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: P632043

Luminaire Tested: GWS-SA2B-830-U-SL4-W

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: | P632043 |
| | TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-35) |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Issue Date: | 1/10/2023 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS |
| Product Line: | McGRAW-EDISON |
| Catalog Number: | GWS-SA2B-830-U-SL4-W |
| Description: | GALLEON WALL SLIM LUMINAIRE. (2) LIGHTSQUARES WITH 16 LEDS EACH AND TYPE IV SPILL LIGHT ELIMINATOR OPTICS |
| Light Source: | (32) 3000K CCT, 80 CRI LEDS |
| Ballast/Driver: | - |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 5265.1 lumens |
| Efficiency: | N/A |
| Efficacy: | 113.5 lumens/watt |
| Luminous Opening: | Rectangular (W 1' x L: 0.5' x H: 0') |
| IES Classification: | Type IV - Short |
| BUG Rating: | B1 - U0 - G2 |

| | |
|---|---|
| Input Watts (W): | 46.4 |
| 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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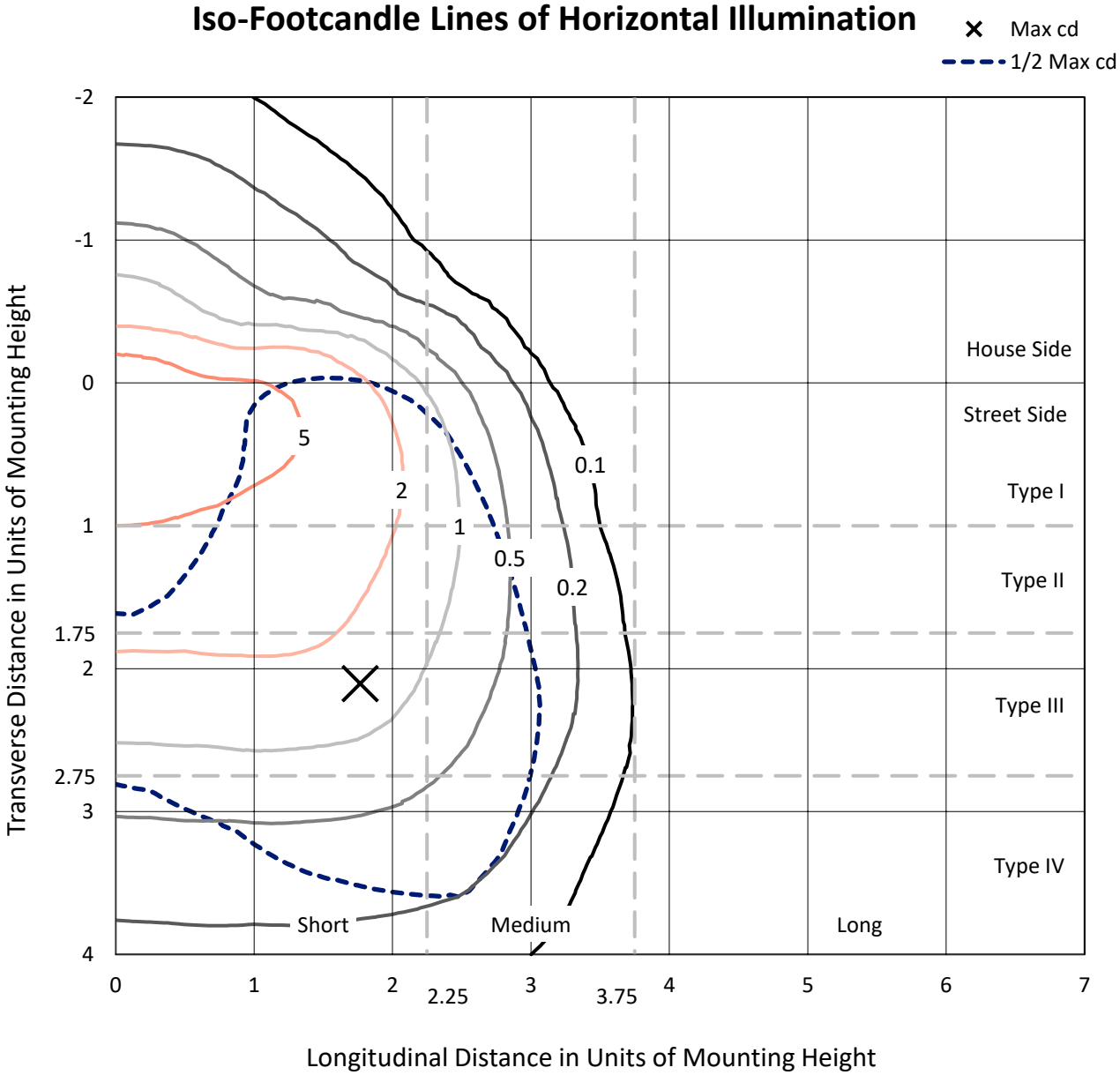
Scaled Data Report

REPORT NUMBER: P632043
CATALOG NUMBER: GWS-SA2B-830-U-SL4-W

## Iso-Footcandle Lines of Horizontal Illumination




Based on 10 foot mounting height. Maximum calculated value = 8.9 fc
Type IV - Short - N/A

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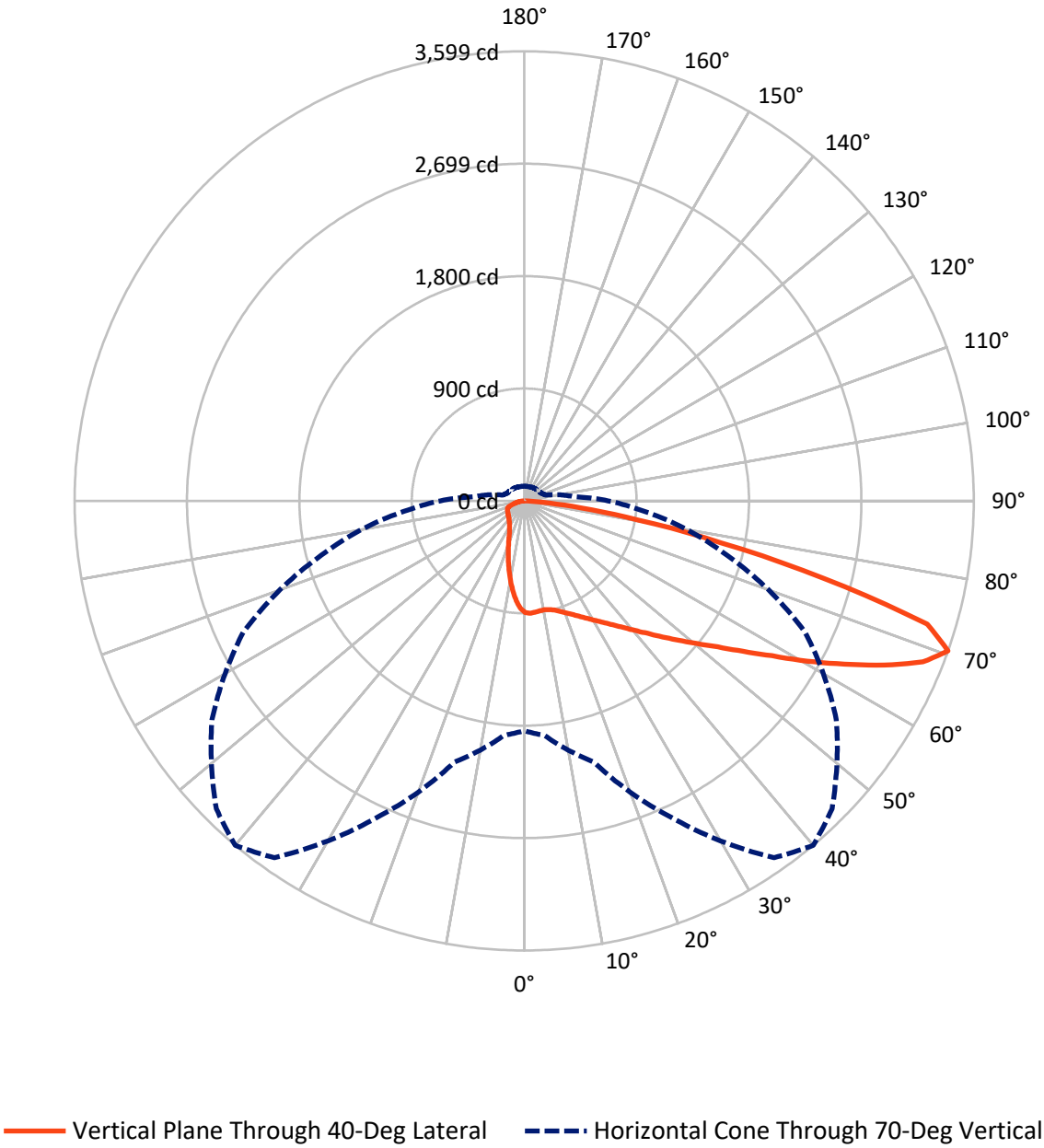
## Luminous Intensity Polar Plot



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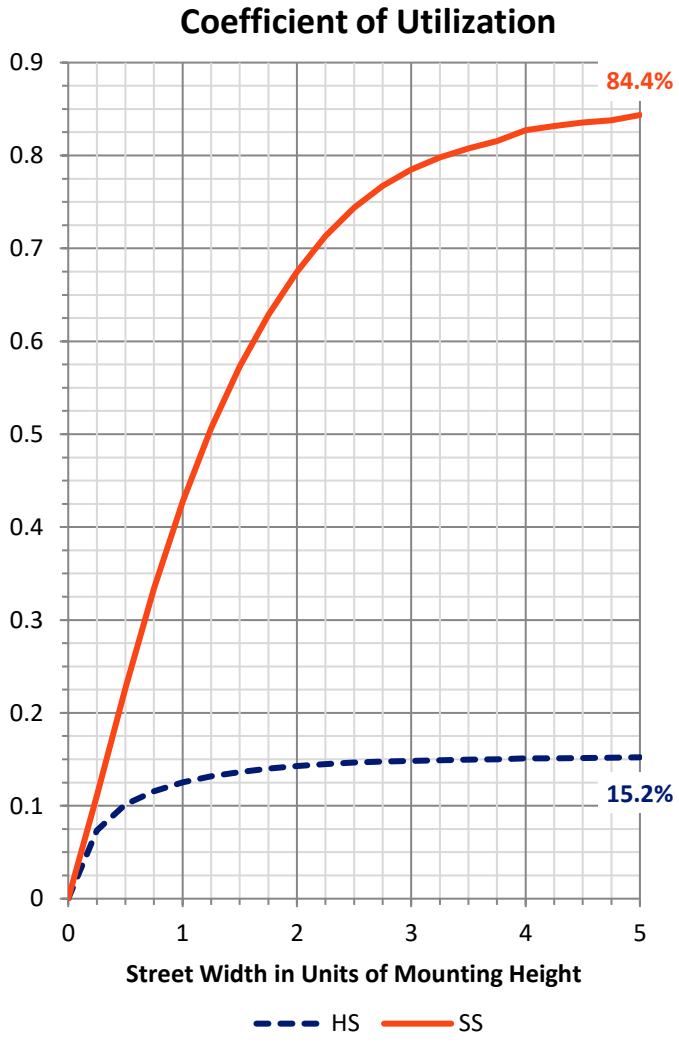
REPORT NUMBER: P632043
CATALOG NUMBER: GWS-SA2B-830-U-SL4-W

**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 811.0 | 0.0 | 811.0 |
| | % Fixture | 15.4 | 0.0 | 15.4 |
| **Street Side** | Lumens | 4454.1 | 0.0 | 4454.1 |
| | % Fixture | 84.6 | 0.0 | 84.6 |
| **Total** | Lumens | 5265.1 | 0.0 | 5265.1 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 79.0 | 1.5 |
| 10°-20° | 205.9 | 3.9 |
| 20°-30° | 323.3 | 6.1 |
| 30°-40° | 486.0 | 9.2 |
| 40°-50° | 750.2 | 14.2 |
| 50°-60° | 1114.1 | 21.2 |
| 60°-70° | 1404.3 | 26.7 |
| 70°-80° | 812.1 | 15.4 |
| 80°-90° | 90.1 | 1.7 |
| 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° | 5265.1 | 100.0 |
| 0°-180° | 5265.1 | 100.0 |



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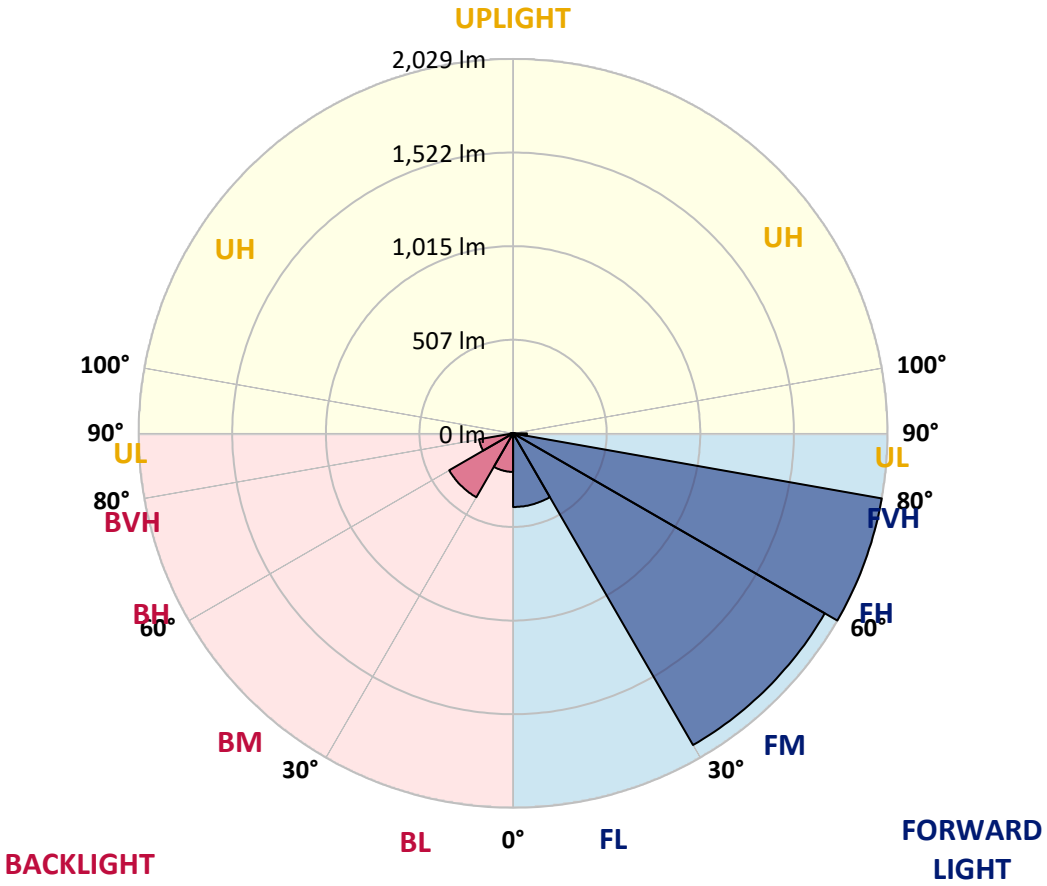
REPORT NUMBER: P632043
CATALOG NUMBER: GWS-SA2B-830-U-SL4-W

## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 399.1 | 7.6 | | | |
| FM | (30°-60°) | 1950.7 | 37.0 | | | |
| FH | (60°-80°) | 2029.3 | 38.5 | | | G2/5000 |
| FVH | (80°-90°) | 75.1 | 1.4 | | | G1/100 |
| BL | (0°-30°) | 209.0 | 4.0 | B1/500 | | |
| BM | (30°-60°) | 399.7 | 7.6 | B1/1000 | | |
| BH | (60°-80°) | 187.2 | 3.6 | B1/500 | | G1/500 |
| BVH | (80°-90°) | 15.1 | 0.3 | | | G1/100 |
| 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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REPORT NUMBER: P632043
CATALOG NUMBER: GWS-SA2B-830-U-SL4-W

**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 40° | 45° | 55° | 65° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 894.1 | 894.1 | 894.1 | 894.1 | 894.1 | *894.1* | 894.1 | 894.1 | 894.1 | 894.1 | 894.1 |
| 2.5° | 899.6 | 901.1 | 902.3 | 903.9 | 903.1 | *900.8* | 902.7 | 902.7 | 898.4 | 893.7 | 889.4 |
| 5° | 900.8 | 902.7 | 902.3 | 901.9 | 898.8 | *894.9* | 894.9 | 892.5 | 885.0 | 877.6 | 870.5 |
| 7.5° | 898.4 | 898.0 | 897.6 | 896.4 | 892.9 | *888.6* | 887.8 | 883.1 | 873.2 | 863.0 | 852.8 |
| 10° | 887.8 | 887.4 | 888.6 | 891.3 | 890.5 | *886.6* | 886.6 | 882.3 | 870.9 | 858.3 | 844.9 |
| 12.5° | 879.1 | 879.1 | 883.9 | 891.3 | 894.1 | *892.5* | 892.9 | 889.8 | 876.8 | 861.8 | 846.1 |
| 15° | 880.3 | 880.7 | 890.9 | 903.1 | 908.2 | *907.0* | 907.4 | 903.9 | 889.4 | 874.4 | 853.2 |
| 17.5° | 888.2 | 890.1 | 907.8 | 924.7 | 931.4 | *929.8* | 927.1 | 921.2 | 904.7 | 887.8 | 861.8 |
| 20° | 904.7 | 907.8 | 930.6 | 951.8 | 959.7 | *956.2* | 951.5 | 939.7 | 921.6 | 903.1 | 871.3 |
| 22.5° | 937.3 | 939.3 | 964.4 | 985.3 | 991.5 | *987.2* | 977.8 | 960.9 | 940.1 | 920.8 | 882.7 |
| 25° | 983.3 | 985.6 | 1009.6 | 1028.9 | 1027.3 | *1022.2* | 1009.2 | 988.4 | 963.6 | 943.2 | 899.2 |
| 27.5° | 1037.9 | 1041.8 | 1065.4 | 1080.7 | 1070.5 | *1063.1* | 1048.5 | 1023.4 | 995.5 | 977.0 | 924.3 |
| 30° | 1097.6 | 1099.2 | 1119.3 | 1134.6 | 1118.9 | *1108.7* | 1091.0 | 1063.9 | 1038.7 | 1024.9 | 962.1 |
| 32.5° | 1155.4 | 1157.0 | 1174.3 | 1182.9 | 1166.4 | *1159.0* | 1143.6 | 1114.9 | 1097.3 | 1089.8 | 1018.3 |
| 35° | 1216.3 | 1215.9 | 1230.1 | 1237.6 | 1220.7 | *1217.5* | 1201.8 | 1179.8 | 1176.6 | 1186.5 | 1100.4 |
| 37.5° | 1277.2 | 1273.7 | 1281.2 | 1291.0 | 1281.6 | *1284.7* | 1274.5 | 1267.0 | 1279.2 | 1304.8 | 1209.7 |
| 40° | 1326.0 | 1326.0 | 1333.8 | 1346.0 | 1349.2 | *1362.9* | 1357.0 | 1366.9 | 1406.2 | 1467.1 | 1344.8 |
| 42.5° | 1369.2 | 1369.6 | 1386.1 | 1405.0 | 1427.8 | *1449.0* | 1453.7 | 1479.3 | 1560.6 | 1656.1 | 1514.6 |
| 45° | 1414.4 | 1414.8 | 1437.2 | 1464.7 | 1513.0 | *1553.5* | 1563.0 | 1620.3 | 1736.7 | 1853.0 | 1698.9 |
| 47.5° | 1466.7 | 1462.4 | 1493.4 | 1539.4 | 1608.2 | *1666.3* | 1690.7 | 1772.0 | 1919.0 | 2062.1 | 1872.6 |
| 50° | 1525.6 | 1516.6 | 1551.2 | 1630.6 | 1715.4 | *1795.2* | 1836.1 | 1929.2 | 2114.7 | 2255.0 | 2036.1 |
| 52.5° | 1592.0 | 1586.9 | 1623.1 | 1719.8 | 1849.5 | *1941.4* | 1996.8 | 2119.1 | 2304.9 | 2447.2 | 2165.8 |
| 55° | 1674.6 | 1662.4 | 1714.7 | 1837.7 | 2006.7 | *2123.8* | 2189.4 | 2306.9 | 2512.8 | 2621.7 | 2264.9 |
| 57.5° | 1765.0 | 1751.6 | 1821.6 | 1985.0 | 2211.0 | *2339.5* | 2421.7 | 2518.3 | 2708.6 | 2755.3 | 2323.0 |
| 60° | 1862.4 | 1858.1 | 1941.0 | 2158.0 | 2454.7 | *2604.0* | 2663.4 | 2751.0 | 2878.7 | 2832.7 | 2308.5 |
| 62.5° | 1951.6 | 1950.1 | 2070.7 | 2345.4 | 2712.9 | *2877.2* | 2924.3 | 2947.5 | 3001.3 | 2827.6 | 2192.9 |
| 65° | 2045.6 | 2058.9 | 2222.0 | 2562.8 | 3008.8 | *3169.9* | 3189.6 | 3130.6 | 3042.6 | 2693.6 | 1956.4 |
| 67.5° | 2057.4 | 2083.3 | 2317.1 | 2766.3 | 3289.4 | *3441.5* | 3425.8 | 3200.2 | 2920.8 | 2320.7 | 1533.5 |
| 70° | *1840.0* | *1885.2* | *2165.4* | *2797.4* | *3487.1* | *3599.1* | *3485.5* | *3050.5* | *2478.6* | *1681.3* | *964.4* |
| 72.5° | 1537.4 | 1576.3 | 1823.9 | 2385.5 | 3232.0 | *3374.7* | 3221.0 | 2582.0 | 1751.6 | 964.4 | 491.2 |
| 75° | 1196.7 | 1241.9 | 1470.2 | 1896.2 | 2419.7 | *2476.7* | 2399.7 | 1800.7 | 962.8 | 397.7 | 223.2 |
| 77.5° | 730.2 | 762.8 | 940.4 | 1284.7 | 1693.0 | *1607.8* | 1362.5 | 1009.6 | 422.5 | 190.6 | 137.9 |
| 80° | 323.0 | 343.1 | 463.3 | 690.1 | 978.2 | *924.7* | 729.0 | 431.1 | 231.1 | 121.0 | 96.3 |
| 82.5° | 173.3 | 186.3 | 228.3 | 273.1 | 429.5 | *449.2* | 364.3 | 248.4 | 124.2 | 69.2 | 55.0 |
| 85° | 76.2 | 83.7 | 103.8 | 99.0 | 141.1 | *138.7* | 139.9 | 170.6 | 59.3 | 31.8 | 35.8 |
| 87.5° | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 | *0.4* | 4.3 | 22.8 | 5.9 | 9.4 | 8.3 |
| 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: P632043
CATALOG NUMBER: GWS-SA2B-830-U-SL4-W

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 894.1 | 894.1 | 894.1 | 894.1 | 894.1 | 894.1 | 894.1 | 894.1 | 894.1 | 894.1 | 894.1 |
| 2.5° | 884.6 | 877.6 | 875.6 | 873.2 | 868.9 | 861.5 | 856.0 | 849.7 | 846.9 | 843.8 | 844.2 |
| 5° | 862.6 | 854.0 | 845.7 | 835.1 | 821.8 | 806.8 | 796.6 | 784.8 | 778.5 | 772.6 | 774.2 |
| 7.5° | 843.8 | 830.4 | 813.5 | 791.1 | 767.1 | 740.4 | 718.8 | 701.9 | 690.5 | 682.6 | 686.6 |
| 10° | 832.0 | 816.3 | 786.8 | 750.2 | 709.8 | 668.9 | 637.8 | 608.8 | 590.7 | 576.5 | 575.7 |
| 12.5° | 829.6 | 809.2 | 766.3 | 713.3 | 654.7 | 600.1 | 554.5 | 515.2 | 491.2 | 473.6 | 480.2 |
| 15° | 832.0 | 806.0 | 748.7 | 679.1 | 605.2 | 531.3 | 474.7 | 429.5 | 400.9 | 384.7 | 383.6 |
| 17.5° | 834.7 | 802.9 | 728.6 | 642.2 | 553.3 | 468.8 | 403.2 | 355.3 | 325.8 | 309.7 | 310.1 |
| 20° | 837.1 | 798.2 | 705.0 | 601.7 | 500.7 | 410.7 | 342.7 | 297.1 | 270.8 | 259.0 | 261.0 |
| 22.5° | 841.0 | 793.5 | 679.9 | 558.5 | 446.8 | 354.5 | 294.7 | 257.8 | 242.1 | 234.2 | 234.6 |
| 25° | 848.5 | 790.7 | 654.0 | 511.3 | 393.8 | 309.7 | 261.7 | 237.0 | 227.2 | 222.4 | 222.0 |
| 27.5° | 863.8 | 793.1 | 626.8 | 465.7 | 345.8 | 275.5 | 240.5 | 224.4 | 217.7 | 214.6 | 214.2 |
| 30° | 889.4 | 802.5 | 603.3 | 419.3 | 304.6 | 248.8 | 226.0 | 216.1 | 212.2 | 209.5 | 209.1 |
| 32.5° | 928.3 | 820.2 | 577.7 | 376.1 | 271.2 | 229.1 | 214.6 | 209.5 | 206.7 | 205.1 | 205.1 |
| 35° | 987.2 | 852.4 | 552.6 | 338.4 | 245.2 | 213.8 | 205.5 | 203.6 | 201.2 | 200.4 | 201.2 |
| 37.5° | 1072.1 | 903.9 | 529.8 | 305.4 | 226.8 | 202.0 | 195.7 | 196.5 | 194.5 | 195.7 | 196.9 |
| 40° | 1179.8 | 972.7 | 510.5 | 278.2 | 213.0 | 193.4 | 187.1 | 189.8 | 188.6 | 189.8 | 191.8 |
| 42.5° | 1316.2 | 1058.0 | 496.0 | 257.0 | 203.2 | 186.3 | 180.4 | 183.1 | 182.4 | 183.9 | 185.9 |
| 45° | 1468.2 | 1170.4 | 489.3 | 242.1 | 196.1 | 181.2 | 174.9 | 176.8 | 176.1 | 177.2 | 179.2 |
| 47.5° | 1614.0 | 1272.5 | 495.2 | 233.4 | 190.2 | 176.8 | 170.2 | 171.0 | 170.6 | 170.2 | 171.3 |
| 50° | 1739.8 | 1353.9 | 512.1 | 230.7 | 186.3 | 172.5 | 166.2 | 166.6 | 165.5 | 163.1 | 163.9 |
| 52.5° | 1842.4 | 1419.1 | 522.3 | 230.7 | 184.3 | 167.8 | 161.9 | 162.3 | 160.0 | 156.8 | 157.2 |
| 55° | 1910.0 | 1445.5 | 514.0 | 230.3 | 183.5 | 163.9 | 157.6 | 158.0 | 155.6 | 151.7 | 152.1 |
| 57.5° | 1929.2 | 1419.9 | 479.5 | 226.0 | 182.7 | 160.7 | 153.3 | 154.1 | 152.5 | 148.2 | 148.2 |
| 60° | 1875.4 | 1326.4 | 416.2 | 216.1 | 180.8 | 158.8 | 150.1 | 151.3 | 150.5 | 146.2 | 146.2 |
| 62.5° | 1734.3 | 1160.1 | 340.7 | 201.2 | 175.3 | 156.4 | 147.4 | 149.7 | 151.7 | 149.3 | 148.9 |
| 65° | 1470.2 | 929.4 | 277.1 | 184.7 | 168.2 | 152.5 | 143.4 | 149.3 | 153.7 | 156.8 | 156.8 |
| 67.5° | 1103.2 | 665.3 | 226.0 | 167.4 | 157.6 | 144.6 | 138.3 | 143.8 | 147.0 | 148.9 | 150.1 |
| 70° | *672.4* | *391.4* | *178.0* | *147.4* | *142.3* | *132.8* | *128.1* | *122.6* | *118.3* | *117.5* | *117.9* |
| 72.5° | 328.9 | 224.0 | 144.6 | 125.4 | 121.4 | 112.8 | 102.2 | 99.8 | 97.9 | 96.7 | 96.3 |
| 75° | 181.2 | 156.0 | 119.5 | 104.1 | 97.1 | 86.5 | 84.1 | 80.2 | 79.4 | 77.8 | 78.2 |
| 77.5° | 128.1 | 123.0 | 98.6 | 84.5 | 73.9 | 68.4 | 69.6 | 66.8 | 66.8 | 65.6 | 65.2 |
| 80° | 96.3 | 96.7 | 75.8 | 61.7 | 54.6 | 52.7 | 53.8 | 53.8 | 53.1 | 52.7 | 52.3 |
| 82.5° | 60.9 | 68.8 | 51.1 | 39.7 | 38.9 | 39.3 | 38.9 | 38.5 | 39.3 | 38.1 | 37.7 |
| 85° | 42.1 | 49.5 | 31.0 | 23.6 | 23.6 | 23.2 | 24.0 | 23.6 | 24.4 | 23.2 | 23.2 |
| 87.5° | 9.4 | 22.0 | 11.4 | 7.1 | 7.5 | 7.1 | 7.5 | 7.9 | 8.6 | 9.0 | 9.0 |
| 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

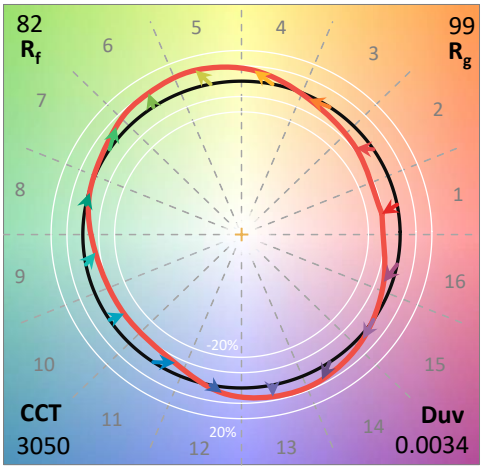
## Test Information

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

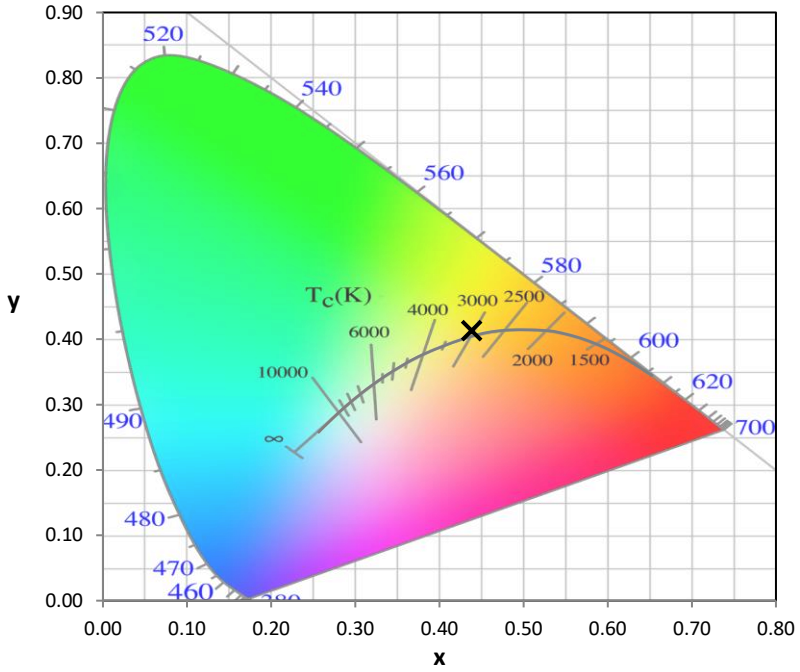
| | |
|---|---|
| Stabilization Time: | 20M |
| Operation Time: | 1H 20M |
| Sphere Temperature (°C): | 24.2 |

REPORT NUMBER: SP1-2408-195-9

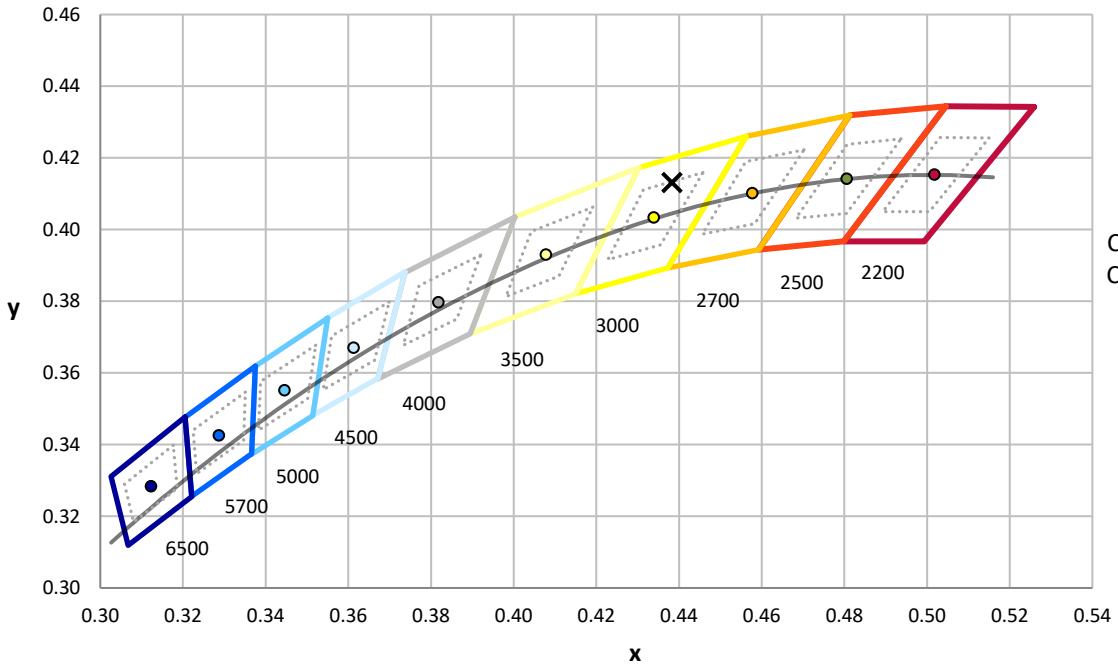
| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 6/18/2024 | 12/18/2024 |
| Power Meter | INXT2011004 | 2/8/2024 | 2/8/2025 |
| AC Power Source | IN0063 | 10/24/2023 | 10/24/2024 |
| DC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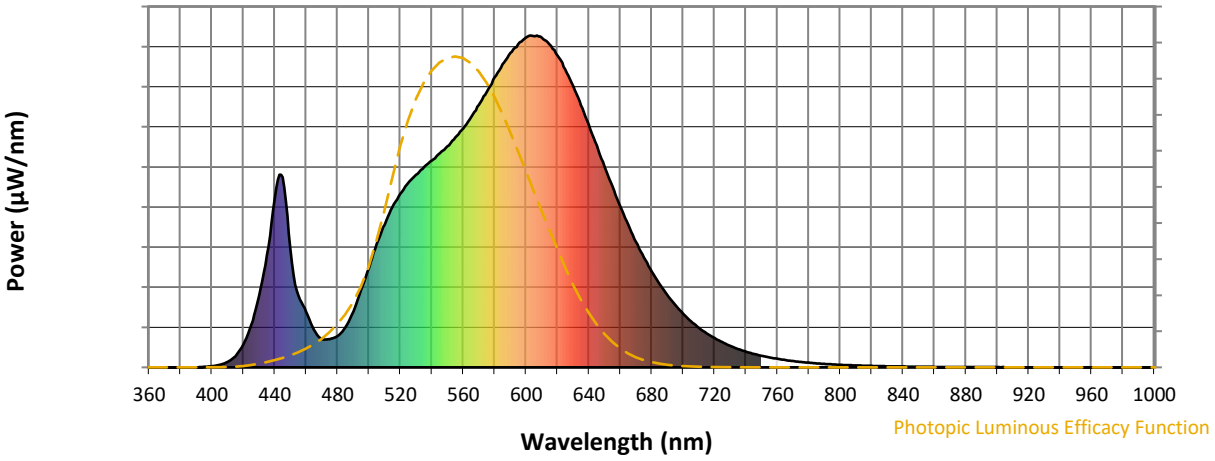
## Photopic Flux vs. Wavelength




## 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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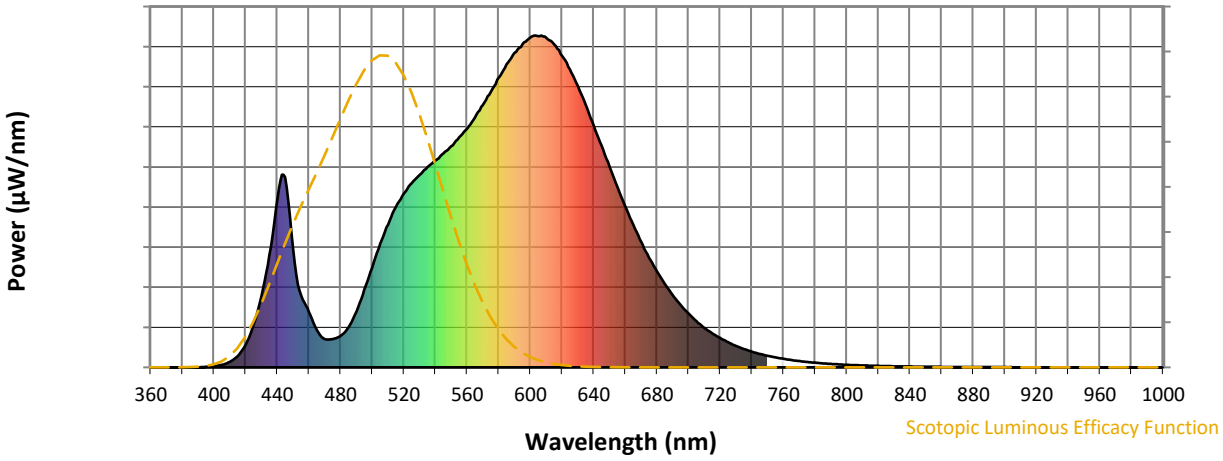
## Scotopic Flux vs. Wavelength




**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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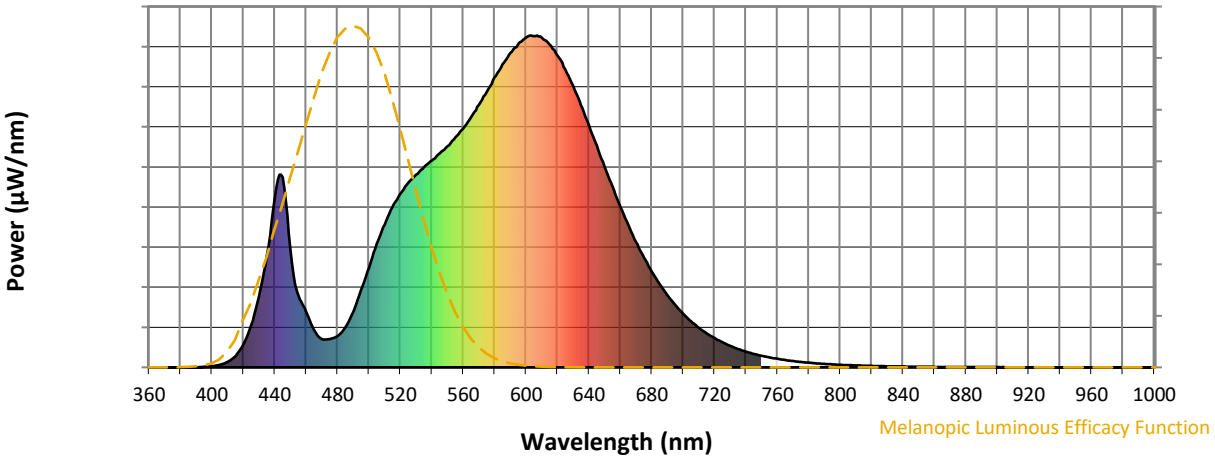
## Melanopic Flux vs. Wavelength




**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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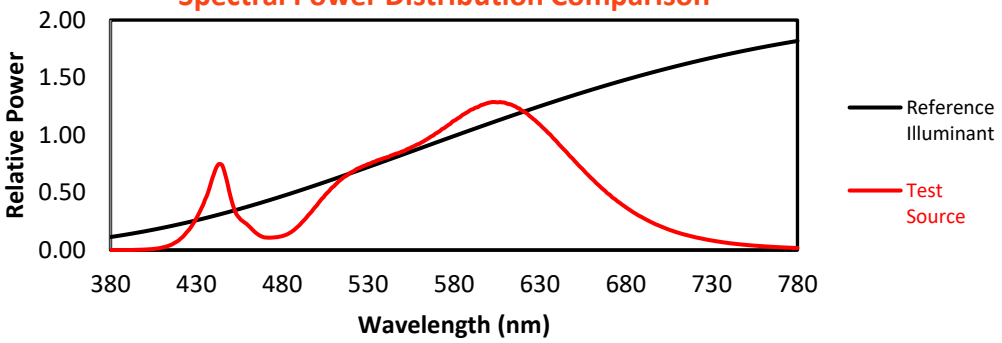
# TM-30-18

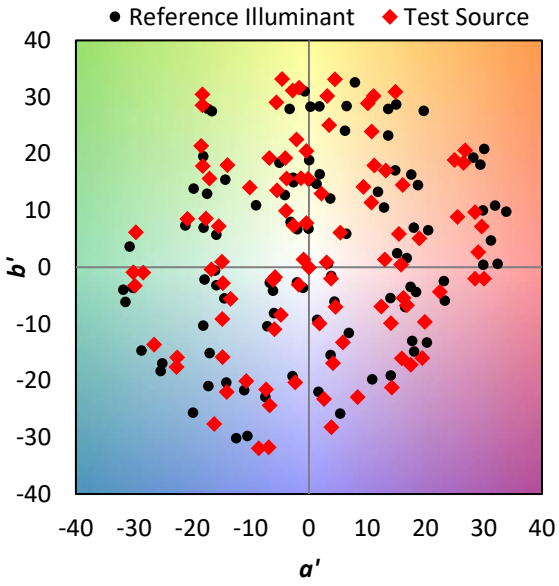
## Summary

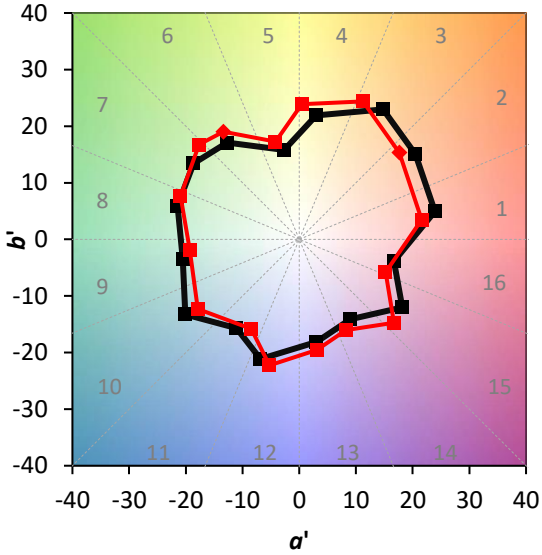
$R_f$ = 81.5
$R_g$ = 99.2
CIE $R_a$ = 81.0
$R_9$ = 7.1

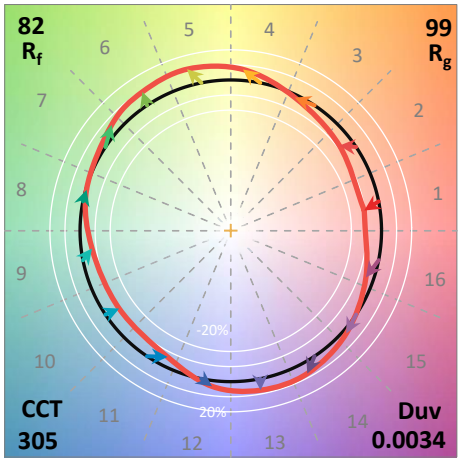
## Spectral Power Distribution Comparison

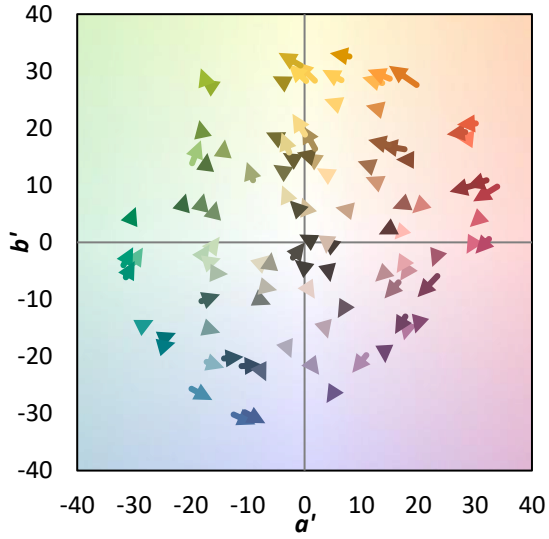



## Color Vector Graphics



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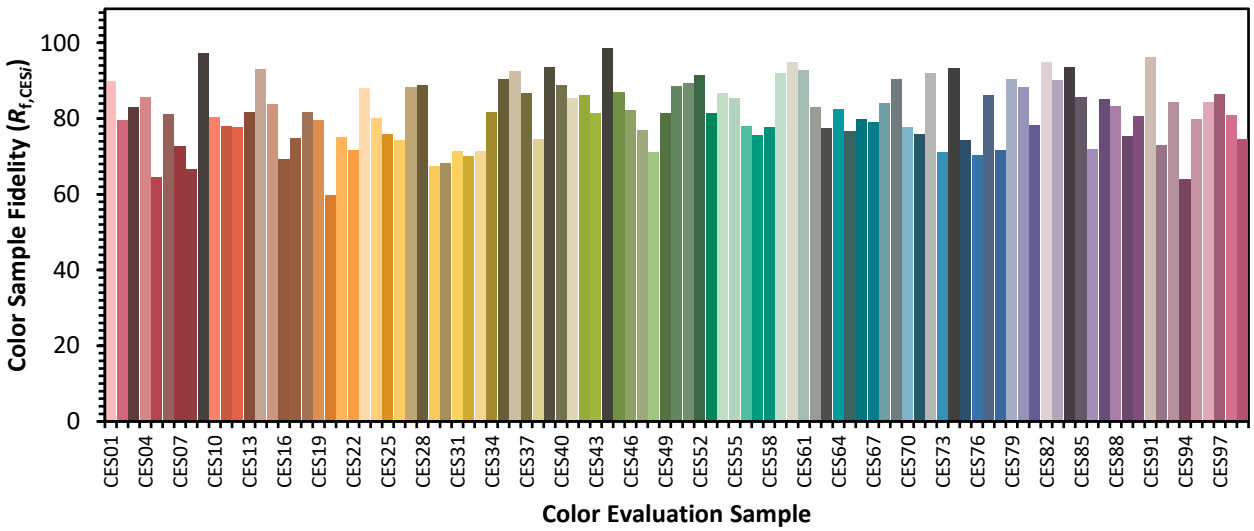
# TM-30-18

**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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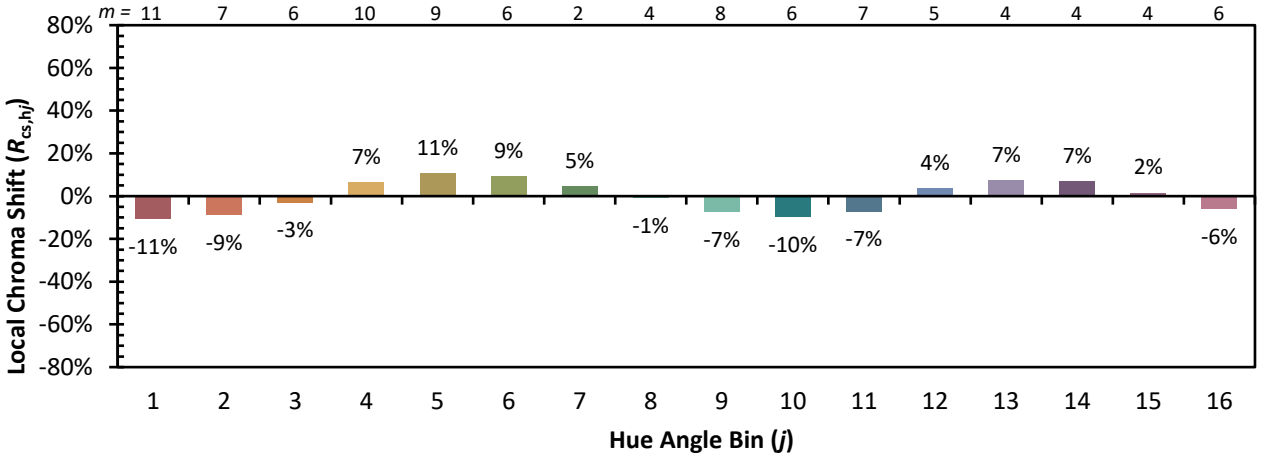
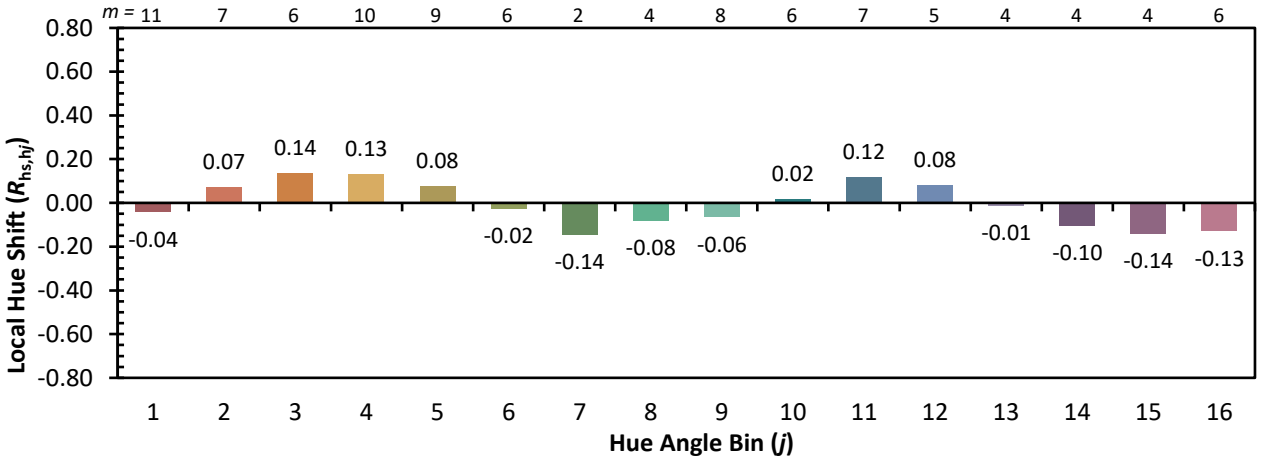
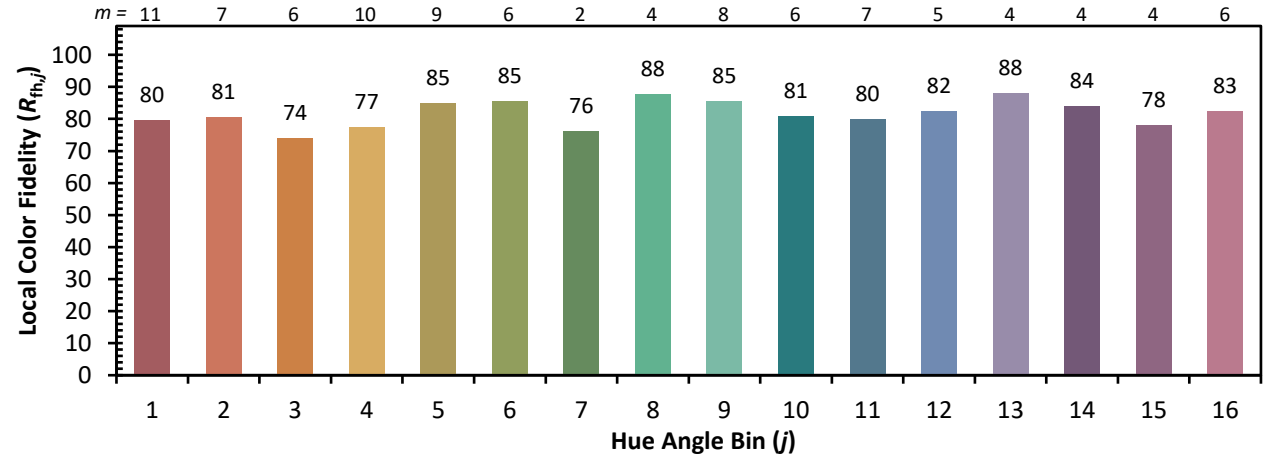
## Color Rendition by Hue-Angle Bin



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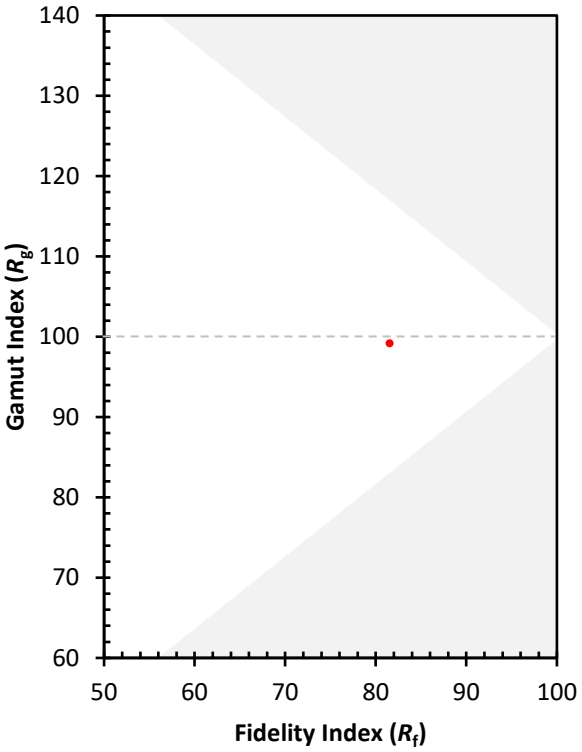
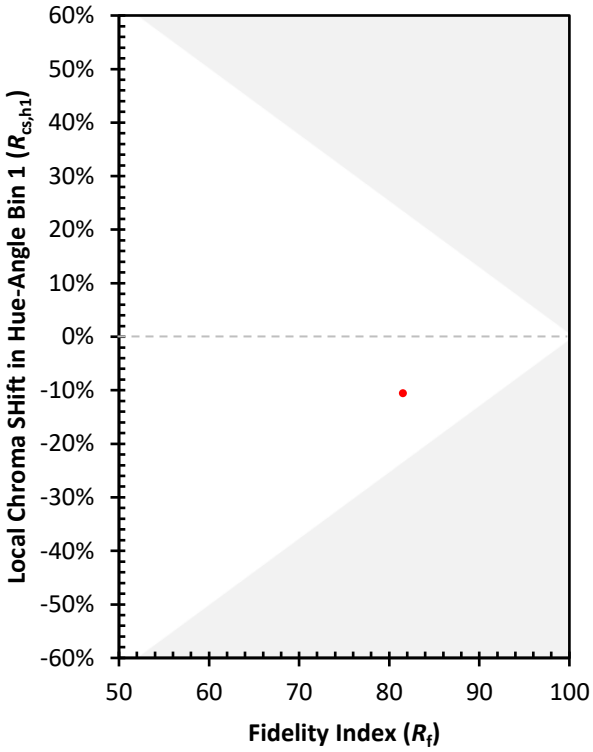
## Measure Comparisons

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