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

Scaled data based on original data using

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

Test Report Prepared for

Cooper Lighting Solutions

Brand: McGRAW-EDISON

Report Number: P631071

Luminaire Tested: GWS-SA1E-830-U-T3-W-GRSBK

Issue Date: 1/10/2023

Report Generated By 670246102 / DESKTOP-G35701P

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

Scaled Data Report

**Test Information**

| | |
|---|---|
| Test Method: | LM-79-2019 |
| Report Number: | P631071 |
| | TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-24) |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Issue Date: | 1/10/2023 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS |
| Product Line: | McGRAW-EDISON |
| Catalog Number: | GWS-SA1E-830-U-T3-W-GRSBK |
| Description: | GALLEON WALL SLIM LUMINAIRE. (1) LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III OPTICS W/ FACTORY INSTALLED GLARE SHIELD, BK |
| Light Source: | (16) 3000K CCT, 80 CRI LEDS |
| Ballast/Driver: | - |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 3717.2 lumens |
| Efficiency: | N/A |
| Efficacy: | 63.7 lumens/watt |
| Luminous Opening: | Rectangular (W 0.5' x L: 0.5' x H: 0') |
| IES Classification: | Type II - Short |
| BUG Rating: | B1 - U0 - G0 |

| | |
|---|---|
| Input Watts (W): | 58.4 |
| Input Voltage (V): | 120 |
| Input Current (Ain): | NR |
| Voltage Rise (V): | NR |
| Power Factor: | NR |
| Total Harmonic Distortion (THDi): | NR |
| Frequency (hertz): | 0 |
| Stabilization Time: | NR |
| Operation Time: | NR |
| Ambient Temperature (°C): | NR |
| Test Distance: | 28.75 FT |

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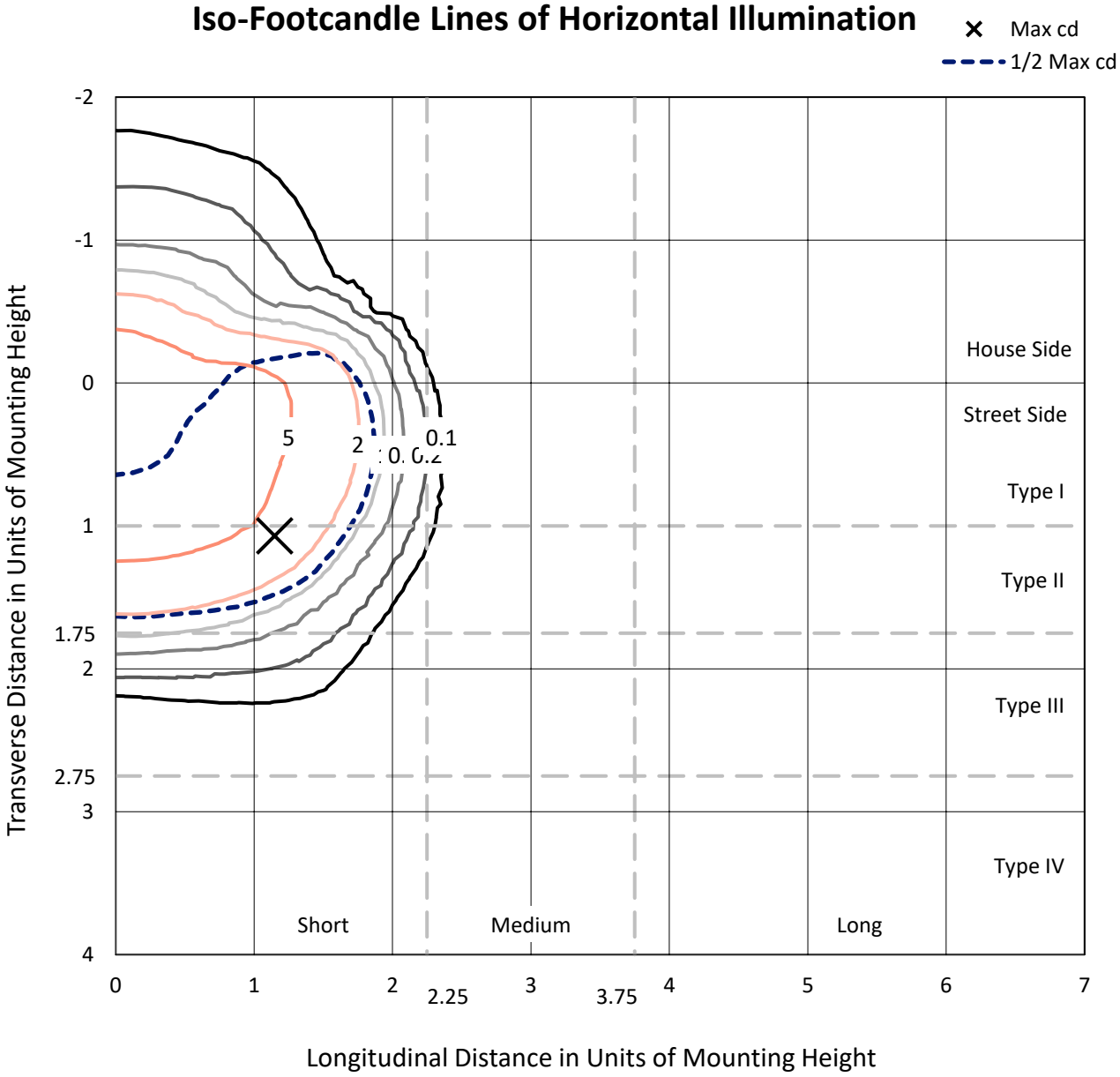
Scaled Data Report

REPORT NUMBER: P631071
CATALOG NUMBER: GWS-SA1E-830-U-T3-W-GRSBK

## Iso-Footcandle Lines of Horizontal Illumination




Based on 10 foot mounting height. Maximum calculated value = 8.8 fc
Type II - Short - N/A

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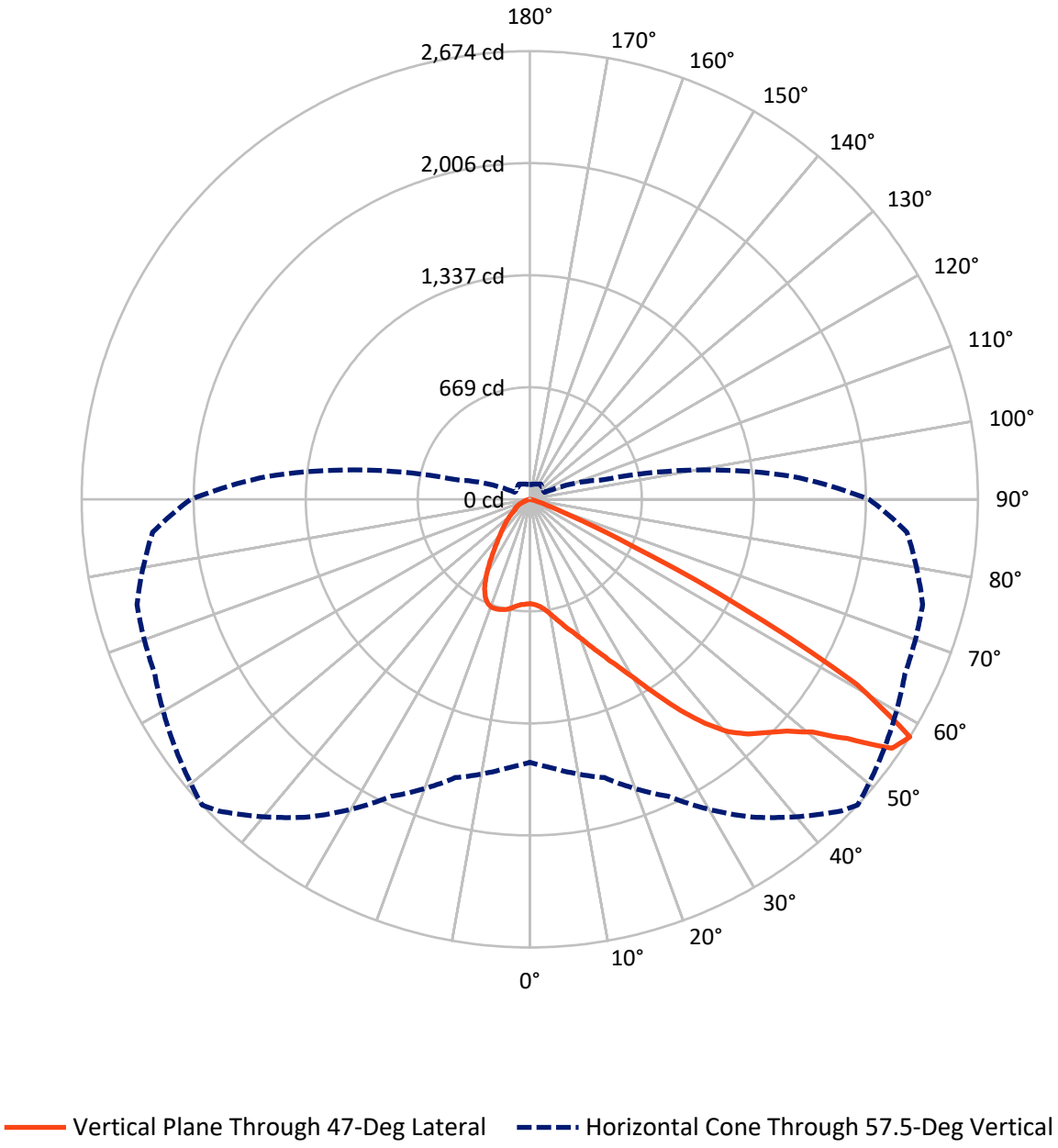
## Luminous Intensity Polar Plot



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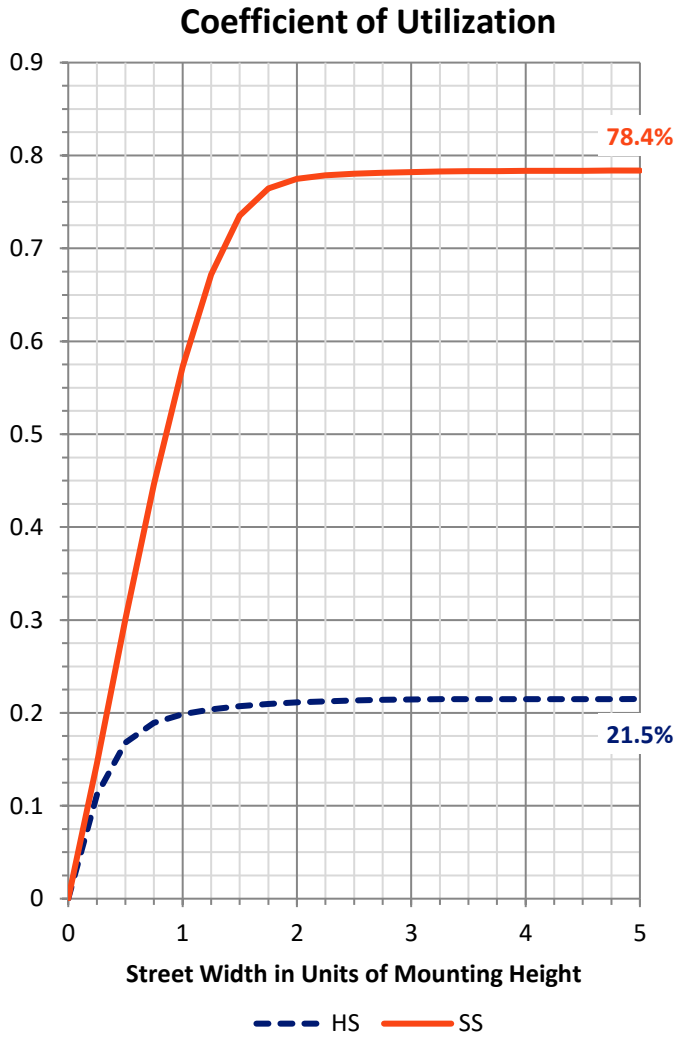
REPORT NUMBER: P631071
CATALOG NUMBER: GWS-SA1E-830-U-T3-W-GRSBK

**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 806.5 | 0.0 | 806.5 |
| | % Fixture | 21.7 | 0.0 | 21.7 |
| **Street Side** | Lumens | 2910.8 | 0.0 | 2910.8 |
| | % Fixture | 78.3 | 0.0 | 78.3 |
| **Total** | Lumens | 3717.2 | 0.0 | 3717.2 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 61.9 | 1.7 |
| 10°-20° | 208.9 | 5.6 |
| 20°-30° | 387.9 | 10.4 |
| 30°-40° | 620.9 | 16.7 |
| 40°-50° | 907.6 | 24.4 |
| 50°-60° | 1120.2 | 30.1 |
| 60°-70° | 374.3 | 10.1 |
| 70°-80° | 34.9 | 0.9 |
| 80°-90° | 0.7 | 0.0 |
| 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° | 3717.2 | 100.0 |
| 0°-180° | 3717.2 | 100.0 |



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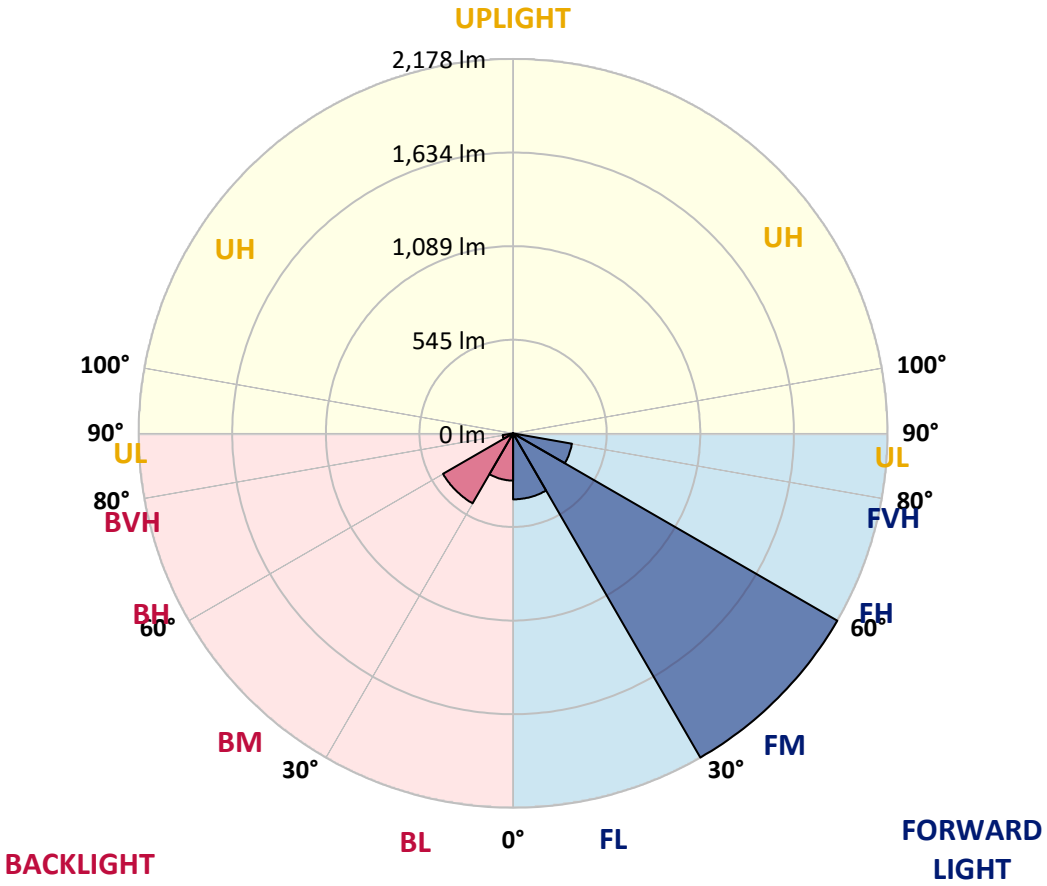
REPORT NUMBER: P631071
CATALOG NUMBER: GWS-SA1E-830-U-T3-W-GRSBK

## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 384.2 | 10.3 | | | |
| FM | (30°-60°) | 2178.3 | 58.6 | | | |
| FH | (60°-80°) | 347.9 | 9.4 | | | G0/660 |
| FVH | (80°-90°) | 0.5 | 0.0 | | | G0/10 |
| BL | (0°-30°) | 274.5 | 7.4 | B1/500 | | |
| BM | (30°-60°) | 470.4 | 12.7 | B1/1000 | | |
| BH | (60°-80°) | 61.3 | 1.6 | B0/110 | | G0/110 |
| BVH | (80°-90°) | 0.2 | 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-G0**
Type II Short



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Scaled Data Report

REPORT NUMBER: P631071
CATALOG NUMBER: GWS-SA1E-830-U-T3-W-GRSBK

**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 45° | 47° | 55° | 65° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 622.3 | 622.3 | 622.3 | 622.3 | 622.3 | 622.3 | *622.3* | 622.3 | 622.3 | 622.3 | 622.3 |
| 2.5° | 628.7 | 628.3 | 627.9 | 630.5 | 629.6 | 629.2 | *630.0* | 630.0 | 630.0 | 627.4 | 622.3 |
| 5° | 643.8 | 643.8 | 643.4 | 646.0 | 643.8 | 642.5 | *643.0* | 643.0 | 641.3 | 636.5 | 630.0 |
| 7.5° | 667.6 | 666.7 | 665.8 | 668.4 | 666.3 | 665.8 | *666.7* | 664.1 | 661.1 | 653.3 | 644.3 |
| 10° | 701.7 | 701.7 | 700.4 | 703.0 | 701.2 | 700.4 | *700.4* | 698.6 | 693.0 | 681.0 | 667.6 |
| 12.5° | 748.7 | 746.5 | 743.5 | 741.4 | 740.5 | 740.1 | *740.5* | 737.9 | 731.9 | 716.3 | 697.8 |
| 15° | 800.1 | 798.3 | 793.6 | 790.1 | 785.4 | 784.5 | *787.1* | 784.9 | 778.9 | 757.8 | 731.4 |
| 17.5° | 864.8 | 866.9 | 854.9 | 847.5 | 833.7 | 832.8 | *833.7* | 837.2 | 832.8 | 805.7 | 767.3 |
| 20° | 920.0 | 921.7 | 912.7 | 907.5 | 895.0 | 889.4 | *891.1* | 896.7 | 892.0 | 860.0 | 806.5 |
| 22.5° | 979.1 | 981.3 | 971.8 | 961.0 | 955.4 | 955.4 | *961.9* | 969.6 | 963.2 | 921.3 | 851.4 |
| 25° | 1049.9 | 1051.6 | 1043.9 | 1029.6 | 1019.7 | 1032.2 | *1041.7* | 1062.4 | 1051.6 | 994.7 | 904.5 |
| 27.5° | 1131.0 | 1131.5 | 1120.2 | 1105.6 | 1100.4 | 1123.7 | *1133.2* | 1165.1 | 1160.8 | 1077.1 | 960.6 |
| 30° | 1217.8 | 1218.2 | 1215.6 | 1205.7 | 1200.9 | 1231.6 | *1244.5* | 1290.7 | 1287.7 | 1179.4 | 1037.0 |
| 32.5° | 1308.0 | 1308.0 | 1312.7 | 1311.8 | 1317.5 | 1367.5 | *1388.2* | 1440.9 | 1437.9 | 1304.5 | 1131.9 |
| 35° | 1398.6 | 1399.0 | 1407.2 | 1427.9 | 1451.2 | 1517.7 | *1544.9* | 1608.7 | 1601.8 | 1454.2 | 1253.2 |
| 37.5° | 1501.7 | 1497.4 | 1508.6 | 1539.7 | 1591.5 | 1668.3 | *1694.2* | 1755.0 | 1747.3 | 1607.4 | 1411.5 |
| 40° | 1626.0 | 1618.2 | 1618.2 | 1654.5 | 1713.2 | 1801.6 | *1823.6* | 1853.8 | 1827.5 | 1731.3 | 1566.9 |
| 42.5° | 1763.2 | 1755.9 | 1746.4 | 1778.3 | 1827.5 | 1896.6 | *1914.7* | 1906.5 | 1884.9 | 1848.2 | 1743.8 |
| 45° | 1902.2 | 1891.0 | 1897.4 | 1916.8 | 1945.3 | 1978.1 | *1985.0* | 1947.1 | 1937.1 | 1947.5 | 1890.1 |
| 47.5° | 2007.9 | 2000.1 | 2016.1 | 2043.3 | 2066.6 | 2071.3 | *2066.6* | 2013.9 | 2013.1 | 2049.8 | 1991.5 |
| 50° | 2043.3 | 2044.1 | 2088.2 | 2147.7 | 2185.3 | 2189.1 | *2182.7* | 2122.3 | 2114.1 | 2124.8 | 2046.3 |
| 52.5° | 2046.7 | 2050.2 | 2114.5 | 2228.0 | 2330.3 | 2376.9 | *2371.7* | 2306.5 | 2226.3 | 2214.6 | 2129.2 |
| 55° | 1963.5 | 1983.7 | 2073.5 | 2239.2 | 2456.7 | 2605.6 | *2622.8* | 2498.1 | 2379.0 | 2369.1 | 2307.4 |
| 57.5° | *1569.5* | *1610.9* | *1719.2* | *1955.3* | *2315.6* | *2629.3* | *2674.2* | *2584.4* | *2469.2* | *2426.9* | *2259.5* |
| 60° | 938.1 | 989.5 | 1093.5 | 1383.0 | 1762.4 | 2161.1 | *2238.3* | 2250.8 | 2197.8 | 2075.6 | 1733.4 |
| 62.5° | 402.6 | 398.3 | 526.5 | 748.3 | 1048.2 | 1373.6 | *1408.5* | 1462.9 | 1509.1 | 1381.3 | 1052.1 |
| 65° | 138.1 | 150.2 | 208.9 | 337.5 | 524.7 | 637.8 | *668.9* | 717.6 | 783.2 | 646.4 | 385.4 |
| 67.5° | 85.4 | 90.6 | 120.4 | 199.4 | 283.1 | 278.8 | *265.0* | 257.2 | 250.3 | 171.3 | 105.7 |
| 70° | 62.1 | 66.5 | 84.6 | 137.2 | 190.3 | 133.8 | *116.1* | 94.1 | 104.4 | 96.2 | 75.1 |
| 72.5° | 41.9 | 45.3 | 58.3 | 83.3 | 97.5 | 65.2 | *60.4* | 68.6 | 82.9 | 79.0 | 61.3 |
| 75° | 25.0 | 27.2 | 33.2 | 40.6 | 39.7 | 33.7 | *34.1* | 48.3 | 63.4 | 59.1 | 43.6 |
| 77.5° | 17.3 | 18.1 | 22.0 | 26.3 | 19.4 | 10.4 | *9.5* | 13.4 | 21.6 | 21.6 | 14.7 |
| 80° | 4.3 | 5.6 | 5.6 | 3.5 | 3.0 | 2.6 | *2.6* | 3.9 | 6.0 | 4.3 | 2.2 |
| 82.5° | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | *0.4* | 0.9 | 0.9 | 0.9 | 0.9 |
| 85° | 0.0 | 0.0 | 0.4 | 0.4 | 0.4 | 0.4 | *0.4* | 0.4 | 0.9 | 0.9 | 0.9 |
| 87.5° | 0.0 | 0.0 | 0.4 | 0.4 | 0.4 | 0.4 | *0.4* | 0.4 | 0.4 | 0.9 | 0.9 |
| 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: P631071
CATALOG NUMBER: GWS-SA1E-830-U-T3-W-GRSBK

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 622.3 | 622.3 | 622.3 | 622.3 | 622.3 | 622.3 | 622.3 | 622.3 | 622.3 | 622.3 | 622.3 |
| 2.5° | 625.3 | 620.1 | 623.6 | 622.7 | 625.3 | 626.1 | 622.3 | 621.4 | 621.8 | 616.7 | 614.9 |
| 5° | 631.3 | 625.3 | 627.0 | 625.3 | 628.3 | 630.9 | 629.6 | 631.3 | 633.5 | 629.6 | 627.9 |
| 7.5° | 644.3 | 638.2 | 637.8 | 635.2 | 639.5 | 641.3 | 640.8 | 645.6 | 649.9 | 647.3 | 644.7 |
| 10° | 666.7 | 658.5 | 657.6 | 655.5 | 656.8 | 658.1 | 653.3 | 654.2 | 658.1 | 655.1 | 653.8 |
| 12.5° | 694.3 | 684.4 | 682.2 | 677.1 | 677.1 | 670.6 | 660.2 | 658.1 | 661.1 | 658.9 | 656.8 |
| 15° | 724.1 | 710.7 | 707.3 | 698.2 | 689.6 | 677.5 | 666.7 | 664.1 | 666.3 | 663.7 | 662.0 |
| 17.5° | 757.3 | 742.2 | 731.0 | 715.0 | 696.1 | 681.8 | 669.7 | 664.1 | 660.7 | 655.5 | 655.1 |
| 20° | 790.1 | 770.3 | 751.3 | 725.8 | 700.8 | 679.2 | 659.4 | 644.7 | 632.2 | 624.4 | 621.4 |
| 22.5° | 828.1 | 798.8 | 768.1 | 732.3 | 696.5 | 663.7 | 628.7 | 603.7 | 582.1 | 574.8 | 571.3 |
| 25° | 868.7 | 830.7 | 784.9 | 738.3 | 681.8 | 629.2 | 581.7 | 544.6 | 516.1 | 506.6 | 502.7 |
| 27.5° | 913.5 | 861.3 | 802.2 | 737.0 | 651.6 | 580.0 | 517.0 | 470.8 | 442.7 | 434.1 | 437.1 |
| 30° | 970.5 | 901.0 | 823.8 | 723.7 | 606.3 | 510.9 | 437.1 | 398.3 | 377.2 | 369.0 | 369.4 |
| 32.5° | 1046.5 | 958.0 | 855.3 | 695.2 | 548.0 | 432.4 | 367.7 | 339.2 | 324.9 | 314.2 | 313.3 |
| 35° | 1155.2 | 1044.7 | 884.6 | 649.4 | 477.3 | 362.5 | 315.4 | 293.0 | 273.2 | 260.6 | 262.8 |
| 37.5° | 1285.5 | 1153.9 | 900.6 | 587.7 | 397.9 | 308.1 | 276.2 | 253.3 | 230.9 | 212.3 | 214.5 |
| 40° | 1440.0 | 1296.7 | 899.3 | 506.6 | 325.4 | 271.0 | 243.4 | 216.6 | 188.6 | 171.7 | 173.5 |
| 42.5° | 1612.2 | 1431.8 | 871.3 | 420.7 | 269.7 | 240.8 | 211.9 | 178.2 | 151.0 | 140.7 | 141.1 |
| 45° | 1761.5 | 1541.4 | 822.1 | 331.8 | 227.0 | 211.4 | 179.1 | 144.6 | 132.5 | 125.1 | 124.7 |
| 47.5° | 1872.0 | 1621.7 | 751.7 | 261.1 | 192.5 | 184.7 | 147.2 | 129.5 | 120.0 | 113.9 | 113.1 |
| 50° | 1933.7 | 1649.7 | 674.0 | 204.5 | 162.7 | 156.6 | 131.6 | 117.4 | 110.9 | 107.0 | 106.2 |
| 52.5° | 2016.5 | 1683.4 | 618.4 | 161.4 | 136.4 | 128.2 | 121.3 | 109.2 | 104.9 | 101.8 | 100.5 |
| 55° | 2147.7 | 1748.6 | 570.0 | 128.2 | 113.5 | 111.8 | 114.4 | 104.4 | 101.8 | 97.1 | 95.4 |
| 57.5° | *2024.3* | *1570.8* | *442.7* | *99.3* | *95.8* | *102.3* | *110.5* | *99.7* | *93.2* | *88.9* | *87.2* |
| 60° | 1424.5 | 1044.3 | 222.7 | 79.8 | 85.4 | 95.8 | 104.0 | 90.2 | 83.7 | 84.6 | 83.7 |
| 62.5° | 785.4 | 522.6 | 100.1 | 66.9 | 74.2 | 84.6 | 88.9 | 78.1 | 73.8 | 81.1 | 82.4 |
| 65° | 256.8 | 177.8 | 57.8 | 51.8 | 58.7 | 69.0 | 76.8 | 74.2 | 73.4 | 82.0 | 84.6 |
| 67.5° | 79.0 | 58.7 | 39.3 | 37.1 | 40.6 | 50.9 | 64.7 | 80.3 | 86.3 | 88.9 | 90.2 |
| 70° | 59.1 | 46.2 | 33.7 | 31.5 | 33.2 | 38.8 | 54.8 | 66.9 | 63.0 | 63.4 | 62.6 |
| 72.5° | 47.5 | 36.7 | 28.9 | 27.6 | 27.6 | 26.8 | 28.9 | 36.2 | 41.0 | 43.2 | 43.2 |
| 75° | 33.2 | 25.9 | 22.0 | 20.3 | 16.0 | 12.9 | 11.7 | 11.7 | 10.4 | 9.9 | 9.5 |
| 77.5° | 11.2 | 9.5 | 8.6 | 6.9 | 4.7 | 3.9 | 3.5 | 3.0 | 2.2 | 1.3 | 0.9 |
| 80° | 1.7 | 1.3 | 0.9 | 0.9 | 0.9 | 0.4 | 0.4 | 0.4 | 0.0 | 0.0 | 0.0 |
| 82.5° | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.4 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 |
| 85° | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.4 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 |
| 87.5° | 0.9 | 0.9 | 0.9 | 0.9 | 0.4 | 0.4 | 0.4 | 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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# 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

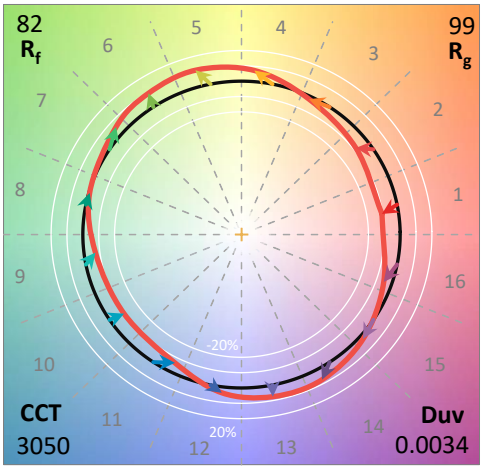
## Test Information

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

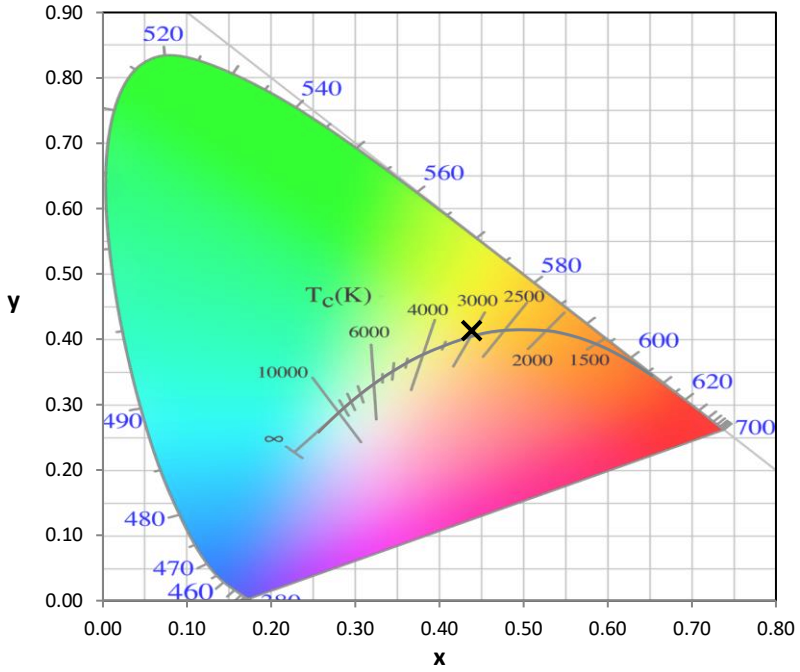
| | |
|---|---|
| Stabilization Time: | 20M |
| Operation Time: | 1H 20M |
| Sphere Temperature (°C): | 24.2 |

REPORT NUMBER: SP1-2408-195-9

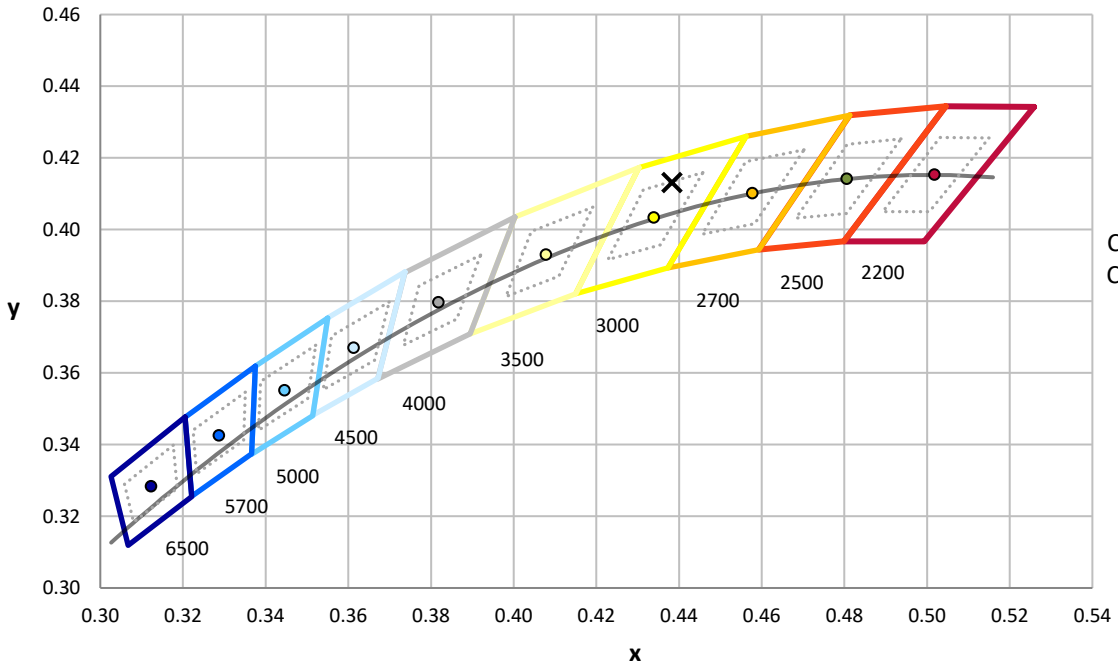
| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 6/18/2024 | 12/18/2024 |
| Power Meter | INXT2011004 | 2/8/2024 | 2/8/2025 |
| AC Power Source | IN0063 | 10/24/2023 | 10/24/2024 |
| DC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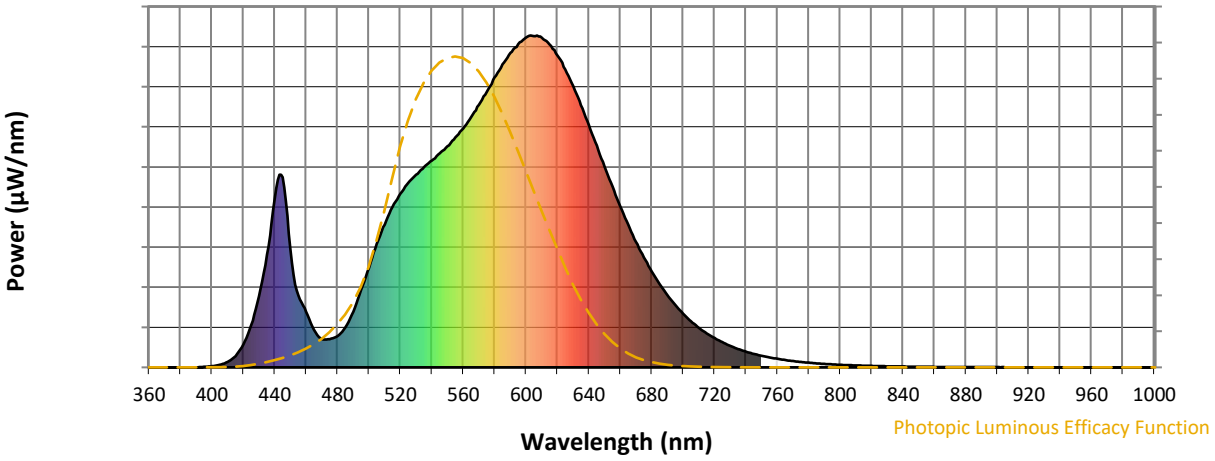
## Photopic Flux vs. Wavelength




## 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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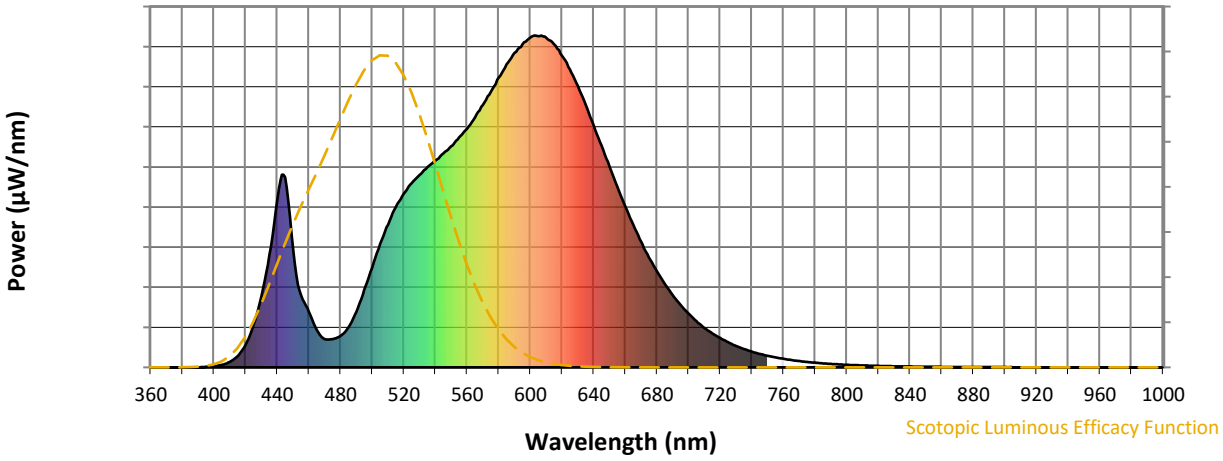
## Scotopic Flux vs. Wavelength




**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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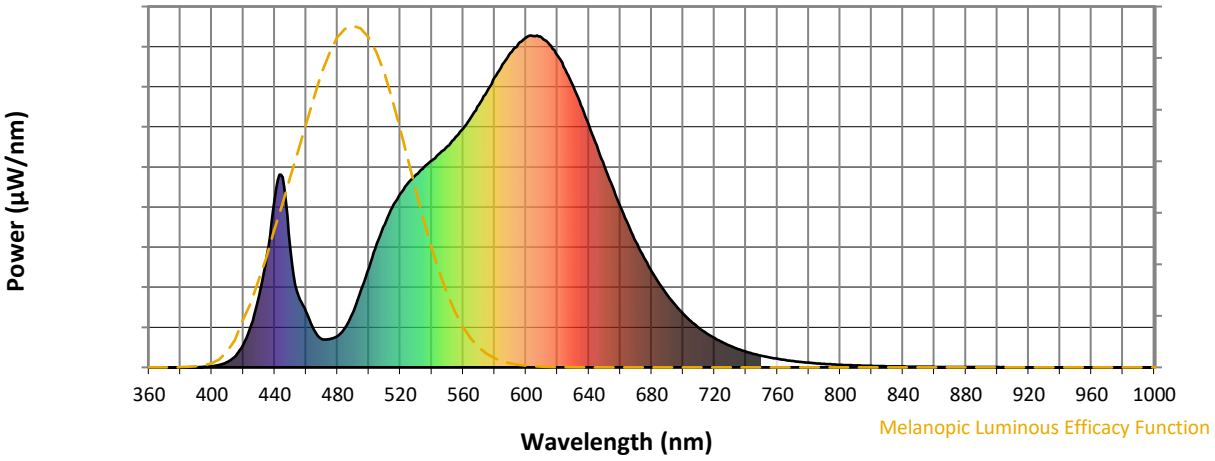
## Melanopic Flux vs. Wavelength




**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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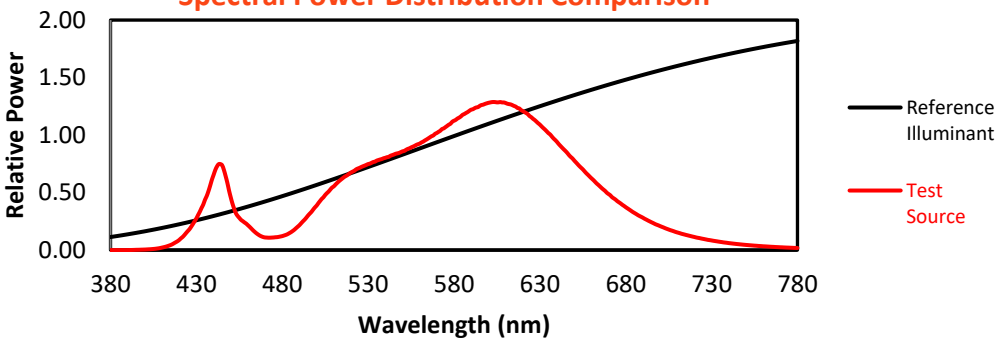
# TM-30-18

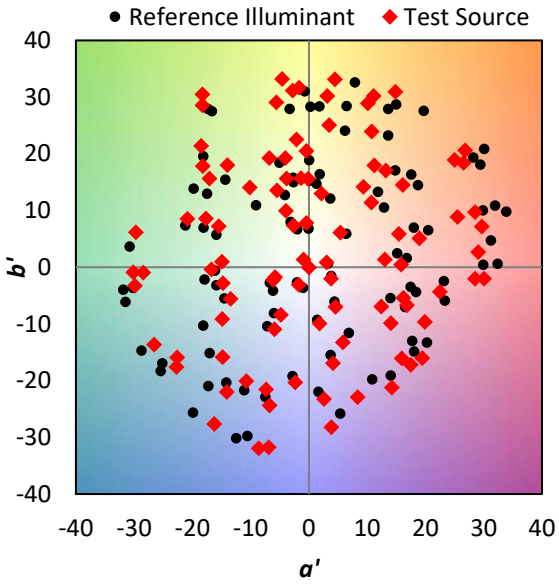
## Summary

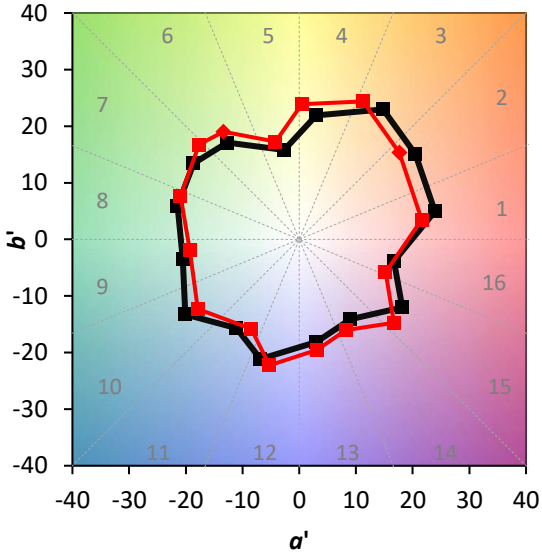
$R_f$ = 81.5
$R_g$ = 99.2
CIE $R_a$ = 81.0
$R_9$ = 7.1

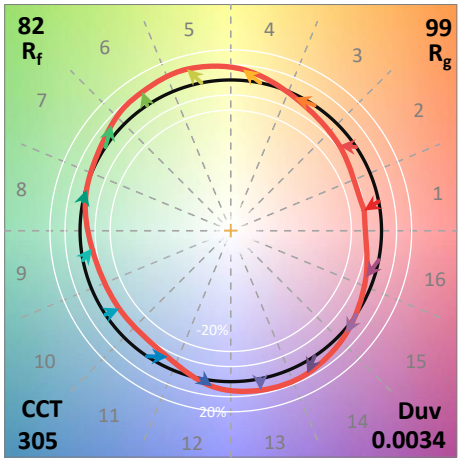
## Spectral Power Distribution Comparison

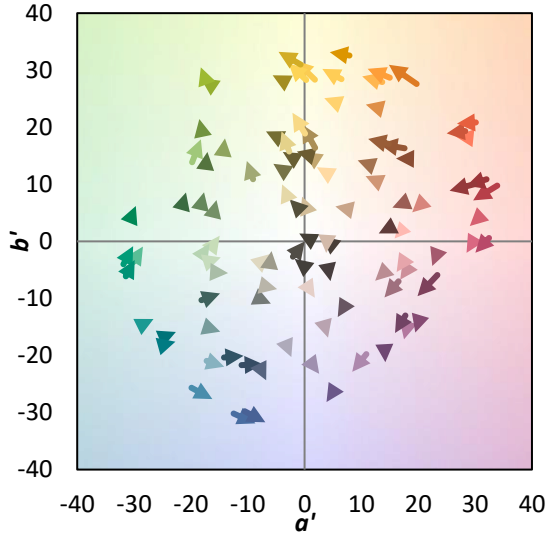



## Color Vector Graphics



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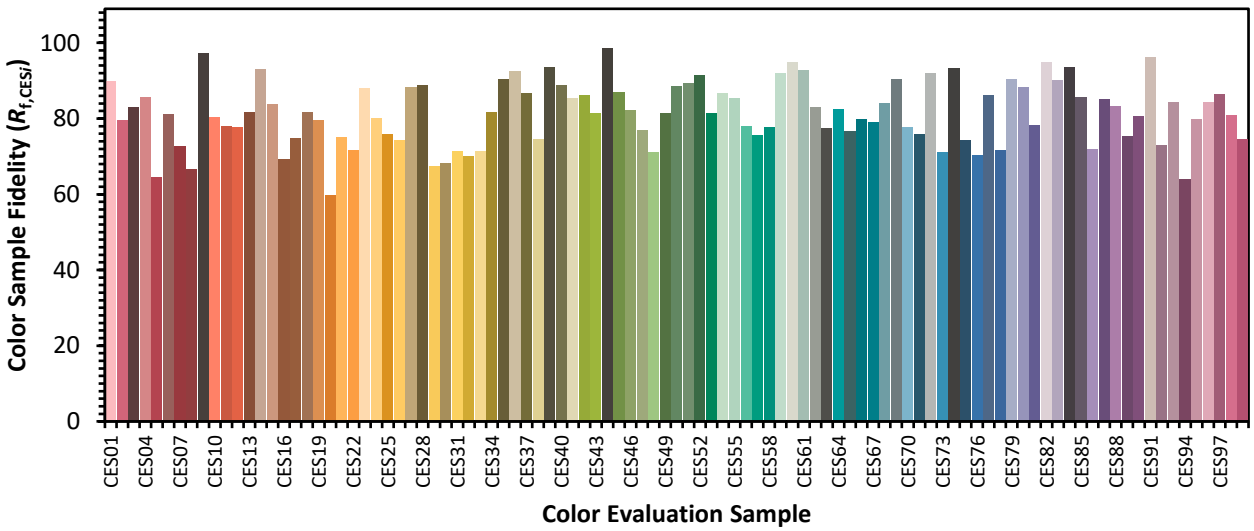
# TM-30-18

**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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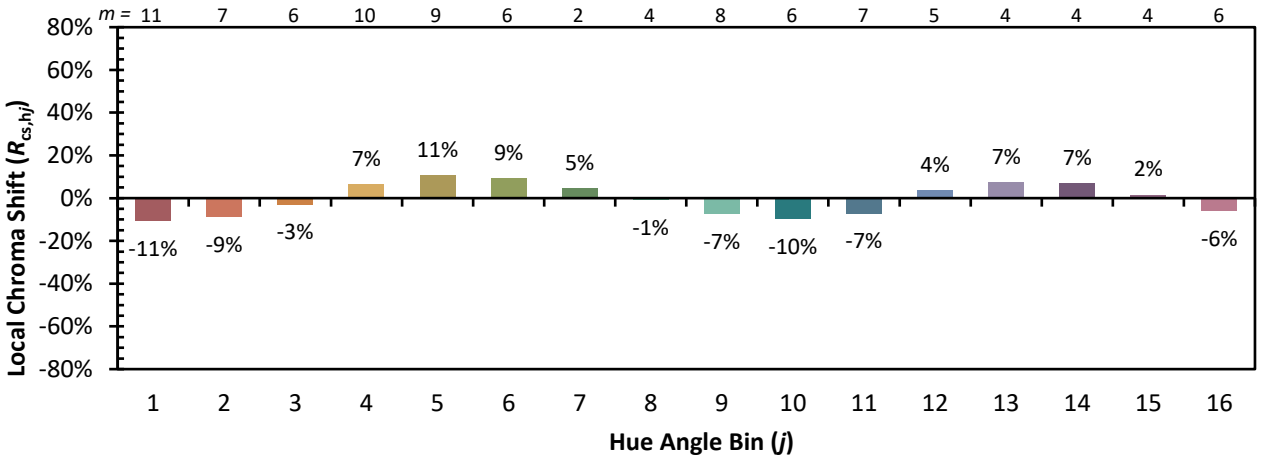
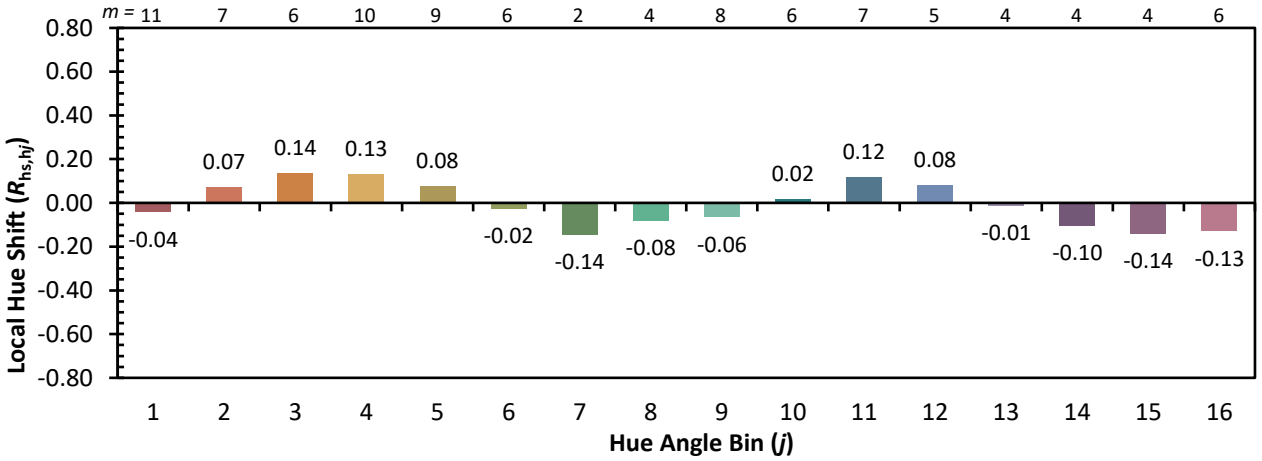
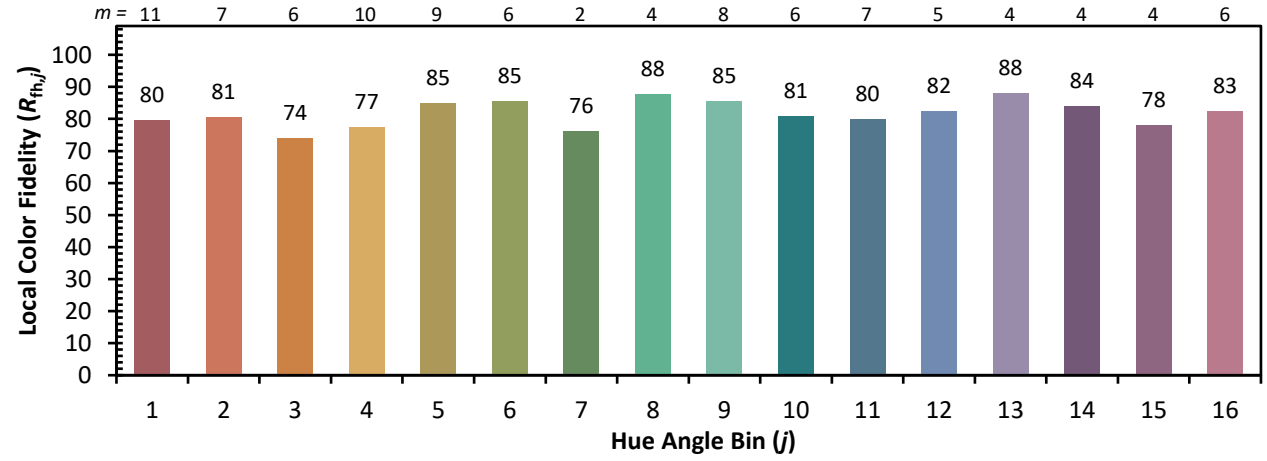
## Color Rendition by Hue-Angle Bin



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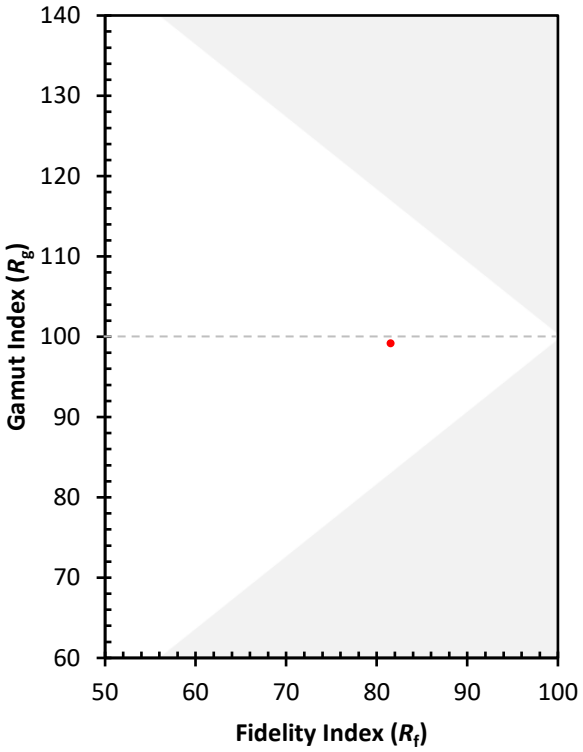
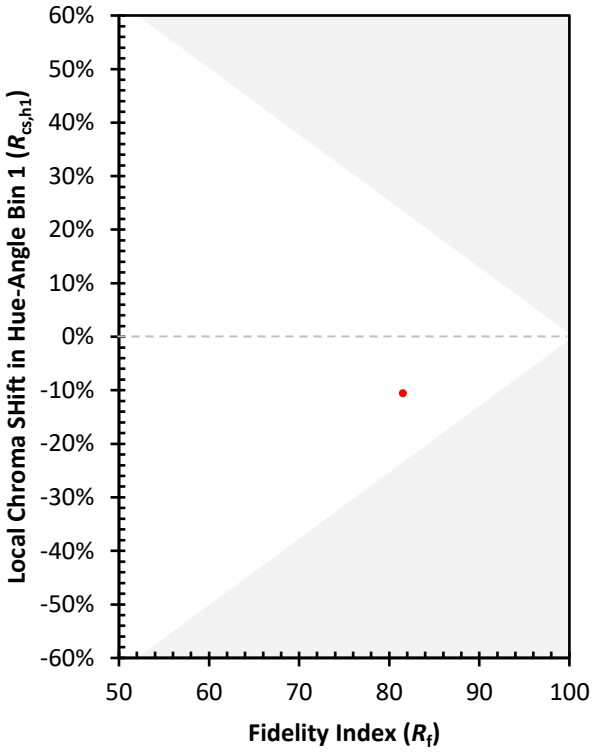
## TM-30-18

### Measure Comparisons

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