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: McGRAW-EDISON

Report Number: P821208

Luminaire Tested: **TT-D2-735-24VDC-DL**

Issue Date: 5/19/2020

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: | P821208 |
| | TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G3-1908-473-26) |
| Test Lab: | INNOVATION CENTER |
| Issue Date: | 5/19/2020 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS (FORMERLY EATON) |
| Product Line: | McGRAW-EDISON |
| Catalog Number: | TT-D2-735-24VDC-DL |
| Description: | TOPTIER LED PARKING GARAGE LUMINAIRE |
| | 3500K, 70 CRI LEDS AND DRIVE LANE DISTRIBUTION |
| Light Source: | - |
| Ballast/Driver: | ELECTRONIC DRIVER |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 4230 lumens |
| Efficiency: | N/A |
| Efficacy: | 111.3 lumens/watt |
| Luminous Opening: | Circular (Dia: 1.12' x H: 0') |
| IES Classification: | Type IV - Short |
| BUG Rating: | B2 - U0 - G3 |

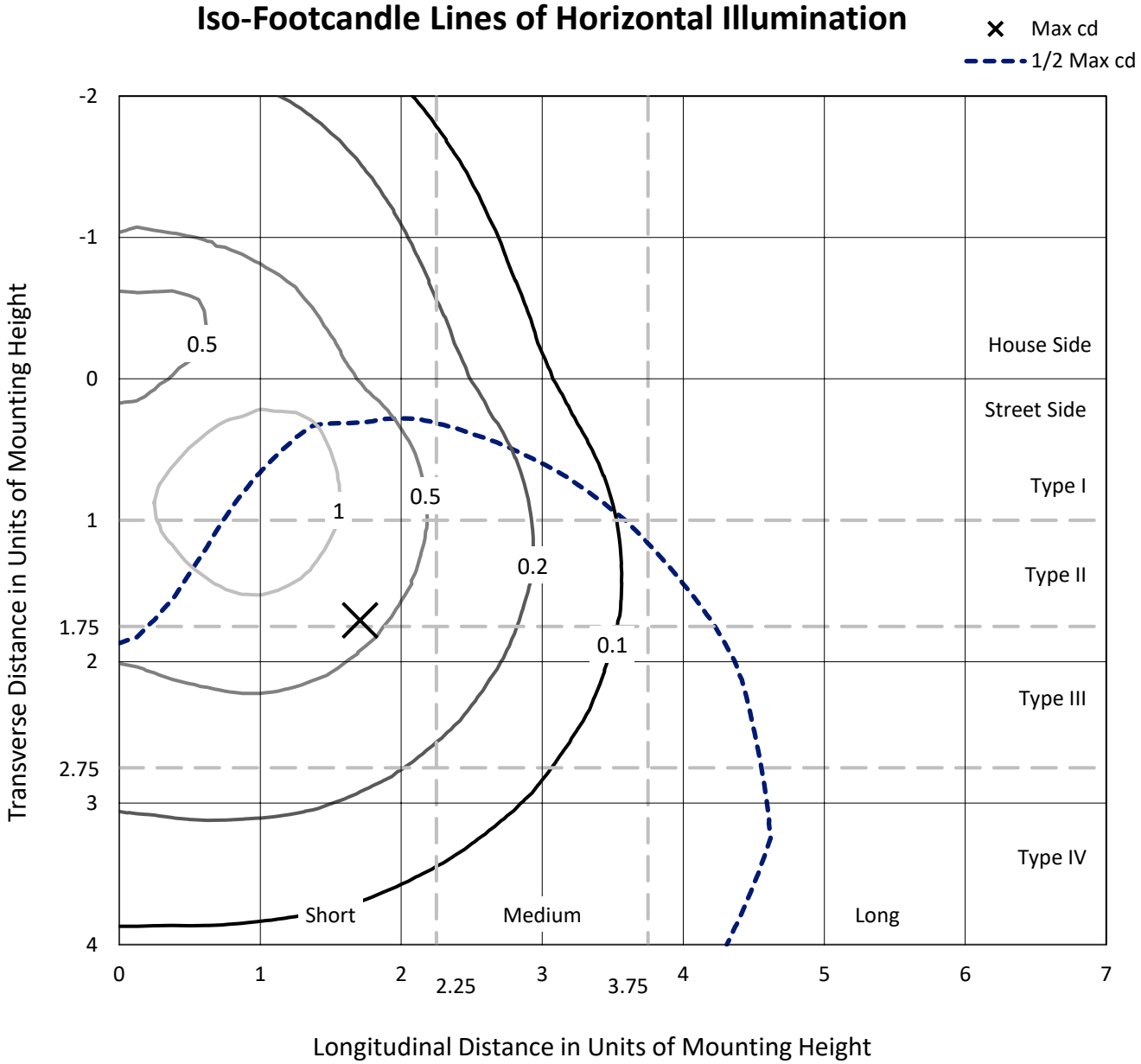
| | |
|---|---|
| Input Watts (W): | 38 |
| Input Voltage (V): | NR |
| Input Current (Ain): | NR |
| Voltage Rise (V): | NR |
| Power Factor: | NR |
| Total Harmonic Distortion (THDi): | NR |
| Frequency (hertz): | 60 |
| Stabilization Time: | NR |
| Operation Time: | NR |
| Ambient Temperature (°C): | NR |
| Test Distance: | 25 FT |

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Scaled Data Report

REPORT NUMBER: P821208
CATALOG NUMBER: TT-D2-735-24VDC-DL

## Iso-Footcandle Lines of Horizontal Illumination



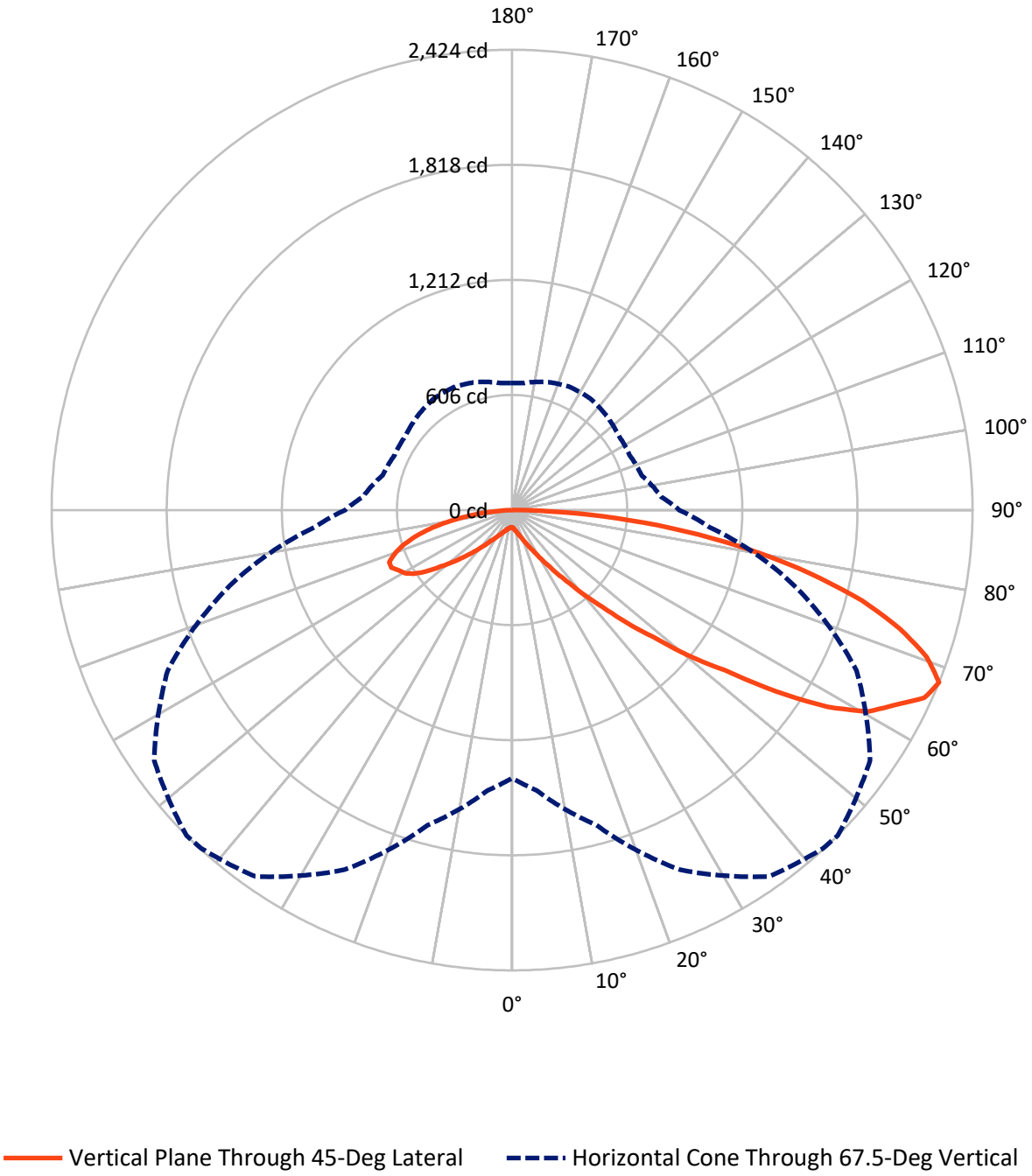

Based on 15 foot mounting height. Maximum calculated value = 1.4 fc
Type IV - Short - N/A

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Peachtree City, GA 30269

Scaled Data Report

REPORT NUMBER: P821208
CATALOG NUMBER: TT-D2-735-24VDC-DL

## Luminous Intensity Polar Plot



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Scaled Data Report

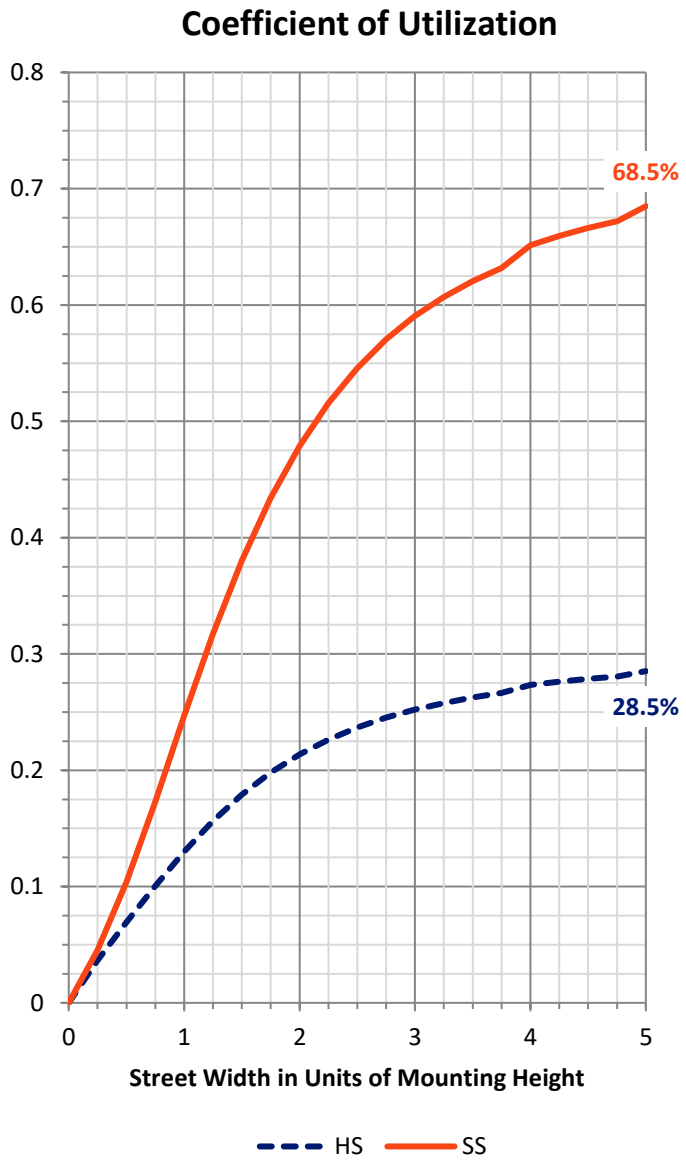
REPORT NUMBER: P821208
CATALOG NUMBER: TT-D2-735-24VDC-DL

**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 1232.6 | 0.0 | 1232.6 |
| | % Fixture | 29.1 | 0.0 | 29.1 |
| **Street Side** | Lumens | 2997.4 | 0.0 | 2997.4 |
| | % Fixture | 70.9 | 0.0 | 70.9 |
| **Total** | Lumens | 4230.0 | 0.0 | 4230.0 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 9.4 | 0.2 |
| 10°-20° | 35.1 | 0.8 |
| 20°-30° | 83.0 | 2.0 |
| 30°-40° | 187.8 | 4.4 |
| 40°-50° | 418.7 | 9.9 |
| 50°-60° | 841.7 | 19.9 |
| 60°-70° | 1236.3 | 29.2 |
| 70°-80° | 1087.1 | 25.7 |
| 80°-90° | 330.9 | 7.8 |
| 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° | 4230.0 | 100.0 |
| 0°-180° | 4230.0 | 100.0 |



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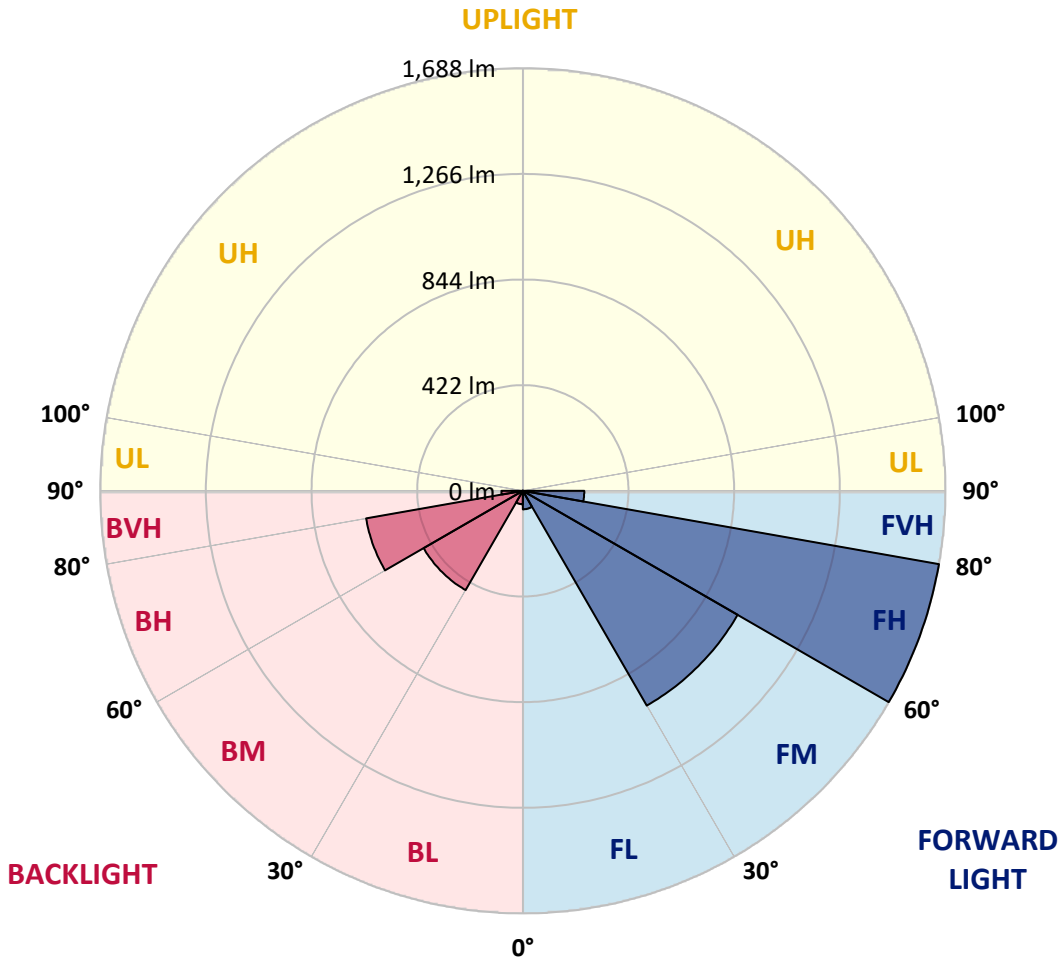
Scaled Data Report

REPORT NUMBER: P821208
CATALOG NUMBER: TT-D2-735-24VDC-DL

## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 73.9 | 1.7 | | | |
| FM | (30°-60°) | 990.6 | 23.4 | | | |
| FH | (60°-80°) | 1687.7 | 39.9 | | | G1/1800 |
| FVH | (80°-90°) | 245.2 | 5.8 | | | G3/500 |
| BL | (0°-30°) | 53.6 | 1.3 | B0/110 | | |
| BM | (30°-60°) | 457.6 | 10.8 | B1/1000 | | |
| BH | (60°-80°) | 635.6 | 15.0 | B2/1000 | | G2/1000 |
| BVH | (80°-90°) | 85.7 | 2.0 | | | G1/100 |
| UL | (90°-100°) | 0.0 | 0.0 | | U0/0 | |
| UH | (100°-180°) | 0.0 | 0.0 | | U0/0 | |

**BUG Rating: B2-U0-G3**
Type IV Short



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REPORT NUMBER: P821208
CATALOG NUMBER: TT-D2-735-24VDC-DL

**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 42.5° | 45° | 55° | 65° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 91.8 | 91.8 | 91.8 | 91.8 | 91.8 | 91.8 | *91.8* | 91.8 | 91.8 | 91.8 | 91.8 |
| 2.5° | 95.7 | 94.9 | 94.9 | 94.9 | 94.1 | 94.1 | *94.1* | 94.1 | 93.3 | 93.3 | 93.3 |
| 5° | 101.2 | 100.5 | 101.2 | 99.7 | 98.9 | 98.9 | *98.1* | 98.1 | 97.3 | 96.5 | 95.7 |
| 7.5° | 109.2 | 108.4 | 108.4 | 106.8 | 106.0 | 105.2 | *105.2* | 103.6 | 102.8 | 101.2 | 99.7 |
| 10° | 117.9 | 117.9 | 117.1 | 116.3 | 114.7 | 113.1 | *113.1* | 110.7 | 109.9 | 107.6 | 105.2 |
| 12.5° | 128.1 | 128.1 | 128.1 | 126.6 | 125.0 | 124.2 | *122.6* | 121.0 | 118.6 | 114.7 | 112.3 |
| 15° | 140.8 | 140.8 | 140.8 | 139.2 | 137.6 | 136.0 | *135.3* | 132.1 | 128.1 | 124.2 | 119.4 |
| 17.5° | 156.6 | 155.0 | 155.0 | 153.4 | 151.9 | 151.1 | *149.5* | 146.3 | 140.8 | 136.0 | 129.7 |
| 20° | 174.0 | 173.2 | 172.4 | 172.4 | 170.8 | 169.3 | *168.5* | 163.7 | 157.4 | 148.7 | 140.8 |
| 22.5° | 193.8 | 193.0 | 193.0 | 194.6 | 193.8 | 191.4 | *191.4* | 184.3 | 175.6 | 165.3 | 153.4 |
| 25° | 218.3 | 217.5 | 219.1 | 222.3 | 222.3 | 220.7 | *218.3* | 211.2 | 198.5 | 184.3 | 170.1 |
| 27.5° | 245.2 | 244.4 | 247.6 | 253.1 | 254.7 | 252.3 | *250.7* | 242.8 | 228.6 | 209.6 | 189.0 |
| 30° | 277.6 | 278.4 | 287.1 | 293.5 | 297.4 | 295.8 | *295.0* | 286.3 | 263.4 | 241.2 | 214.4 |
| 32.5° | 317.2 | 314.8 | 325.9 | 336.2 | 343.3 | 347.2 | *344.9* | 334.6 | 314.8 | 280.0 | 246.0 |
| 35° | 359.1 | 359.9 | 373.3 | 388.4 | 405.0 | 406.6 | *411.3* | 401.0 | 374.1 | 333.0 | 285.5 |
| 37.5° | 413.7 | 407.3 | 424.8 | 453.2 | 473.0 | 490.4 | *487.2* | 480.9 | 449.3 | 394.7 | 329.8 |
| 40° | 462.7 | 461.1 | 485.7 | 525.2 | 561.6 | 586.9 | *590.1* | 582.2 | 540.2 | 462.7 | 377.3 |
| 42.5° | 518.9 | 523.6 | 557.6 | 612.2 | 667.6 | 704.0 | *695.3* | 691.3 | 642.3 | 543.4 | 442.2 |
| 45° | 575.8 | 591.6 | 635.1 | 714.2 | 779.1 | 831.3 | *846.3* | 832.9 | 772.8 | 670.7 | 524.4 |
| 47.5° | 644.6 | 666.0 | 719.8 | 826.6 | 932.6 | 993.5 | *996.6* | 1037.0 | 946.0 | 793.3 | 609.8 |
| 50° | 735.6 | 745.1 | 820.2 | 950.7 | 1096.3 | 1181.7 | *1206.2* | 1207.0 | 1116.1 | 916.7 | 706.3 |
| 52.5° | 825.0 | 832.1 | 931.0 | 1099.4 | 1297.2 | 1394.5 | *1400.0* | 1430.9 | 1306.7 | 1116.1 | 844.8 |
| 55° | 932.6 | 929.4 | 1065.4 | 1267.9 | 1501.3 | 1642.8 | *1684.0* | 1725.9 | 1567.7 | 1273.5 | 923.9 |
| 57.5° | 1037.0 | 1032.2 | 1195.9 | 1461.7 | 1780.5 | 1921.3 | *1955.3* | 1925.2 | 1690.3 | 1339.1 | 962.6 |
| 60° | 1133.5 | 1150.1 | 1349.4 | 1676.1 | 1996.4 | 2130.9 | *2153.8* | 2072.3 | 1769.4 | 1389.7 | 987.1 |
| 62.5° | 1233.9 | 1267.1 | 1508.4 | 1854.8 | 2161.7 | 2258.2 | *2259.8* | 2164.1 | 1901.5 | 1487.8 | 1067.0 |
| 65° | 1328.0 | 1381.0 | 1631.8 | 2007.5 | 2277.2 | 2373.7 | *2384.8* | 2298.6 | 2031.2 | 1573.2 | 1080.5 |
| 67.5° | *1411.1* | *1481.5* | *1717.2* | *2089.7* | *2355.5* | *2418.0* | *2423.5* | *2299.4* | *2000.4* | *1538.4* | *1043.3* |
| 70° | 1478.3 | 1535.3 | 1770.2 | 2091.3 | 2300.9 | 2318.3 | *2314.4* | 2182.3 | 1914.9 | 1469.6 | 980.8 |
| 72.5° | 1504.4 | 1551.1 | 1744.9 | 1993.2 | 2140.4 | 2136.4 | *2133.2* | 2011.4 | 1774.1 | 1354.9 | 890.6 |
| 75° | 1467.3 | 1480.7 | 1606.5 | 1783.6 | 1877.0 | 1899.1 | *1902.3* | 1792.3 | 1556.6 | 1184.9 | 764.1 |
| 77.5° | 1313.8 | 1306.7 | 1403.2 | 1520.2 | 1590.6 | 1606.5 | *1603.3* | 1511.5 | 1305.1 | 984.8 | 640.7 |
| 80° | 1041.7 | 1056.7 | 1116.9 | 1194.4 | 1264.8 | 1282.2 | *1271.1* | 1201.5 | 1015.6 | 768.0 | 492.0 |
| 82.5° | 728.5 | 746.7 | 797.3 | 855.8 | 908.8 | 908.8 | *919.1* | 851.9 | 719.8 | 551.3 | 344.1 |
| 85° | 393.1 | 382.8 | 438.2 | 504.6 | 542.6 | 549.7 | *553.7* | 531.5 | 445.3 | 333.0 | 204.1 |
| 87.5° | 64.9 | 69.6 | 86.2 | 132.1 | 150.3 | 174.0 | *185.1* | 144.7 | 87.8 | 56.2 | 41.1 |
| 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

Scaled Data Report

REPORT NUMBER: P821208
CATALOG NUMBER: TT-D2-735-24VDC-DL

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 91.8 | 91.8 | 91.8 | 91.8 | 91.8 | 91.8 | 91.8 | 91.8 | 91.8 | 91.8 | 91.8 |
| 2.5° | 93.3 | 92.5 | 91.8 | 91.0 | 91.0 | 90.2 | 90.2 | 90.2 | 91.0 | 91.0 | 91.0 |
| 5° | 95.7 | 94.9 | 94.1 | 93.3 | 91.8 | 91.8 | 91.8 | 91.8 | 91.8 | 91.8 | 91.8 |
| 7.5° | 99.7 | 98.1 | 97.3 | 95.7 | 94.1 | 94.1 | 93.3 | 93.3 | 93.3 | 94.1 | 93.3 |
| 10° | 104.4 | 102.8 | 101.2 | 98.9 | 98.1 | 97.3 | 96.5 | 96.5 | 97.3 | 97.3 | 96.5 |
| 12.5° | 109.9 | 109.2 | 106.0 | 103.6 | 102.0 | 101.2 | 100.5 | 101.2 | 100.5 | 101.2 | 101.2 |
| 15° | 117.9 | 115.5 | 111.5 | 109.2 | 106.8 | 106.0 | 105.2 | 106.0 | 106.0 | 106.8 | 106.0 |
| 17.5° | 126.6 | 123.4 | 119.4 | 115.5 | 112.3 | 111.5 | 111.5 | 111.5 | 112.3 | 113.1 | 112.3 |
| 20° | 136.8 | 132.9 | 127.3 | 122.6 | 119.4 | 118.6 | 118.6 | 119.4 | 120.2 | 121.0 | 121.0 |
| 22.5° | 147.1 | 144.0 | 136.0 | 129.7 | 128.1 | 127.3 | 126.6 | 128.1 | 129.7 | 130.5 | 131.3 |
| 25° | 162.9 | 156.6 | 147.1 | 140.0 | 136.8 | 136.8 | 137.6 | 139.2 | 140.0 | 141.6 | 140.8 |
| 27.5° | 179.6 | 172.4 | 160.6 | 151.1 | 148.7 | 147.9 | 149.5 | 151.1 | 154.2 | 154.2 | 153.4 |
| 30° | 202.5 | 190.6 | 175.6 | 166.9 | 160.6 | 161.4 | 163.7 | 166.1 | 169.3 | 170.8 | 170.8 |
| 32.5° | 228.6 | 215.9 | 195.4 | 181.9 | 178.8 | 179.6 | 180.3 | 184.3 | 187.5 | 190.6 | 188.3 |
| 35° | 262.6 | 246.8 | 221.5 | 206.4 | 198.5 | 197.7 | 200.9 | 205.7 | 208.8 | 210.4 | 210.4 |
| 37.5° | 299.8 | 279.2 | 247.6 | 234.9 | 225.4 | 224.6 | 225.4 | 229.4 | 233.3 | 234.9 | 238.1 |
| 40° | 344.9 | 319.6 | 282.4 | 261.8 | 254.7 | 253.1 | 256.3 | 261.8 | 261.8 | 264.2 | 265.0 |
| 42.5° | 400.2 | 367.8 | 326.7 | 299.8 | 291.1 | 291.1 | 290.3 | 295.0 | 295.0 | 295.0 | 293.5 |
| 45° | 470.6 | 434.2 | 380.5 | 352.8 | 337.7 | 329.8 | 332.2 | 329.0 | 328.3 | 330.6 | 323.5 |
| 47.5° | 538.7 | 492.8 | 429.5 | 399.4 | 384.4 | 379.7 | 371.0 | 368.6 | 364.6 | 364.6 | 354.4 |
| 50° | 617.7 | 560.8 | 499.9 | 457.2 | 442.9 | 429.5 | 422.4 | 411.3 | 399.4 | 397.1 | 393.1 |
| 52.5° | 749.8 | 678.7 | 582.9 | 537.1 | 500.7 | 487.2 | 470.6 | 456.4 | 442.2 | 431.1 | 437.4 |
| 55° | 803.6 | 730.9 | 639.9 | 595.6 | 570.3 | 557.6 | 526.8 | 507.8 | 486.4 | 470.6 | 479.3 |
| 57.5° | 830.5 | 751.4 | 666.8 | 633.6 | 626.4 | 614.6 | 591.6 | 559.2 | 534.7 | 514.9 | 516.5 |
| 60° | 845.5 | 762.5 | 681.0 | 651.0 | 647.0 | 654.9 | 643.1 | 620.9 | 582.9 | 563.2 | 560.8 |
| 62.5° | 903.3 | 816.3 | 721.4 | 678.7 | 670.0 | 675.5 | 678.7 | 665.2 | 633.6 | 607.5 | 600.3 |
| 65° | 915.2 | 822.6 | 729.3 | 701.6 | 702.4 | 704.0 | 706.3 | 692.1 | 676.3 | 643.9 | 637.5 |
| 67.5° | *879.6* | *788.6* | *705.5* | *682.6* | *684.2* | *702.4* | *716.6* | *715.8* | *698.4* | *670.7* | *668.4* |
| 70° | 825.8 | 737.2 | 660.5 | 639.9 | 643.9 | 660.5 | 691.3 | 707.1 | 704.0 | 685.8 | 689.7 |
| 72.5° | 741.9 | 662.8 | 595.6 | 579.8 | 589.3 | 605.1 | 634.4 | 662.8 | 679.4 | 683.4 | 692.1 |
| 75° | 643.9 | 580.6 | 517.3 | 507.8 | 514.9 | 533.1 | 560.0 | 593.2 | 629.6 | 649.4 | 654.9 |
| 77.5° | 531.5 | 473.8 | 427.1 | 420.8 | 431.1 | 447.7 | 474.6 | 500.7 | 541.8 | 576.6 | 584.5 |
| 80° | 416.1 | 366.2 | 333.0 | 327.5 | 333.8 | 348.0 | 368.6 | 389.9 | 429.5 | 456.4 | 460.3 |
| 82.5° | 288.7 | 258.6 | 237.3 | 234.1 | 238.1 | 243.6 | 260.2 | 280.0 | 302.2 | 323.5 | 325.9 |
| 85° | 167.7 | 148.7 | 143.2 | 138.4 | 147.1 | 147.1 | 151.1 | 162.1 | 173.2 | 174.8 | 179.6 |
| 87.5° | 30.8 | 29.3 | 30.1 | 22.1 | 27.7 | 19.8 | 19.8 | 25.3 | 19.0 | 22.1 | 18.2 |
| 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: SP1-2407-176-4

Test Date: 09/24/2024

Luminaire Tested: MEM2-HTN-VA-30-735-U-WQ

Data in this report applies to families of products including MEM2-HTN-VA-30-735-U-WQ

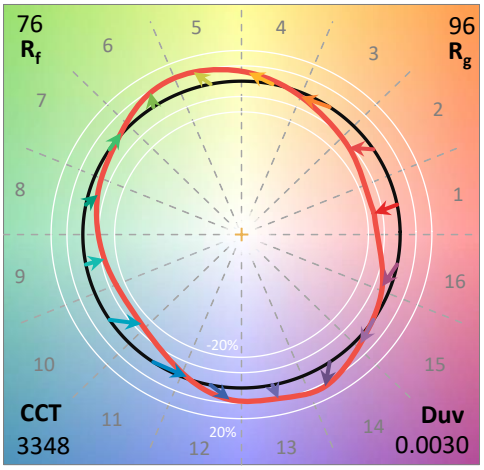
Report Generated By FNC07603 / LDUCLS01DT446
Version: v7.04

## Test Information

| | |
|---|---|
| Test Method: | LM-79-2019 |
| Report Number: | SP1-2407-176-4 |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Photometer: | SP1 - 76IN SPHERE |
| Measurement Geometry: | 4π |
| Issue Date: | 09/27/2024 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS |
| Product Line: | Streetworks |
| Catalog Number: | **MEM2-HTN-VA-30-735-U-WQ** |
| Description: | EPIC MODERN VISUAL COMFORT 30W WAVESTREAM WIDE |

## Spectral Parameters

| | | | | | |
|---|---|---|---|---|---|
| CCT (K): | 3348 | CRI (Ra): | 73.4 | | |
| CIE u': | 0.2384 | R1: | 70.8 | R9: | -19.2 |
| CIE v': | 0.5184 | R2: | 79.9 | R10: | 52.5 |
| Duv: | 0.0030 | R3: | 87.6 | R11: | 68.0 |
| CIE x: | 0.4177 | R4: | 72.6 | R12: | 42.6 |
| CIE y: | 0.4036 | R5: | 69.3 | R13: | 72.0 |
| CIE z: | 0.1787 | R6: | 71.3 | R14: | 92.6 |
| Peak Wavelength (nm): | 593 | R7: | 82.1 | R15: | 63.8 |
| Dominant Wavelength (nm): | 580 | R8: | 53.3 | | |
| Purity: | 46.5223 | | | | |
| Rf: | 75.8 | | | | |
| Rg: | 95.8 | | | | |




## Test Conditions

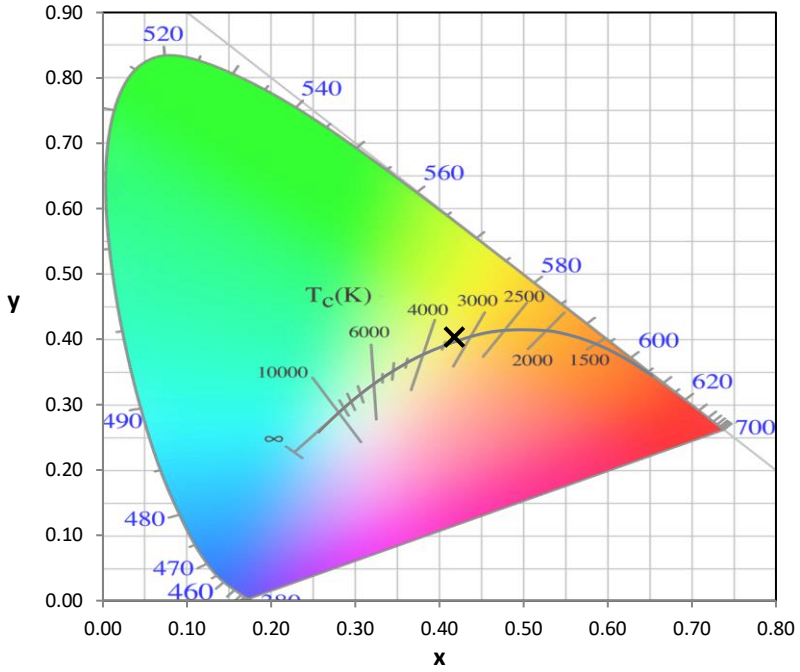
| | |
|---|---|
| Stabilization Time: | 30M |
| Operation Time: | 1H 30M |
| Sphere Temperature (°C): | 25.2 |

REPORT NUMBER: SP1-2407-176-4

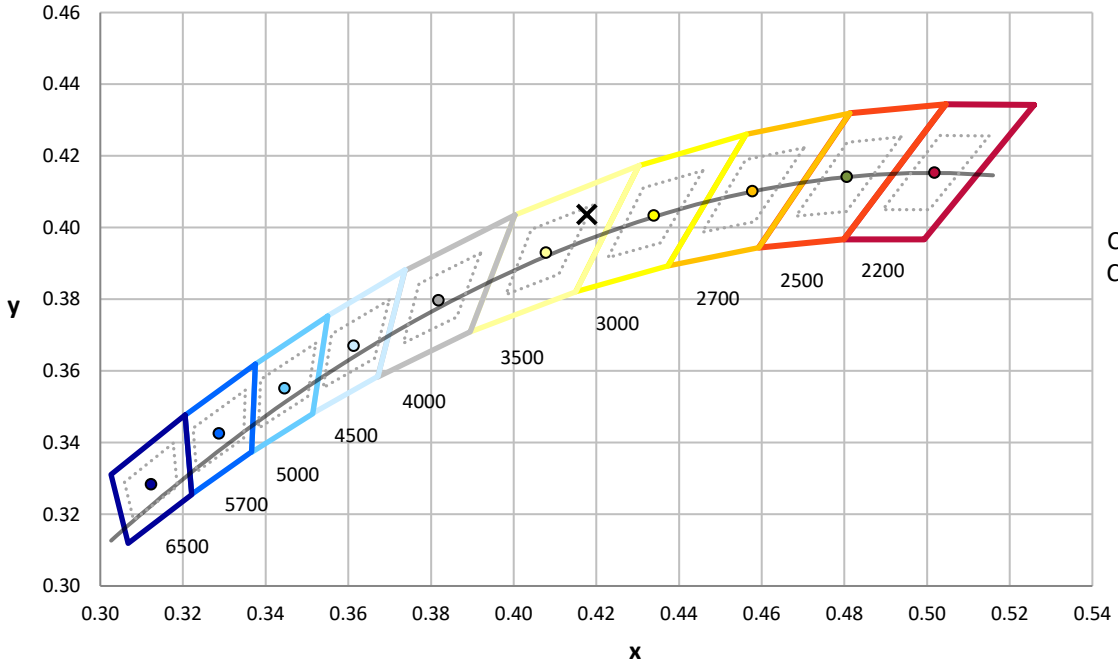
| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 6/18/2024 | 12/18/2024 |
| Power Meter | INXT2011004 | 2/8/2024 | 2/8/2025 |
| AC Power Source | IN0063 | 10/24/2023 | 10/24/2024 |
| DC 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: SP1-2407-176-4

## CIE 1931 Chromaticity Diagram




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

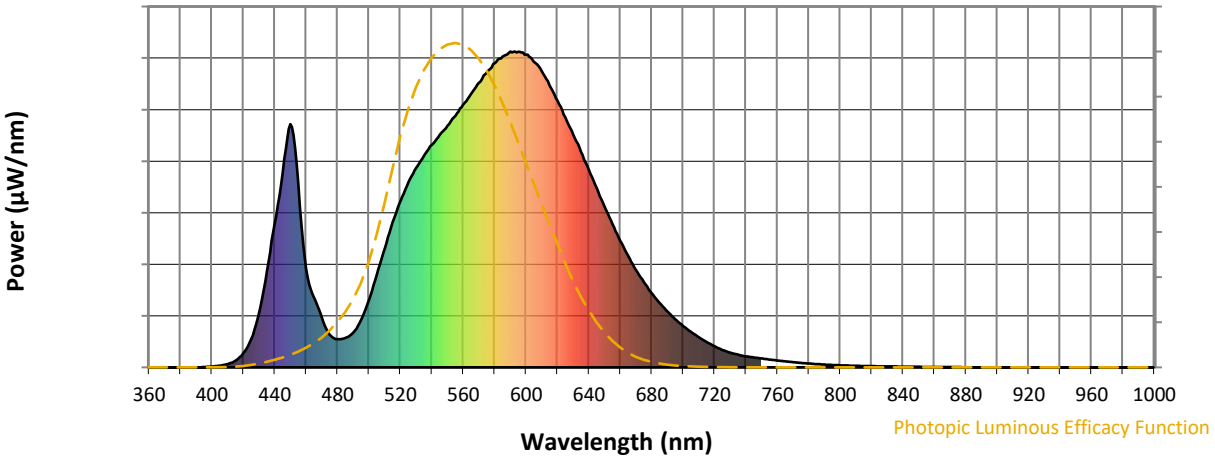



CCT = 3348K
CIE x = 0.4177
CIE y = 0.4036
Duv = 0.0030

Point lies inside the ANSI 3500K 4-step quadrangle

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## Photopic Flux vs. Wavelength

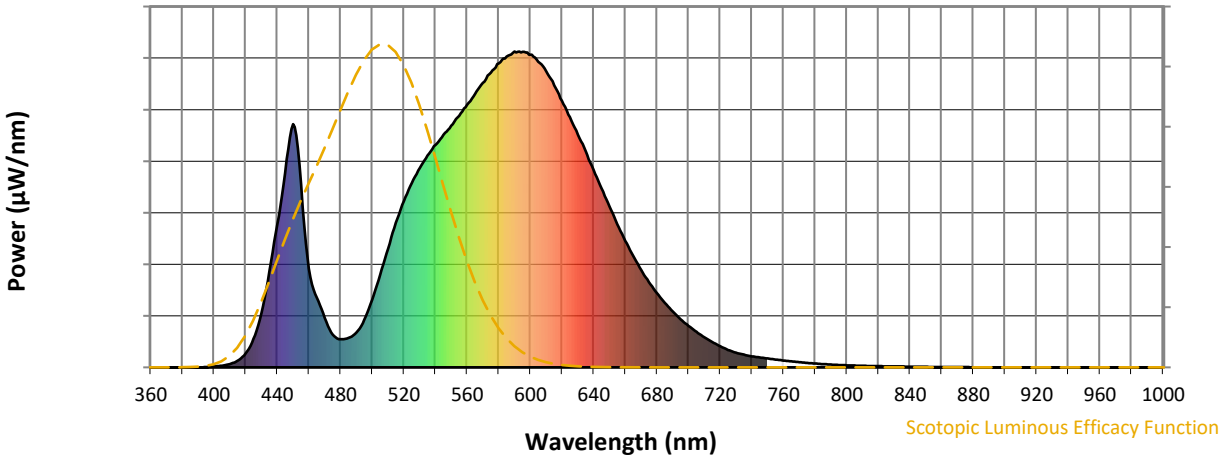



## Photopic Lumens: NR

| 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 | 110 | NR | 620 | 844 | NR | 750 | 28 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 150 | NR | 625 | 792 | NR | 755 | 25 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 214 | NR | 630 | 737 | NR | 760 | 22 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 293 | NR | 635 | 683 | NR | 765 | 19 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 376 | NR | 640 | 625 | NR | 770 | 16 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 458 | NR | 645 | 566 | NR | 775 | 14 | NR | 905 | 0 | NR |
| 390 | 0 | NR | 520 | 526 | NR | 650 | 509 | NR | 780 | 12 | NR | 910 | 0 | NR |
| 395 | 1 | NR | 525 | 584 | NR | 655 | 453 | NR | 785 | 10 | NR | 915 | 0 | NR |
| 400 | 3 | NR | 530 | 631 | NR | 660 | 401 | NR | 790 | 9 | NR | 920 | 0 | NR |
| 405 | 5 | NR | 535 | 671 | NR | 665 | 353 | NR | 795 | 8 | NR | 925 | 0 | NR |
| 410 | 10 | NR | 540 | 704 | NR | 670 | 308 | NR | 800 | 7 | NR | 930 | 0 | NR |
| 415 | 21 | NR | 545 | 737 | NR | 675 | 269 | NR | 805 | 6 | NR | 935 | 0 | NR |
| 420 | 44 | NR | 550 | 766 | NR | 680 | 235 | NR | 810 | 5 | NR | 940 | 0 | NR |
| 425 | 90 | NR | 555 | 797 | NR | 685 | 204 | NR | 815 | 4 | NR | 945 | 0 | NR |
| 430 | 171 | NR | 560 | 832 | NR | 690 | 177 | NR | 820 | 4 | NR | 950 | 0 | NR |
| 435 | 305 | NR | 565 | 866 | NR | 695 | 152 | NR | 825 | 3 | NR | 955 | 0 | NR |
| 440 | 455 | NR | 570 | 901 | NR | 700 | 131 | NR | 830 | 3 | NR | 960 | 0 | NR |
| 445 | 615 | NR | 575 | 933 | NR | 705 | 112 | NR | 835 | 3 | NR | 965 | 0 | NR |
| 450 | 771 | NR | 580 | 963 | NR | 710 | 96 | NR | 840 | 2 | NR | 970 | 0 | NR |
| 455 | 579 | NR | 585 | 984 | NR | 715 | 80 | NR | 845 | 2 | NR | 975 | 0 | NR |
| 460 | 313 | NR | 590 | 1000 | NR | 720 | 67 | NR | 850 | 2 | NR | 980 | 0 | NR |
| 465 | 221 | NR | 595 | 999 | NR | 725 | 55 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 156 | NR | 600 | 990 | NR | 730 | 46 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 103 | NR | 605 | 968 | NR | 735 | 40 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 89 | NR | 610 | 937 | NR | 740 | 35 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 93 | NR | 615 | 893 | NR | 745 | 31 | NR | 875 | 1 | NR | | | |

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## Scotopic Flux vs. Wavelength

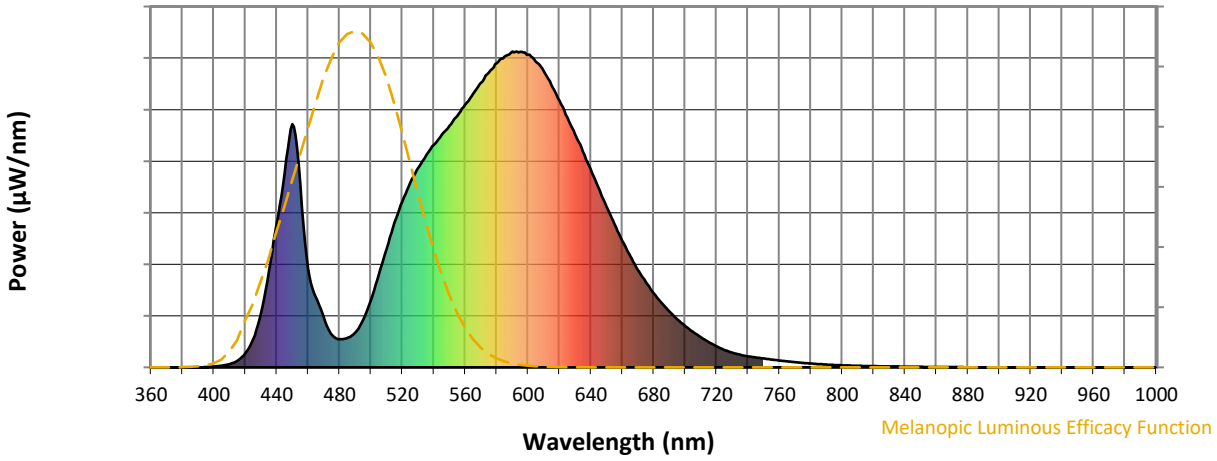



**Scotopic Lumens: NR** **S/P: 1.31**

| 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 | 110 | NR | 620 | 844 | NR | 750 | 28 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 150 | NR | 625 | 792 | NR | 755 | 25 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 214 | NR | 630 | 737 | NR | 760 | 22 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 293 | NR | 635 | 683 | NR | 765 | 19 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 376 | NR | 640 | 625 | NR | 770 | 16 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 458 | NR | 645 | 566 | NR | 775 | 14 | NR | 905 | 0 | NR |
| 390 | 0 | NR | 520 | 526 | NR | 650 | 509 | NR | 780 | 12 | NR | 910 | 0 | NR |
| 395 | 1 | NR | 525 | 584 | NR | 655 | 453 | NR | 785 | 10 | NR | 915 | 0 | NR |
| 400 | 3 | NR | 530 | 631 | NR | 660 | 401 | NR | 790 | 9 | NR | 920 | 0 | NR |
| 405 | 5 | NR | 535 | 671 | NR | 665 | 353 | NR | 795 | 8 | NR | 925 | 0 | NR |
| 410 | 10 | NR | 540 | 704 | NR | 670 | 308 | NR | 800 | 7 | NR | 930 | 0 | NR |
| 415 | 21 | NR | 545 | 737 | NR | 675 | 269 | NR | 805 | 6 | NR | 935 | 0 | NR |
| 420 | 44 | NR | 550 | 766 | NR | 680 | 235 | NR | 810 | 5 | NR | 940 | 0 | NR |
| 425 | 90 | NR | 555 | 797 | NR | 685 | 204 | NR | 815 | 4 | NR | 945 | 0 | NR |
| 430 | 171 | NR | 560 | 832 | NR | 690 | 177 | NR | 820 | 4 | NR | 950 | 0 | NR |
| 435 | 305 | NR | 565 | 866 | NR | 695 | 152 | NR | 825 | 3 | NR | 955 | 0 | NR |
| 440 | 455 | NR | 570 | 901 | NR | 700 | 131 | NR | 830 | 3 | NR | 960 | 0 | NR |
| 445 | 615 | NR | 575 | 933 | NR | 705 | 112 | NR | 835 | 3 | NR | 965 | 0 | NR |
| 450 | 771 | NR | 580 | 963 | NR | 710 | 96 | NR | 840 | 2 | NR | 970 | 0 | NR |
| 455 | 579 | NR | 585 | 984 | NR | 715 | 80 | NR | 845 | 2 | NR | 975 | 0 | NR |
| 460 | 313 | NR | 590 | 1000 | NR | 720 | 67 | NR | 850 | 2 | NR | 980 | 0 | NR |
| 465 | 221 | NR | 595 | 999 | NR | 725 | 55 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 156 | NR | 600 | 990 | NR | 730 | 46 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 103 | NR | 605 | 968 | NR | 735 | 40 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 89 | NR | 610 | 937 | NR | 740 | 35 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 93 | NR | 615 | 893 | NR | 745 | 31 | NR | 875 | 1 | NR | | | |

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## Melanopic Flux vs. Wavelength




**Melanopic Lumens: NR** **M/P: 2.4**

| 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 | 110 | NR | 620 | 844 | NR | 750 | 28 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 150 | NR | 625 | 792 | NR | 755 | 25 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 214 | NR | 630 | 737 | NR | 760 | 22 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 293 | NR | 635 | 683 | NR | 765 | 19 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 376 | NR | 640 | 625 | NR | 770 | 16 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 458 | NR | 645 | 566 | NR | 775 | 14 | NR | 905 | 0 | NR |
| 390 | 0 | NR | 520 | 526 | NR | 650 | 509 | NR | 780 | 12 | NR | 910 | 0 | NR |
| 395 | 1 | NR | 525 | 584 | NR | 655 | 453 | NR | 785 | 10 | NR | 915 | 0 | NR |
| 400 | 3 | NR | 530 | 631 | NR | 660 | 401 | NR | 790 | 9 | NR | 920 | 0 | NR |
| 405 | 5 | NR | 535 | 671 | NR | 665 | 353 | NR | 795 | 8 | NR | 925 | 0 | NR |
| 410 | 10 | NR | 540 | 704 | NR | 670 | 308 | NR | 800 | 7 | NR | 930 | 0 | NR |
| 415 | 21 | NR | 545 | 737 | NR | 675 | 269 | NR | 805 | 6 | NR | 935 | 0 | NR |
| 420 | 44 | NR | 550 | 766 | NR | 680 | 235 | NR | 810 | 5 | NR | 940 | 0 | NR |
| 425 | 90 | NR | 555 | 797 | NR | 685 | 204 | NR | 815 | 4 | NR | 945 | 0 | NR |
| 430 | 171 | NR | 560 | 832 | NR | 690 | 177 | NR | 820 | 4 | NR | 950 | 0 | NR |
| 435 | 305 | NR | 565 | 866 | NR | 695 | 152 | NR | 825 | 3 | NR | 955 | 0 | NR |
| 440 | 455 | NR | 570 | 901 | NR | 700 | 131 | NR | 830 | 3 | NR | 960 | 0 | NR |
| 445 | 615 | NR | 575 | 933 | NR | 705 | 112 | NR | 835 | 3 | NR | 965 | 0 | NR |
| 450 | 771 | NR | 580 | 963 | NR | 710 | 96 | NR | 840 | 2 | NR | 970 | 0 | NR |
| 455 | 579 | NR | 585 | 984 | NR | 715 | 80 | NR | 845 | 2 | NR | 975 | 0 | NR |
| 460 | 313 | NR | 590 | 1000 | NR | 720 | 67 | NR | 850 | 2 | NR | 980 | 0 | NR |
| 465 | 221 | NR | 595 | 999 | NR | 725 | 55 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 156 | NR | 600 | 990 | NR | 730 | 46 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 103 | NR | 605 | 968 | NR | 735 | 40 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 89 | NR | 610 | 937 | NR | 740 | 35 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 93 | NR | 615 | 893 | NR | 745 | 31 | NR | 875 | 1 | NR | | | |

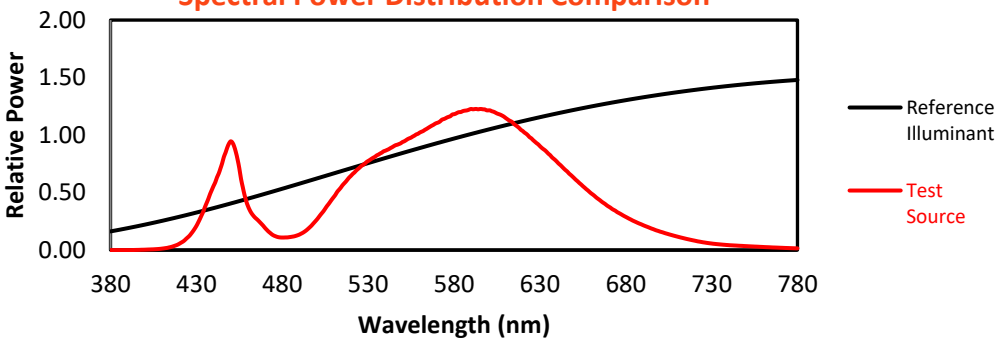
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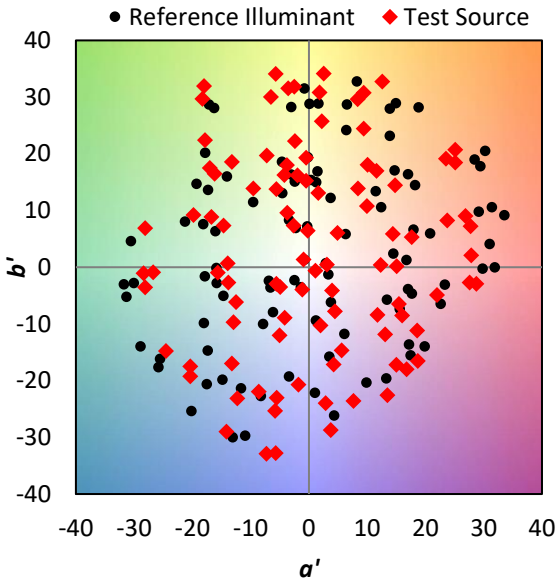
## Summary

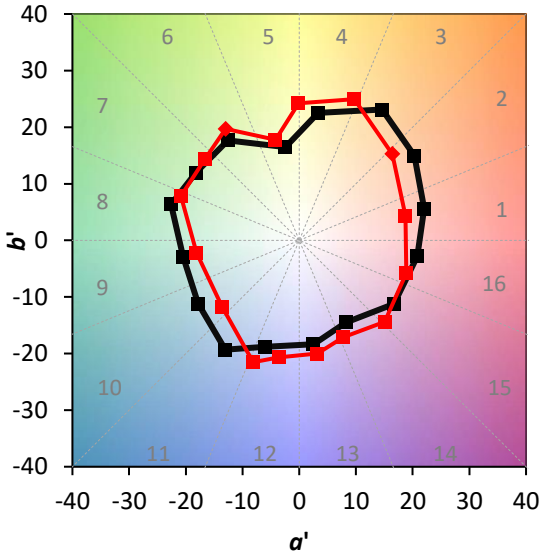
$R_f$ = 75.8
$R_g$ = 95.8
CIE $R_a$ = 73.4
$R_9$ = -19.2

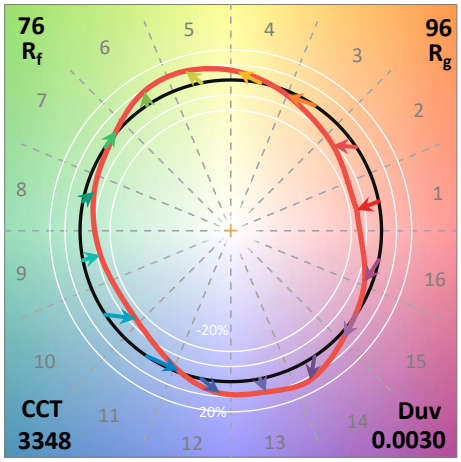
## Spectral Power Distribution Comparison

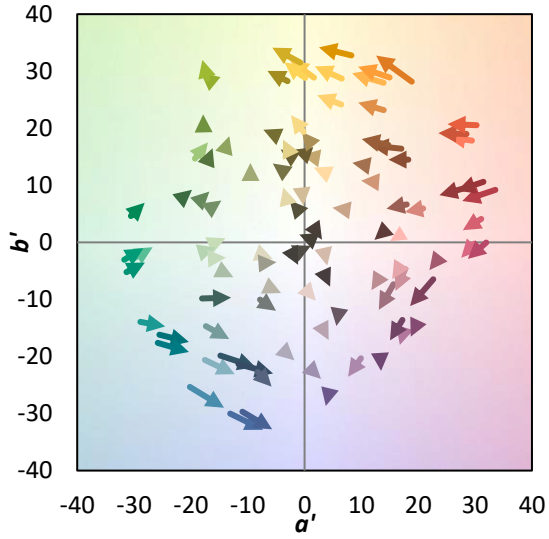



## Color Vector Graphics



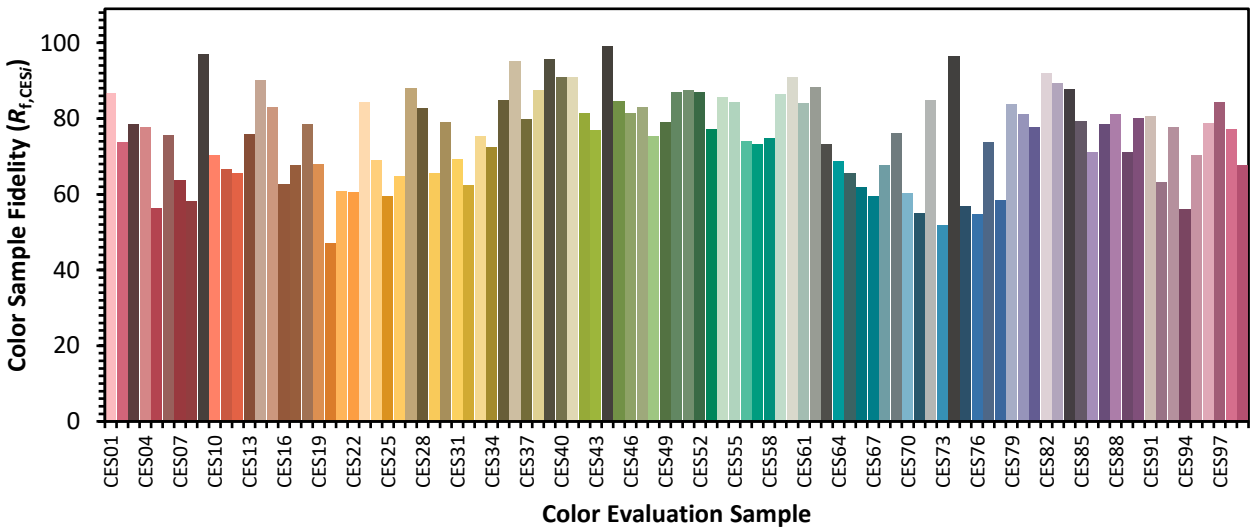



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**Individual Sample Fidelity Index ($R_{f,i}$)**

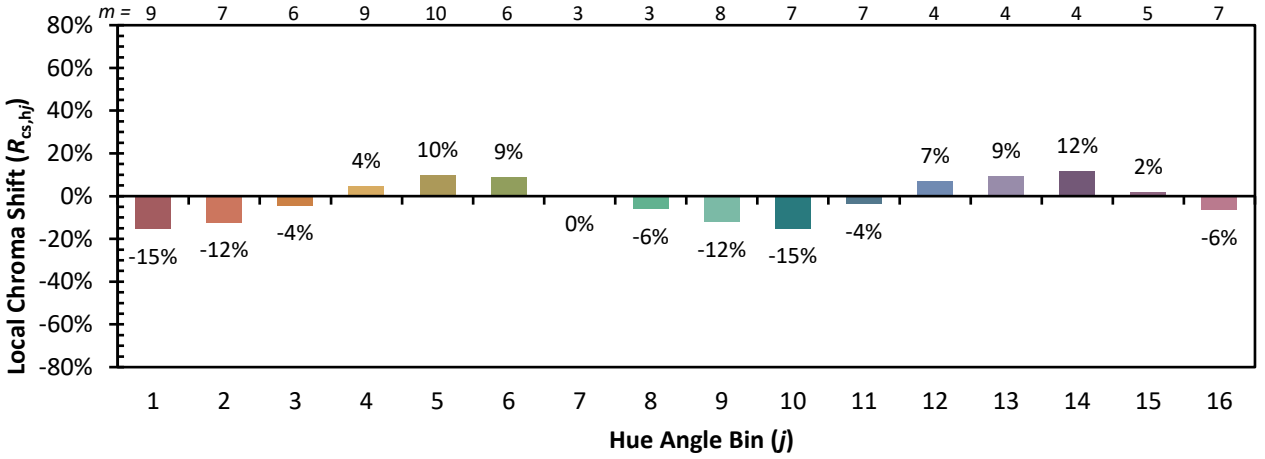
| | | | |
|---|---|---|---|
| CES01 = 86 | CES26 = 65 | CES51 = 88 | CES76 = 55 |
| CES02 = 62 | CES27 = 88 | CES52 = 87 | CES77 = 74 |
| CES03 = 31 | CES28 = 83 | CES53 = 77 | CES78 = 58 |
| CES04 = 70 | CES29 = 66 | CES54 = 86 | CES79 = 84 |
| CES05 = 48 | CES30 = 79 | CES55 = 84 | CES80 = 81 |
| CES06 = 51 | CES31 = 69 | CES56 = 74 | CES81 = 78 |
| CES07 = 41 | CES32 = 62 | CES57 = 73 | CES82 = 92 |
| CES08 = 40 | CES33 = 75 | CES58 = 75 | CES83 = 89 |
| CES09 = 29 | CES34 = 73 | CES59 = 87 | CES84 = 88 |
| CES10 = 75 | CES35 = 85 | CES60 = 91 | CES85 = 79 |
| CES11 = 58 | CES36 = 95 | CES61 = 84 | CES86 = 71 |
| CES12 = 64 | CES37 = 80 | CES62 = 88 | CES87 = 79 |
| CES13 = 43 | CES38 = 88 | CES63 = 73 | CES88 = 81 |
| CES14 = 74 | CES39 = 96 | CES64 = 69 | CES89 = 71 |
| CES15 = 71 | CES40 = 91 | CES65 = 66 | CES90 = 80 |
| CES16 = 47 | CES41 = 91 | CES66 = 62 | CES91 = 81 |
| CES17 = 50 | CES42 = 81 | CES67 = 60 | CES92 = 63 |
| CES18 = 56 | CES43 = 77 | CES68 = 68 | CES93 = 78 |
| CES19 = 72 | CES44 = 99 | CES69 = 76 | CES94 = 56 |
| CES20 = 65 | CES45 = 85 | CES70 = 60 | CES95 = 70 |
| CES21 = 87 | CES46 = 82 | CES71 = 55 | CES96 = 79 |
| CES22 = 79 | CES47 = 83 | CES72 = 85 | CES97 = 84 |
| CES23 = 92 | CES48 = 75 | CES73 = 52 | CES98 = 77 |
| CES24 = 91 | CES49 = 79 | CES74 = 96 | CES99 = 68 |
| CES25 = 72 | CES50 = 87 | CES75 = 57 | |

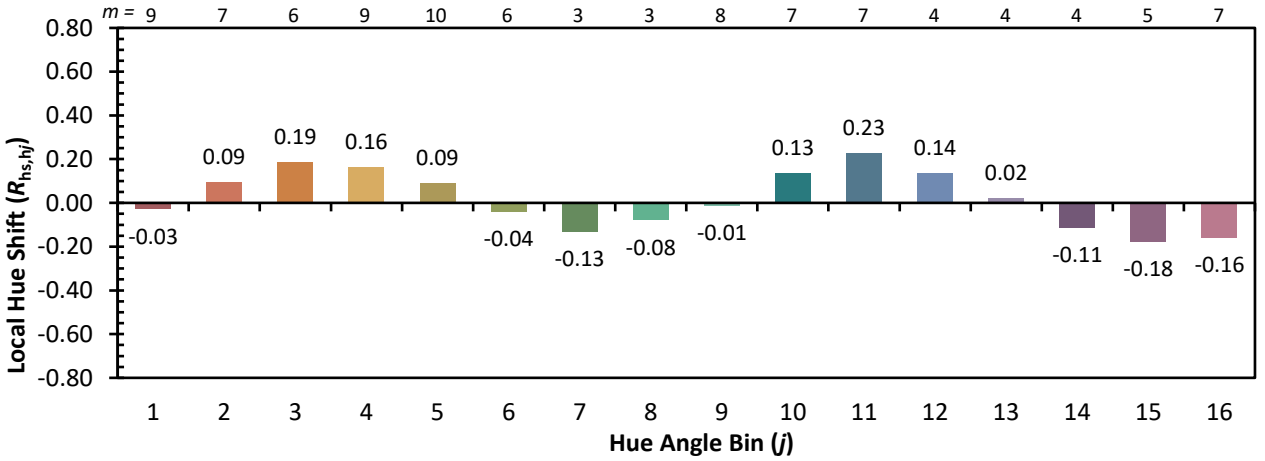


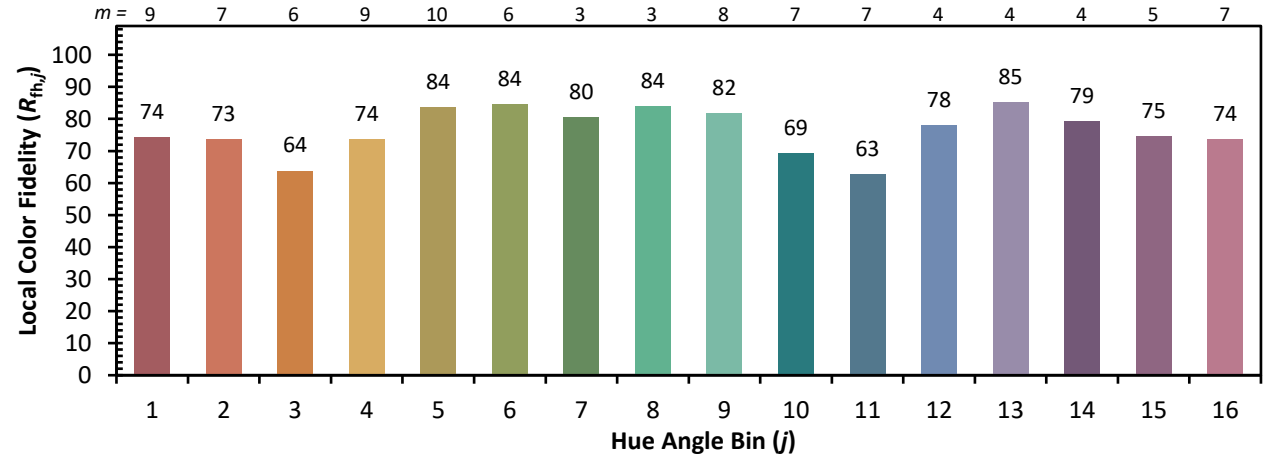
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## Color Rendition by Hue-Angle Bin



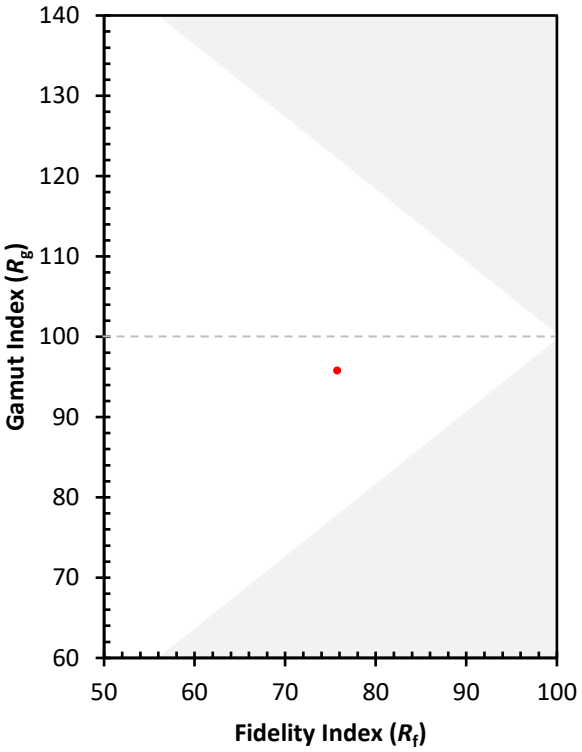



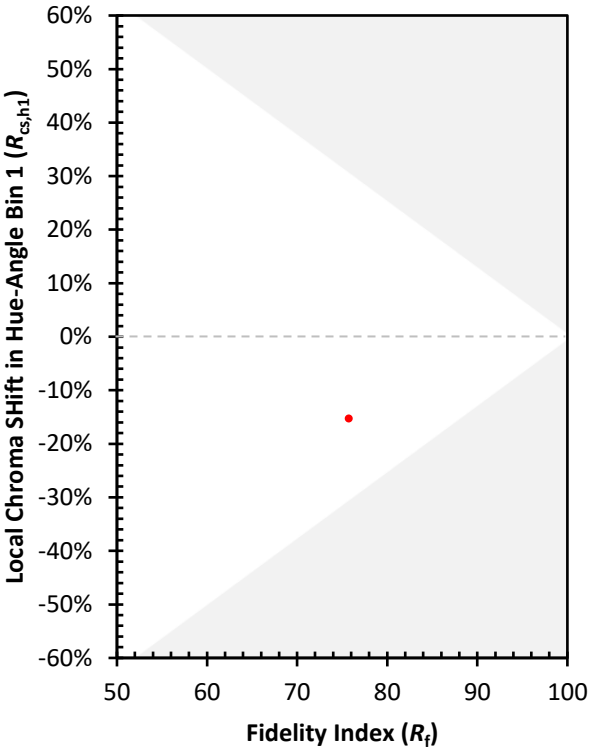



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## Measure Comparisons




(END OF REPORT)