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: P437249

Luminaire Tested: **ISS-SA1B-830-U-SL2**

Issue Date: 12/9/2020

Report Generated By 670245982

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: | P437249 |
| | TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G3-2011-074-14) |
| Test Lab: | INNOVATION CENTER |
| Issue Date: | 12/9/2020 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS (FORMERLY EATON) |
| Product Line: | McGRAW-EDISON |
| Catalog Number: | ISS-SA1B-830-U-SL2 |
| Description: | IMPACT ELITE LED QUARTER SPHERE LUMINAIRE |
| | (1) 80 CRI, 3000K, 450mA LIGHTSQUARE WITH 16 LEDS AND TYPE II SPILL LIGHT ELIMINATOR OPTICS |
| Light Source: | - |
| Ballast/Driver: | ELECTRONIC DRIVER |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 2743 lumens |
| Efficiency: | N/A |
| Efficacy: | 108.0 lumens/watt |
| Luminous Opening: | Rectangular (W 0.5' x L: 0.5' x H: 0') |
| IES Classification: | Type III - Medium |
| BUG Rating: | B1 - U0 - G1 |

| | |
|---|---|
| Input Watts (W): | 25.4 |
| 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: | 28.75 FT |

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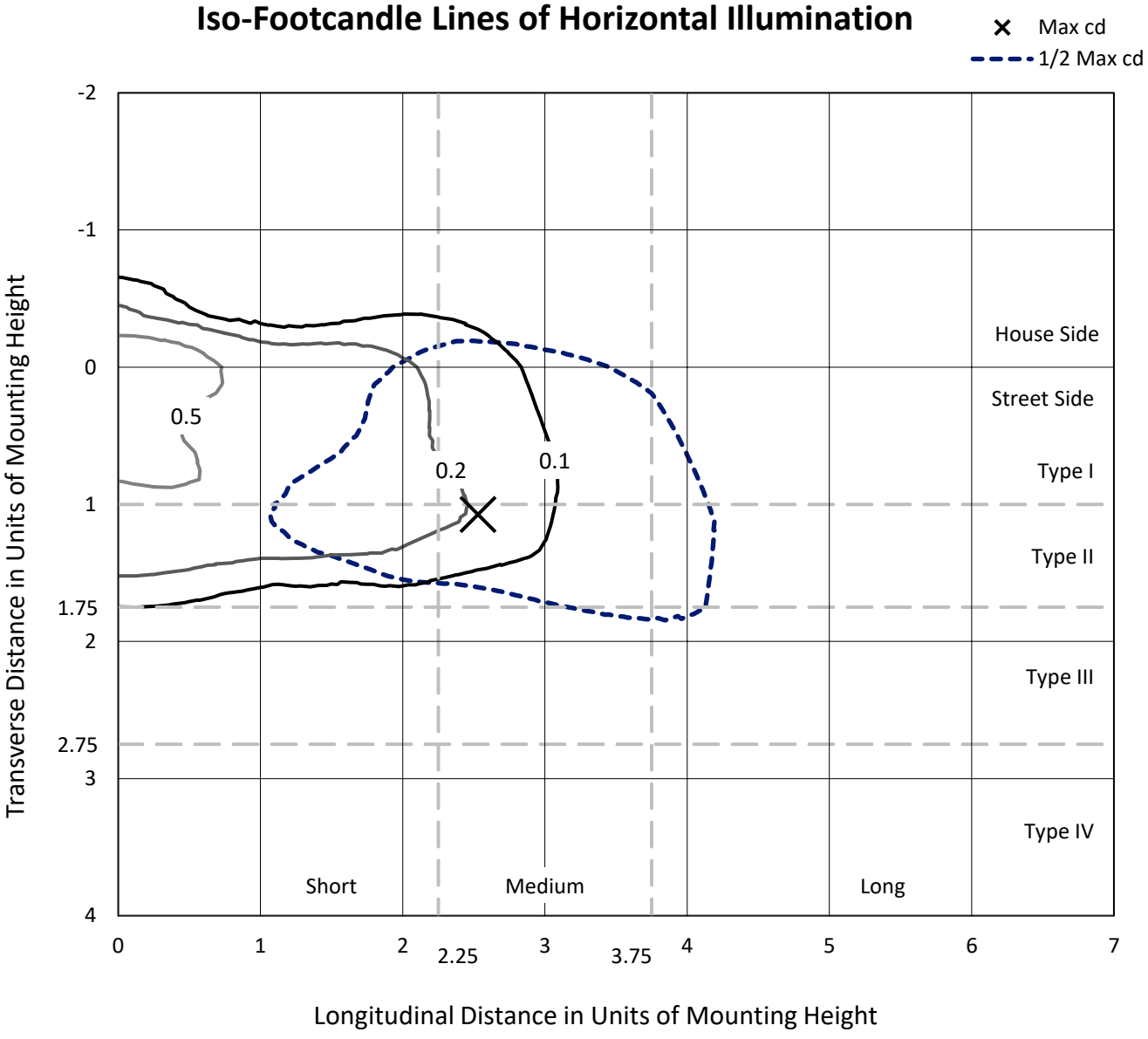
Scaled Data Report

REPORT NUMBER: P437249
CATALOG NUMBER: ISS-SA1B-830-U-SL2

## Iso-Footcandle Lines of Horizontal Illumination




Based on 25 foot mounting height. Maximum calculated value = 1 fc
Type III - Medium - N/A

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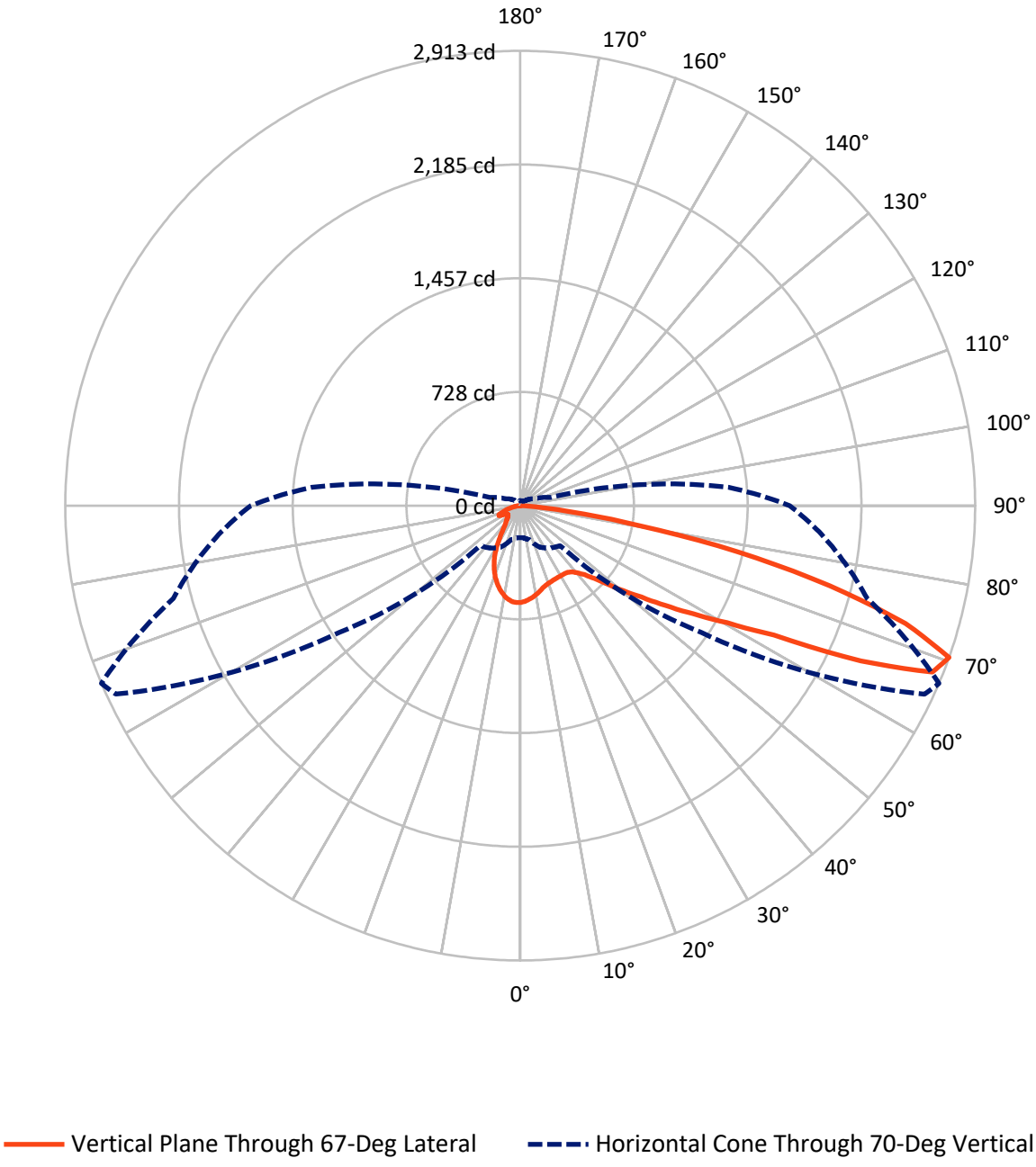
## Luminous Intensity Polar Plot



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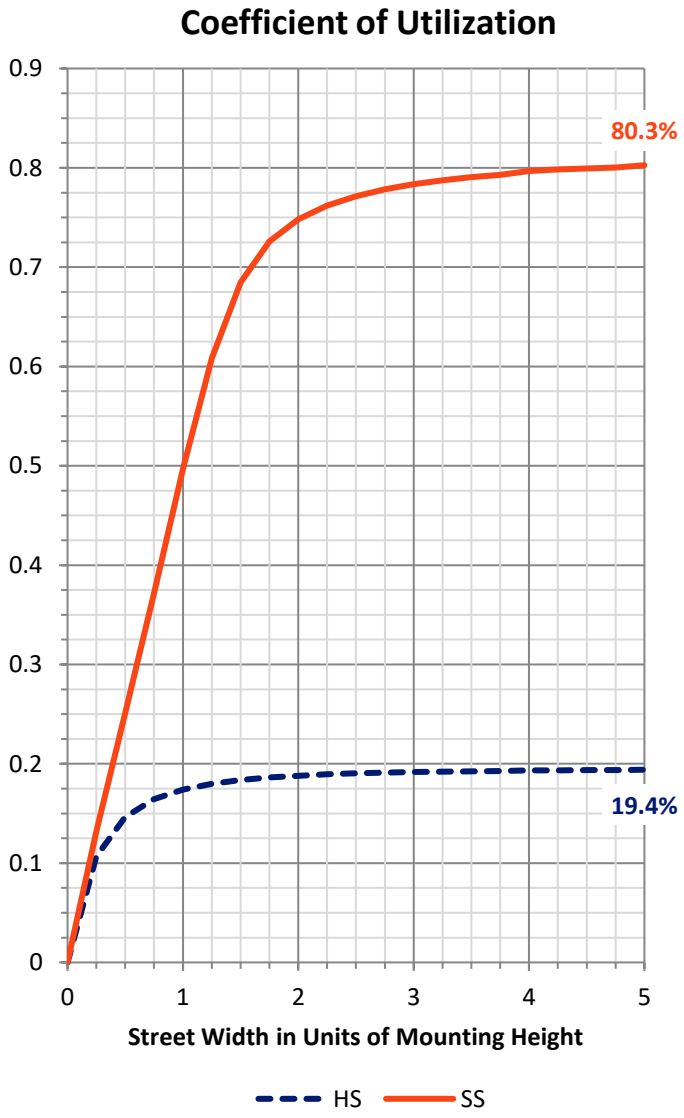
CATALOG NUMBER: ISS-SA1B-830-U-SL2

**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 537.2 | 0.0 | 537.2 |
| | % Fixture | 19.6 | 0.0 | 19.6 |
| **Street Side** | Lumens | 2205.8 | 0.0 | 2205.8 |
| | % Fixture | 80.4 | 0.0 | 80.4 |
| **Total** | Lumens | 2743.0 | 0.0 | 2743.0 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 54.4 | 2.0 |
| 10°-20° | 131.6 | 4.8 |
| 20°-30° | 181.4 | 6.6 |
| 30°-40° | 245.1 | 8.9 |
| 40°-50° | 363.6 | 13.3 |
| 50°-60° | 559.7 | 20.4 |
| 60°-70° | 692.0 | 25.2 |
| 70°-80° | 463.5 | 16.9 |
| 80°-90° | 51.7 | 1.9 |
| 90°-100° | 0.0 | 0.0 |
| 100°-110° | 0.0 | 0.0 |
| 110°-120° | 0.0 | 0.0 |
| 120°-130° | 0.0 | 0.0 |
| 130°-140° | 0.0 | 0.0 |
| 140°-150° | 0.0 | 0.0 |
| 150°-160° | 0.0 | 0.0 |
| 160°-170° | 0.0 | 0.0 |
| 170°-180° | 0.0 | 0.0 |
| 0°-90° | 2743.0 | 100.0 |
| 0°-180° | 2743.0 | 100.0 |



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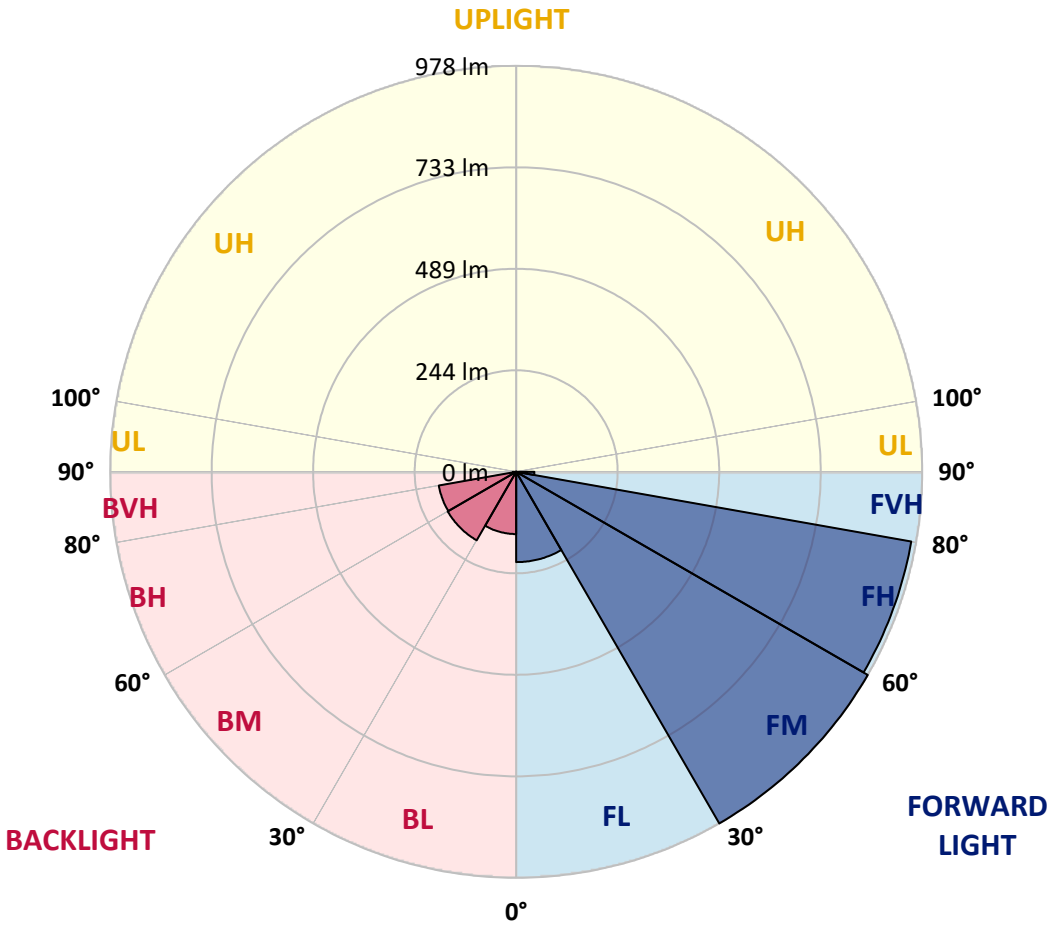
CATALOG NUMBER: ISS-SA1B-830-U-SL2

## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 217.6 | 7.9 | | | |
| FM | (30°-60°) | 977.9 | 35.7 | | | |
| FH | (60°-80°) | 966.3 | 35.2 | | | G1/1800 |
| FVH | (80°-90°) | 44.0 | 1.6 | | | G1/100 |
| BL | (0°-30°) | 149.9 | 5.5 | B1/500 | | |
| BM | (30°-60°) | 190.5 | 6.9 | B0/220 | | |
| BH | (60°-80°) | 189.2 | 6.9 | B1/500 | | G1/500 |
| BVH | (80°-90°) | 7.7 | 0.3 | | | 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 Medium



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**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 65° | 67° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 619.4 | 619.4 | 619.4 | 619.4 | 619.4 | 619.4 | 619.4 | 619.4 | *619.4* | 619.4 | 619.4 |
| 2.5° | 585.6 | 589.6 | 590.6 | 593.6 | 597.6 | 601.5 | 606.5 | 612.4 | *613.4* | 616.4 | 622.4 |
| 5° | 545.9 | 547.9 | 549.9 | 555.9 | 562.8 | 575.7 | 588.6 | 600.5 | *602.5* | 612.4 | 623.4 |
| 7.5° | 509.2 | 514.2 | 515.2 | 520.1 | 531.0 | 546.9 | 564.8 | 585.6 | *591.6* | 605.5 | 622.4 |
| 10° | 482.4 | 485.4 | 487.4 | 496.3 | 505.2 | 523.1 | 544.9 | 570.8 | *576.7* | 597.6 | 621.4 |
| 12.5° | 460.6 | 465.5 | 468.5 | 474.5 | 488.4 | 504.2 | 526.1 | 553.9 | *561.8* | 587.6 | 617.4 |
| 15° | 448.7 | 452.6 | 453.6 | 460.6 | 471.5 | 487.4 | 508.2 | 540.0 | *545.9* | 577.7 | 617.4 |
| 17.5° | 445.7 | 446.7 | 447.7 | 451.6 | 460.6 | 473.5 | 495.3 | 528.1 | *535.0* | 573.7 | 617.4 |
| 20° | 451.6 | 451.6 | 451.6 | 449.7 | 456.6 | 466.5 | 488.4 | 518.1 | *528.1* | 569.8 | 620.4 |
| 22.5° | 465.5 | 466.5 | 463.6 | 458.6 | 455.6 | 462.6 | 481.4 | 515.2 | *524.1* | 568.8 | 626.3 |
| 25° | 485.4 | 486.4 | 484.4 | 477.4 | 463.6 | 462.6 | 478.4 | 512.2 | *520.1* | 567.8 | 625.3 |
| 27.5° | 512.2 | 518.1 | 512.2 | 504.2 | 486.4 | 470.5 | 481.4 | 510.2 | *519.1* | 567.8 | 627.3 |
| 30° | 549.9 | 553.9 | 550.9 | 538.0 | 515.2 | 487.4 | 485.4 | 512.2 | *519.1* | 566.8 | 626.3 |
| 32.5° | 587.6 | 588.6 | 591.6 | 582.7 | 554.9 | 512.2 | 496.3 | 514.2 | *520.1* | 565.8 | 623.4 |
| 35° | 616.4 | 622.4 | 635.3 | 636.3 | 603.5 | 547.9 | 519.1 | 522.1 | *524.1* | 568.8 | 620.4 |
| 37.5° | 653.1 | 655.1 | 676.0 | 691.9 | 663.1 | 597.6 | 550.9 | 537.0 | *538.0* | 578.7 | 625.3 |
| 40° | 686.9 | 694.8 | 723.6 | 743.5 | 733.5 | 664.1 | 594.6 | 563.8 | *565.8* | 596.6 | 637.3 |
| 42.5° | 737.5 | 743.5 | 773.2 | 801.0 | 804.0 | 739.5 | 655.1 | 609.5 | *604.5* | 631.3 | 663.1 |
| 45° | 782.2 | 789.1 | 826.8 | 867.5 | 881.4 | 824.9 | 730.6 | 672.0 | *664.1* | 689.9 | 710.7 |
| 47.5° | 844.7 | 856.6 | 886.4 | 933.1 | 979.7 | 929.1 | 826.8 | 757.4 | *750.4* | 768.3 | 774.2 |
| 50° | 904.3 | 911.2 | 936.0 | 992.6 | 1075.0 | 1060.1 | 945.0 | 868.5 | *857.6* | 860.6 | 874.5 |
| 52.5° | 913.2 | 916.2 | 942.0 | 1001.5 | 1156.4 | 1219.9 | 1089.9 | 993.6 | *973.8* | 976.7 | 993.6 |
| 55° | 845.7 | 857.6 | 876.5 | 959.9 | 1162.4 | 1397.6 | 1293.4 | 1158.4 | *1127.6* | 1116.7 | 1130.6 |
| 57.5° | 705.7 | 719.6 | 746.4 | 832.8 | 1093.9 | 1493.9 | 1626.9 | 1354.9 | *1307.3* | 1256.6 | 1273.5 |
| 60° | 520.1 | 535.0 | 551.9 | 636.3 | 920.2 | 1508.8 | 1958.4 | 1593.1 | *1522.7* | 1396.6 | 1405.5 |
| 62.5° | 399.0 | 399.0 | 413.9 | 448.7 | 615.4 | 1400.6 | 2153.0 | 1996.1 | *1823.4* | 1567.3 | 1556.4 |
| 65° | 322.6 | 326.6 | 341.5 | 374.2 | 389.1 | 994.6 | 2230.4 | 2581.8 | *2398.2* | 1771.8 | 1715.2 |
| 67.5° | 267.0 | 268.0 | 284.9 | 336.5 | 340.5 | 546.9 | 2022.9 | 2889.5 | *2845.8* | 2027.9 | 1884.0 |
| 70° | *204.5* | *205.5* | *225.3* | *292.8* | *331.5* | *362.3* | *1415.5* | *2857.7* | *2913.3* | *2299.9* | *1920.7* |
| 72.5° | 136.0 | 141.9 | 165.8 | 232.3 | 330.5 | 341.5 | 768.3 | 2499.4 | *2579.8* | 2406.1 | 1797.6 |
| 75° | 84.4 | 85.4 | 110.2 | 160.8 | 303.7 | 340.5 | 451.6 | 1947.5 | *2046.8* | 1996.1 | 1559.4 |
| 77.5° | 51.6 | 53.6 | 65.5 | 105.2 | 235.2 | 341.5 | 321.6 | 1340.0 | *1422.4* | 1310.3 | 919.2 |
| 80° | 31.8 | 31.8 | 37.7 | 63.5 | 152.9 | 305.7 | 276.9 | 779.2 | *771.3* | 484.4 | 261.1 |
| 82.5° | 11.9 | 12.9 | 19.9 | 34.7 | 77.4 | 237.2 | 243.2 | 352.4 | *324.6* | 142.9 | 93.3 |
| 85° | 2.0 | 2.0 | 4.0 | 10.9 | 20.8 | 98.3 | 135.0 | 124.1 | *104.2* | 43.7 | 38.7 |
| 87.5° | 0.0 | 0.0 | 0.0 | 1.0 | 1.0 | 2.0 | 3.0 | 3.0 | *3.0* | 3.0 | 4.0 |
| 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: P437249
CATALOG NUMBER: ISS-SA1B-830-U-SL2

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 619.4 | 619.4 | 619.4 | 619.4 | 619.4 | 619.4 | 619.4 | 619.4 | 619.4 | 619.4 | 619.4 |
| 2.5° | 622.4 | 624.4 | 623.4 | 620.4 | 617.4 | 615.4 | 610.5 | 607.5 | 608.5 | 608.5 | 609.5 |
| 5° | 624.4 | 627.3 | 622.4 | 616.4 | 605.5 | 593.6 | 582.7 | 576.7 | 568.8 | 571.7 | 569.8 |
| 7.5° | 627.3 | 629.3 | 620.4 | 602.5 | 583.7 | 563.8 | 544.9 | 528.1 | 515.2 | 509.2 | 513.2 |
| 10° | 625.3 | 628.3 | 611.5 | 584.6 | 555.9 | 524.1 | 495.3 | 467.5 | 449.7 | 437.7 | 440.7 |
| 12.5° | 624.4 | 621.4 | 598.5 | 558.8 | 519.1 | 475.5 | 431.8 | 398.0 | 368.3 | 356.3 | 358.3 |
| 15° | 620.4 | 618.4 | 582.7 | 532.0 | 477.4 | 415.9 | 358.3 | 314.7 | 278.9 | 267.0 | 271.0 |
| 17.5° | 622.4 | 616.4 | 563.8 | 499.3 | 424.8 | 349.4 | 278.9 | 236.2 | 218.4 | 214.4 | 213.4 |
| 20° | 620.4 | 609.5 | 544.9 | 463.6 | 369.3 | 271.0 | 207.5 | 184.6 | 184.6 | 190.6 | 191.6 |
| 22.5° | 622.4 | 603.5 | 524.1 | 422.9 | 305.7 | 203.5 | 161.8 | 155.8 | 164.8 | 177.7 | 177.7 |
| 25° | 622.4 | 596.6 | 501.3 | 377.2 | 239.2 | 154.8 | 138.0 | 138.0 | 149.9 | 161.8 | 160.8 |
| 27.5° | 618.4 | 582.7 | 475.5 | 328.6 | 177.7 | 128.0 | 121.1 | 124.1 | 132.0 | 141.9 | 141.0 |
| 30° | 608.5 | 568.8 | 443.7 | 272.0 | 135.0 | 113.2 | 112.2 | 113.2 | 117.1 | 123.1 | 122.1 |
| 32.5° | 599.5 | 552.9 | 412.9 | 211.4 | 114.2 | 105.2 | 104.2 | 105.2 | 106.2 | 108.2 | 108.2 |
| 35° | 593.6 | 539.0 | 376.2 | 162.8 | 103.2 | 100.3 | 98.3 | 98.3 | 96.3 | 97.3 | 97.3 |
| 37.5° | 586.6 | 526.1 | 338.5 | 127.1 | 97.3 | 95.3 | 93.3 | 90.3 | 90.3 | 88.3 | 88.3 |
| 40° | 586.6 | 516.2 | 299.8 | 107.2 | 93.3 | 92.3 | 88.3 | 84.4 | 82.4 | 82.4 | 82.4 |
| 42.5° | 602.5 | 516.2 | 264.0 | 98.3 | 89.3 | 88.3 | 83.4 | 79.4 | 77.4 | 77.4 | 77.4 |
| 45° | 629.3 | 522.1 | 227.3 | 92.3 | 86.4 | 84.4 | 78.4 | 74.4 | 72.5 | 72.5 | 71.5 |
| 47.5° | 676.0 | 546.9 | 194.6 | 89.3 | 83.4 | 80.4 | 73.5 | 69.5 | 67.5 | 67.5 | 67.5 |
| 50° | 754.4 | 596.6 | 167.8 | 86.4 | 80.4 | 75.4 | 69.5 | 65.5 | 63.5 | 63.5 | 62.5 |
| 52.5° | 862.6 | 671.0 | 154.8 | 84.4 | 76.4 | 70.5 | 65.5 | 61.5 | 59.6 | 58.6 | 58.6 |
| 55° | 992.6 | 783.2 | 152.9 | 83.4 | 72.5 | 66.5 | 61.5 | 57.6 | 55.6 | 54.6 | 54.6 |
| 57.5° | 1134.6 | 906.3 | 166.8 | 81.4 | 68.5 | 61.5 | 57.6 | 53.6 | 51.6 | 50.6 | 50.6 |
| 60° | 1271.5 | 1041.3 | 211.4 | 79.4 | 65.5 | 57.6 | 52.6 | 49.6 | 47.6 | 46.7 | 46.7 |
| 62.5° | 1430.4 | 1183.2 | 309.7 | 80.4 | 63.5 | 53.6 | 48.6 | 45.7 | 44.7 | 43.7 | 43.7 |
| 65° | 1605.1 | 1346.0 | 396.1 | 88.3 | 64.5 | 49.6 | 44.7 | 42.7 | 40.7 | 39.7 | 39.7 |
| 67.5° | 1759.9 | 1451.2 | 330.5 | 102.2 | 70.5 | 46.7 | 39.7 | 38.7 | 36.7 | 35.7 | 36.7 |
| 70° | *1725.2* | *1340.0* | *203.5* | *103.2* | *71.5* | *44.7* | *35.7* | *33.7* | *31.8* | *31.8* | *31.8* |
| 72.5° | 1573.3 | 1182.2 | 141.9 | 89.3 | 63.5 | 39.7 | 30.8 | 28.8 | 27.8 | 27.8 | 27.8 |
| 75° | 1324.1 | 974.7 | 113.2 | 72.5 | 49.6 | 32.8 | 25.8 | 24.8 | 23.8 | 22.8 | 22.8 |
| 77.5° | 724.6 | 530.1 | 84.4 | 55.6 | 36.7 | 24.8 | 21.8 | 19.9 | 18.9 | 18.9 | 18.9 |
| 80° | 212.4 | 181.6 | 52.6 | 39.7 | 23.8 | 17.9 | 16.9 | 14.9 | 13.9 | 13.9 | 13.9 |
| 82.5° | 89.3 | 75.4 | 31.8 | 21.8 | 15.9 | 11.9 | 10.9 | 9.9 | 8.9 | 7.9 | 8.9 |
| 85° | 34.7 | 36.7 | 19.9 | 12.9 | 8.9 | 6.0 | 5.0 | 4.0 | 4.0 | 3.0 | 4.0 |
| 87.5° | 4.0 | 5.0 | 4.0 | 3.0 | 2.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| 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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Peachtree City, GA 30269

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

Report Prepared for

Cooper Lighting Solutions

MCGRAW EDISON

Report Number: SP1-2408-195-9

Test Date: 08/07/2024

Luminaire Tested: GALN-SB1A-830-U-5WQ

Data in this report applies to families of products including GALN-SB1A-830-U-5WQ.

Report Generated By FNC07603 / LDUCLS01DT446
Version: v7.04

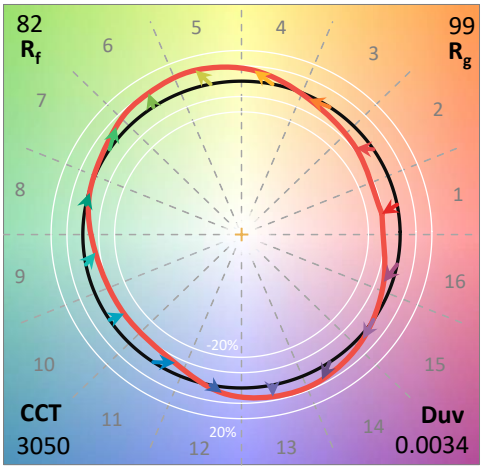
## Test Information

| | |
|---|---|
| Test Method: | LM-79-2019 |
| Report Number: | SP1-2408-195-9 |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Photometer: | SP1 - 76IN SPHERE |
| Measurement Geometry: | 4π |
| Issue Date: | 08/07/2024 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS |
| Product Line: | MCGRAW EDISON |
| Catalog Number: | **GALN-SB1A-830-U-5WQ** |
| Description: | GALLEON AREA AND ROADWAY LUMINAIRE. (1) 80 CRI, 3000K, 350MA HIGH DENSITY LIGHTSQUARE WITH 26 LEDS AND TYPE V WIDE OPTICS |

## Spectral Parameters

| | | | | | |
|---|---|---|---|---|---|
| CCT (K): | 3050 | CRI (Ra): | 81.0 | | |
| CIE u': | 0.2476 | R1: | 79.6 | R9: | 7.1 |
| CIE v': | 0.5251 | R2: | 85.6 | R10: | 67.0 |
| Duv: | 0.0034 | R3: | 92.0 | R11: | 82.7 |
| CIE x: | 0.4383 | R4: | 82.6 | R12: | 63.2 |
| CIE y: | 0.4131 | R5: | 78.9 | R13: | 80.3 |
| CIE z: | 0.1487 | R6: | 81.7 | R14: | 95.0 |
| Peak Wavelength (nm): | 603 | R7: | 85.2 | R15: | 71.7 |
| Dominant Wavelength (nm): | 581 | R8: | 62.0 | | |
| Purity: | 55.55201 | | | | |

| | |
|---|---|
| Rf: | 81.5 |
| Rg: | 99.2 |




## Test Conditions

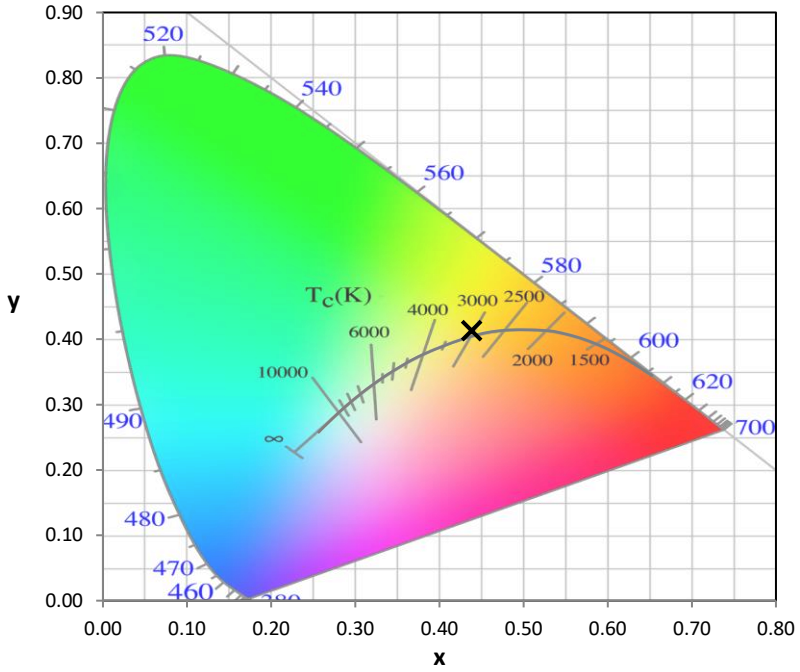
| | |
|---|---|
| Stabilization Time: | 20M |
| Operation Time: | 1H 20M |
| Sphere Temperature (°C): | 24.2 |

REPORT NUMBER: SP1-2408-195-9

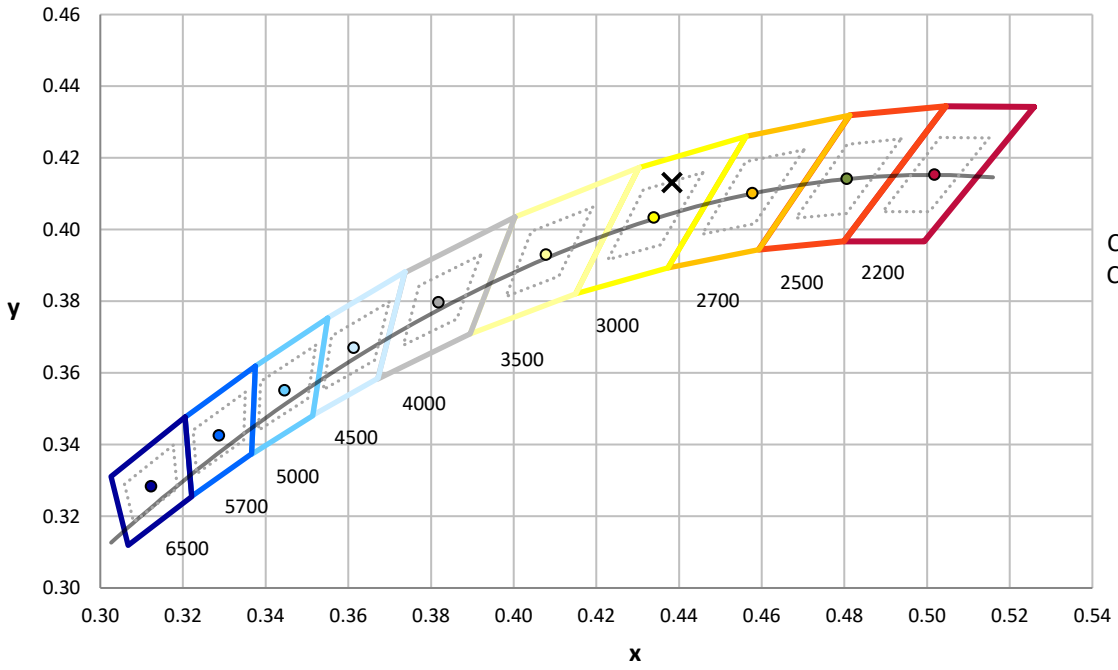
| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 6/18/2024 | 12/18/2024 |
| Power Meter | INXT2011004 | 2/8/2024 | 2/8/2025 |
| AC Power Source | IN0063 | 10/24/2023 | 10/24/2024 |
| DC 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: SP1-2408-195-9

## CIE 1931 Chromaticity Diagram




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




CCT = 3050K
CIE x = 0.4383
CIE y = 0.4131
Duv = 0.0034

Point lies inside the ANSI 3000K 4-step quadrangle

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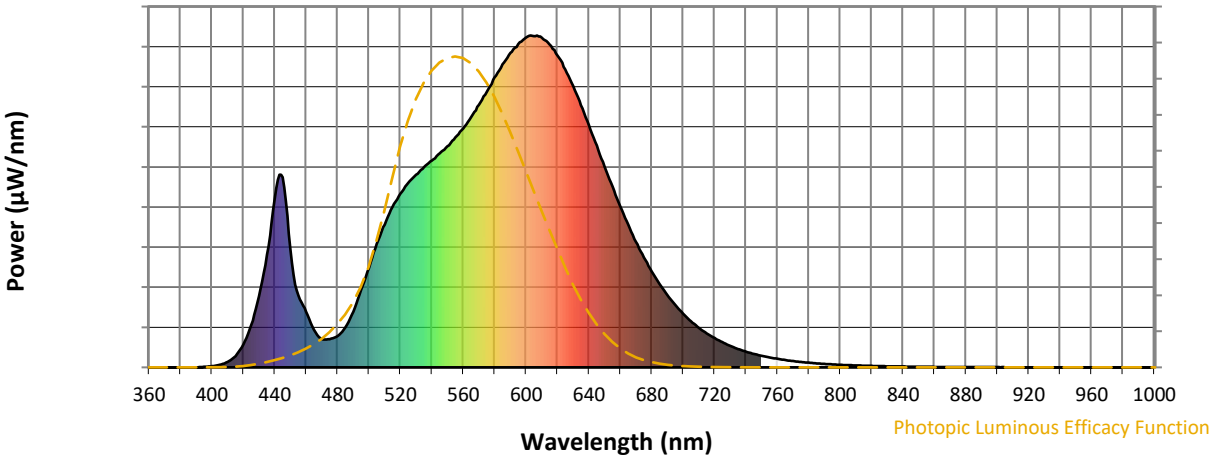
## Photopic Flux vs. Wavelength




## 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 | 168 | NR | 620 | 940 | NR | 750 | 35 | NR | 880 | 1 | NR |
| 365 | 0 | NR | 495 | 233 | NR | 625 | 897 | NR | 755 | 30 | NR | 885 | 1 | NR |
| 370 | 0 | NR | 500 | 300 | NR | 630 | 847 | NR | 760 | 26 | NR | 890 | 1 | NR |
| 375 | 0 | NR | 505 | 372 | NR | 635 | 790 | NR | 765 | 22 | NR | 895 | 1 | NR |
| 380 | 0 | NR | 510 | 430 | NR | 640 | 730 | NR | 770 | 19 | NR | 900 | 1 | NR |
| 385 | 0 | NR | 515 | 483 | NR | 645 | 668 | NR | 775 | 16 | NR | 905 | 1 | NR |
| 390 | 0 | NR | 520 | 524 | NR | 650 | 605 | NR | 780 | 14 | NR | 910 | 0 | NR |
| 395 | 2 | NR | 525 | 555 | NR | 655 | 545 | NR | 785 | 12 | NR | 915 | 0 | NR |
| 400 | 4 | NR | 530 | 581 | NR | 660 | 485 | NR | 790 | 10 | NR | 920 | 0 | NR |
| 405 | 7 | NR | 535 | 604 | NR | 665 | 430 | NR | 795 | 9 | NR | 925 | 0 | NR |
| 410 | 17 | NR | 540 | 623 | NR | 670 | 378 | NR | 800 | 8 | NR | 930 | 0 | NR |
| 415 | 34 | NR | 545 | 645 | NR | 675 | 331 | NR | 805 | 7 | NR | 935 | 0 | NR |
| 420 | 68 | NR | 550 | 667 | NR | 680 | 290 | NR | 810 | 6 | NR | 940 | 0 | NR |
| 425 | 128 | NR | 555 | 693 | NR | 685 | 251 | NR | 815 | 5 | NR | 945 | 0 | NR |
| 430 | 214 | NR | 560 | 719 | NR | 690 | 218 | NR | 820 | 4 | NR | 950 | 0 | NR |
| 435 | 339 | NR | 565 | 754 | NR | 695 | 188 | NR | 825 | 4 | NR | 955 | 0 | NR |
| 440 | 507 | NR | 570 | 791 | NR | 700 | 162 | NR | 830 | 3 | NR | 960 | 0 | NR |
| 445 | 573 | NR | 575 | 830 | NR | 705 | 139 | NR | 835 | 3 | NR | 965 | 0 | NR |
| 450 | 356 | NR | 580 | 873 | NR | 710 | 119 | NR | 840 | 3 | NR | 970 | 0 | NR |
| 455 | 217 | NR | 585 | 913 | NR | 715 | 102 | NR | 845 | 2 | NR | 975 | 0 | NR |
| 460 | 168 | NR | 590 | 948 | NR | 720 | 88 | NR | 850 | 2 | NR | 980 | 0 | NR |
| 465 | 113 | NR | 595 | 974 | NR | 725 | 76 | NR | 855 | 2 | NR | 985 | 0 | NR |
| 470 | 85 | NR | 600 | 994 | NR | 730 | 65 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 85 | NR | 605 | 998 | NR | 735 | 55 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 94 | NR | 610 | 994 | NR | 740 | 47 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 120 | NR | 615 | 973 | NR | 745 | 41 | NR | 875 | 1 | NR | | | |

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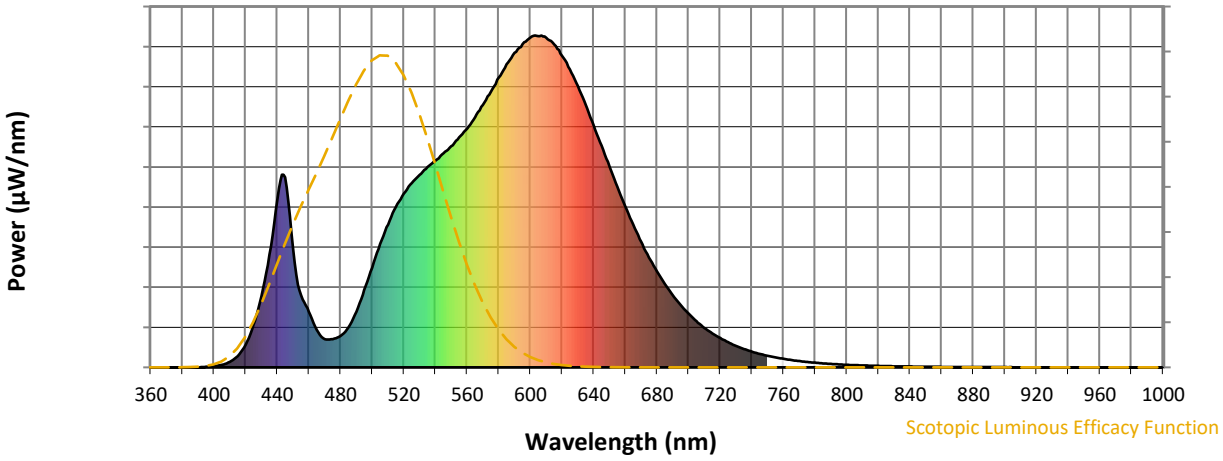
## Scotopic Flux vs. Wavelength




**Scotopic Lumens: NR** **S/P: 1.27**

| 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 | 168 | NR | 620 | 940 | NR | 750 | 35 | NR | 880 | 1 | NR |
| 365 | 0 | NR | 495 | 233 | NR | 625 | 897 | NR | 755 | 30 | NR | 885 | 1 | NR |
| 370 | 0 | NR | 500 | 300 | NR | 630 | 847 | NR | 760 | 26 | NR | 890 | 1 | NR |
| 375 | 0 | NR | 505 | 372 | NR | 635 | 790 | NR | 765 | 22 | NR | 895 | 1 | NR |
| 380 | 0 | NR | 510 | 430 | NR | 640 | 730 | NR | 770 | 19 | NR | 900 | 1 | NR |
| 385 | 0 | NR | 515 | 483 | NR | 645 | 668 | NR | 775 | 16 | NR | 905 | 1 | NR |
| 390 | 0 | NR | 520 | 524 | NR | 650 | 605 | NR | 780 | 14 | NR | 910 | 0 | NR |
| 395 | 2 | NR | 525 | 555 | NR | 655 | 545 | NR | 785 | 12 | NR | 915 | 0 | NR |
| 400 | 4 | NR | 530 | 581 | NR | 660 | 485 | NR | 790 | 10 | NR | 920 | 0 | NR |
| 405 | 7 | NR | 535 | 604 | NR | 665 | 430 | NR | 795 | 9 | NR | 925 | 0 | NR |
| 410 | 17 | NR | 540 | 623 | NR | 670 | 378 | NR | 800 | 8 | NR | 930 | 0 | NR |
| 415 | 34 | NR | 545 | 645 | NR | 675 | 331 | NR | 805 | 7 | NR | 935 | 0 | NR |
| 420 | 68 | NR | 550 | 667 | NR | 680 | 290 | NR | 810 | 6 | NR | 940 | 0 | NR |
| 425 | 128 | NR | 555 | 693 | NR | 685 | 251 | NR | 815 | 5 | NR | 945 | 0 | NR |
| 430 | 214 | NR | 560 | 719 | NR | 690 | 218 | NR | 820 | 4 | NR | 950 | 0 | NR |
| 435 | 339 | NR | 565 | 754 | NR | 695 | 188 | NR | 825 | 4 | NR | 955 | 0 | NR |
| 440 | 507 | NR | 570 | 791 | NR | 700 | 162 | NR | 830 | 3 | NR | 960 | 0 | NR |
| 445 | 573 | NR | 575 | 830 | NR | 705 | 139 | NR | 835 | 3 | NR | 965 | 0 | NR |
| 450 | 356 | NR | 580 | 873 | NR | 710 | 119 | NR | 840 | 3 | NR | 970 | 0 | NR |
| 455 | 217 | NR | 585 | 913 | NR | 715 | 102 | NR | 845 | 2 | NR | 975 | 0 | NR |
| 460 | 168 | NR | 590 | 948 | NR | 720 | 88 | NR | 850 | 2 | NR | 980 | 0 | NR |
| 465 | 113 | NR | 595 | 974 | NR | 725 | 76 | NR | 855 | 2 | NR | 985 | 0 | NR |
| 470 | 85 | NR | 600 | 994 | NR | 730 | 65 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 85 | NR | 605 | 998 | NR | 735 | 55 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 94 | NR | 610 | 994 | NR | 740 | 47 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 120 | NR | 615 | 973 | NR | 745 | 41 | NR | 875 | 1 | NR | | | |

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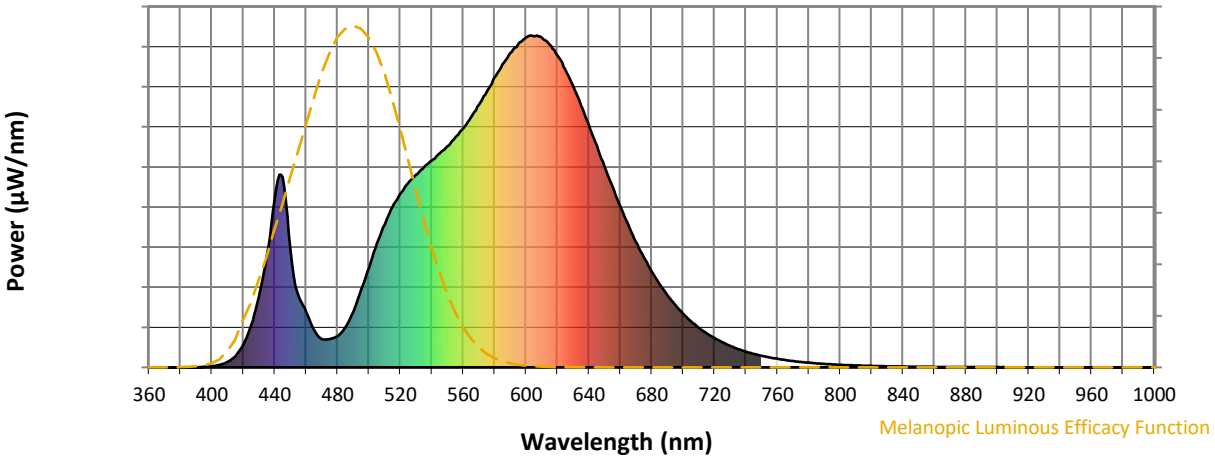
## Melanopic Flux vs. Wavelength




**Melanopic Lumens: NR** **M/P: 2.32**

| 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 | 168 | NR | 620 | 940 | NR | 750 | 35 | NR | 880 | 1 | NR |
| 365 | 0 | NR | 495 | 233 | NR | 625 | 897 | NR | 755 | 30 | NR | 885 | 1 | NR |
| 370 | 0 | NR | 500 | 300 | NR | 630 | 847 | NR | 760 | 26 | NR | 890 | 1 | NR |
| 375 | 0 | NR | 505 | 372 | NR | 635 | 790 | NR | 765 | 22 | NR | 895 | 1 | NR |
| 380 | 0 | NR | 510 | 430 | NR | 640 | 730 | NR | 770 | 19 | NR | 900 | 1 | NR |
| 385 | 0 | NR | 515 | 483 | NR | 645 | 668 | NR | 775 | 16 | NR | 905 | 1 | NR |
| 390 | 0 | NR | 520 | 524 | NR | 650 | 605 | NR | 780 | 14 | NR | 910 | 0 | NR |
| 395 | 2 | NR | 525 | 555 | NR | 655 | 545 | NR | 785 | 12 | NR | 915 | 0 | NR |
| 400 | 4 | NR | 530 | 581 | NR | 660 | 485 | NR | 790 | 10 | NR | 920 | 0 | NR |
| 405 | 7 | NR | 535 | 604 | NR | 665 | 430 | NR | 795 | 9 | NR | 925 | 0 | NR |
| 410 | 17 | NR | 540 | 623 | NR | 670 | 378 | NR | 800 | 8 | NR | 930 | 0 | NR |
| 415 | 34 | NR | 545 | 645 | NR | 675 | 331 | NR | 805 | 7 | NR | 935 | 0 | NR |
| 420 | 68 | NR | 550 | 667 | NR | 680 | 290 | NR | 810 | 6 | NR | 940 | 0 | NR |
| 425 | 128 | NR | 555 | 693 | NR | 685 | 251 | NR | 815 | 5 | NR | 945 | 0 | NR |
| 430 | 214 | NR | 560 | 719 | NR | 690 | 218 | NR | 820 | 4 | NR | 950 | 0 | NR |
| 435 | 339 | NR | 565 | 754 | NR | 695 | 188 | NR | 825 | 4 | NR | 955 | 0 | NR |
| 440 | 507 | NR | 570 | 791 | NR | 700 | 162 | NR | 830 | 3 | NR | 960 | 0 | NR |
| 445 | 573 | NR | 575 | 830 | NR | 705 | 139 | NR | 835 | 3 | NR | 965 | 0 | NR |
| 450 | 356 | NR | 580 | 873 | NR | 710 | 119 | NR | 840 | 3 | NR | 970 | 0 | NR |
| 455 | 217 | NR | 585 | 913 | NR | 715 | 102 | NR | 845 | 2 | NR | 975 | 0 | NR |
| 460 | 168 | NR | 590 | 948 | NR | 720 | 88 | NR | 850 | 2 | NR | 980 | 0 | NR |
| 465 | 113 | NR | 595 | 974 | NR | 725 | 76 | NR | 855 | 2 | NR | 985 | 0 | NR |
| 470 | 85 | NR | 600 | 994 | NR | 730 | 65 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 85 | NR | 605 | 998 | NR | 735 | 55 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 94 | NR | 610 | 994 | NR | 740 | 47 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 120 | NR | 615 | 973 | NR | 745 | 41 | NR | 875 | 1 | NR | | | |

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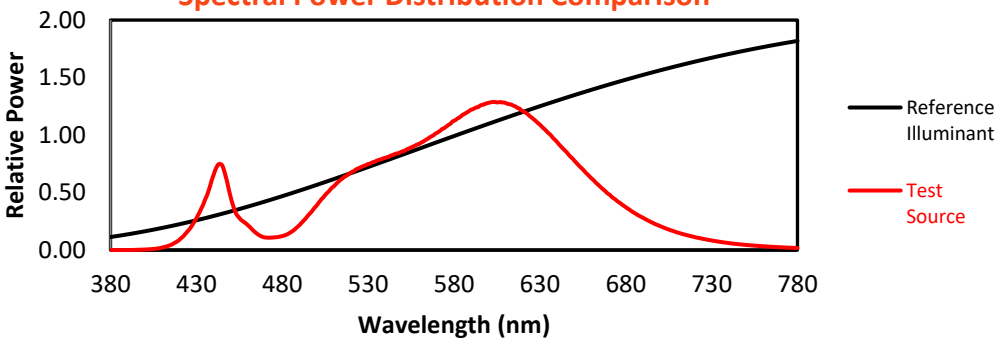
# TM-30-18

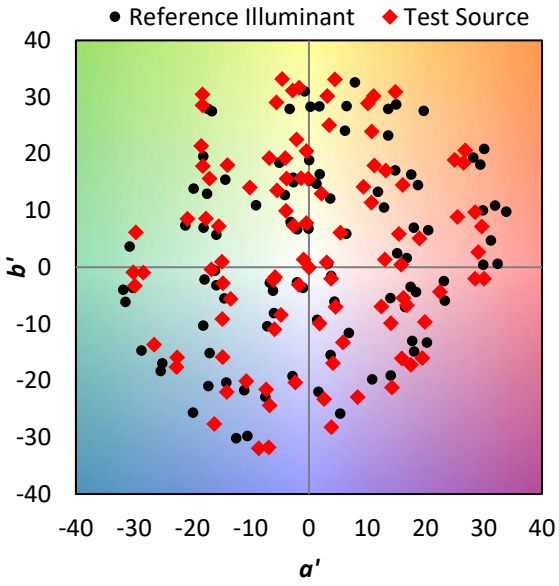
## Summary

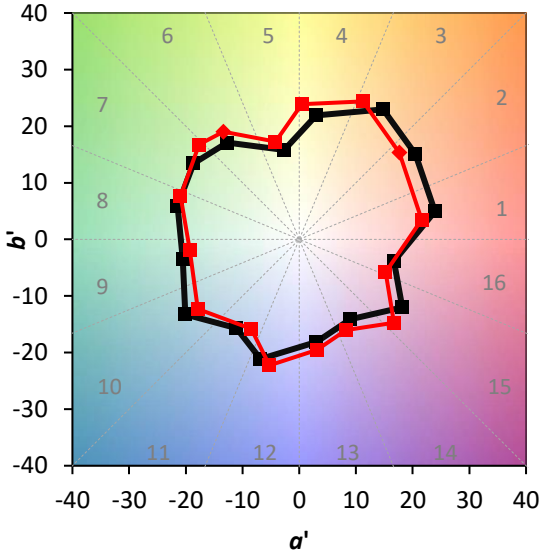
$R_f$ = 81.5
$R_g$ = 99.2
CIE $R_a$ = 81.0
$R_9$ = 7.1

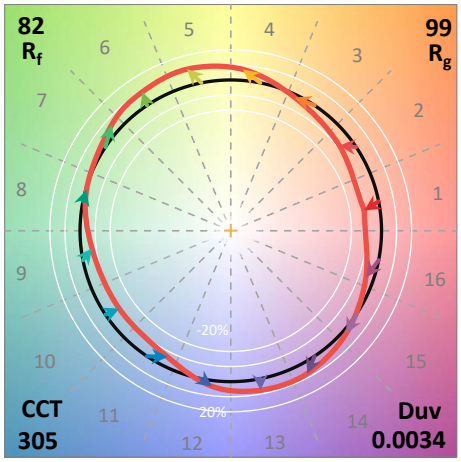
## Spectral Power Distribution Comparison

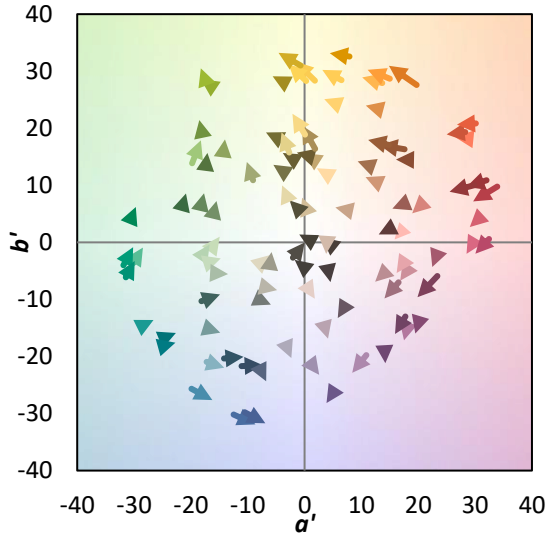



## Color Vector Graphics



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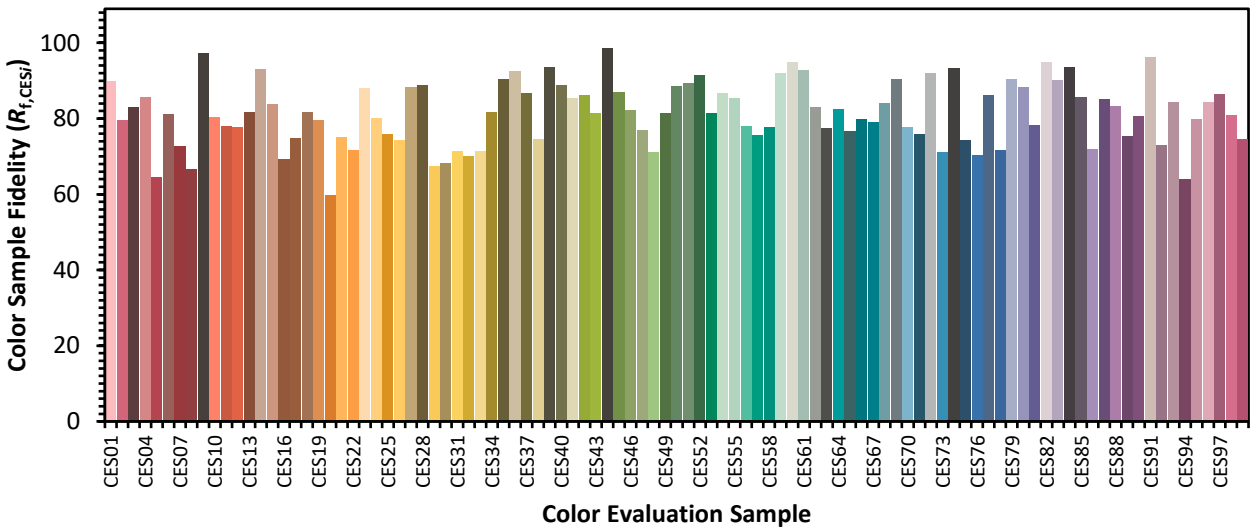
## Individual Sample Fidelity Index ($R_{f,i}$)

| | | | |
|---|---|---|---|
| CES01 = 86 | CES26 = 74 | CES51 = 89 | CES76 = 70 |
| CES02 = 63 | CES27 = 88 | CES52 = 92 | CES77 = 86 |
| CES03 = 31 | CES28 = 89 | CES53 = 81 | CES78 = 72 |
| CES04 = 70 | CES29 = 67 | CES54 = 87 | CES79 = 90 |
| CES05 = 50 | CES30 = 68 | CES55 = 85 | CES80 = 88 |
| CES06 = 51 | CES31 = 71 | CES56 = 78 | CES81 = 78 |
| CES07 = 42 | CES32 = 70 | CES57 = 76 | CES82 = 95 |
| CES08 = 41 | CES33 = 71 | CES58 = 78 | CES83 = 90 |
| CES09 = 29 | CES34 = 82 | CES59 = 92 | CES84 = 94 |
| CES10 = 76 | CES35 = 90 | CES60 = 95 | CES85 = 86 |
| CES11 = 59 | CES36 = 93 | CES61 = 93 | CES86 = 72 |
| CES12 = 65 | CES37 = 87 | CES62 = 83 | CES87 = 85 |
| CES13 = 43 | CES38 = 75 | CES63 = 77 | CES88 = 83 |
| CES14 = 74 | CES39 = 94 | CES64 = 83 | CES89 = 75 |
| CES15 = 71 | CES40 = 89 | CES65 = 77 | CES90 = 81 |
| CES16 = 47 | CES41 = 85 | CES66 = 80 | CES91 = 96 |
| CES17 = 50 | CES42 = 86 | CES67 = 79 | CES92 = 73 |
| CES18 = 56 | CES43 = 81 | CES68 = 84 | CES93 = 84 |
| CES19 = 72 | CES44 = 99 | CES69 = 91 | CES94 = 64 |
| CES20 = 66 | CES45 = 87 | CES70 = 78 | CES95 = 80 |
| CES21 = 87 | CES46 = 82 | CES71 = 76 | CES96 = 84 |
| CES22 = 79 | CES47 = 77 | CES72 = 92 | CES97 = 87 |
| CES23 = 92 | CES48 = 71 | CES73 = 71 | CES98 = 81 |
| CES24 = 91 | CES49 = 81 | CES74 = 93 | CES99 = 74 |
| CES25 = 72 | CES50 = 89 | CES75 = 74 | |



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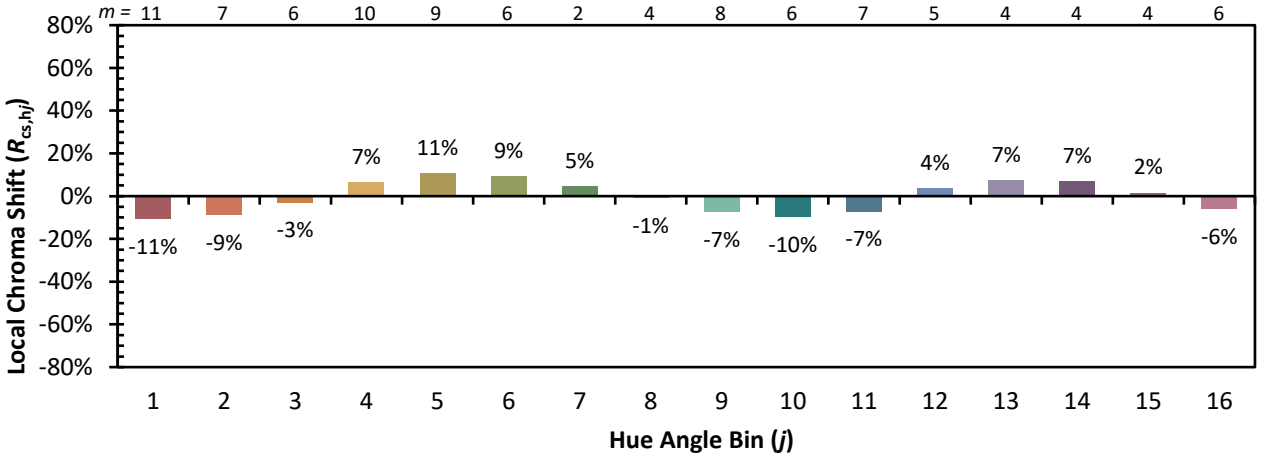
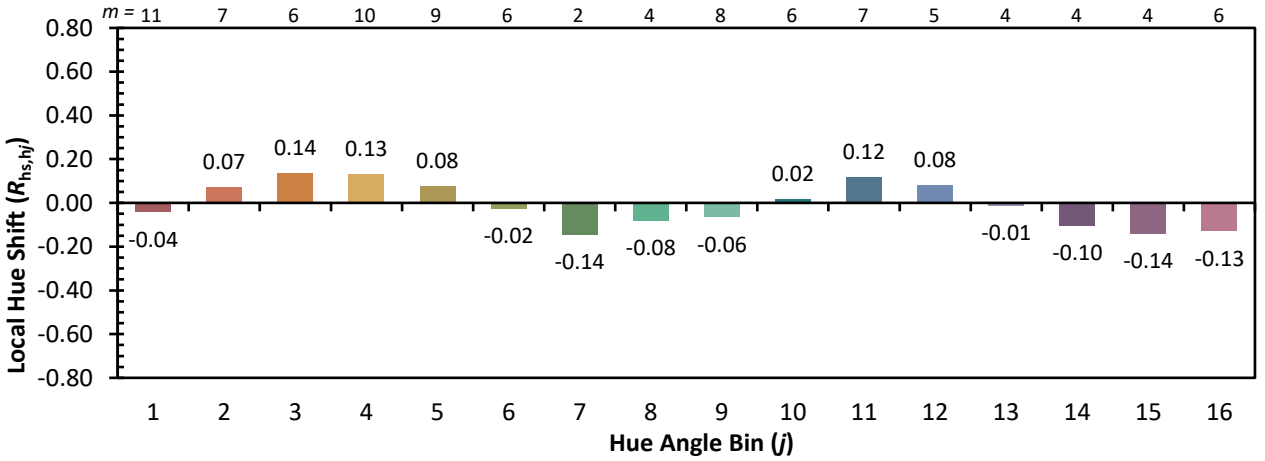
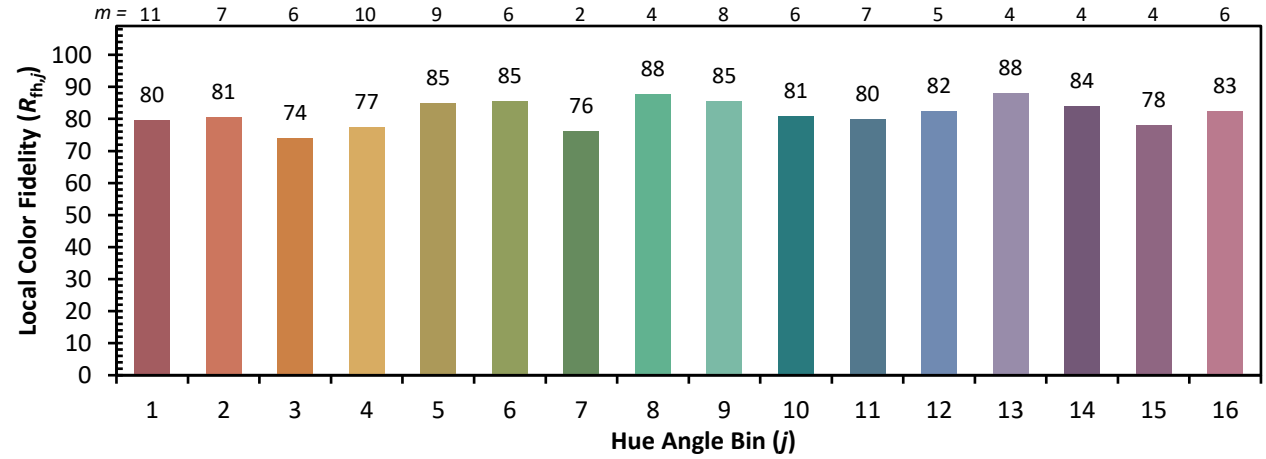
## Color Rendition by Hue-Angle Bin



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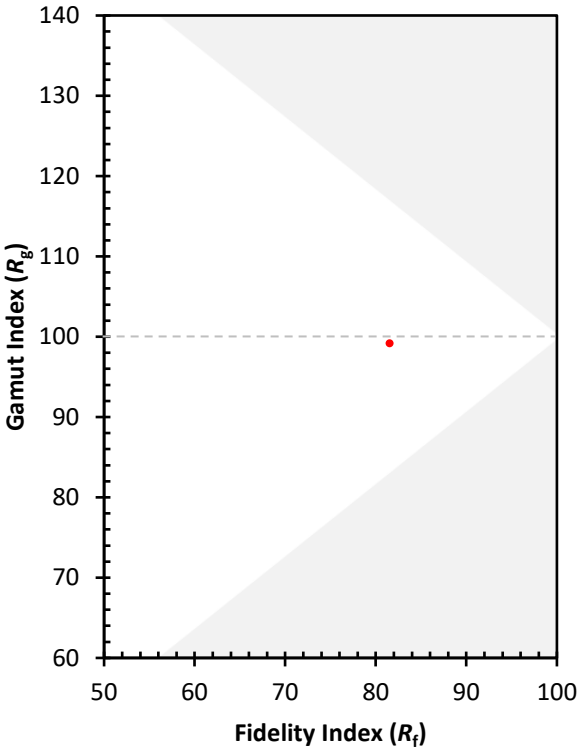
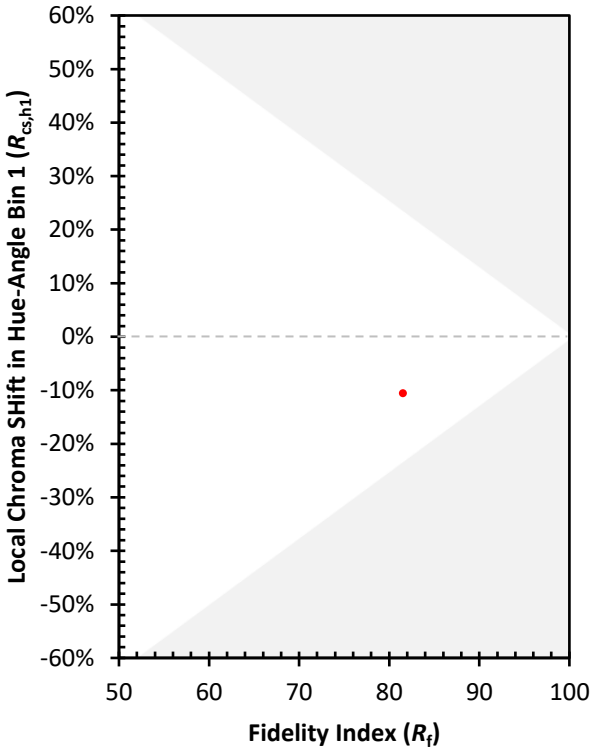
## Measure Comparisons

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