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

Scaled data based on original data using

LM-79-2024 Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Test Report Prepared for

Cooper Lighting Solutions

Brand: INVUE

Report Number: P1442045

Luminaire Tested: ABB-C3-827-X-U-A-GM

Issue Date: 4/23/2026

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

Scaled Data Report

**Test Information**

| | |
|---|---|
| Test Method: | LM-79-2024 |
| Report Number: | P1442045 |
| | TEST IS SCALED FROM IESNA LM-79-24 TEST DATA (G2-2509-539-32) |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Issue Date: | 4/24/2026 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS |
| Product Line: | INVUE |
| Catalog Number: | ABB-C3-827-X-U-A-GM |
| Description: | ARBOR OUTDOOR ARCHITECTURAL BOLLARD LUMINAIRE |
| | ASYMMETRIC OPTIC, GRAPHITE METALLIC PAINTED FINISH |
| Light Source: | 2200K CCT, 80 CRI LEDS |
| Ballast/Driver: | - |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 871.7 lumens |
| Efficiency: | N/A |
| Efficacy: | 36.8 lumens/watt |
| Luminous Opening: | Circular (Dia: 0.4' x H: 0') |
| IES Classification: | Type III - Short |
| BUG Rating: | B1 - U0 - G1 |

| | |
|---|---|
| Input Watts (W): | 23.7 |
| Input Voltage (V): | 120 |
| Input Current (Ain): | NR |
| Voltage Rise (V): | NR |
| Power Factor: | 0.9878 |
| Total Harmonic Distortion (THDi): | 0.130909 |
| Frequency (hertz): | 60 |
| Stabilization Time: | 0.5 HR |
| Operation Time: | 3 HR |
| Ambient Temperature (°C): | NR |
| Test Distance: | 28.75 FT |

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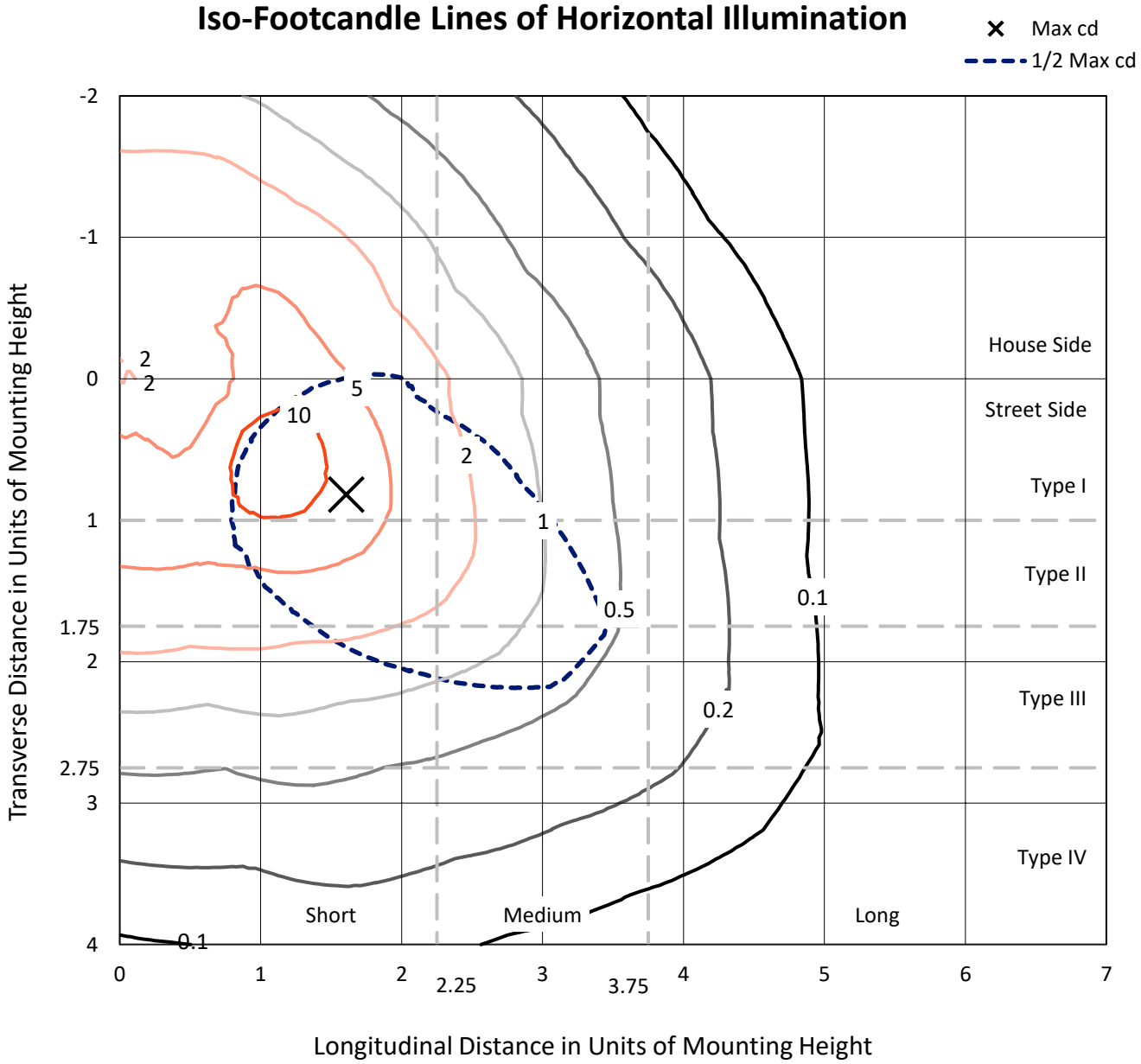
Scaled Data Report

REPORT NUMBER: P1442045
CATALOG NUMBER: ABB-C3-827-X-U-A-GM

## Iso-Footcandle Lines of Horizontal Illumination




Based on 3 foot mounting height. Maximum calculated value = 14.5 fc
Type III - Short - N/A

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REPORT NUMBER: P1442045
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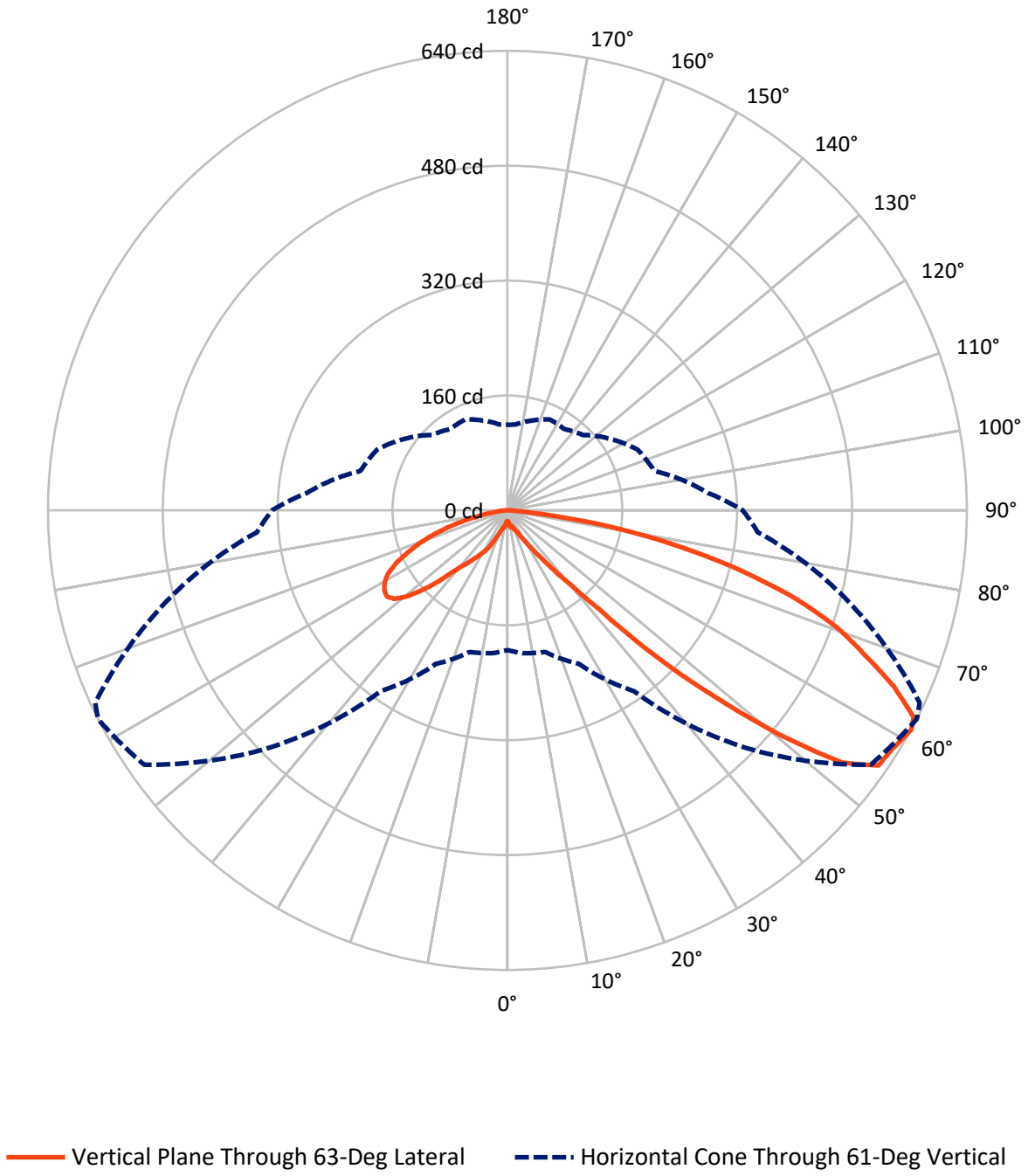
## Luminous Intensity Polar Plot



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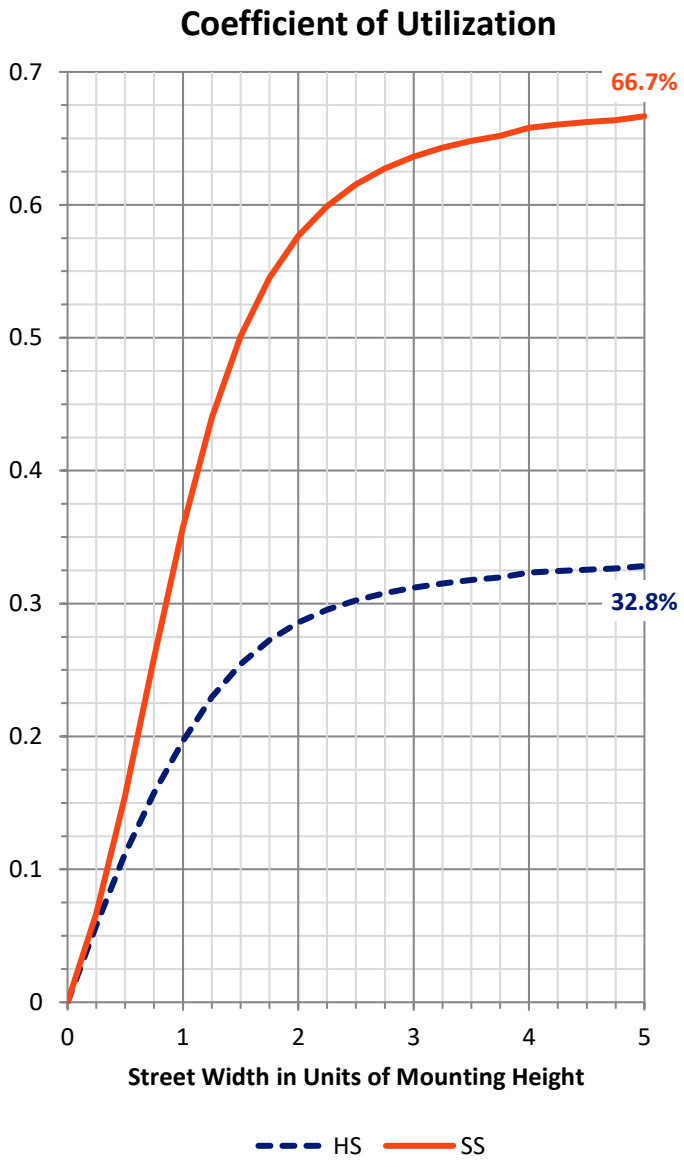
**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 288.2 | 0.0 | 288.2 |
| | % Fixture | 33.1 | 0.0 | 33.1 |
| **Street Side** | Lumens | 583.5 | 0.0 | 583.5 |
| | % Fixture | 66.9 | 0.0 | 66.9 |
| **Total** | Lumens | 871.7 | 0.0 | 871.7 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 2.1 | 0.2 |
| 10°-20° | 8.6 | 1.0 |
| 20°-30° | 21.7 | 2.5 |
| 30°-40° | 49.6 | 5.7 |
| 40°-50° | 129.0 | 14.8 |
| 50°-60° | 247.1 | 28.3 |
| 60°-70° | 249.5 | 28.6 |
| 70°-80° | 144.2 | 16.5 |
| 80°-90° | 20.0 | 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° | 871.7 | 100.0 |
| 0°-180° | 871.7 | 100.0 |



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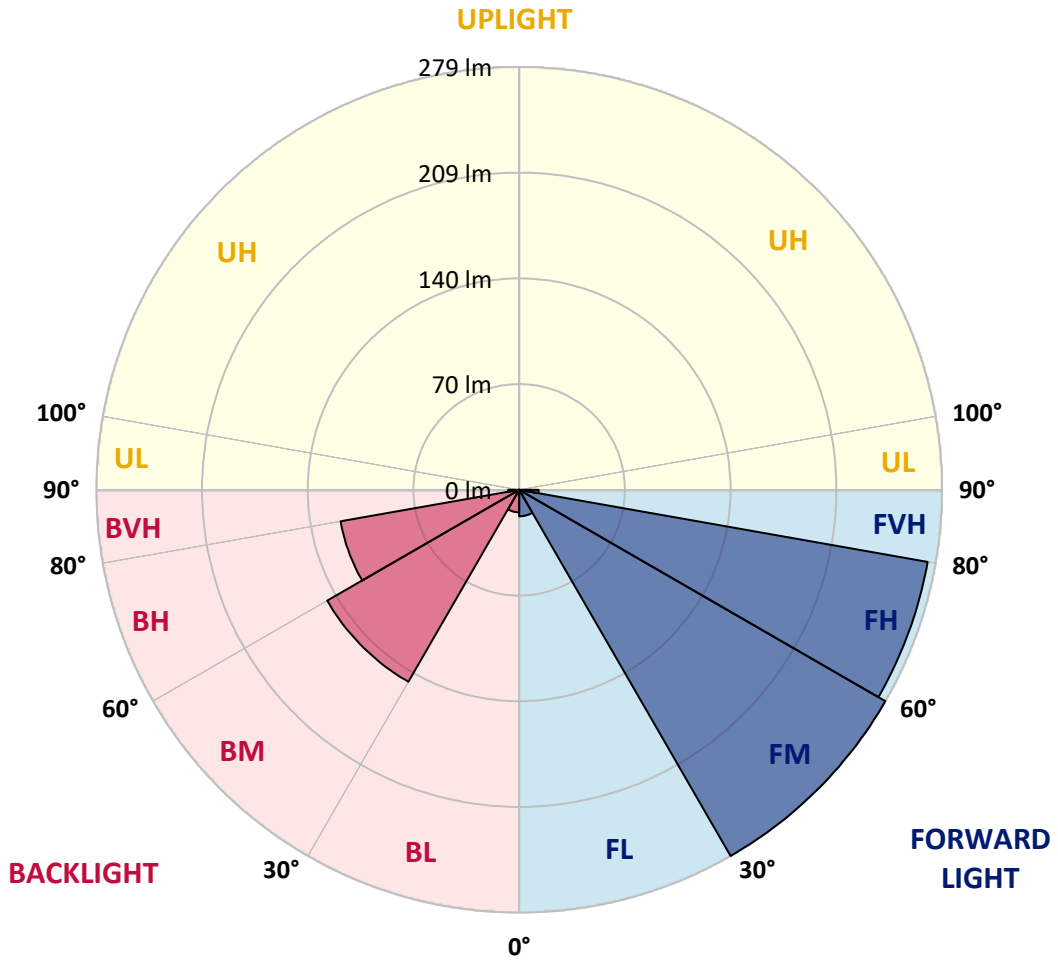
## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 17.5 | 2.0 | | | |
| FM | (30°-60°) | 279.3 | 32.0 | | | |
| FH | (60°-80°) | 273.9 | 31.4 | | | G0/660 |
| FVH | (80°-90°) | 12.9 | 1.5 | | | G1/100 |
| BL | (0°-30°) | 14.9 | 1.7 | B0/110 | | |
| BM | (30°-60°) | 146.4 | 16.8 | B0/220 | | |
| BH | (60°-80°) | 119.7 | 13.7 | B1/500 | | G1/500 |
| BVH | (80°-90°) | 7.2 | 0.8 | | | G0/10 |
| UL | (90°-100°) | 0.0 | 0.0 | | U0/0 | |
| UH | (100°-180°) | 0.0 | 0.0 | | U0/0 | |

**BUG Rating: B1-U0-G1**
Type III Short



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Scaled Data Report

REPORT NUMBER: P1442045
CATALOG NUMBER: ABB-C3-827-X-U-A-GM

**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 63° | 65° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 15.1 | 15.1 | 15.1 | 15.1 | 15.1 | 15.1 | 15.1 | *15.1* | 15.1 | 15.1 | 15.1 |
| 2.5° | 27.8 | 26.2 | 24.6 | 23.8 | 21.4 | 20.6 | 19.8 | *18.3* | 18.3 | 16.7 | 15.9 |
| 5° | 34.1 | 32.6 | 28.6 | 24.6 | 23.0 | 19.8 | 16.7 | *15.9* | 15.9 | 15.9 | 14.3 |
| 7.5° | 37.3 | 34.1 | 33.3 | 27.8 | 27.0 | 27.0 | 26.2 | *22.2* | 21.4 | 19.8 | 19.8 |
| 10° | 36.5 | 36.5 | 36.5 | 31.8 | 31.0 | 29.4 | 26.2 | *23.8* | 23.8 | 21.4 | 22.2 |
| 12.5° | 33.3 | 33.3 | 37.3 | 35.7 | 30.2 | 29.4 | 26.2 | *21.4* | 21.4 | 20.6 | 19.8 |
| 15° | 34.1 | 35.7 | 41.3 | 40.5 | 37.3 | 31.8 | 27.0 | *24.6* | 23.8 | 22.2 | 21.4 |
| 17.5° | 42.9 | 42.1 | 42.1 | 42.9 | 42.1 | 34.9 | 28.6 | *24.6* | 25.4 | 23.8 | 23.8 |
| 20° | 48.4 | 48.4 | 48.4 | 47.6 | 46.1 | 37.3 | 31.0 | *28.6* | 27.8 | 27.0 | 26.2 |
| 22.5° | 58.0 | 57.2 | 59.6 | 55.6 | 50.8 | 40.5 | 34.9 | *31.8* | 32.6 | 31.0 | 28.6 |
| 25° | 72.3 | 74.6 | 65.9 | 58.0 | 53.2 | 43.7 | 38.1 | *35.7* | 36.5 | 37.3 | 33.3 |
| 27.5° | 87.3 | 86.5 | 73.0 | 65.1 | 58.8 | 49.2 | 45.3 | *42.9* | 44.5 | 44.5 | 41.3 |
| 30° | 95.3 | 98.5 | 85.0 | 73.8 | 65.1 | 58.0 | 53.2 | *52.4* | 54.8 | 54.8 | 49.2 |
| 32.5° | 105.6 | 107.2 | 93.7 | 81.0 | 73.0 | 68.3 | 67.5 | *65.1* | 67.5 | 64.3 | 58.8 |
| 35° | 116.7 | 117.5 | 106.4 | 88.9 | 83.4 | 82.6 | 85.0 | *81.8* | 85.0 | 77.0 | 69.9 |
| 37.5° | 124.7 | 126.2 | 116.7 | 99.2 | 94.5 | 96.9 | 106.4 | *105.6* | 109.6 | 97.7 | 83.4 |
| 40° | 131.8 | 135.8 | 127.0 | 111.2 | 108.8 | 116.7 | 136.6 | *138.2* | 144.5 | 126.2 | 100.0 |
| 42.5° | 142.1 | 146.1 | 140.5 | 125.5 | 128.6 | 146.1 | 186.6 | *190.6* | 204.9 | 170.7 | 130.2 |
| 45° | 164.4 | 167.5 | 167.5 | 154.8 | 165.2 | 204.9 | 284.3 | *290.6* | 307.3 | 239.8 | 177.1 |
| 47.5° | 179.4 | 179.4 | 185.0 | 177.1 | 199.3 | 268.4 | 376.4 | *385.1* | 399.4 | 311.2 | 226.3 |
| 50° | 199.3 | 199.3 | 211.2 | 210.4 | 246.9 | 354.1 | 471.6 | *489.9* | 501.0 | 391.4 | 281.9 |
| 52.5° | 205.6 | 209.6 | 223.9 | 231.1 | 284.3 | 412.1 | 561.4 | *583.6* | 589.9 | 451.8 | 321.6 |
| 55° | 209.6 | 214.4 | 226.3 | 237.4 | 304.9 | 455.0 | 613.8 | *627.3* | 621.7 | 490.7 | 340.6 |
| 57.5° | 209.6 | 212.8 | 222.3 | 236.6 | 307.3 | 470.8 | 615.4 | *630.4* | 624.1 | 503.4 | 349.4 |
| 60° | 201.7 | 204.1 | 209.6 | 235.8 | 308.1 | 469.3 | 614.6 | *636.8* | 631.2 | 499.4 | 352.5 |
| 61° | *194.5* | *199.3* | *204.1* | *235.8* | *307.3* | *466.9* | *617.7* | *640.0* | *633.6* | *492.3* | *350.2* |
| 62.5° | 185.8 | 191.4 | 194.5 | 235.0 | 300.9 | 457.3 | 614.6 | *635.2* | 623.3 | 479.6 | 340.6 |
| 65° | 169.1 | 172.3 | 173.1 | 227.1 | 281.9 | 424.8 | 578.8 | *591.5* | 574.1 | 445.4 | 315.2 |
| 67.5° | 145.3 | 148.5 | 150.9 | 212.8 | 260.4 | 385.1 | 527.2 | *536.7* | 522.5 | 401.0 | 289.8 |
| 70° | 119.9 | 123.9 | 129.4 | 194.5 | 235.0 | 339.0 | 472.4 | *486.7* | 471.6 | 350.2 | 262.0 |
| 72.5° | 92.1 | 97.7 | 107.2 | 166.7 | 202.5 | 287.4 | 404.1 | *419.2* | 401.8 | 291.4 | 223.1 |
| 75° | 66.7 | 72.3 | 85.0 | 135.0 | 164.4 | 228.7 | 324.0 | *338.2* | 318.4 | 228.7 | 180.2 |
| 77.5° | 43.7 | 47.6 | 60.3 | 96.9 | 119.9 | 166.7 | 243.8 | *250.1* | 230.3 | 157.2 | 130.2 |
| 80° | 26.2 | 29.4 | 38.1 | 58.0 | 70.7 | 105.6 | 156.4 | *160.4* | 140.5 | 88.9 | 77.8 |
| 82.5° | 16.7 | 17.5 | 19.8 | 23.8 | 23.8 | 49.2 | 69.1 | *69.9* | 52.4 | 27.0 | 31.0 |
| 85° | 10.3 | 11.1 | 9.5 | 7.9 | 8.7 | 10.3 | 10.3 | *11.1* | 9.5 | 7.9 | 7.9 |
| 87.5° | 7.9 | 7.9 | 7.1 | 6.4 | 6.4 | 6.4 | 7.9 | *7.9* | 7.9 | 6.4 | 6.4 |
| 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: P1442045
CATALOG NUMBER: ABB-C3-827-X-U-A-GM

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 15.1 | 15.1 | 15.1 | 15.1 | 15.1 | 15.1 | 15.1 | 15.1 | 15.1 | 15.1 | 15.1 |
| 2.5° | 15.1 | 15.1 | 15.1 | 15.1 | 15.1 | 15.1 | 15.1 | 15.9 | 15.9 | 16.7 | 16.7 |
| 5° | 13.5 | 14.3 | 15.9 | 15.9 | 16.7 | 16.7 | 17.5 | 17.5 | 15.9 | 15.1 | 15.1 |
| 7.5° | 19.8 | 20.6 | 19.8 | 20.6 | 20.6 | 19.1 | 19.1 | 19.8 | 20.6 | 19.1 | 18.3 |
| 10° | 21.4 | 20.6 | 20.6 | 22.2 | 26.2 | 23.0 | 24.6 | 24.6 | 23.8 | 21.4 | 20.6 |
| 12.5° | 20.6 | 21.4 | 22.2 | 23.8 | 25.4 | 30.2 | 27.8 | 27.8 | 26.2 | 23.8 | 23.0 |
| 15° | 21.4 | 23.0 | 23.8 | 24.6 | 28.6 | 33.3 | 31.8 | 30.2 | 28.6 | 23.8 | 23.8 |
| 17.5° | 24.6 | 25.4 | 27.0 | 27.8 | 32.6 | 36.5 | 36.5 | 31.8 | 29.4 | 25.4 | 24.6 |
| 20° | 26.2 | 27.0 | 31.0 | 32.6 | 37.3 | 38.9 | 42.1 | 36.5 | 32.6 | 28.6 | 27.8 |
| 22.5° | 28.6 | 29.4 | 34.1 | 39.7 | 42.9 | 43.7 | 45.3 | 38.9 | 33.3 | 31.0 | 29.4 |
| 25° | 34.1 | 34.1 | 38.9 | 48.4 | 50.8 | 46.8 | 47.6 | 42.1 | 34.9 | 31.0 | 30.2 |
| 27.5° | 41.3 | 42.9 | 47.6 | 59.6 | 55.6 | 51.6 | 51.6 | 45.3 | 36.5 | 32.6 | 31.8 |
| 30° | 51.6 | 50.0 | 56.4 | 66.7 | 62.7 | 58.0 | 56.4 | 48.4 | 38.9 | 34.1 | 33.3 |
| 32.5° | 61.9 | 61.1 | 65.9 | 73.8 | 71.5 | 63.5 | 60.3 | 52.4 | 41.3 | 35.7 | 34.1 |
| 35° | 72.3 | 73.0 | 76.2 | 82.6 | 78.6 | 68.3 | 65.9 | 56.4 | 44.5 | 38.1 | 37.3 |
| 37.5° | 85.8 | 86.5 | 85.8 | 92.9 | 86.5 | 75.4 | 72.3 | 61.1 | 49.2 | 44.5 | 42.1 |
| 40° | 100.8 | 102.4 | 100.0 | 103.2 | 95.3 | 84.2 | 80.2 | 68.3 | 58.0 | 52.4 | 51.6 |
| 42.5° | 127.0 | 127.8 | 120.7 | 119.1 | 108.8 | 96.9 | 94.5 | 81.0 | 71.5 | 65.9 | 63.5 |
| 45° | 165.2 | 161.2 | 149.3 | 143.7 | 129.4 | 112.7 | 110.4 | 97.7 | 86.5 | 81.8 | 80.2 |
| 47.5° | 205.6 | 200.1 | 178.6 | 166.7 | 147.7 | 131.0 | 126.2 | 116.7 | 104.0 | 97.7 | 96.1 |
| 50° | 254.9 | 234.2 | 207.2 | 189.0 | 165.9 | 149.3 | 140.5 | 132.6 | 118.3 | 111.2 | 108.8 |
| 52.5° | 292.2 | 258.0 | 223.1 | 205.6 | 178.6 | 157.2 | 147.7 | 142.9 | 128.6 | 119.9 | 117.5 |
| 55° | 308.1 | 271.5 | 229.5 | 212.0 | 183.4 | 159.6 | 148.5 | 146.1 | 132.6 | 123.1 | 121.5 |
| 57.5° | 316.0 | 277.1 | 225.5 | 210.4 | 180.2 | 156.4 | 144.5 | 143.7 | 132.6 | 123.1 | 123.1 |
| 60° | 327.1 | 281.1 | 216.8 | 204.1 | 176.3 | 151.7 | 140.5 | 141.3 | 130.2 | 121.5 | 120.7 |
| 61° | *327.9* | *280.3* | *212.0* | *200.1* | *173.9* | *148.5* | *138.2* | *139.7* | *129.4* | *119.9* | *119.1* |
| 62.5° | 325.5 | 276.3 | 204.9 | 193.7 | 167.5 | 142.9 | 134.2 | 136.6 | 125.5 | 116.7 | 115.9 |
| 65° | 308.9 | 262.8 | 189.0 | 177.1 | 151.7 | 131.0 | 123.9 | 127.8 | 118.3 | 108.8 | 108.8 |
| 67.5° | 289.0 | 245.3 | 170.7 | 155.6 | 135.0 | 117.5 | 112.7 | 115.1 | 108.0 | 99.2 | 99.2 |
| 70° | 259.6 | 220.7 | 150.9 | 133.4 | 116.7 | 102.4 | 99.2 | 103.2 | 96.9 | 88.1 | 88.1 |
| 72.5° | 220.7 | 188.2 | 129.4 | 109.6 | 95.3 | 86.5 | 85.0 | 88.9 | 82.6 | 75.4 | 76.2 |
| 75° | 175.5 | 149.3 | 102.4 | 83.4 | 73.0 | 69.9 | 69.1 | 71.5 | 67.5 | 61.9 | 61.9 |
| 77.5° | 125.5 | 105.6 | 72.3 | 58.0 | 52.4 | 53.2 | 50.8 | 52.4 | 50.8 | 46.1 | 46.8 |
| 80° | 73.0 | 58.8 | 41.3 | 34.9 | 33.3 | 34.9 | 33.3 | 34.1 | 34.1 | 31.0 | 31.8 |
| 82.5° | 27.8 | 20.6 | 18.3 | 19.1 | 18.3 | 19.1 | 15.9 | 16.7 | 17.5 | 18.3 | 18.3 |
| 85° | 7.9 | 7.9 | 8.7 | 9.5 | 9.5 | 8.7 | 7.9 | 7.9 | 8.7 | 10.3 | 10.3 |
| 87.5° | 6.4 | 5.6 | 6.4 | 7.1 | 7.1 | 7.1 | 6.4 | 6.4 | 7.1 | 7.9 | 8.7 |
| 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

Invue

Report Number: SP1-2509-539-6

Test Date: 04/15/2026

Luminaire Tested: Luxscape Bollard

Data in this report applies to families of products including ;Luxscape

Report Generated By FNC07603 / LDUCLS01DT446
Version: v7.05

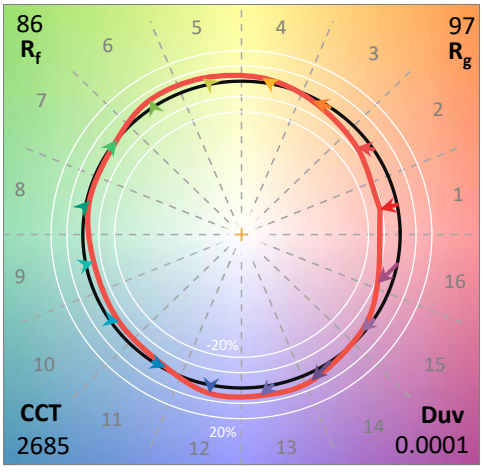
## Test Information

| | |
|---|---|
| Test Method: | LM-79-2019 |
| Report Number: | SP1-2509-539-6 |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Photometer: | SP1 - 76IN SPHERE |
| Measurement Geometry: | 4π |
| Issue Date: | 04/15/2026 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS |
| Product Line: | Invue |
| Catalog Number: | **Luxscape Bollard** |
| Description: | ARB-C1-827-LED-XX-Dx-S-GM-SPECULAR REFLECTOR |

## Spectral Parameters

| | |
|---|---|
| CCT (K): | 2685 |
| CIE u': | 0.2631 |
| CIE v': | 0.5278 |
| Duv: | 0.0001 |
| CIE x: | 0.4613 |
| CIE y: | 0.4112 |
| CIE z: | 0.1276 |
| Peak Wavelength (nm): | 607 |
| Dominant Wavelength (nm): | 584 |
| Purity: | 61.87869 |
| Rf: | 85.8 |
| Rg: | 97.1 |

| | | | | | |
|---|---|---|---|---|---|
| CRI (Ra): | 83.3 | | | | |
| R1: | 82.0 | R9: | 7.2 | | |
| R2: | 92.1 | R10: | 83.2 | | |
| R3: | 95.4 | R11: | 84.1 | | |
| R4: | 82.6 | R12: | 80.9 | | |
| R5: | 82.9 | R13: | 84.4 | | |
| R6: | 92.4 | R14: | 98.1 | | |
| R7: | 81.6 | R15: | 73.2 | | |
| R8: | 57.2 | | | | |




## Test Conditions

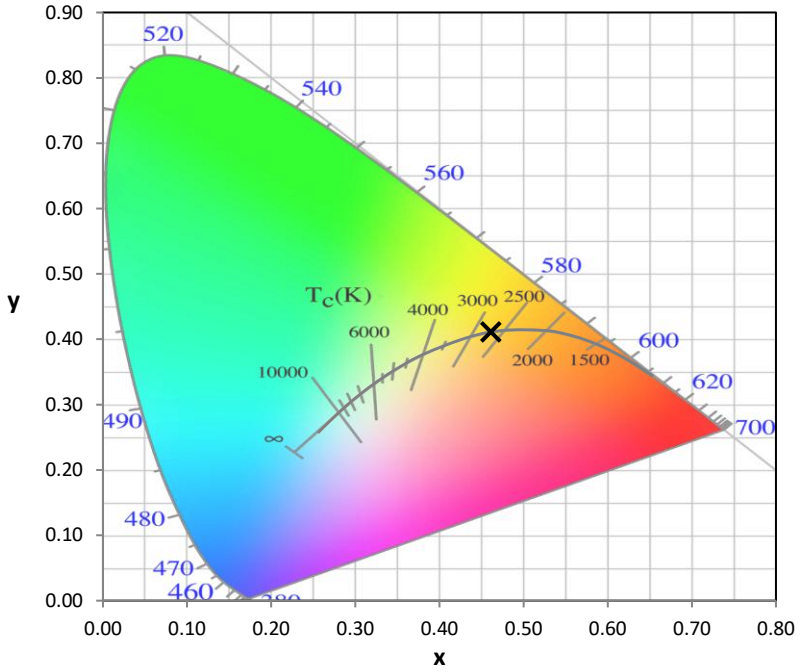
| | |
|---|---|
| Stabilization Time: | 29M |
| Operation Time: | 1H 29M |
| Sphere Temperature (°C): | 25.1 |

REPORT NUMBER: SP1-2509-539-6

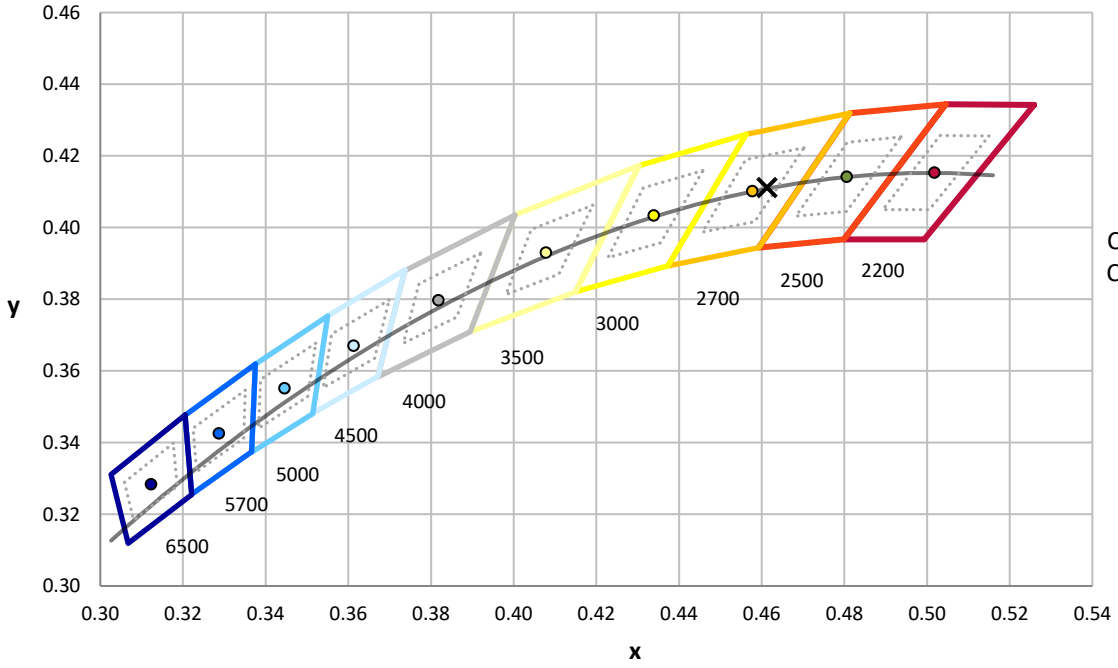
| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | 76INCH SPHERE IN0058 | 12/16/2025 | 6/16/2026 |
| Power Meter | XITRON INXT2011004 | 10/21/2025 | 10/21/2026 |
| AC Power Source | CHROMA 61603 IN0063 | 10/21/2025 | 10/21/2026 |
| DC Power Source | AGILENT E3634A IN0208 | 10/21/2025 | 10/21/2026 |
| Sphere Thermometer | ONSET IN0085 | 10/21/2025 | 10/21/2026 |
| Room Thermometer | ONSET IN0046 | 10/21/2025 | 10/21/2026 |

REPORT NUMBER: SP1-2509-539-6

## CIE 1931 Chromaticity Diagram




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

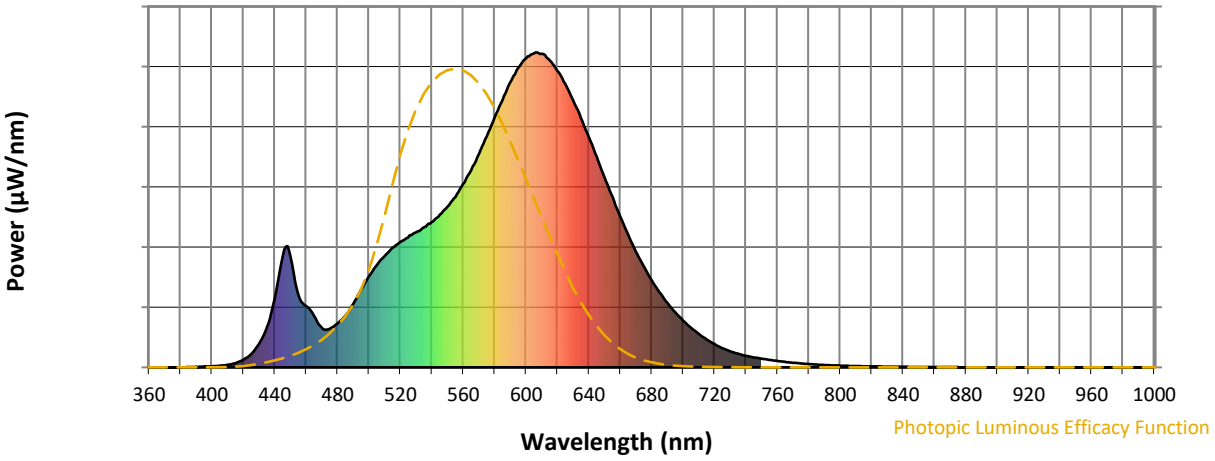



CCT = 2685K
CIE x = 0.4613
CIE y = 0.4112
Duv = 0.0001

Point lies inside the ANSI 2700K 4-step quadrangle

REPORT NUMBER: SP1-2509-539-6

## 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 | 202 | NR | 620 | 941 | NR | 750 | 28 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 247 | NR | 625 | 900 | NR | 755 | 24 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 290 | NR | 630 | 847 | NR | 760 | 20 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 324 | NR | 635 | 791 | NR | 765 | 17 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 354 | NR | 640 | 730 | NR | 770 | 15 | NR | 900 | 0 | NR |
| 385 | 1 | NR | 515 | 380 | NR | 645 | 668 | NR | 775 | 13 | NR | 905 | 0 | NR |
| 390 | 2 | NR | 520 | 398 | NR | 650 | 602 | NR | 780 | 11 | NR | 910 | 0 | NR |
| 395 | 3 | NR | 525 | 413 | NR | 655 | 541 | NR | 785 | 9 | NR | 915 | 0 | NR |
| 400 | 3 | NR | 530 | 428 | NR | 660 | 478 | NR | 790 | 8 | NR | 920 | 0 | NR |
| 405 | 5 | NR | 535 | 445 | NR | 665 | 421 | NR | 795 | 6 | NR | 925 | 0 | NR |
| 410 | 8 | NR | 540 | 461 | NR | 670 | 367 | NR | 800 | 5 | NR | 930 | 0 | NR |
| 415 | 14 | NR | 545 | 485 | NR | 675 | 320 | NR | 805 | 5 | NR | 935 | 0 | NR |
| 420 | 24 | NR | 550 | 510 | NR | 680 | 277 | NR | 810 | 4 | NR | 940 | 0 | NR |
| 425 | 43 | NR | 555 | 541 | NR | 685 | 238 | NR | 815 | 3 | NR | 945 | 0 | NR |
| 430 | 74 | NR | 560 | 582 | NR | 690 | 205 | NR | 820 | 3 | NR | 950 | 0 | NR |
| 435 | 128 | NR | 565 | 626 | NR | 695 | 175 | NR | 825 | 3 | NR | 955 | 0 | NR |
| 440 | 218 | NR | 570 | 677 | NR | 700 | 148 | NR | 830 | 2 | NR | 960 | 0 | NR |
| 445 | 352 | NR | 575 | 734 | NR | 705 | 126 | NR | 835 | 2 | NR | 965 | 0 | NR |
| 450 | 354 | NR | 580 | 793 | NR | 710 | 106 | NR | 840 | 2 | NR | 970 | 0 | NR |
| 455 | 230 | NR | 585 | 849 | NR | 715 | 89 | NR | 845 | 1 | NR | 975 | 0 | NR |
| 460 | 195 | NR | 590 | 907 | NR | 720 | 74 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 164 | NR | 595 | 951 | NR | 725 | 61 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 125 | NR | 600 | 981 | NR | 730 | 51 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 122 | NR | 605 | 997 | NR | 735 | 43 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 140 | NR | 610 | 996 | NR | 740 | 37 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 164 | NR | 615 | 976 | NR | 745 | 32 | NR | 875 | 1 | NR | | | |

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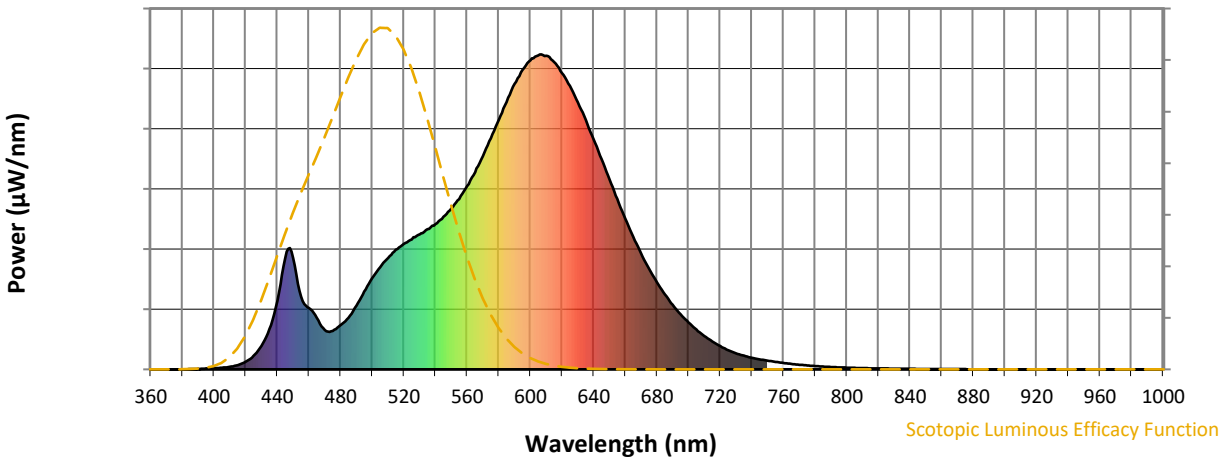
## Scotopic Flux vs. Wavelength




**Scotopic Lumens: NR** **S/P: 1.22**

| 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 | 202 | NR | 620 | 941 | NR | 750 | 28 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 247 | NR | 625 | 900 | NR | 755 | 24 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 290 | NR | 630 | 847 | NR | 760 | 20 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 324 | NR | 635 | 791 | NR | 765 | 17 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 354 | NR | 640 | 730 | NR | 770 | 15 | NR | 900 | 0 | NR |
| 385 | 1 | NR | 515 | 380 | NR | 645 | 668 | NR | 775 | 13 | NR | 905 | 0 | NR |
| 390 | 2 | NR | 520 | 398 | NR | 650 | 602 | NR | 780 | 11 | NR | 910 | 0 | NR |
| 395 | 3 | NR | 525 | 413 | NR | 655 | 541 | NR | 785 | 9 | NR | 915 | 0 | NR |
| 400 | 3 | NR | 530 | 428 | NR | 660 | 478 | NR | 790 | 8 | NR | 920 | 0 | NR |
| 405 | 5 | NR | 535 | 445 | NR | 665 | 421 | NR | 795 | 6 | NR | 925 | 0 | NR |
| 410 | 8 | NR | 540 | 461 | NR | 670 | 367 | NR | 800 | 5 | NR | 930 | 0 | NR |
| 415 | 14 | NR | 545 | 485 | NR | 675 | 320 | NR | 805 | 5 | NR | 935 | 0 | NR |
| 420 | 24 | NR | 550 | 510 | NR | 680 | 277 | NR | 810 | 4 | NR | 940 | 0 | NR |
| 425 | 43 | NR | 555 | 541 | NR | 685 | 238 | NR | 815 | 3 | NR | 945 | 0 | NR |
| 430 | 74 | NR | 560 | 582 | NR | 690 | 205 | NR | 820 | 3 | NR | 950 | 0 | NR |
| 435 | 128 | NR | 565 | 626 | NR | 695 | 175 | NR | 825 | 3 | NR | 955 | 0 | NR |
| 440 | 218 | NR | 570 | 677 | NR | 700 | 148 | NR | 830 | 2 | NR | 960 | 0 | NR |
| 445 | 352 | NR | 575 | 734 | NR | 705 | 126 | NR | 835 | 2 | NR | 965 | 0 | NR |
| 450 | 354 | NR | 580 | 793 | NR | 710 | 106 | NR | 840 | 2 | NR | 970 | 0 | NR |
| 455 | 230 | NR | 585 | 849 | NR | 715 | 89 | NR | 845 | 1 | NR | 975 | 0 | NR |
| 460 | 195 | NR | 590 | 907 | NR | 720 | 74 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 164 | NR | 595 | 951 | NR | 725 | 61 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 125 | NR | 600 | 981 | NR | 730 | 51 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 122 | NR | 605 | 997 | NR | 735 | 43 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 140 | NR | 610 | 996 | NR | 740 | 37 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 164 | NR | 615 | 976 | NR | 745 | 32 | NR | 875 | 1 | NR | | | |

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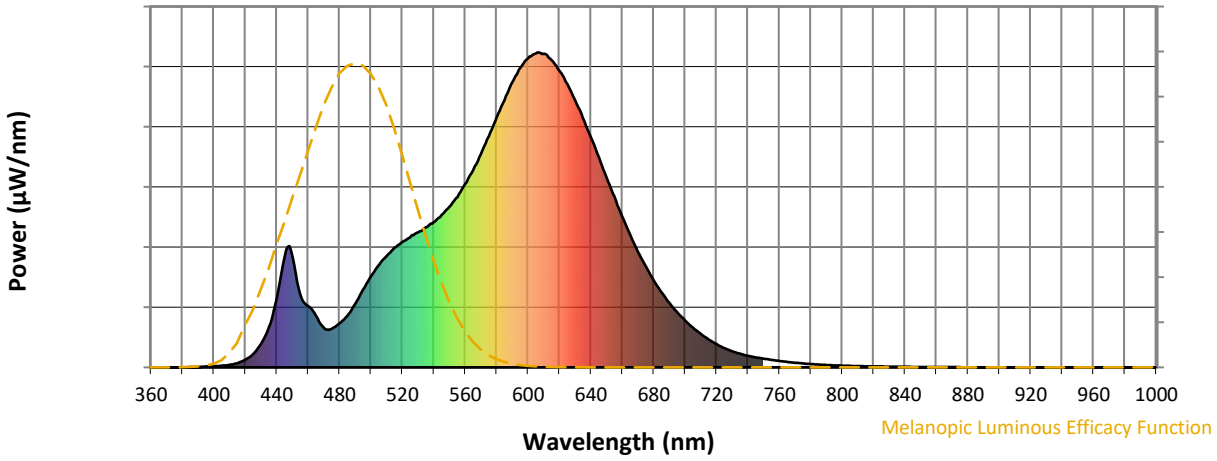
## Melanopic Flux vs. Wavelength




**Melanopic Lumens: NR** **M/P: 2.26**

| 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 | 202 | NR | 620 | 941 | NR | 750 | 28 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 247 | NR | 625 | 900 | NR | 755 | 24 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 290 | NR | 630 | 847 | NR | 760 | 20 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 324 | NR | 635 | 791 | NR | 765 | 17 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 354 | NR | 640 | 730 | NR | 770 | 15 | NR | 900 | 0 | NR |
| 385 | 1 | NR | 515 | 380 | NR | 645 | 668 | NR | 775 | 13 | NR | 905 | 0 | NR |
| 390 | 2 | NR | 520 | 398 | NR | 650 | 602 | NR | 780 | 11 | NR | 910 | 0 | NR |
| 395 | 3 | NR | 525 | 413 | NR | 655 | 541 | NR | 785 | 9 | NR | 915 | 0 | NR |
| 400 | 3 | NR | 530 | 428 | NR | 660 | 478 | NR | 790 | 8 | NR | 920 | 0 | NR |
| 405 | 5 | NR | 535 | 445 | NR | 665 | 421 | NR | 795 | 6 | NR | 925 | 0 | NR |
| 410 | 8 | NR | 540 | 461 | NR | 670 | 367 | NR | 800 | 5 | NR | 930 | 0 | NR |
| 415 | 14 | NR | 545 | 485 | NR | 675 | 320 | NR | 805 | 5 | NR | 935 | 0 | NR |
| 420 | 24 | NR | 550 | 510 | NR | 680 | 277 | NR | 810 | 4 | NR | 940 | 0 | NR |
| 425 | 43 | NR | 555 | 541 | NR | 685 | 238 | NR | 815 | 3 | NR | 945 | 0 | NR |
| 430 | 74 | NR | 560 | 582 | NR | 690 | 205 | NR | 820 | 3 | NR | 950 | 0 | NR |
| 435 | 128 | NR | 565 | 626 | NR | 695 | 175 | NR | 825 | 3 | NR | 955 | 0 | NR |
| 440 | 218 | NR | 570 | 677 | NR | 700 | 148 | NR | 830 | 2 | NR | 960 | 0 | NR |
| 445 | 352 | NR | 575 | 734 | NR | 705 | 126 | NR | 835 | 2 | NR | 965 | 0 | NR |
| 450 | 354 | NR | 580 | 793 | NR | 710 | 106 | NR | 840 | 2 | NR | 970 | 0 | NR |
| 455 | 230 | NR | 585 | 849 | NR | 715 | 89 | NR | 845 | 1 | NR | 975 | 0 | NR |
| 460 | 195 | NR | 590 | 907 | NR | 720 | 74 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 164 | NR | 595 | 951 | NR | 725 | 61 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 125 | NR | 600 | 981 | NR | 730 | 51 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 122 | NR | 605 | 997 | NR | 735 | 43 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 140 | NR | 610 | 996 | NR | 740 | 37 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 164 | NR | 615 | 976 | NR | 745 | 32 | NR | 875 | 1 | NR | | | |

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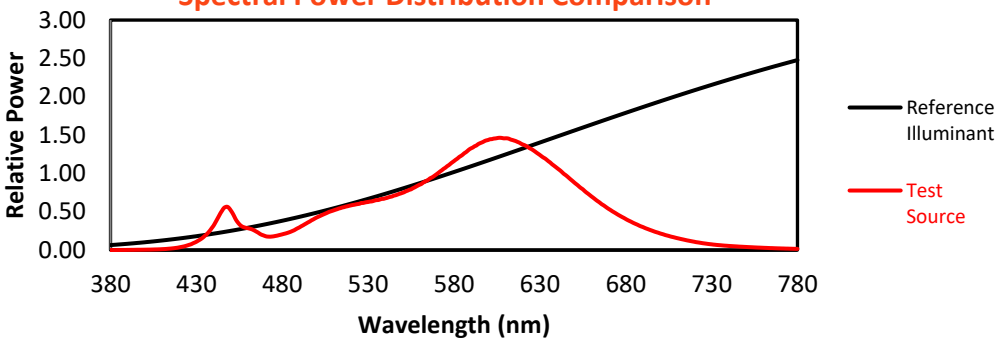
# TM-30-18

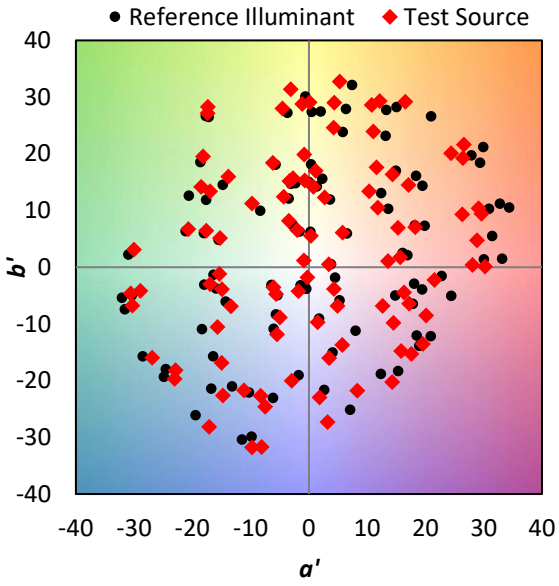
## Summary

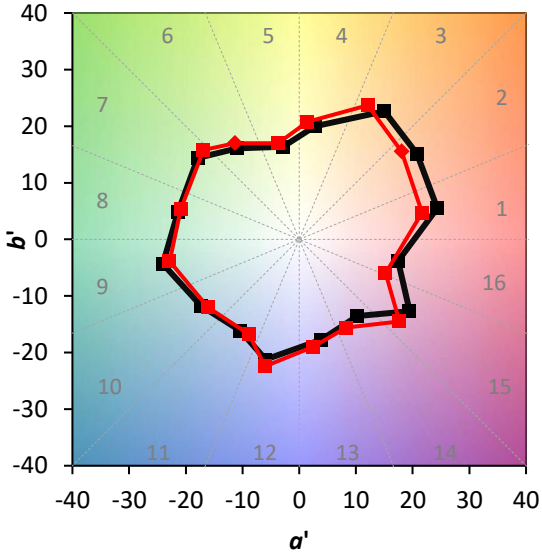
$R_f$ = 85.8
$R_g$ = 97.1
CIE $R_a$ = 83.3
$R_9$ = 7.2

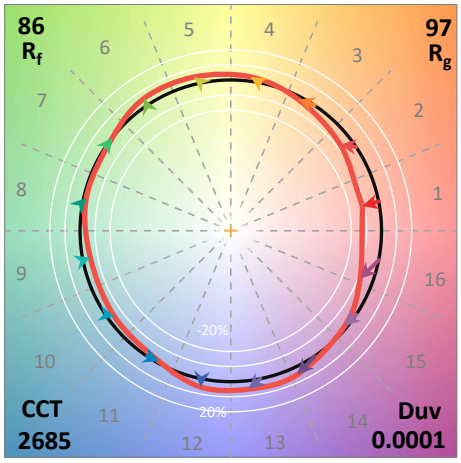
## Spectral Power Distribution Comparison

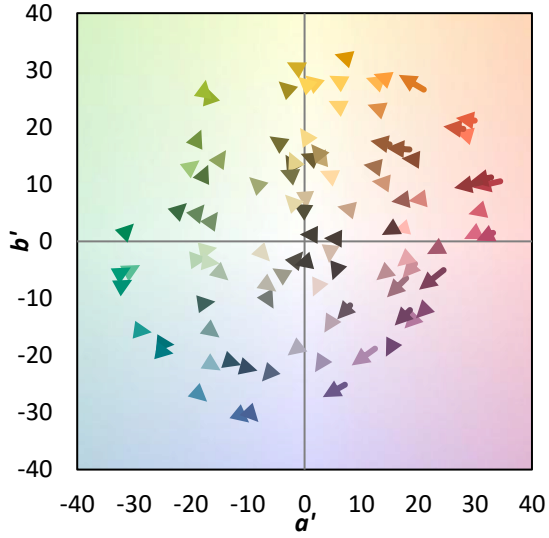



## Color Vector Graphics



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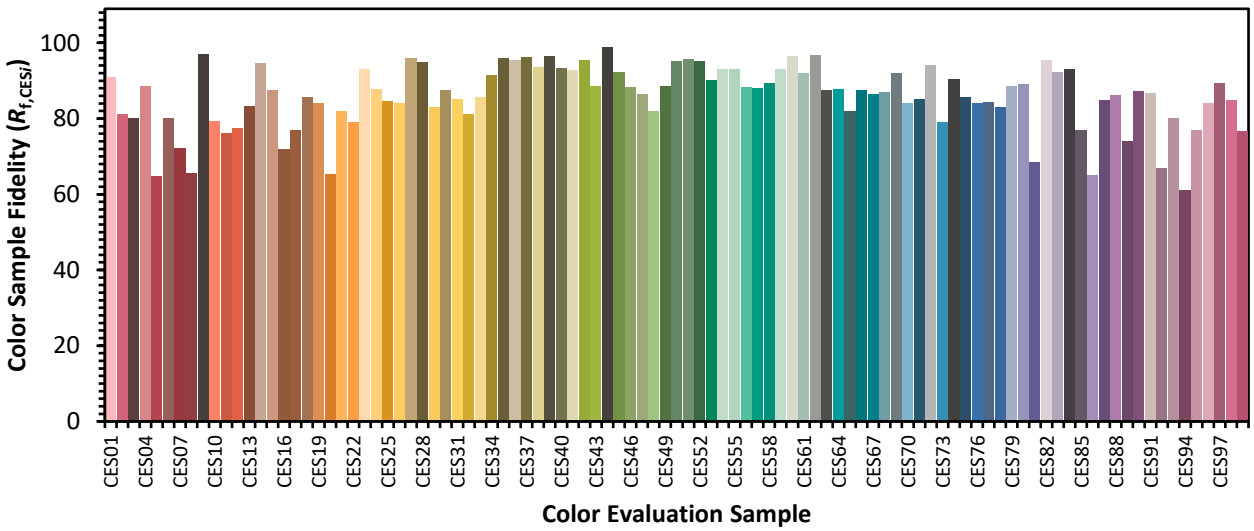
# TM-30-18

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

| | | | |
|---|---|---|---|
| CES01 = 86 | CES26 = 84 | CES51 = 96 | CES76 = 84 |
| CES02 = 64 | CES27 = 96 | CES52 = 95 | CES77 = 84 |
| CES03 = 32 | CES28 = 95 | CES53 = 90 | CES78 = 83 |
| CES04 = 71 | CES29 = 83 | CES54 = 93 | CES79 = 89 |
| CES05 = 51 | CES30 = 87 | CES55 = 93 | CES80 = 89 |
| CES06 = 52 | CES31 = 85 | CES56 = 88 | CES81 = 69 |
| CES07 = 43 | CES32 = 81 | CES57 = 88 | CES82 = 95 |
| CES08 = 42 | CES33 = 86 | CES58 = 89 | CES83 = 92 |
| CES09 = 29 | CES34 = 91 | CES59 = 93 | CES84 = 93 |
| CES10 = 77 | CES35 = 96 | CES60 = 97 | CES85 = 77 |
| CES11 = 60 | CES36 = 95 | CES61 = 92 | CES86 = 65 |
| CES12 = 66 | CES37 = 96 | CES62 = 97 | CES87 = 85 |
| CES13 = 44 | CES38 = 94 | CES63 = 87 | CES88 = 86 |
| CES14 = 74 | CES39 = 96 | CES64 = 88 | CES89 = 74 |
| CES15 = 72 | CES40 = 93 | CES65 = 82 | CES90 = 87 |
| CES16 = 48 | CES41 = 93 | CES66 = 87 | CES91 = 87 |
| CES17 = 50 | CES42 = 95 | CES67 = 86 | CES92 = 67 |
| CES18 = 57 | CES43 = 89 | CES68 = 87 | CES93 = 80 |
| CES19 = 73 | CES44 = 99 | CES69 = 92 | CES94 = 61 |
| CES20 = 67 | CES45 = 92 | CES70 = 84 | CES95 = 77 |
| CES21 = 87 | CES46 = 88 | CES71 = 85 | CES96 = 84 |
| CES22 = 79 | CES47 = 86 | CES72 = 94 | CES97 = 89 |
| CES23 = 92 | CES48 = 82 | CES73 = 79 | CES98 = 85 |
| CES24 = 91 | CES49 = 89 | CES74 = 90 | CES99 = 77 |
| CES25 = 72 | CES50 = 95 | CES75 = 86 | |



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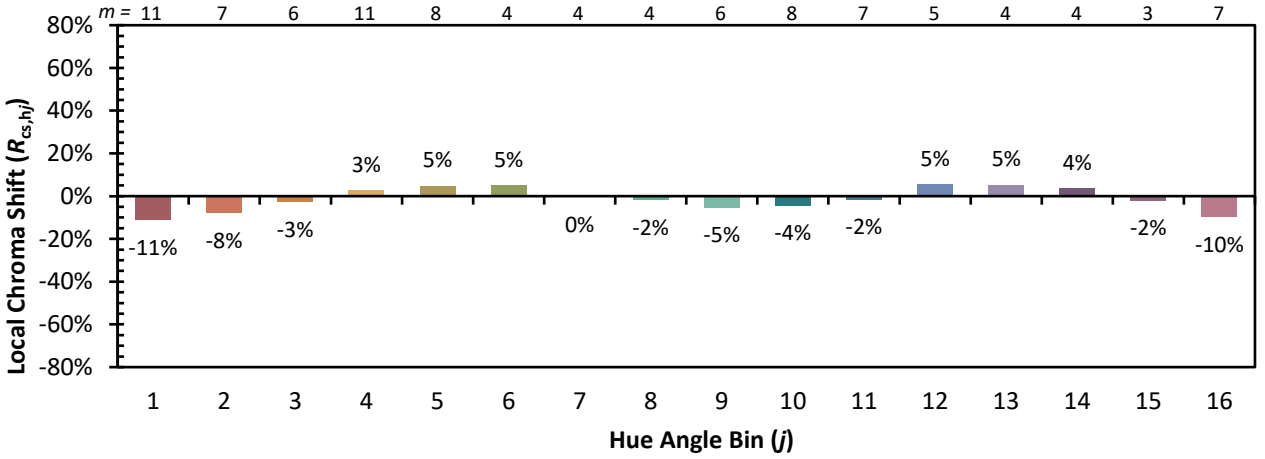
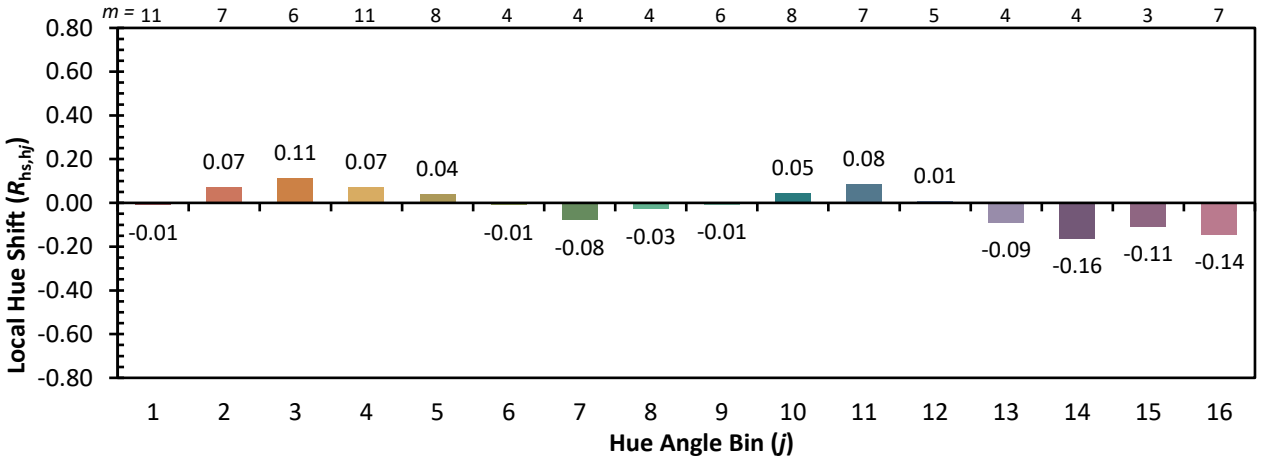
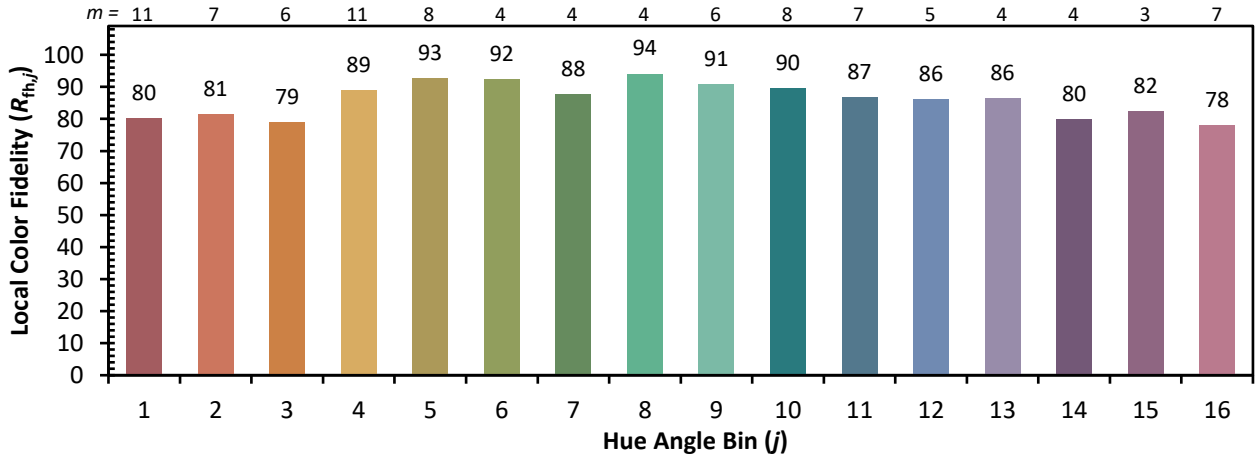
**TM-30-18**

## Color Rendition by Hue-Angle Bin



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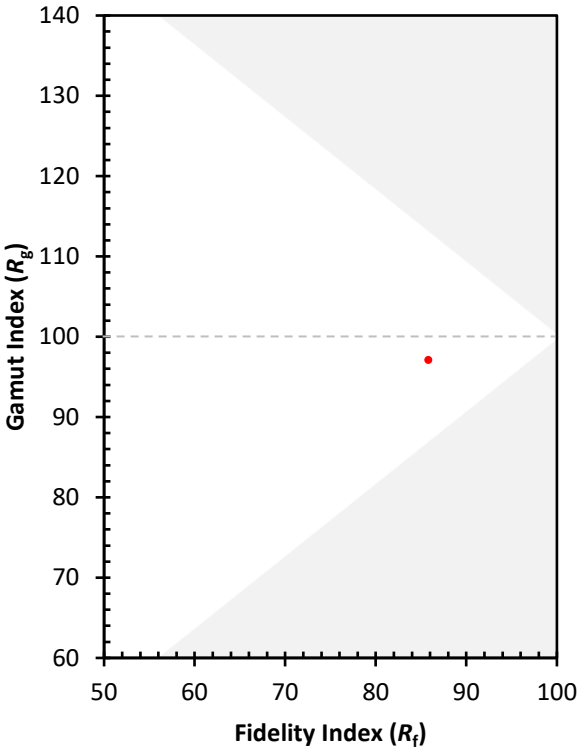
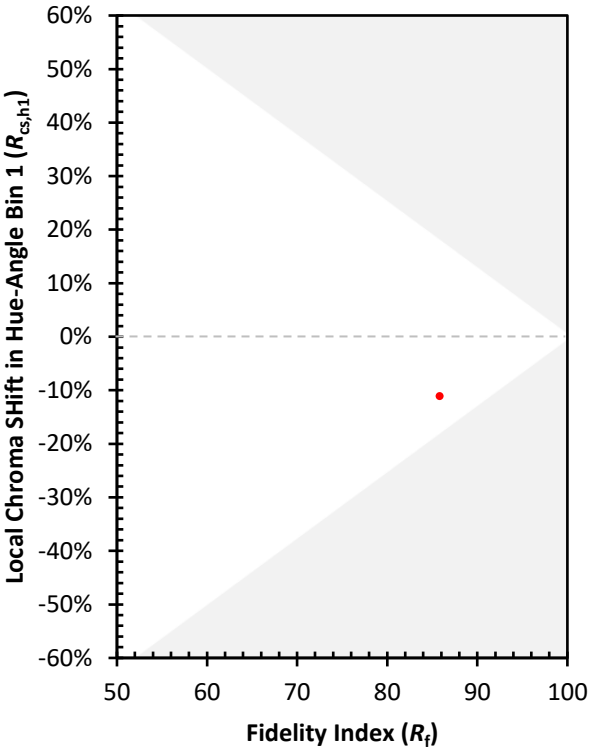
## Measure Comparisons

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