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: P437775

Luminaire Tested: **ISS-SA1E-830-U-T4FT-HSS**

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: | P437775 |
| | TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G3-2011-074-11) |
| Test Lab: | INNOVATION CENTER |
| Issue Date: | 12/9/2020 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS (FORMERLY EATON) |
| Product Line: | McGRAW-EDISON |
| Catalog Number: | ISS-SA1E-830-U-T4FT-HSS |
| Description: | IMPACT ELITE LED QUARTER SPHERE LUMINAIRE |
| | (1) 80 CRI, 3000K, 1050mA LIGHTSQUARE WITH 16 LEDS AND TYPE IV FORWARD THROW OPTICS WITH HOUSE SIDE SHIELD |
| Light Source: | - |
| Ballast/Driver: | ELECTRONIC DRIVER |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 4050 lumens |
| Efficiency: | N/A |
| Efficacy: | 69.6 lumens/watt |
| Luminous Opening: | Rectangular (W 0.5' x L: 0.5' x H: 0') |
| IES Classification: | Type IV - Short |
| BUG Rating: | B1 - U0 - G2 |

| | |
|---|---|
| Input Watts (W): | 58.2 |
| 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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REPORT NUMBER: P437775
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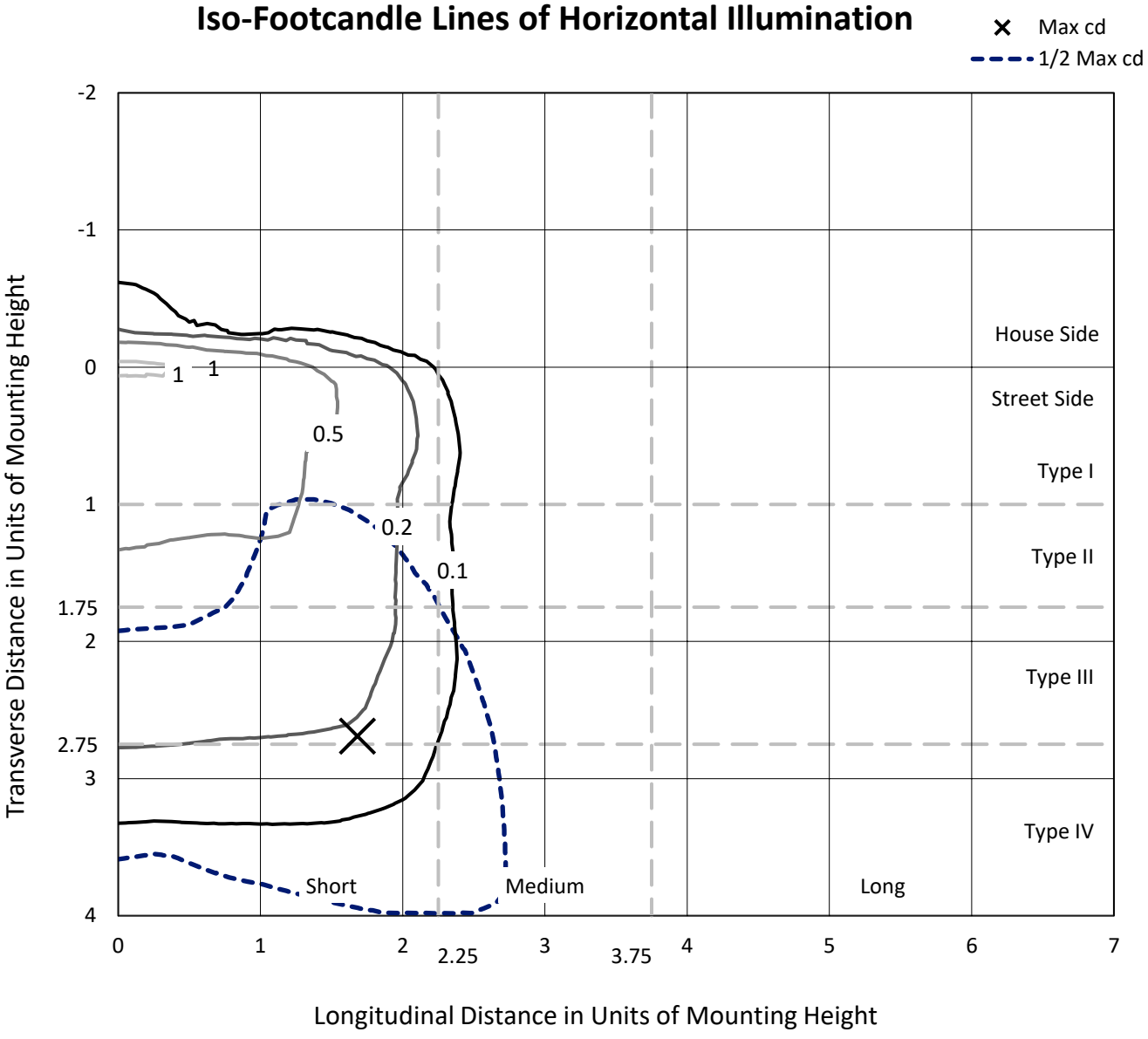
## Iso-Footcandle Lines of Horizontal Illumination




Based on 25 foot mounting height. Maximum calculated value = 1.1 fc
Type IV - Short - N/A

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REPORT NUMBER: P437775
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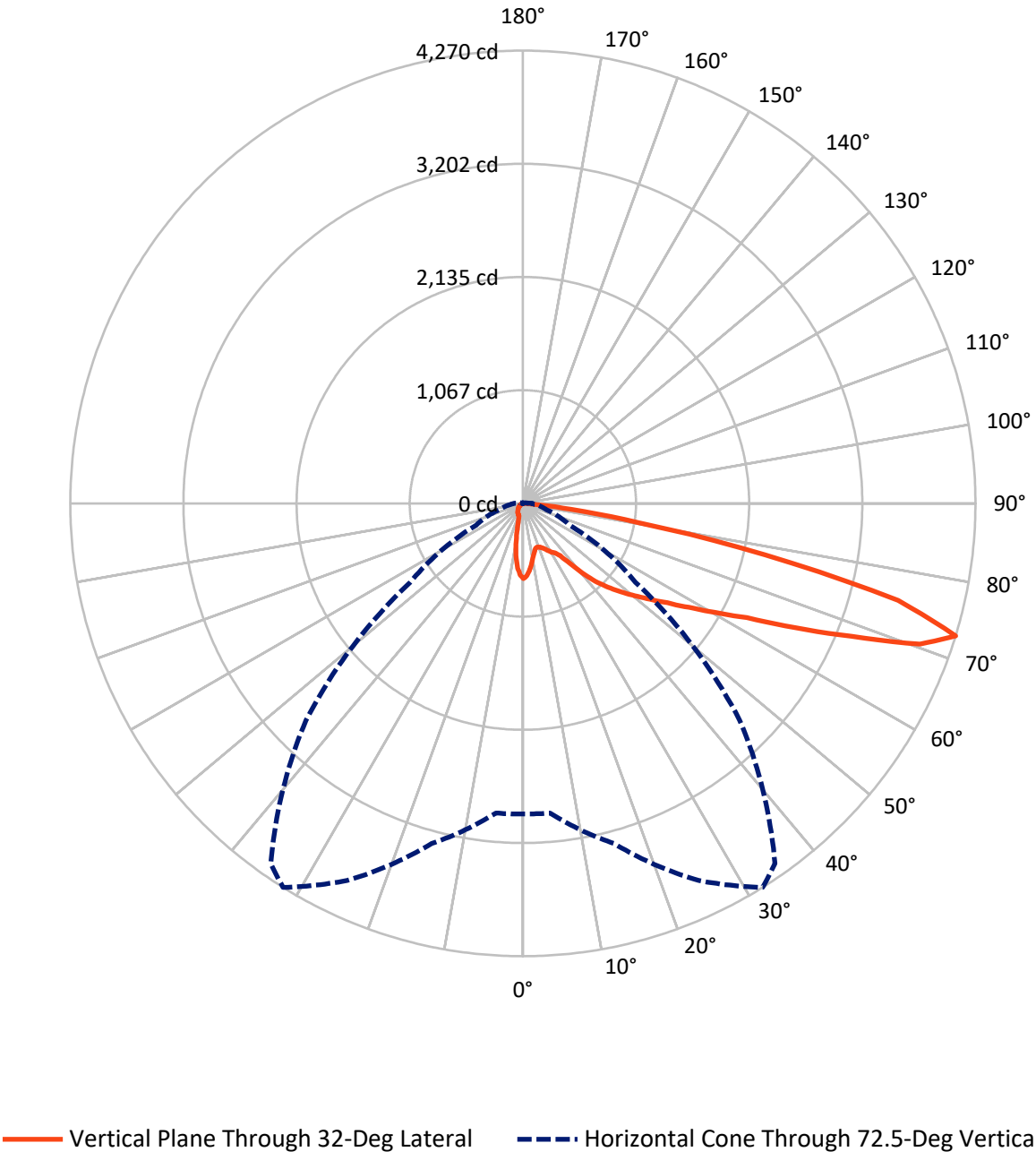
## Luminous Intensity Polar Plot



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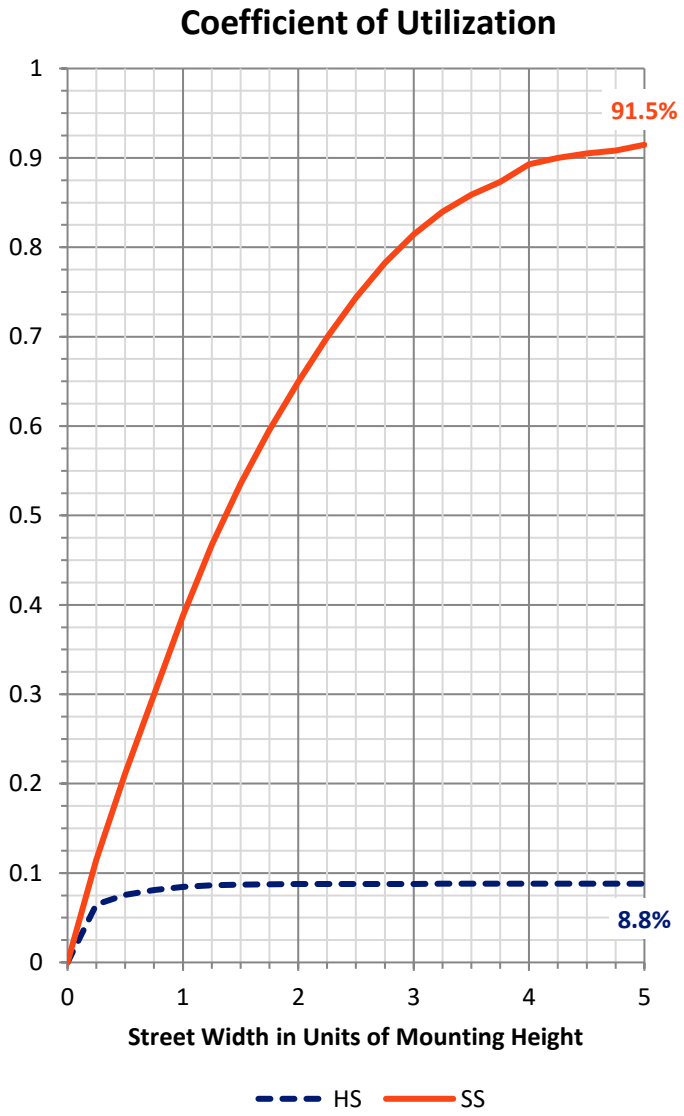
**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 358.5 | 0.0 | 358.5 |
| | % Fixture | 8.9 | 0.0 | 8.9 |
| **Street Side** | Lumens | 3691.5 | 0.0 | 3691.5 |
| | % Fixture | 91.1 | 0.0 | 91.1 |
| **Total** | Lumens | 4050.0 | 0.0 | 4050.0 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 58.9 | 1.5 |
| 10°-20° | 128.0 | 3.2 |
| 20°-30° | 193.7 | 4.8 |
| 30°-40° | 312.2 | 7.7 |
| 40°-50° | 552.9 | 13.7 |
| 50°-60° | 846.9 | 20.9 |
| 60°-70° | 1133.0 | 28.0 |
| 70°-80° | 782.2 | 19.3 |
| 80°-90° | 42.4 | 1.0 |
| 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° | 4050.0 | 100.0 |
| 0°-180° | 4050.0 | 100.0 |



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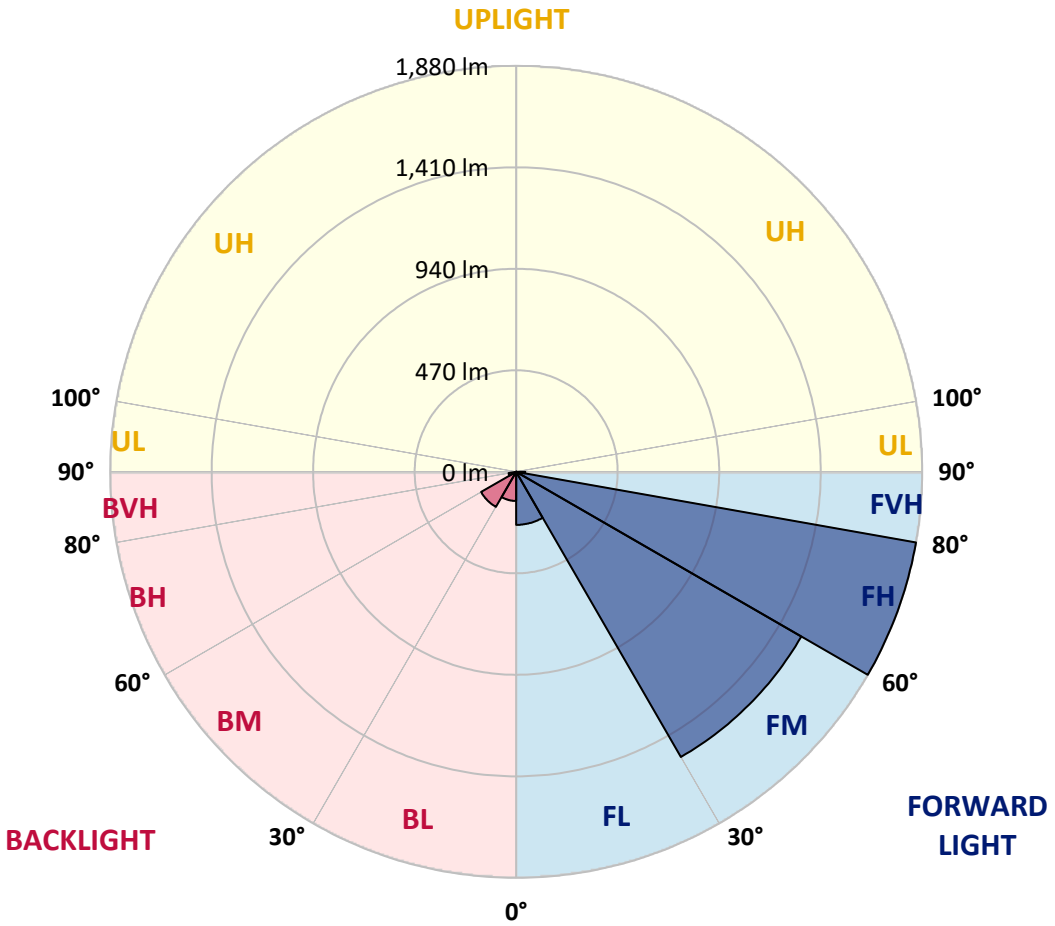
## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 245.6 | 6.1 | | | |
| FM | (30°-60°) | 1524.6 | 37.6 | | | |
| FH | (60°-80°) | 1879.6 | 46.4 | | | G2/5000 |
| FVH | (80°-90°) | 41.8 | 1.0 | | | G1/100 |
| BL | (0°-30°) | 135.0 | 3.3 | B1/500 | | |
| BM | (30°-60°) | 187.4 | 4.6 | B0/220 | | |
| BH | (60°-80°) | 35.6 | 0.9 | B0/110 | | G0/110 |
| BVH | (80°-90°) | 0.5 | 0.0 | | | G0/10 |
| UL | (90°-100°) | 0.0 | 0.0 | | U0/0 | |
| UH | (100°-180°) | 0.0 | 0.0 | | U0/0 | |

**BUG Rating: B1-U0-G2**
Type IV Short



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**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 32° | 35° | 45° | 55° | 65° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 709.6 | 709.6 | 709.6 | 709.6 | 709.6 | 709.6 | 709.6 | 709.6 | 709.6 | 709.6 | 709.6 |
| 2.5° | 682.9 | 682.9 | 685.0 | 687.0 | 687.0 | 693.2 | 701.4 | 703.4 | 709.6 | 713.7 | 715.7 |
| 5° | 611.1 | 619.3 | 619.3 | 629.6 | 637.8 | 646.0 | 666.5 | 678.8 | 699.3 | 713.7 | 717.8 |
| 7.5° | 545.5 | 547.6 | 553.7 | 566.0 | 582.4 | 588.6 | 615.2 | 650.1 | 689.1 | 713.7 | 723.9 |
| 10° | 479.9 | 481.9 | 486.0 | 504.5 | 520.9 | 535.2 | 572.2 | 615.2 | 670.6 | 713.7 | 732.1 |
| 12.5° | 432.7 | 432.7 | 436.8 | 457.3 | 475.8 | 490.1 | 531.1 | 586.5 | 652.1 | 715.7 | 744.4 |
| 15° | 416.3 | 416.3 | 414.3 | 424.5 | 440.9 | 453.2 | 500.4 | 561.9 | 635.7 | 719.8 | 756.7 |
| 17.5° | 424.5 | 424.5 | 416.3 | 418.4 | 432.7 | 440.9 | 481.9 | 543.5 | 627.5 | 728.0 | 777.2 |
| 20° | 440.9 | 440.9 | 424.5 | 424.5 | 438.9 | 445.0 | 479.9 | 533.2 | 623.4 | 742.4 | 806.0 |
| 22.5° | 459.4 | 461.4 | 438.9 | 438.9 | 453.2 | 459.4 | 492.2 | 539.4 | 629.6 | 760.8 | 834.7 |
| 25° | 490.1 | 490.1 | 461.4 | 461.4 | 473.7 | 484.0 | 514.7 | 557.8 | 637.8 | 783.4 | 879.8 |
| 27.5° | 533.2 | 531.1 | 494.2 | 484.0 | 502.4 | 510.6 | 545.5 | 580.4 | 646.0 | 810.1 | 920.8 |
| 30° | 584.5 | 574.2 | 537.3 | 516.8 | 533.2 | 539.4 | 574.2 | 611.1 | 670.6 | 849.0 | 984.4 |
| 32.5° | 639.8 | 643.9 | 584.5 | 547.6 | 555.8 | 564.0 | 609.1 | 658.3 | 711.6 | 900.3 | 1070.5 |
| 35° | 748.5 | 748.5 | 687.0 | 617.3 | 602.9 | 607.0 | 656.2 | 719.8 | 762.9 | 986.4 | 1168.9 |
| 37.5° | 883.9 | 888.0 | 830.6 | 756.7 | 711.6 | 693.2 | 728.0 | 793.6 | 836.7 | 1095.1 | 1277.6 |
| 40° | 1031.5 | 1025.4 | 965.9 | 898.2 | 861.3 | 838.8 | 820.3 | 898.2 | 937.2 | 1212.0 | 1386.3 |
| 42.5° | 1154.6 | 1142.3 | 1062.3 | 1027.4 | 1004.9 | 976.2 | 939.3 | 1029.5 | 1066.4 | 1359.7 | 1511.4 |
| 45° | 1234.6 | 1224.3 | 1144.3 | 1134.1 | 1125.9 | 1109.5 | 1117.7 | 1187.4 | 1222.3 | 1529.9 | 1642.7 |
| 47.5° | 1296.1 | 1281.7 | 1214.1 | 1228.4 | 1244.8 | 1261.2 | 1333.0 | 1384.3 | 1376.1 | 1685.7 | 1749.3 |
| 50° | 1380.2 | 1359.7 | 1296.1 | 1324.8 | 1367.9 | 1400.7 | 1564.7 | 1579.1 | 1515.5 | 1819.0 | 1845.7 |
| 52.5° | 1431.4 | 1406.8 | 1390.4 | 1437.6 | 1501.2 | 1542.2 | 1819.0 | 1763.7 | 1626.3 | 1915.4 | 1921.6 |
| 55° | 1474.5 | 1472.4 | 1501.2 | 1562.7 | 1655.0 | 1706.2 | 2028.2 | 1921.6 | 1698.0 | 2013.9 | 1962.6 |
| 57.5° | 1605.7 | 1597.5 | 1646.8 | 1696.0 | 1849.8 | 1935.9 | 2253.8 | 2036.4 | 1749.3 | 2067.2 | 1940.0 |
| 60° | 1792.4 | 1796.5 | 1798.5 | 1888.8 | 2085.6 | 2204.6 | 2432.2 | 2132.8 | 1788.3 | 2075.4 | 1874.4 |
| 62.5° | 2083.6 | 2112.3 | 2063.1 | 2132.8 | 2370.7 | 2520.4 | 2604.5 | 2202.5 | 1776.0 | 2015.9 | 1708.3 |
| 65° | 2506.0 | 2495.8 | 2426.1 | 2504.0 | 2821.9 | 2914.1 | 2782.9 | 2223.0 | 1704.2 | 1810.8 | 1396.6 |
| 67.5° | 2936.7 | 2940.8 | 2908.0 | 3031.0 | 3340.7 | 3324.3 | 2983.9 | 2153.3 | 1519.6 | 1367.9 | 875.7 |
| 70° | 3217.7 | 3223.8 | 3305.8 | 3638.1 | 3974.4 | 3861.6 | 3147.9 | 1907.2 | 1070.5 | 652.1 | 332.2 |
| 72.5° | 2928.5 | 2930.5 | 3320.2 | 3923.1 | 4269.7 | 4146.6 | 2893.6 | 1296.1 | 488.1 | 231.7 | 116.9 |
| 75° | 1853.9 | 1761.6 | 2467.1 | 3326.3 | 3656.5 | 3535.5 | 2063.1 | 605.0 | 215.3 | 116.9 | 49.2 |
| 77.5° | 646.0 | 656.2 | 1004.9 | 1915.4 | 2335.8 | 2385.0 | 1060.2 | 198.9 | 118.9 | 80.0 | 26.7 |
| 80° | 129.2 | 145.6 | 297.4 | 705.5 | 1107.4 | 1150.5 | 383.5 | 96.4 | 77.9 | 61.5 | 14.4 |
| 82.5° | 8.2 | 10.3 | 88.2 | 293.3 | 453.2 | 430.7 | 75.9 | 49.2 | 53.3 | 43.1 | 8.2 |
| 85° | 0.0 | 0.0 | 6.2 | 49.2 | 82.0 | 61.5 | 8.2 | 12.3 | 22.6 | 24.6 | 4.1 |
| 87.5° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.1 | 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 |

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Scaled Data Report

REPORT NUMBER: P437775
CATALOG NUMBER: ISS-SA1E-830-U-T4FT-HSS

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 709.6 | 709.6 | 709.6 | 709.6 | 709.6 | 709.6 | 709.6 | 709.6 | 709.6 | 709.6 | 709.6 |
| 2.5° | 715.7 | 715.7 | 705.5 | 701.4 | 695.2 | 687.0 | 678.8 | 674.7 | 666.5 | 668.5 | 668.5 |
| 5° | 717.8 | 713.7 | 701.4 | 682.9 | 662.4 | 641.9 | 617.3 | 600.9 | 582.4 | 586.5 | 584.5 |
| 7.5° | 721.9 | 719.8 | 691.1 | 658.3 | 621.4 | 576.3 | 533.2 | 496.3 | 463.5 | 455.3 | 449.1 |
| 10° | 730.1 | 723.9 | 682.9 | 629.6 | 555.8 | 481.9 | 408.1 | 344.5 | 317.9 | 289.2 | 283.0 |
| 12.5° | 738.3 | 728.0 | 668.5 | 588.6 | 475.8 | 367.1 | 270.7 | 213.3 | 178.4 | 168.2 | 164.1 |
| 15° | 750.6 | 734.2 | 650.1 | 531.1 | 381.4 | 248.1 | 170.2 | 139.5 | 133.3 | 131.2 | 131.2 |
| 17.5° | 767.0 | 738.3 | 631.6 | 465.5 | 281.0 | 160.0 | 125.1 | 125.1 | 127.1 | 129.2 | 129.2 |
| 20° | 791.6 | 748.5 | 605.0 | 385.5 | 188.7 | 121.0 | 118.9 | 121.0 | 123.0 | 125.1 | 125.1 |
| 22.5° | 818.3 | 764.9 | 574.2 | 301.5 | 133.3 | 112.8 | 112.8 | 114.8 | 116.9 | 118.9 | 118.9 |
| 25° | 849.0 | 777.2 | 533.2 | 215.3 | 110.7 | 106.6 | 106.6 | 108.7 | 110.7 | 112.8 | 112.8 |
| 27.5° | 881.8 | 791.6 | 477.8 | 147.7 | 100.5 | 100.5 | 102.5 | 104.6 | 106.6 | 106.6 | 108.7 |
| 30° | 931.0 | 814.2 | 420.4 | 108.7 | 92.3 | 92.3 | 96.4 | 100.5 | 102.5 | 102.5 | 104.6 |
| 32.5° | 994.6 | 832.6 | 342.5 | 92.3 | 86.1 | 84.1 | 88.2 | 94.3 | 98.4 | 100.5 | 100.5 |
| 35° | 1064.3 | 859.3 | 256.3 | 84.1 | 80.0 | 77.9 | 80.0 | 86.1 | 94.3 | 98.4 | 98.4 |
| 37.5° | 1136.1 | 883.9 | 190.7 | 80.0 | 73.8 | 71.8 | 73.8 | 77.9 | 86.1 | 94.3 | 96.4 |
| 40° | 1207.9 | 888.0 | 137.4 | 73.8 | 69.7 | 67.7 | 67.7 | 71.8 | 80.0 | 88.2 | 90.2 |
| 42.5° | 1281.7 | 904.4 | 104.6 | 69.7 | 63.6 | 63.6 | 63.6 | 65.6 | 71.8 | 77.9 | 80.0 |
| 45° | 1365.8 | 914.6 | 84.1 | 63.6 | 59.5 | 59.5 | 59.5 | 59.5 | 63.6 | 65.6 | 65.6 |
| 47.5° | 1437.6 | 900.3 | 67.7 | 57.4 | 55.4 | 55.4 | 55.4 | 53.3 | 53.3 | 51.3 | 51.3 |
| 50° | 1488.9 | 867.5 | 55.4 | 51.3 | 51.3 | 53.3 | 49.2 | 45.1 | 45.1 | 41.0 | 41.0 |
| 52.5° | 1519.6 | 818.3 | 47.2 | 45.1 | 49.2 | 49.2 | 43.1 | 41.0 | 36.9 | 32.8 | 30.8 |
| 55° | 1517.6 | 736.2 | 41.0 | 39.0 | 43.1 | 43.1 | 36.9 | 32.8 | 28.7 | 24.6 | 24.6 |
| 57.5° | 1458.1 | 646.0 | 36.9 | 32.8 | 36.9 | 34.9 | 30.8 | 24.6 | 20.5 | 16.4 | 16.4 |
| 60° | 1365.8 | 549.6 | 32.8 | 26.7 | 28.7 | 26.7 | 24.6 | 18.5 | 14.4 | 10.3 | 10.3 |
| 62.5° | 1240.7 | 459.4 | 26.7 | 22.6 | 20.5 | 20.5 | 18.5 | 14.4 | 8.2 | 6.2 | 6.2 |
| 65° | 1002.8 | 340.4 | 20.5 | 16.4 | 14.4 | 16.4 | 12.3 | 8.2 | 4.1 | 2.1 | 2.1 |
| 67.5° | 619.3 | 194.8 | 16.4 | 12.3 | 10.3 | 12.3 | 8.2 | 6.2 | 2.1 | 0.0 | 0.0 |
| 70° | 244.0 | 84.1 | 12.3 | 8.2 | 8.2 | 8.2 | 6.2 | 4.1 | 0.0 | 0.0 | 0.0 |
| 72.5° | *84.1* | *36.9* | *10.3* | *6.2* | *6.2* | *4.1* | *4.1* | *2.1* | *0.0* | *0.0* | *0.0* |
| 75° | 36.9 | 22.6 | 8.2 | 6.2 | 4.1 | 4.1 | 2.1 | 2.1 | 0.0 | 0.0 | 0.0 |
| 77.5° | 20.5 | 14.4 | 6.2 | 4.1 | 4.1 | 2.1 | 2.1 | 2.1 | 0.0 | 0.0 | 0.0 |
| 80° | 12.3 | 8.2 | 4.1 | 4.1 | 4.1 | 2.1 | 2.1 | 2.1 | 0.0 | 0.0 | 0.0 |
| 82.5° | 8.2 | 4.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 0.0 | 0.0 | 0.0 |
| 85° | 4.1 | 2.1 | 0.0 | 2.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 87.5° | 0.0 | 0.0 | 0.0 | 0.0 | 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 |

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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

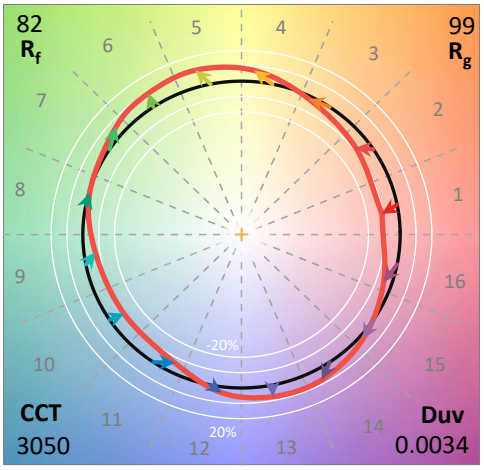
## Test Information

| | |
|---|---|
| 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

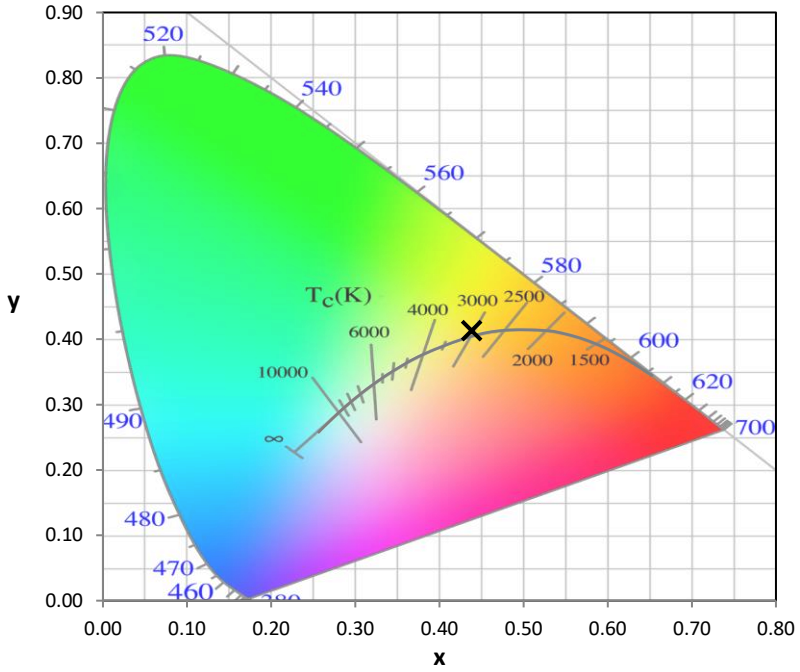
| | |
|---|---|
| Stabilization Time: | 20M |
| Operation Time: | 1H 20M |
| Sphere Temperature (°C): | 24.2 |

REPORT NUMBER: SP1-2408-195-9

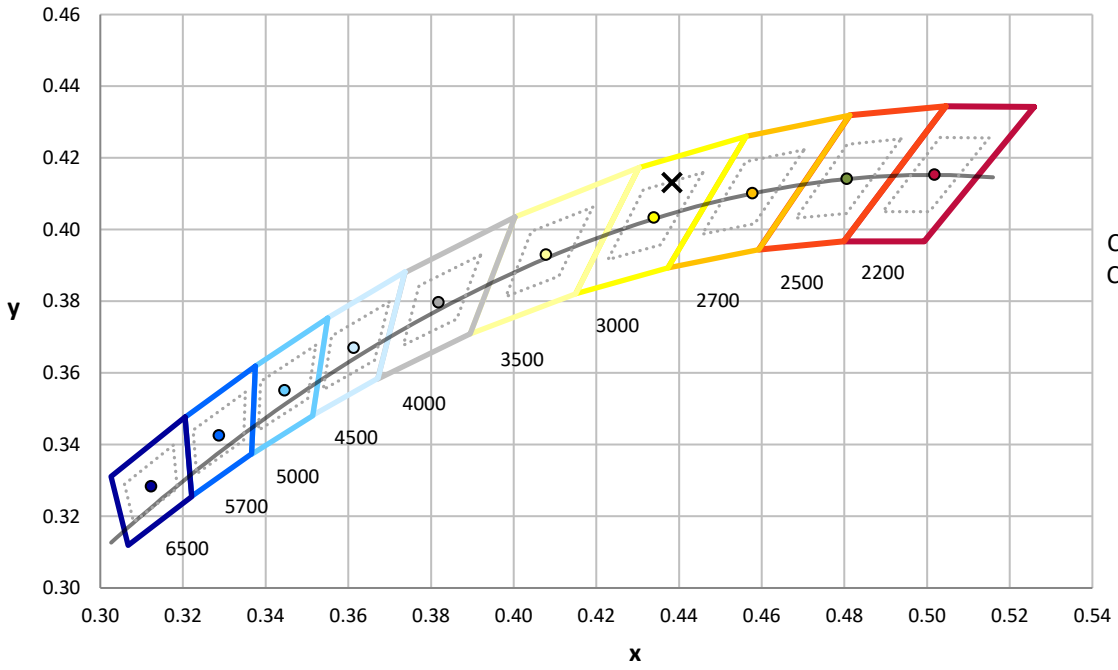
| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 6/18/2024 | 12/18/2024 |
| Power Meter | INXT2011004 | 2/8/2024 | 2/8/2025 |
| AC Power Source | IN0063 | 10/24/2023 | 10/24/2024 |
| DC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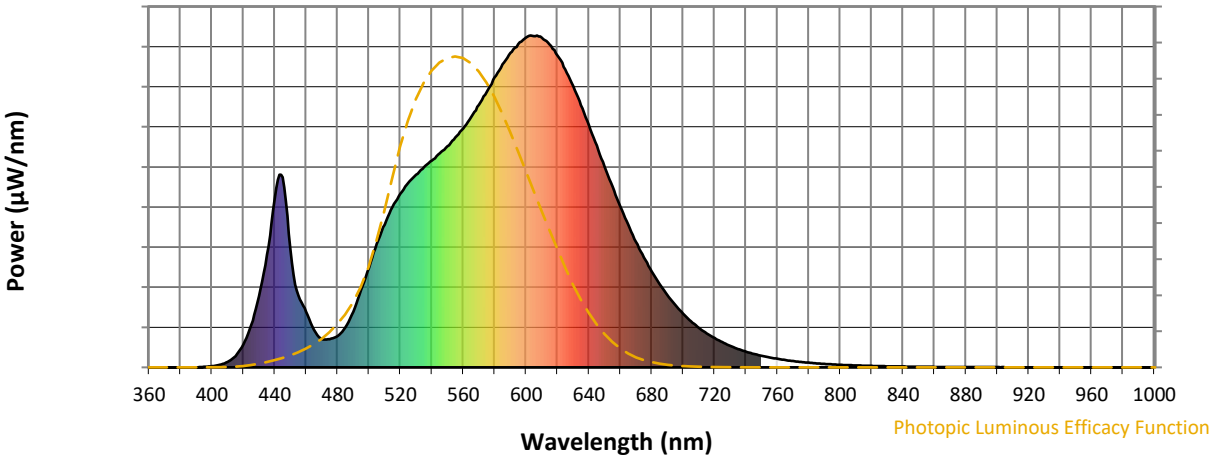
## Photopic Flux vs. Wavelength




## 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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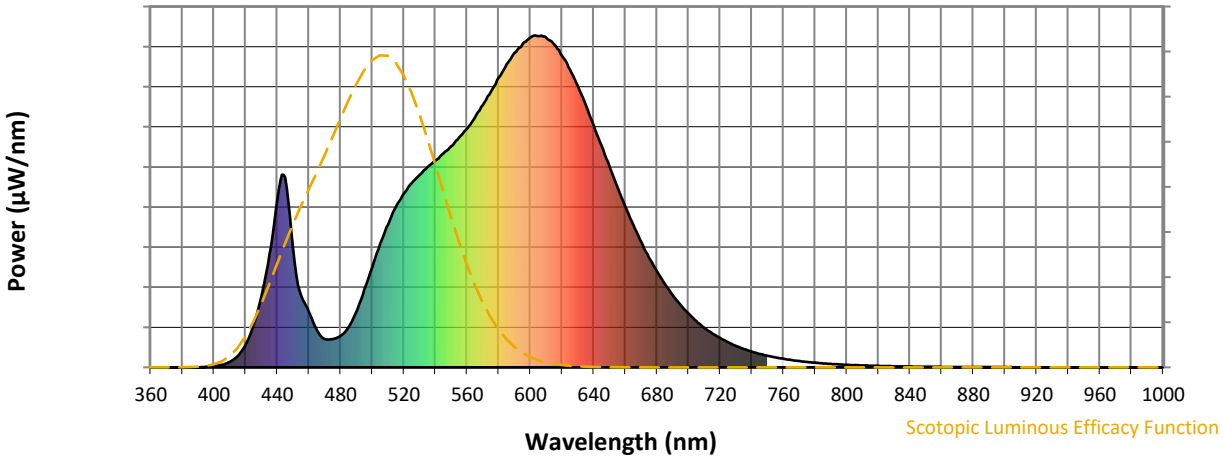
## Scotopic Flux vs. Wavelength




**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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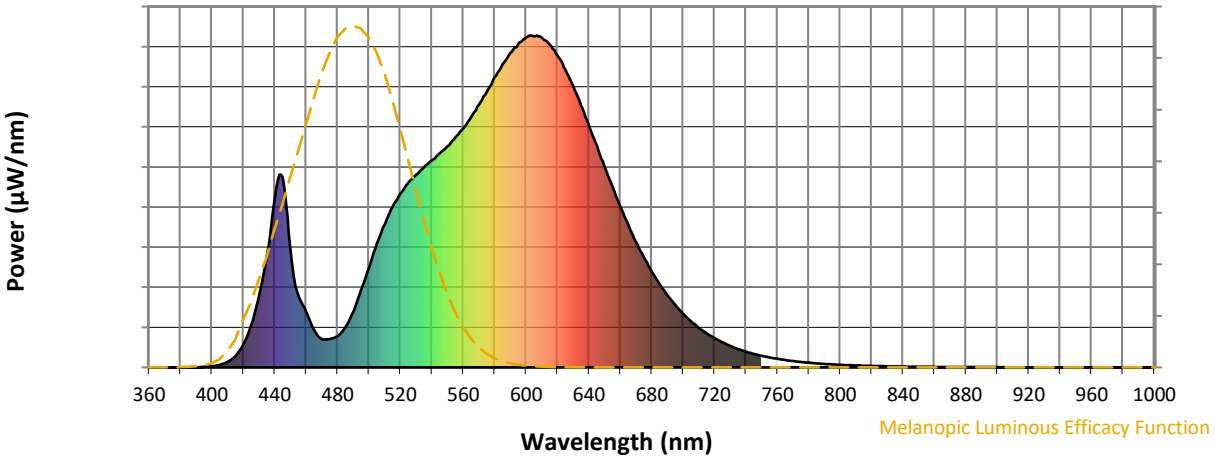
## Melanopic Flux vs. Wavelength




**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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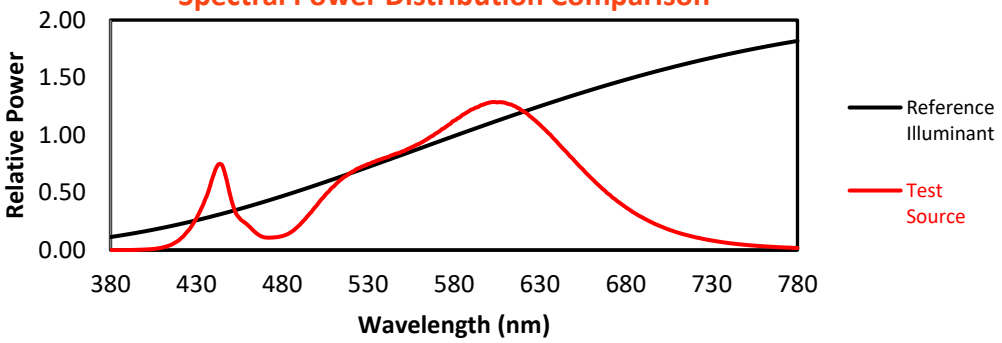
# TM-30-18

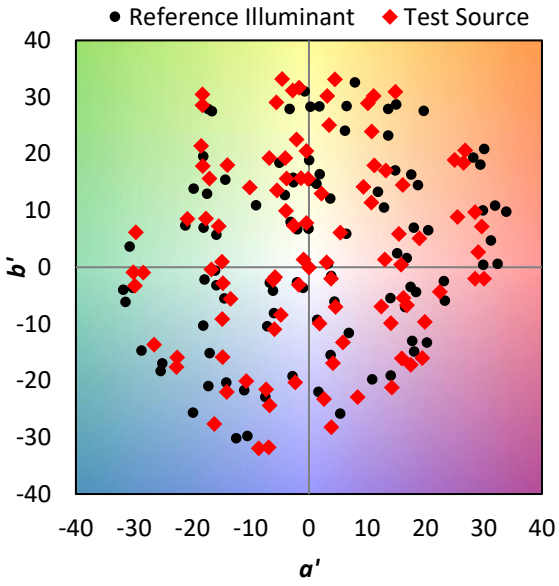
## Summary

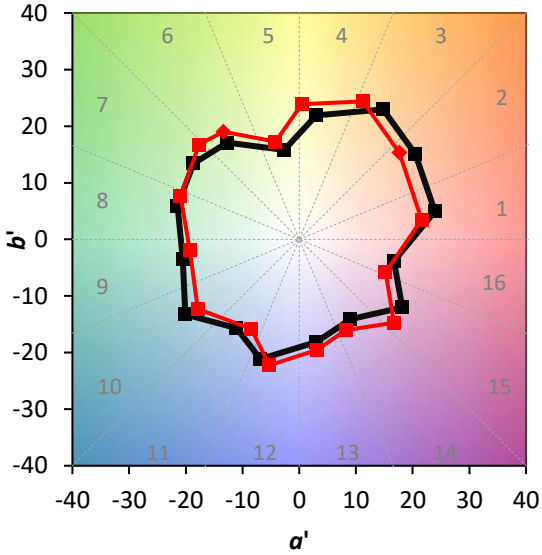
$R_f$ = 81.5
$R_g$ = 99.2
CIE $R_a$ = 81.0
$R_9$ = 7.1

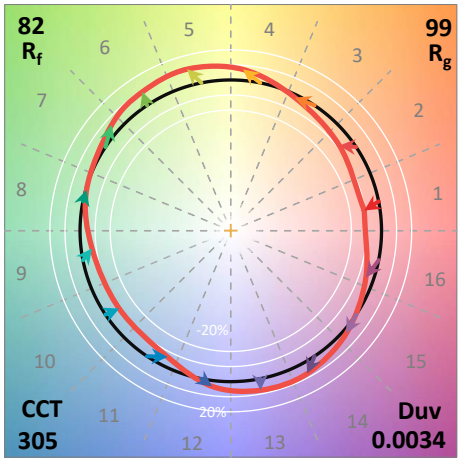
## Spectral Power Distribution Comparison

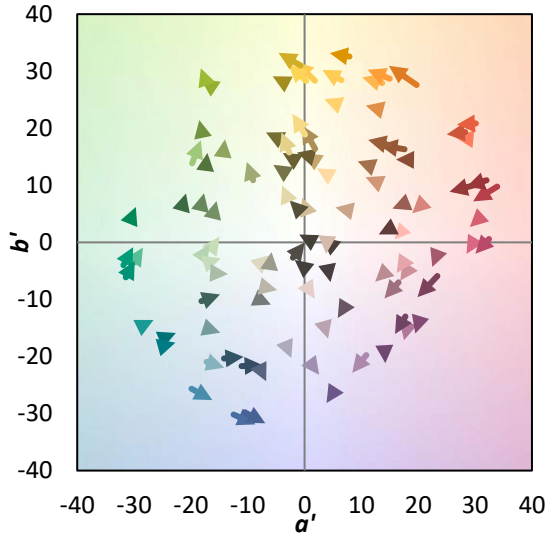



## Color Vector Graphics



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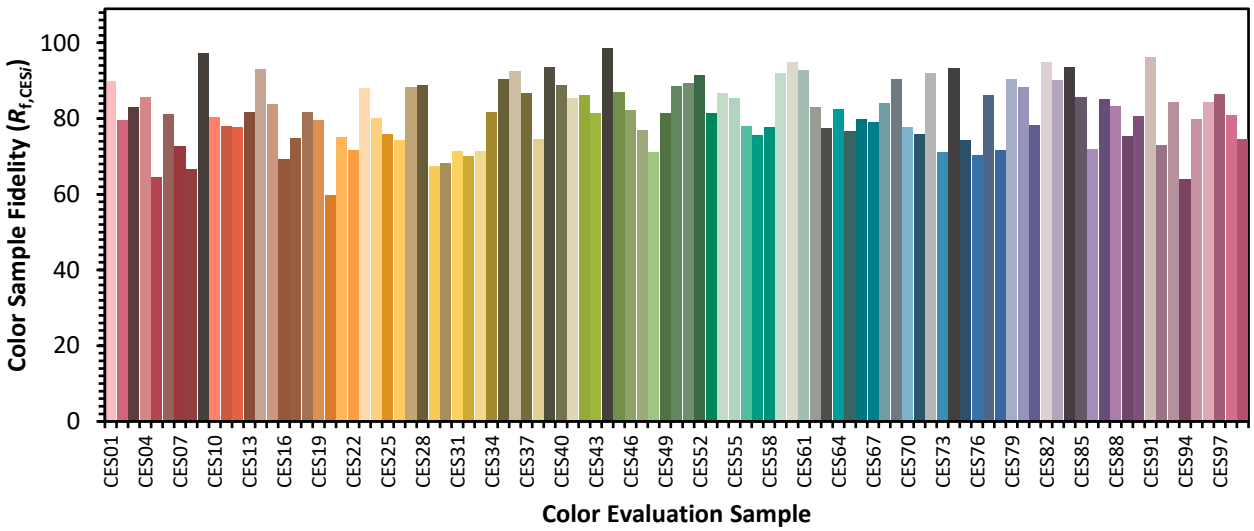
**Individual Sample Fidelity Index ($R_{f,i}$)**

| | | | |
|---|---|---|---|
| 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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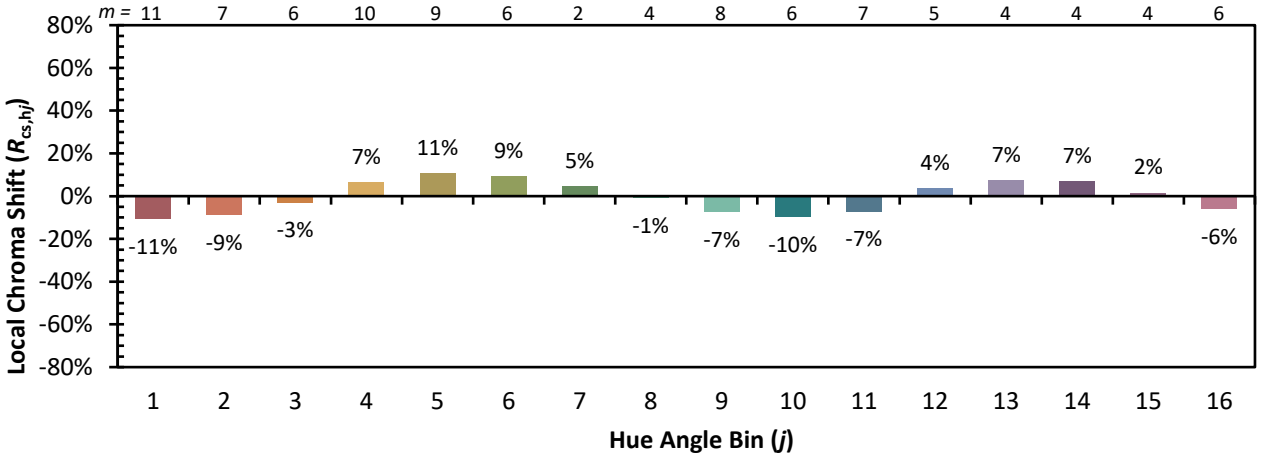
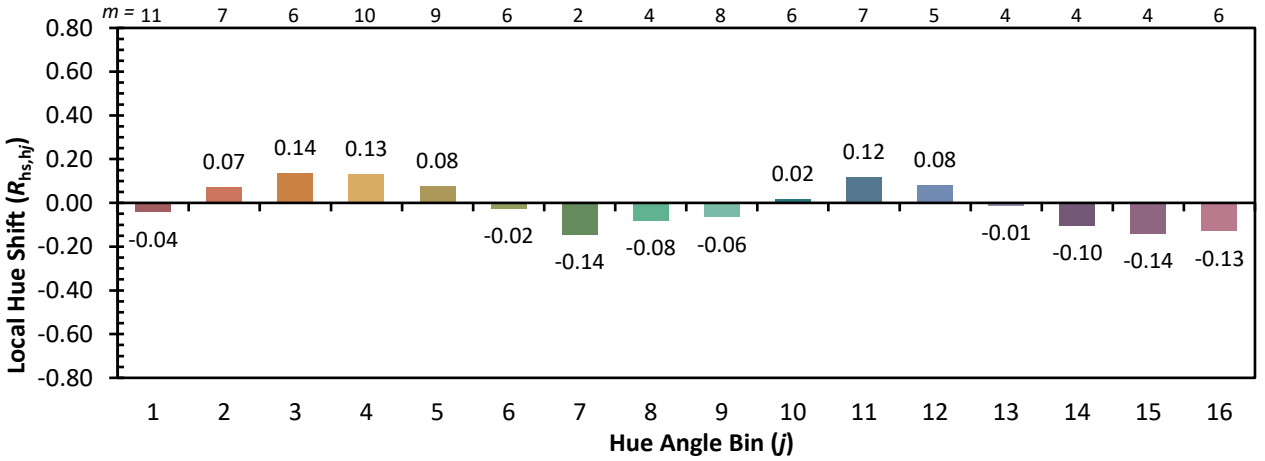
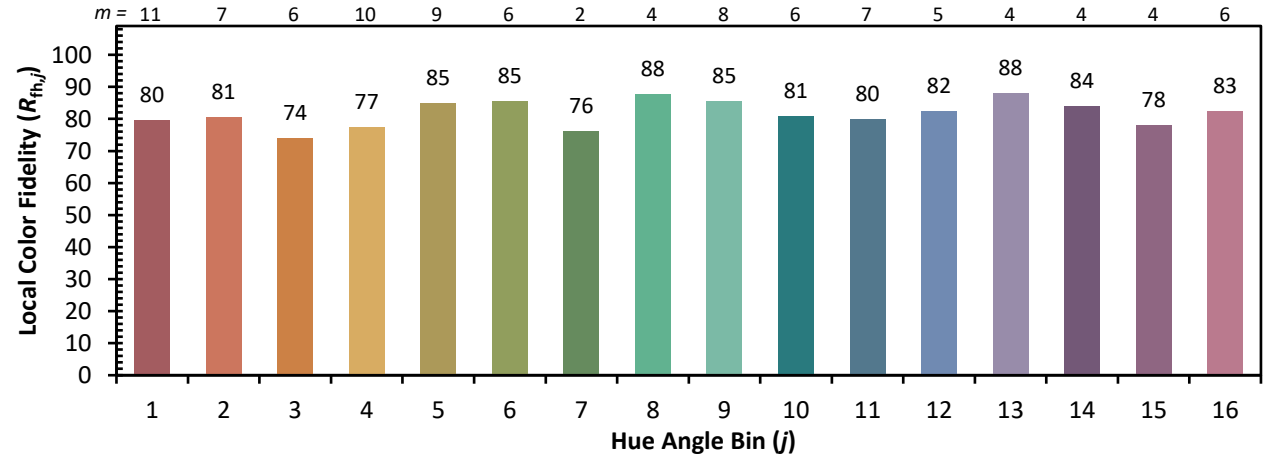
## Color Rendition by Hue-Angle Bin



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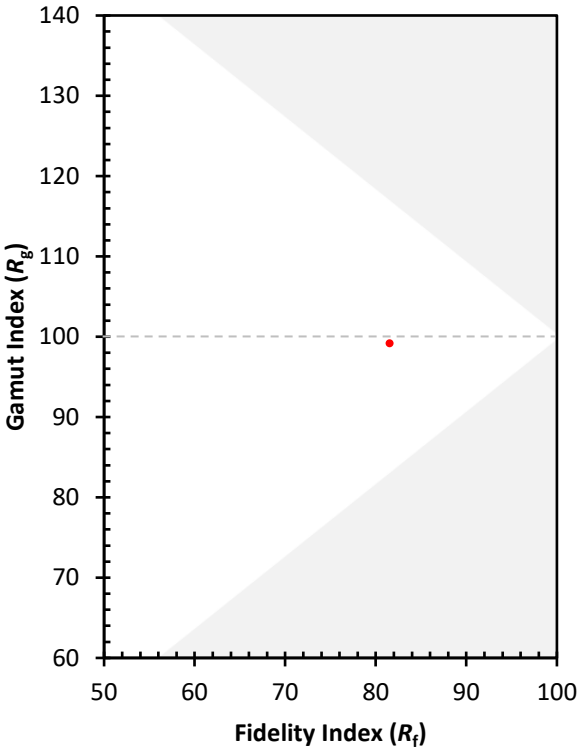
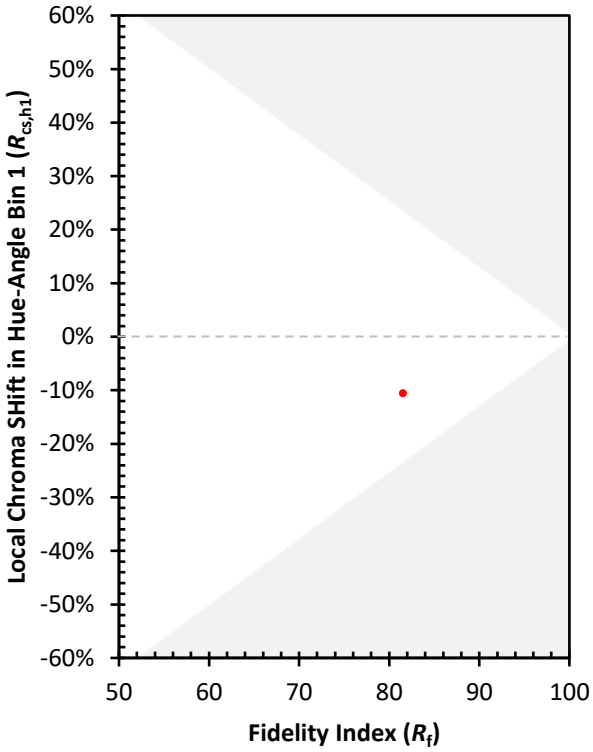
## Measure Comparisons

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