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: P637016

Luminaire Tested: GWS-SA4B-830-U-T3R-W-GRSWH

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: | P637016 |
| | TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-17) |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Issue Date: | 1/10/2023 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS |
| Product Line: | McGRAW-EDISON |
| Catalog Number: | GWS-SA4B-830-U-T3R-W-GRSWH |
| Description: | GALLEON WALL SLIM LUMINAIRE. (4) LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III ROADWAY OPTICS W/ FACTORY INSTALLED GLARE SHIELD, WH |
| Light Source: | (64) 3000K CCT, 80 CRI LEDS |
| Ballast/Driver: | - |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 10080.9 lumens |
| Efficiency: | N/A |
| Efficacy: | 106.8 lumens/watt |
| Luminous Opening: | Rectangular (W 1' x L: 1' x H: 0') |
| IES Classification: | Type II - Short |
| BUG Rating: | B2 - U0 - G2 |

| | |
|---|---|
| Input Watts (W): | 94.4 |
| 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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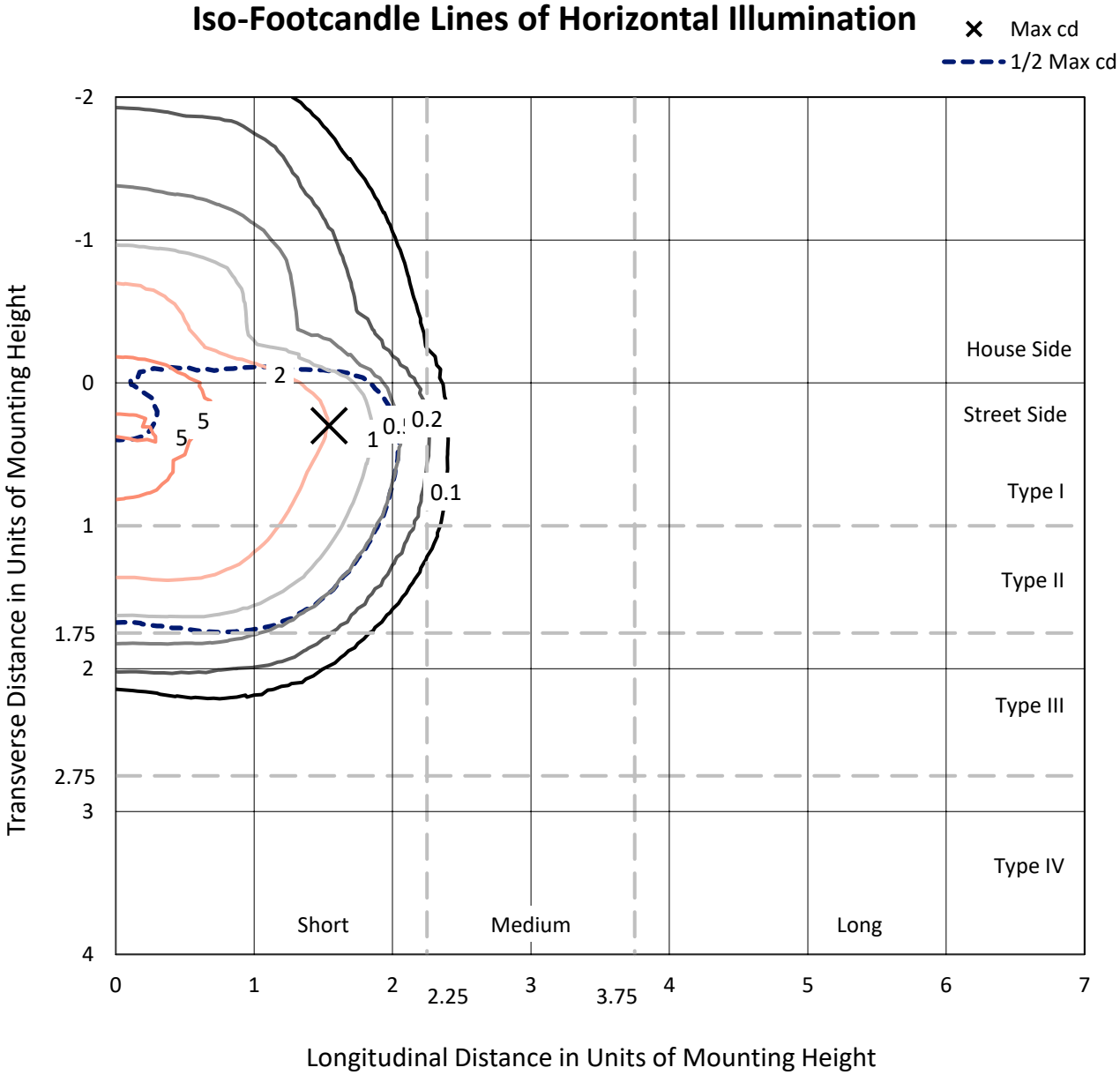
Scaled Data Report

REPORT NUMBER: P637016
CATALOG NUMBER: GWS-SA4B-830-U-T3R-W-GRSWH

## Iso-Footcandle Lines of Horizontal Illumination




Based on 20 foot mounting height. Maximum calculated value = 6.3 fc
Type II - Short - N/A

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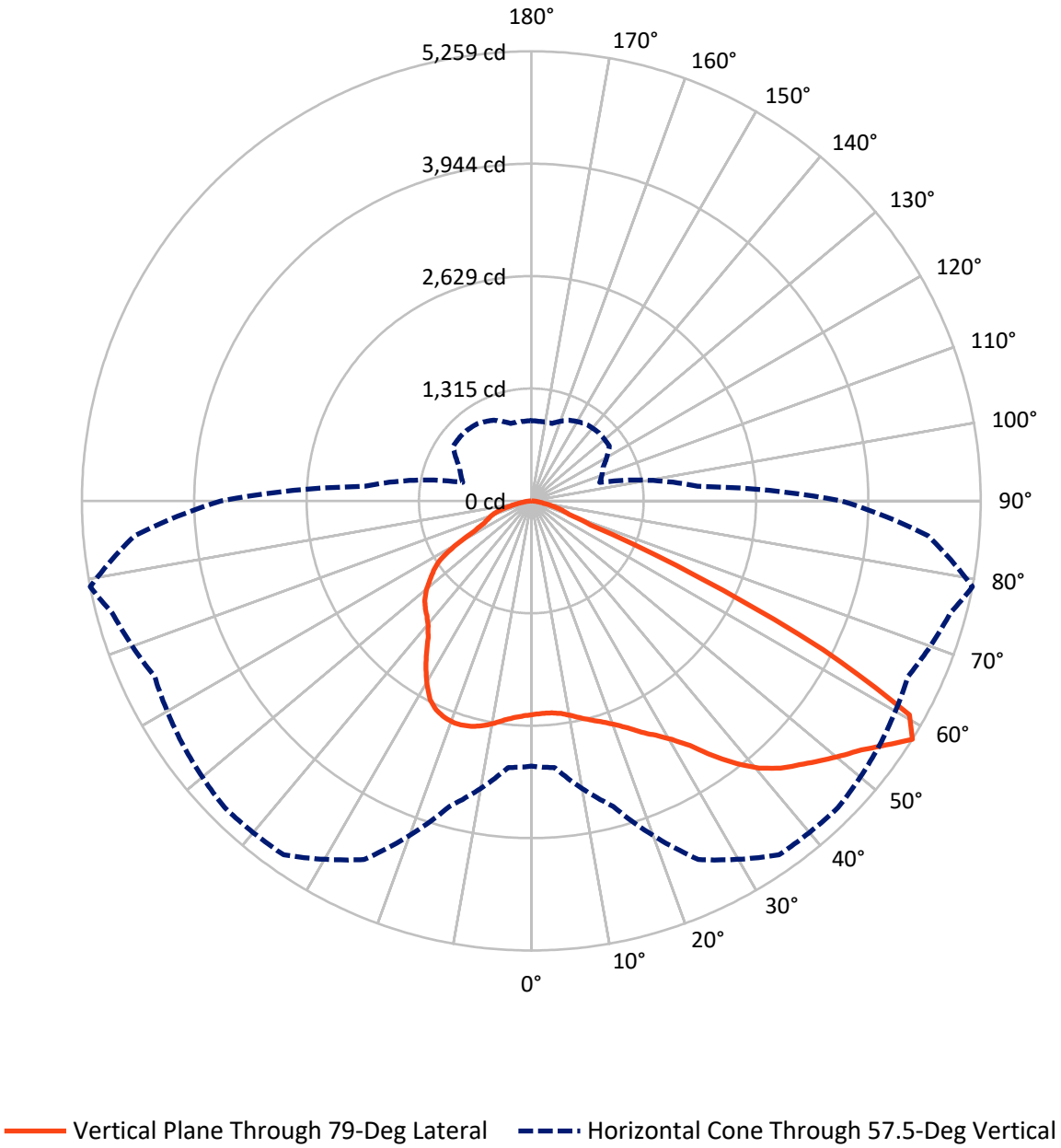
## Luminous Intensity Polar Plot



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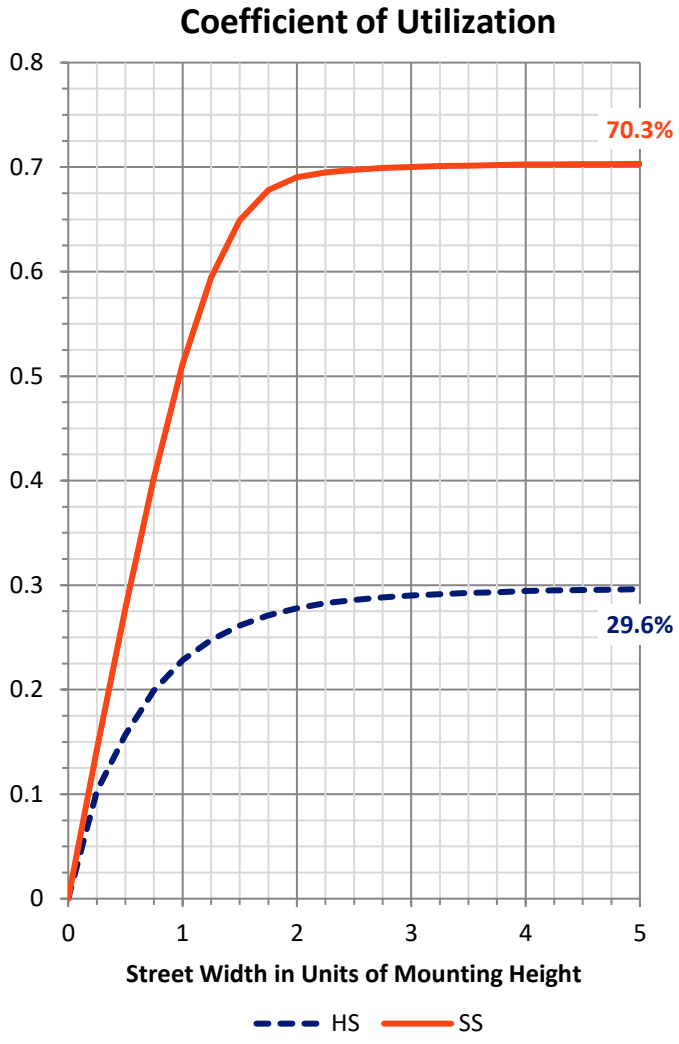
REPORT NUMBER: P637016
CATALOG NUMBER: GWS-SA4B-830-U-T3R-W-GRSWH

**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 2996.6 | 0.0 | 2996.6 |
| | % Fixture | 29.7 | 0.0 | 29.7 |
| **Street Side** | Lumens | 7084.3 | 0.0 | 7084.3 |
| | % Fixture | 70.3 | 0.0 | 70.3 |
| **Total** | Lumens | 10080.9 | 0.0 | 10080.9 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 231.4 | 2.3 |
| 10°-20° | 643.0 | 6.4 |
| 20°-30° | 1089.8 | 10.8 |
| 30°-40° | 1668.1 | 16.5 |
| 40°-50° | 2224.3 | 22.1 |
| 50°-60° | 2568.9 | 25.5 |
| 60°-70° | 1334.9 | 13.2 |
| 70°-80° | 283.8 | 2.8 |
| 80°-90° | 36.8 | 0.4 |
| 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° | 10080.9 | 100.0 |
| 0°-180° | 10080.9 | 100.0 |



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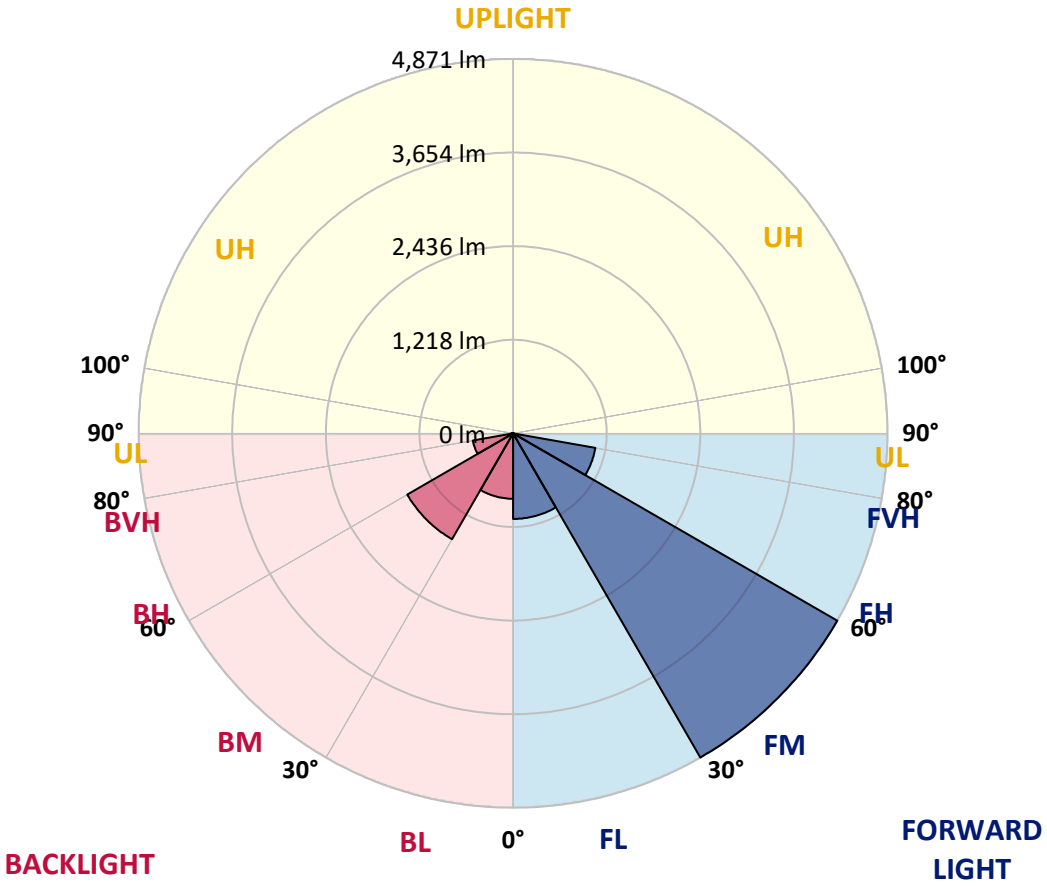
## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 1113.2 | 11.0 | | | |
| FM | (30°-60°) | 4871.4 | 48.3 | | | |
| FH | (60°-80°) | 1087.0 | 10.8 | | | G1/1800 |
| FVH | (80°-90°) | 12.8 | 0.1 | | | G1/100 |
| BL | (0°-30°) | 851.0 | 8.4 | B2/1000 | | |
| BM | (30°-60°) | 1590.0 | 15.8 | B2/2500 | | |
| BH | (60°-80°) | 531.7 | 5.3 | B2/1000 | | G2/1000 |
| BVH | (80°-90°) | 23.9 | 0.2 | | | G1/100 |
| UL | (90°-100°) | 0.0 | 0.0 | | U0/0 | |
| UH | (100°-180°) | 0.0 | 0.0 | | U0/0 | |

**BUG Rating: B2-U0-G2**
Type II Short



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REPORT NUMBER: P637016
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**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 65° | 75° | 79° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 2498.3 | 2498.3 | 2498.3 | 2498.3 | 2498.3 | 2498.3 | 2498.3 | 2498.3 | 2498.3 | 2498.3 | 2498.3 |
| 2.5° | 2384.5 | 2379.6 | 2381.2 | 2387.8 | 2412.6 | 2430.7 | 2449.6 | 2467.0 | 2483.4 | 2488.4 | 2492.5 |
| 5° | 2299.6 | 2290.6 | 2293.0 | 2303.8 | 2332.6 | 2363.1 | 2396.9 | 2438.1 | 2477.7 | 2490.9 | 2508.2 |
| 7.5° | 2239.5 | 2237.8 | 2241.9 | 2258.4 | 2288.9 | 2317.8 | 2361.5 | 2420.0 | 2488.4 | 2510.6 | 2541.1 |
| 10° | 2159.5 | 2156.2 | 2172.7 | 2206.5 | 2256.8 | 2302.9 | 2354.9 | 2424.1 | 2519.7 | 2552.7 | 2599.7 |
| 12.5° | 2096.0 | 2094.4 | 2111.7 | 2158.7 | 2223.0 | 2296.3 | 2368.0 | 2445.5 | 2561.7 | 2607.1 | 2664.8 |
| 15° | 2133.1 | 2125.7 | 2126.5 | 2159.5 | 2217.2 | 2303.8 | 2401.0 | 2484.3 | 2603.8 | 2661.5 | 2735.7 |
| 17.5° | 2241.1 | 2227.9 | 2218.0 | 2223.8 | 2256.8 | 2346.6 | 2451.3 | 2536.2 | 2652.4 | 2720.0 | 2810.7 |
| 20° | 2390.3 | 2382.9 | 2355.7 | 2337.6 | 2345.0 | 2424.1 | 2530.4 | 2609.6 | 2715.9 | 2791.7 | 2889.0 |
| 22.5° | 2590.6 | 2572.5 | 2535.4 | 2506.5 | 2484.3 | 2546.1 | 2644.2 | 2712.6 | 2804.1 | 2883.2 | 2984.6 |
| 25° | 2838.7 | 2812.3 | 2753.8 | 2708.5 | 2660.7 | 2724.1 | 2811.5 | 2863.4 | 2925.2 | 2998.6 | 3095.0 |
| 27.5° | 3091.7 | 3069.5 | 3004.4 | 2943.4 | 2884.0 | 2923.6 | 3027.4 | 3057.1 | 3050.5 | 3104.1 | 3186.5 |
| 30° | 3361.3 | 3333.2 | 3271.4 | 3205.5 | 3128.8 | 3154.4 | 3247.5 | 3262.4 | 3192.3 | 3236.8 | 3292.9 |
| 32.5° | 3645.6 | 3618.4 | 3564.9 | 3488.2 | 3401.7 | 3411.5 | 3437.1 | 3451.1 | 3384.3 | 3409.9 | 3452.8 |
| 35° | 3934.9 | 3909.4 | 3855.0 | 3779.2 | 3715.7 | 3655.5 | 3591.2 | 3647.3 | 3608.5 | 3658.0 | 3654.7 |
| 37.5° | 4199.5 | 4174.0 | 4140.2 | 4081.7 | 3972.9 | 3854.2 | 3705.8 | 3775.0 | 3835.2 | 3897.8 | 3887.1 |
| 40° | 4378.4 | 4361.1 | 4369.3 | 4360.2 | 4220.1 | 3985.2 | 3761.8 | 3837.7 | 4001.7 | 4108.9 | 4103.1 |
| 42.5° | 4532.5 | 4515.2 | 4563.0 | 4597.6 | 4432.8 | 4106.4 | 3789.0 | 3861.6 | 4108.0 | 4275.3 | 4267.1 |
| 45° | 4600.9 | 4596.0 | 4675.1 | 4784.7 | 4627.3 | 4235.0 | 3859.1 | 3911.0 | 4188.8 | 4403.1 | 4371.8 |
| 47.5° | 4519.3 | 4536.6 | 4692.4 | 4877.9 | 4788.9 | 4387.4 | 4002.5 | 4015.7 | 4294.3 | 4541.6 | 4453.4 |
| 50° | 4356.9 | 4394.9 | 4605.0 | 4880.3 | 4906.7 | 4559.7 | 4201.2 | 4168.2 | 4436.1 | 4689.1 | 4496.2 |
| 52.5° | 4120.4 | 4160.0 | 4502.8 | 4861.4 | 4974.3 | 4759.2 | 4465.7 | 4418.8 | 4614.9 | 4836.7 | 4503.7 |
| 55° | 3577.2 | 3630.8 | 4268.8 | 4818.5 | 5040.2 | 4940.5 | 4764.1 | 4668.5 | 4845.7 | 5039.4 | 4577.0 |
| 57.5° | 3103.3 | 3131.3 | 3698.4 | 4628.1 | 5053.4 | 5074.0 | 4976.8 | 4863.0 | 5074.9 | 5258.7 | 4659.4 |
| 60° | 2277.4 | 2284.0 | 2794.2 | 3829.4 | 4648.7 | 4996.6 | 4959.5 | 4790.5 | 4966.1 | 5083.1 | 4281.9 |
| 62.5° | 1286.6 | 1287.5 | 1694.6 | 2556.0 | 3472.5 | 4072.6 | 4095.7 | 3946.5 | 3798.9 | 3833.6 | 2980.5 |
| 65° | 483.0 | 528.3 | 774.0 | 1256.1 | 2002.1 | 2404.3 | 2499.9 | 2534.5 | 2288.9 | 2136.4 | 1598.2 |
| 67.5° | 323.1 | 333.8 | 451.7 | 646.2 | 891.0 | 1028.7 | 1150.6 | 1153.9 | 844.0 | 752.5 | 629.7 |
| 70° | 246.4 | 257.2 | 355.2 | 462.4 | 451.7 | 417.1 | 450.9 | 438.5 | 453.3 | 465.7 | 478.9 |
| 72.5° | 183.8 | 194.5 | 275.3 | 326.4 | 271.2 | 267.1 | 302.5 | 336.3 | 367.6 | 380.8 | 401.4 |
| 75° | 122.0 | 130.2 | 185.5 | 174.7 | 150.0 | 177.2 | 220.9 | 254.7 | 272.8 | 288.5 | 304.1 |
| 77.5° | 77.5 | 83.2 | 98.9 | 80.0 | 83.2 | 103.9 | 128.6 | 159.1 | 176.4 | 192.0 | 200.3 |
| 80° | 35.4 | 34.6 | 33.8 | 37.9 | 47.0 | 61.0 | 77.5 | 95.6 | 108.8 | 115.4 | 120.3 |
| 82.5° | 14.0 | 15.7 | 17.3 | 20.6 | 25.6 | 33.0 | 43.7 | 56.0 | 66.8 | 68.4 | 72.5 |
| 85° | 5.8 | 6.6 | 7.4 | 9.1 | 11.5 | 14.8 | 18.1 | 25.6 | 32.1 | 34.6 | 37.1 |
| 87.5° | 0.0 | 0.0 | 0.0 | 0.0 | 0.8 | 1.6 | 2.5 | 4.1 | 7.4 | 8.2 | 9.1 |
| 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: P637016
CATALOG NUMBER: GWS-SA4B-830-U-T3R-W-GRSWH

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 2498.3 | 2498.3 | 2498.3 | 2498.3 | 2498.3 | 2498.3 | 2498.3 | 2498.3 | 2498.3 | 2498.3 | 2498.3 |
| 2.5° | 2514.8 | 2504.0 | 2522.2 | 2534.5 | 2546.1 | 2533.7 | 2529.6 | 2518.9 | 2517.2 | 2517.2 | 2523.0 |
| 5° | 2537.8 | 2530.4 | 2549.4 | 2556.8 | 2556.0 | 2528.8 | 2512.3 | 2490.9 | 2480.1 | 2480.1 | 2481.8 |
| 7.5° | 2579.1 | 2574.9 | 2585.6 | 2574.1 | 2547.7 | 2492.5 | 2438.1 | 2392.8 | 2362.3 | 2346.6 | 2351.6 |
| 10° | 2647.5 | 2642.5 | 2633.5 | 2590.6 | 2514.8 | 2400.2 | 2288.9 | 2206.5 | 2157.0 | 2129.0 | 2130.7 |
| 12.5° | 2714.2 | 2706.0 | 2673.8 | 2579.1 | 2423.3 | 2241.1 | 2095.2 | 2002.9 | 1948.5 | 1915.5 | 1908.1 |
| 15° | 2787.6 | 2766.2 | 2696.9 | 2519.7 | 2274.1 | 2046.6 | 1894.1 | 1794.4 | 1735.9 | 1716.1 | 1715.2 |
| 17.5° | 2857.6 | 2819.7 | 2694.4 | 2414.2 | 2095.2 | 1843.0 | 1689.7 | 1627.9 | 1618.0 | 1627.1 | 1629.5 |
| 20° | 2928.5 | 2867.5 | 2667.2 | 2268.3 | 1882.6 | 1640.2 | 1561.1 | 1586.7 | 1623.8 | 1648.5 | 1654.3 |
| 22.5° | 3001.9 | 2907.1 | 2605.4 | 2080.4 | 1658.4 | 1503.4 | 1536.4 | 1592.4 | 1638.6 | 1671.6 | 1674.9 |
| 25° | 3084.3 | 2944.2 | 2513.1 | 1850.4 | 1478.7 | 1465.5 | 1530.6 | 1590.0 | 1639.4 | 1677.3 | 1683.9 |
| 27.5° | 3131.3 | 2945.0 | 2383.7 | 1613.9 | 1396.3 | 1450.7 | 1516.6 | 1572.7 | 1622.1 | 1663.3 | 1670.7 |
| 30° | 3177.5 | 2922.8 | 2178.5 | 1421.8 | 1372.4 | 1433.4 | 1492.7 | 1544.6 | 1591.6 | 1632.0 | 1641.1 |
| 32.5° | 3242.6 | 2902.2 | 1941.9 | 1311.4 | 1358.4 | 1416.9 | 1465.5 | 1511.7 | 1547.9 | 1566.1 | 1571.0 |
| 35° | 3323.3 | 2875.8 | 1690.5 | 1263.6 | 1349.3 | 1403.7 | 1446.5 | 1471.3 | 1424.3 | 1414.4 | 1425.1 |
| 37.5° | 3436.3 | 2851.1 | 1440.0 | 1243.0 | 1343.5 | 1398.7 | 1436.7 | 1373.2 | 1315.5 | 1292.4 | 1300.7 |
| 40° | 3558.3 | 2837.0 | 1270.2 | 1226.5 | 1346.0 | 1403.7 | 1395.4 | 1301.5 | 1218.2 | 1169.6 | 1168.0 |
| 42.5° | 3662.1 | 2815.6 | 1161.4 | 1215.8 | 1352.6 | 1422.6 | 1339.4 | 1238.0 | 1114.4 | 1085.5 | 1086.4 |
| 45° | 3732.2 | 2761.2 | 1103.7 | 1204.2 | 1358.4 | 1426.8 | 1313.0 | 1150.6 | 1062.4 | 1044.3 | 1043.5 |
| 47.5° | 3761.0 | 2662.3 | 1066.6 | 1186.1 | 1357.5 | 1393.0 | 1259.4 | 1114.4 | 1026.2 | 1021.2 | 1024.5 |
| 50° | 3742.1 | 2499.9 | 1028.7 | 1150.6 | 1337.7 | 1357.5 | 1197.6 | 1082.2 | 1001.5 | 1028.7 | 1048.4 |
| 52.5° | 3672.0 | 2289.7 | 983.3 | 1102.0 | 1302.3 | 1317.1 | 1166.3 | 1062.4 | 983.3 | 1019.6 | 1035.2 |
| 55° | 3653.9 | 2119.1 | 925.6 | 1038.5 | 1249.6 | 1245.4 | 1133.3 | 1052.6 | 971.0 | 956.9 | 959.4 |
| 57.5° | *3630.0* | *1952.6* | *830.0* | *924.8* | *1116.0* | *1122.6* | *1102.0* | *1041.0* | *938.8* | *934.7* | *938.8* |
| 60° | 3153.6 | 1496.8 | 740.2 | 797.9 | 916.6 | 952.0 | 1066.6 | 1019.6 | 886.9 | 869.6 | 868.8 |
| 62.5° | 2059.8 | 906.7 | 658.6 | 695.7 | 746.8 | 788.0 | 972.6 | 957.8 | 830.0 | 819.3 | 826.7 |
| 65° | 1107.8 | 646.2 | 599.2 | 621.5 | 649.5 | 680.8 | 806.1 | 853.1 | 750.1 | 712.1 | 713.0 |
| 67.5° | 566.3 | 549.8 | 554.7 | 570.4 | 591.8 | 607.5 | 650.3 | 691.5 | 639.6 | 607.5 | 606.6 |
| 70° | 484.7 | 497.8 | 505.3 | 514.3 | 528.3 | 525.9 | 530.0 | 537.4 | 533.3 | 517.6 | 516.8 |
| 72.5° | 412.9 | 433.6 | 435.2 | 436.8 | 441.8 | 430.3 | 422.8 | 410.5 | 411.3 | 413.8 | 414.6 |
| 75° | 314.0 | 333.8 | 338.8 | 336.3 | 341.2 | 326.4 | 316.5 | 304.1 | 289.3 | 286.8 | 288.5 |
| 77.5° | 204.4 | 220.1 | 227.5 | 225.8 | 228.3 | 216.8 | 211.8 | 198.6 | 181.3 | 174.7 | 174.7 |
| 80° | 123.6 | 132.7 | 138.5 | 140.1 | 142.6 | 134.4 | 126.1 | 114.6 | 107.2 | 99.7 | 99.7 |
| 82.5° | 75.0 | 80.8 | 84.9 | 84.9 | 87.4 | 78.3 | 71.7 | 63.5 | 60.2 | 53.6 | 53.6 |
| 85° | 37.9 | 42.0 | 43.7 | 42.9 | 41.2 | 33.8 | 31.3 | 27.2 | 25.6 | 22.3 | 22.3 |
| 87.5° | 9.1 | 11.5 | 11.5 | 8.2 | 8.2 | 4.1 | 2.5 | 0.8 | 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

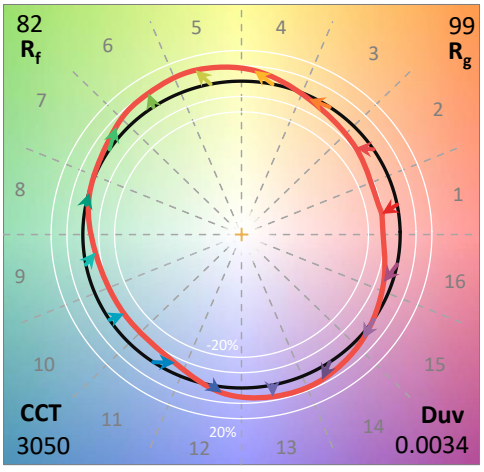
## Test Information

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

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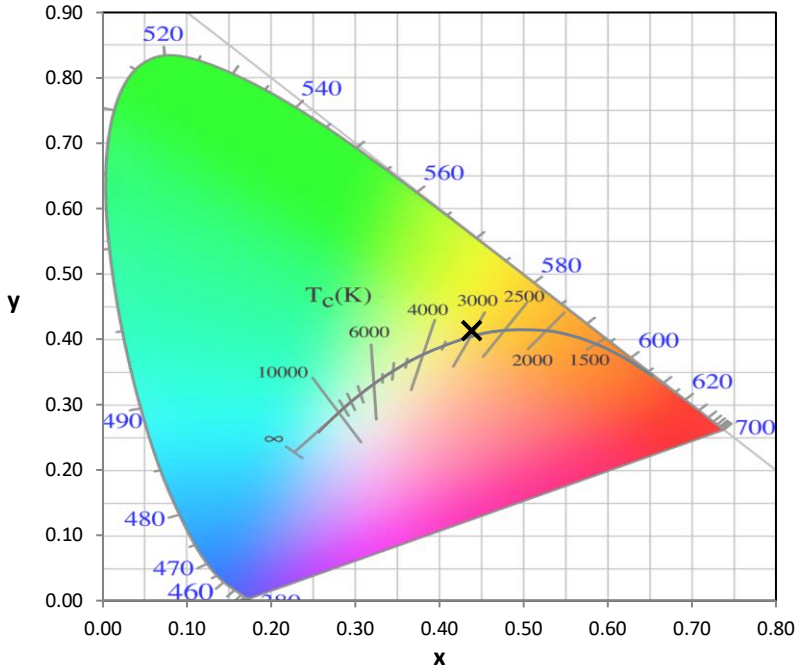
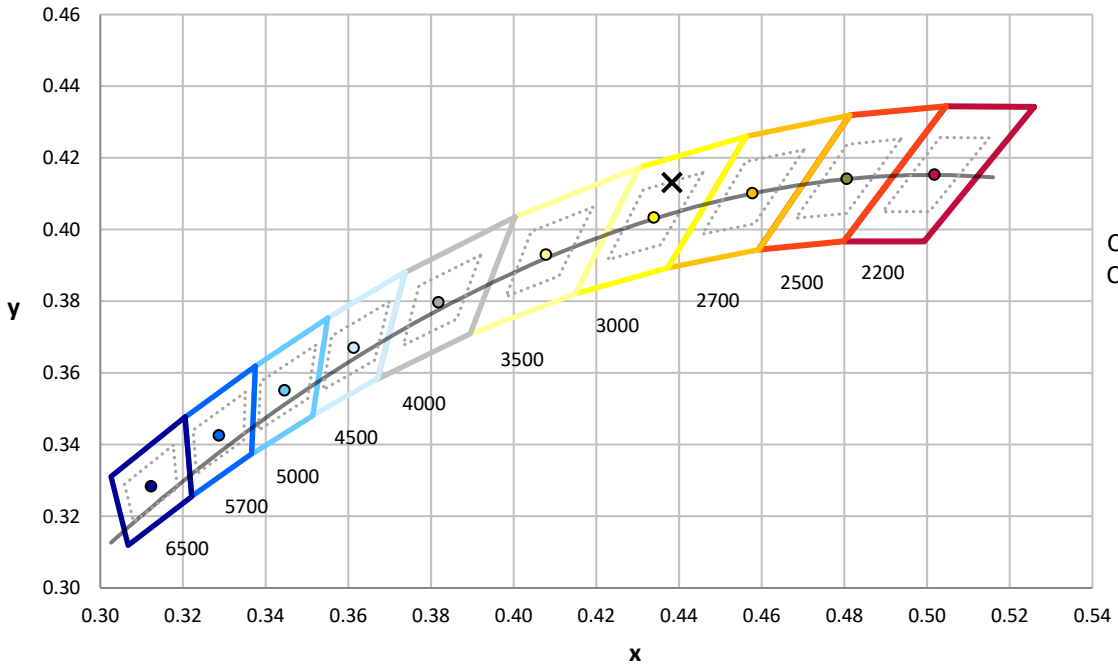
## CIE 1931 Chromaticity Diagram




## 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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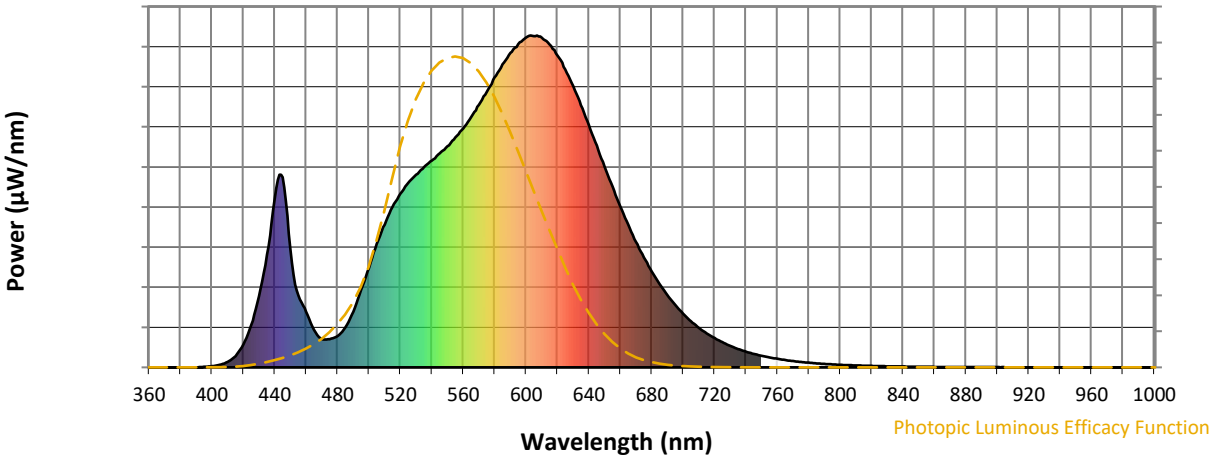
## Photopic Flux vs. Wavelength




## 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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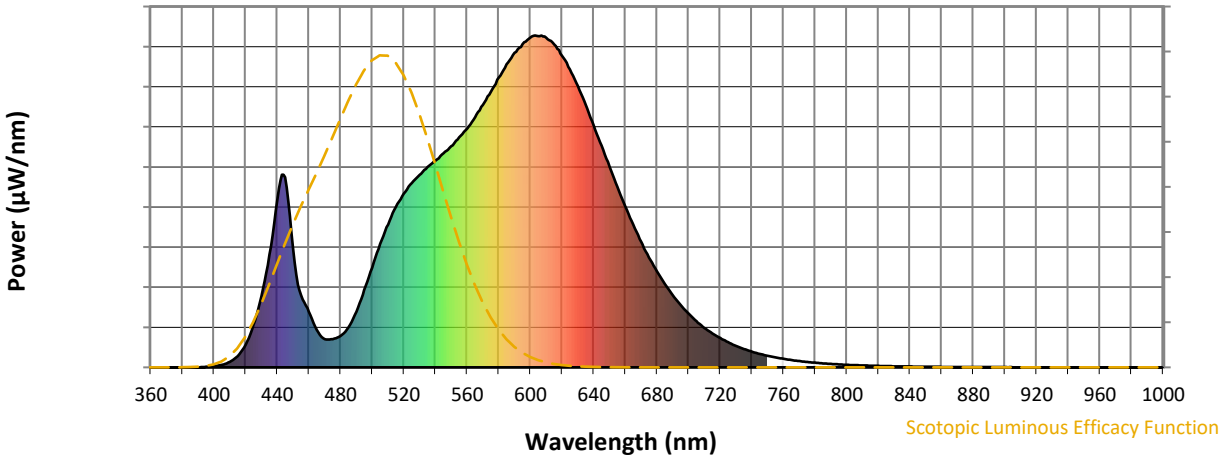
## Scotopic Flux vs. Wavelength




**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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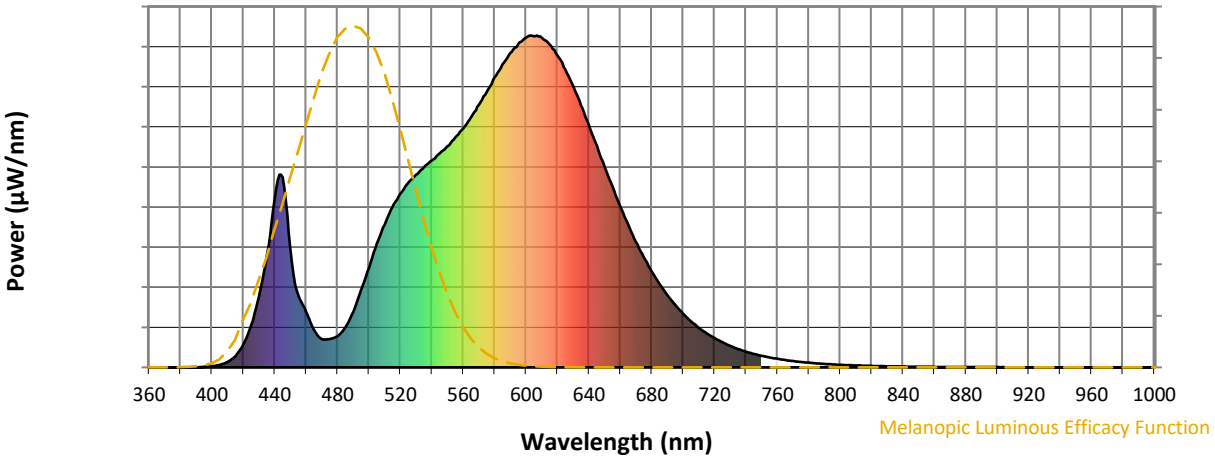
## Melanopic Flux vs. Wavelength




**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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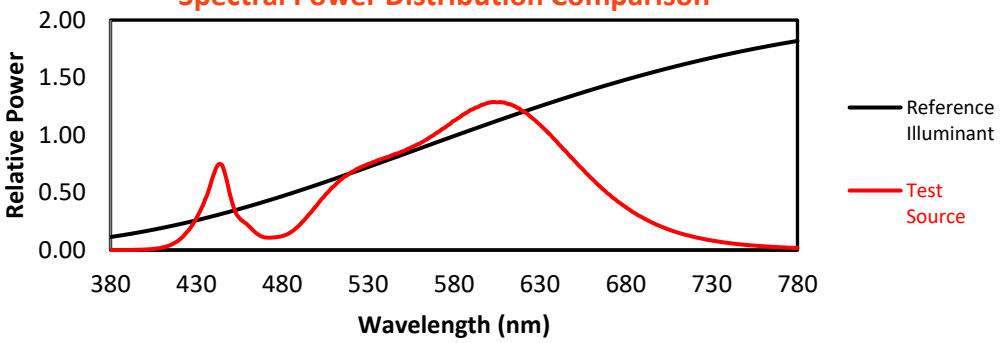
# TM-30-18

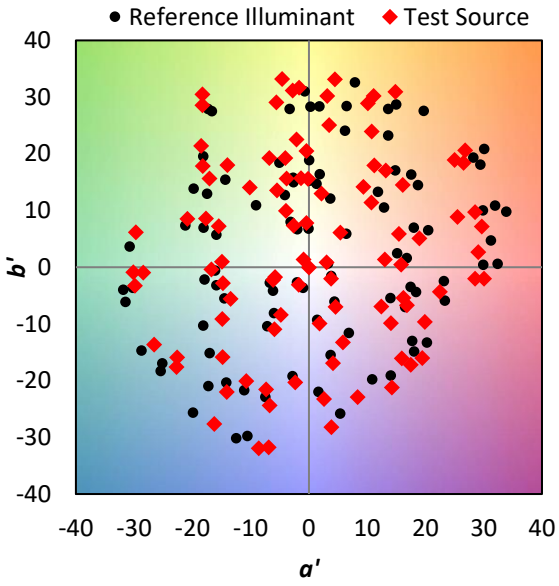
## Summary

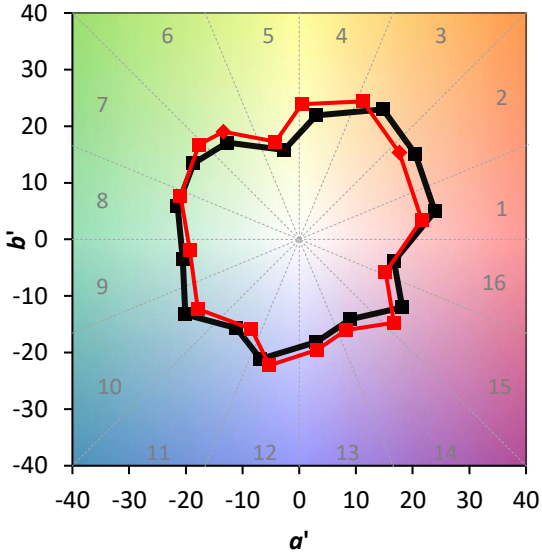
$R_f$ = 81.5
$R_g$ = 99.2
CIE $R_a$ = 81.0
$R_9$ = 7.1

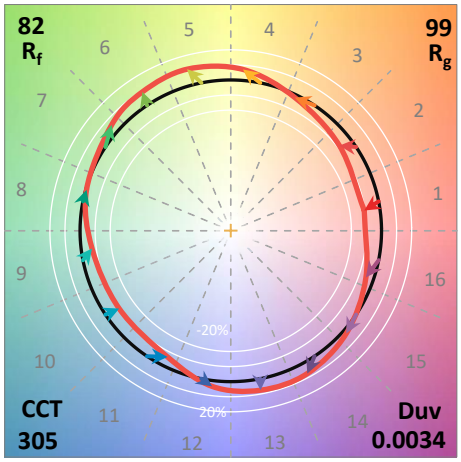
## Spectral Power Distribution Comparison

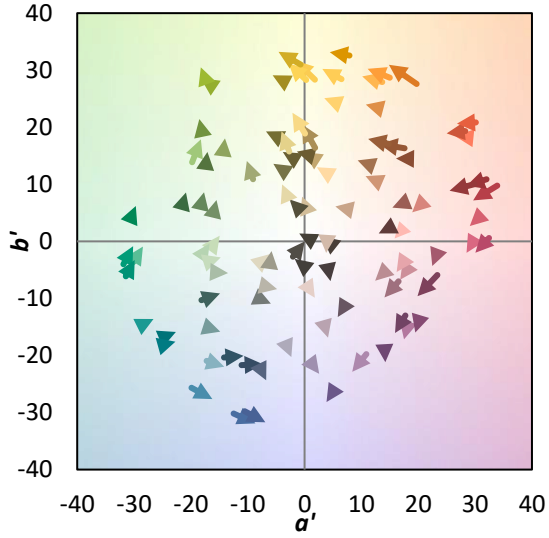



## Color Vector Graphics



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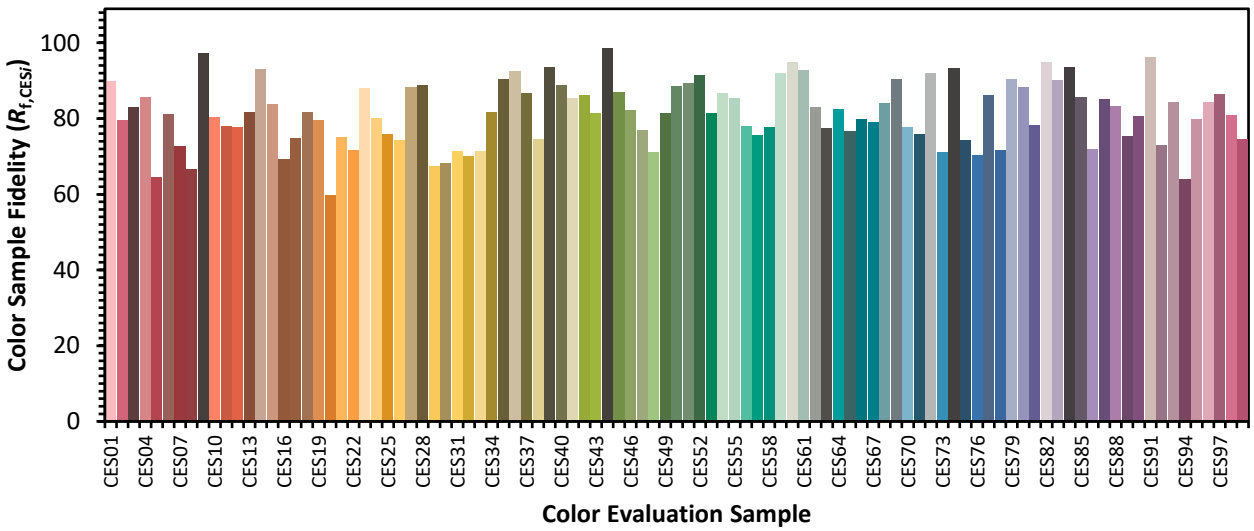
**Individual Sample Fidelity Index ($R_{f,i}$)**

| | | | |
|---|---|---|---|
| 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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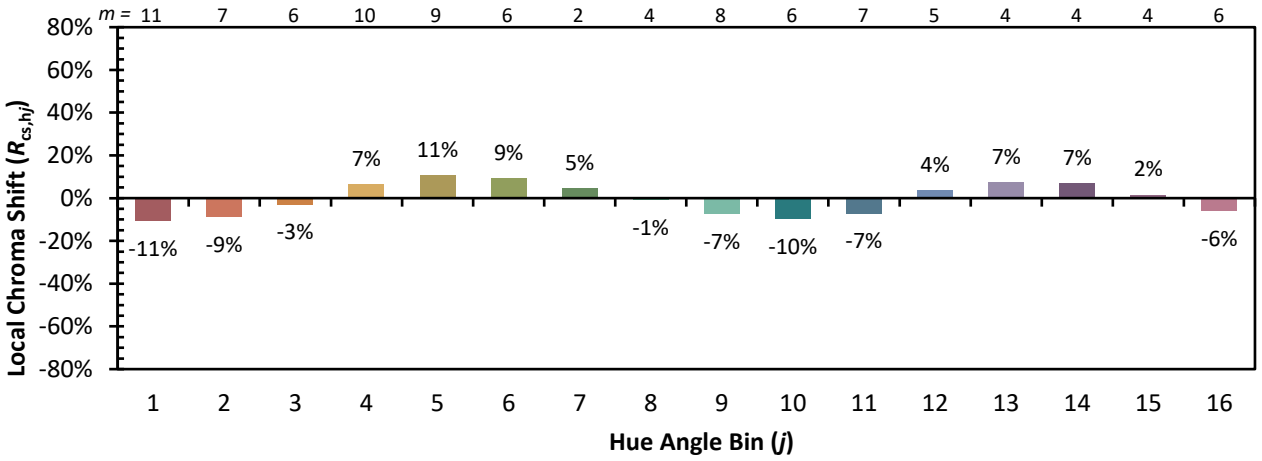
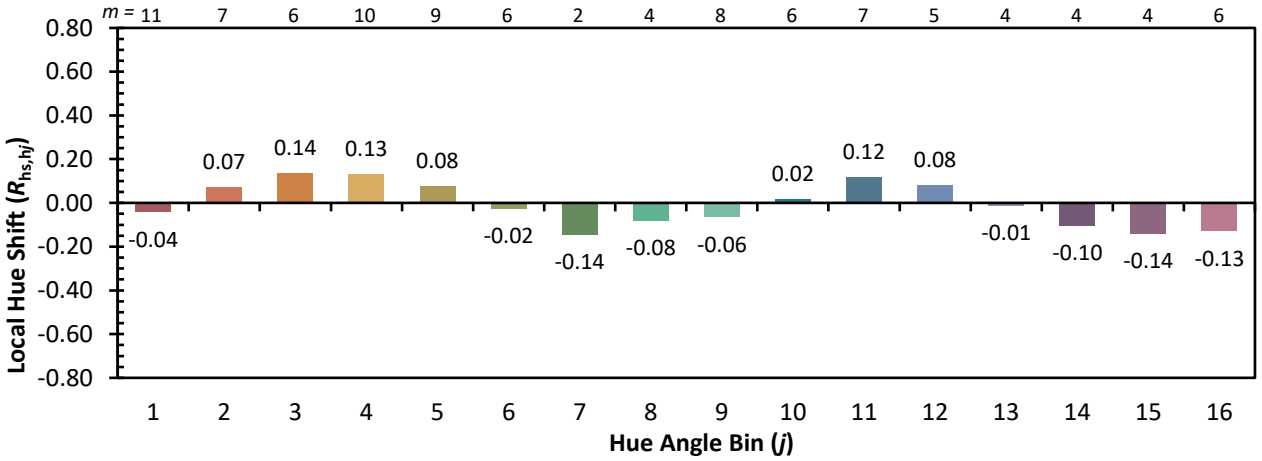
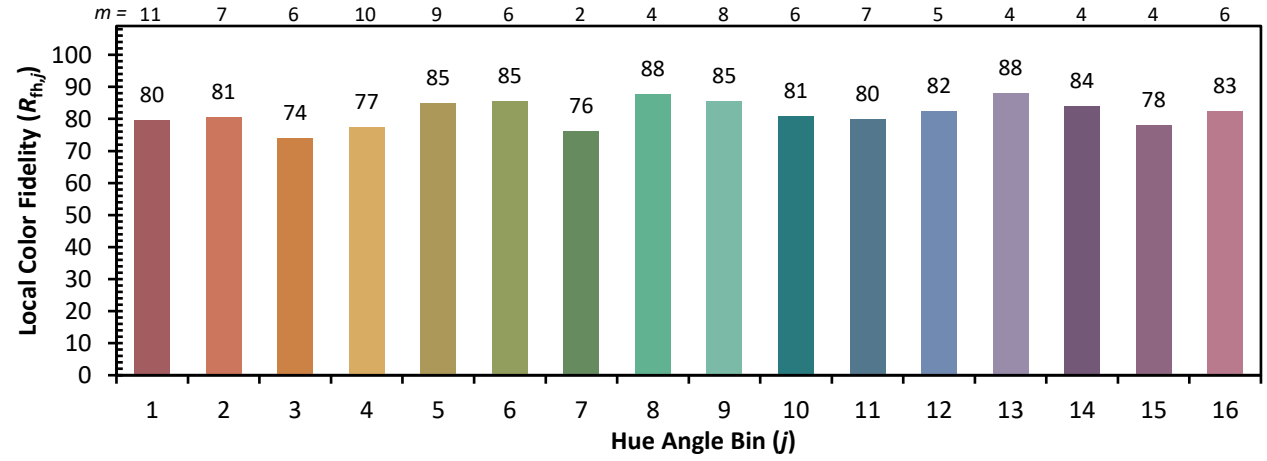
# TM-30-18

## Color Rendition by Hue-Angle Bin



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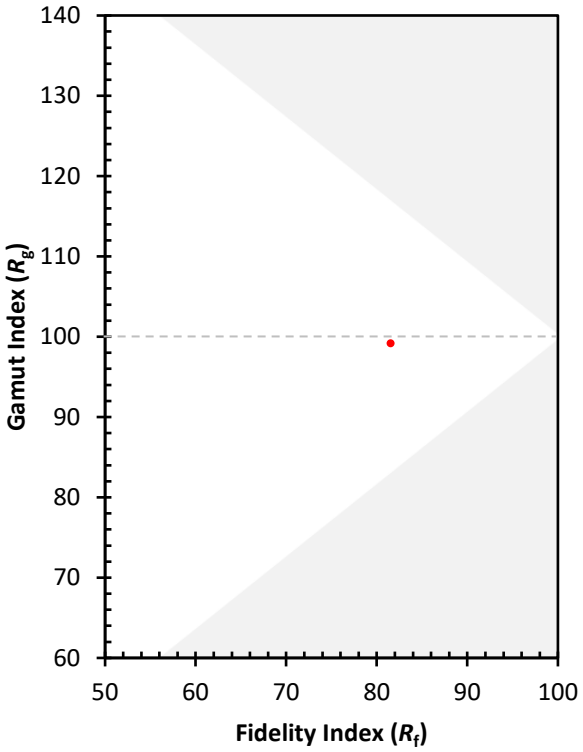
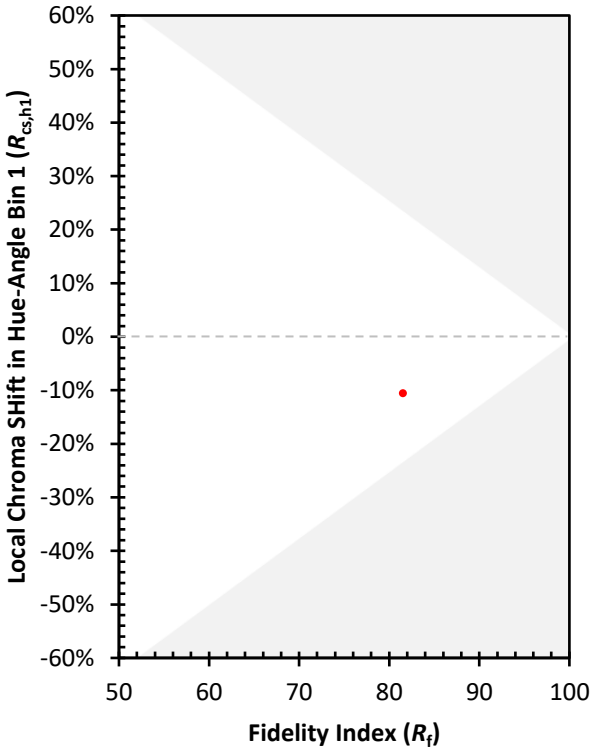
## TM-30-18

### Measure Comparisons




(END OF REPORT)