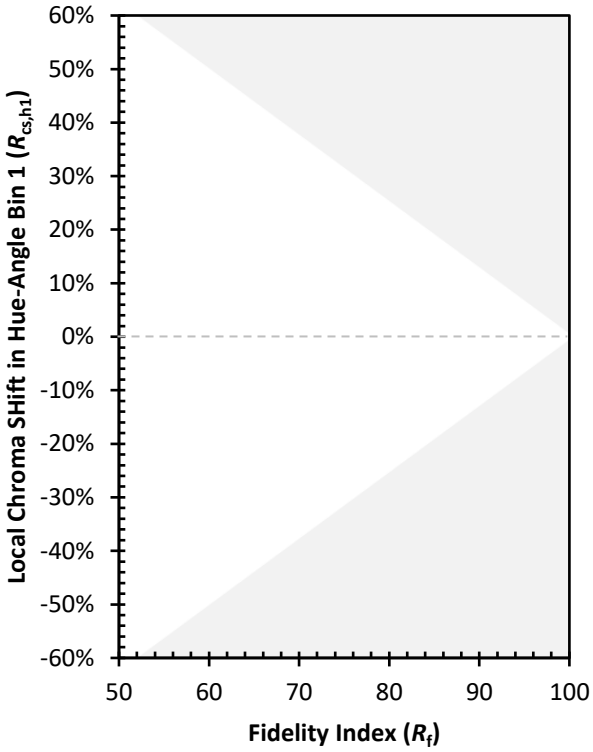



REPORT NUMBER: SP1-2407-157-1

# TM-30-18

## Measure Comparisons




(END OF REPORT)