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: P637499

Luminaire Tested: GWS-SA4C-830-U-T2-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: | P637499 |
| | TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-21) |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Issue Date: | 1/10/2023 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS |
| Product Line: | McGRAW-EDISON |
| Catalog Number: | GWS-SA4C-830-U-T2-W-GRSWH |
| Description: | GALLEON WALL SLIM LUMINAIRE. (4) LIGHTSQUARES WITH 16 LEDS EACH AND TYPE II OPTICS W/ FACTORY INSLLED GLARE SHIELD, WH |
| Light Source: | (64) 3000K CCT, 80 CRI LEDS |
| Ballast/Driver: | - |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 12856.3 lumens |
| Efficiency: | N/A |
| Efficacy: | 100.0 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): | 128.5 |
| 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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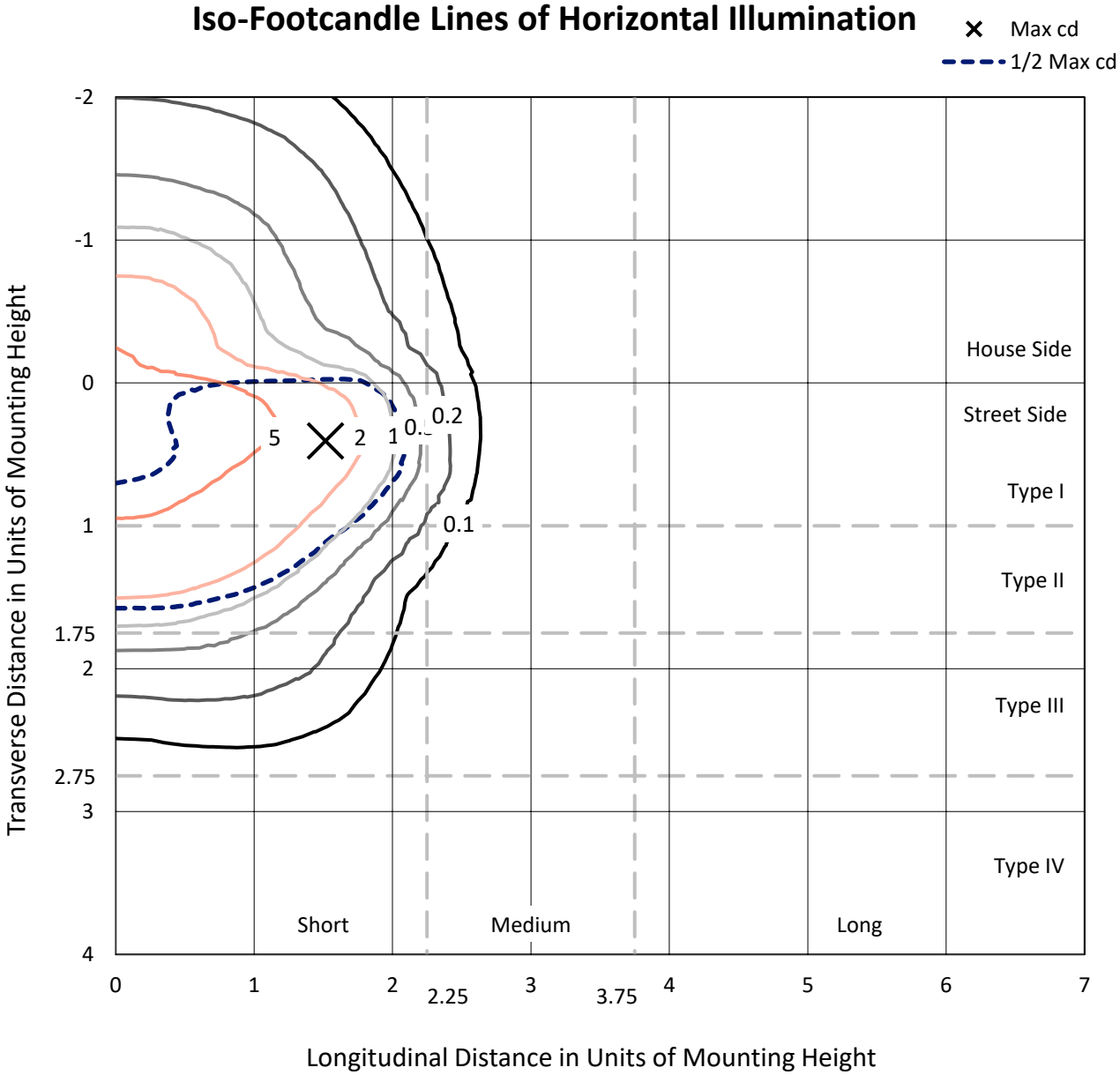
Scaled Data Report

REPORT NUMBER: P637499
CATALOG NUMBER: GWS-SA4C-830-U-T2-W-GRSWH

## Iso-Footcandle Lines of Horizontal Illumination




Based on 20 foot mounting height. Maximum calculated value = 8.5 fc
Type II - Short - N/A

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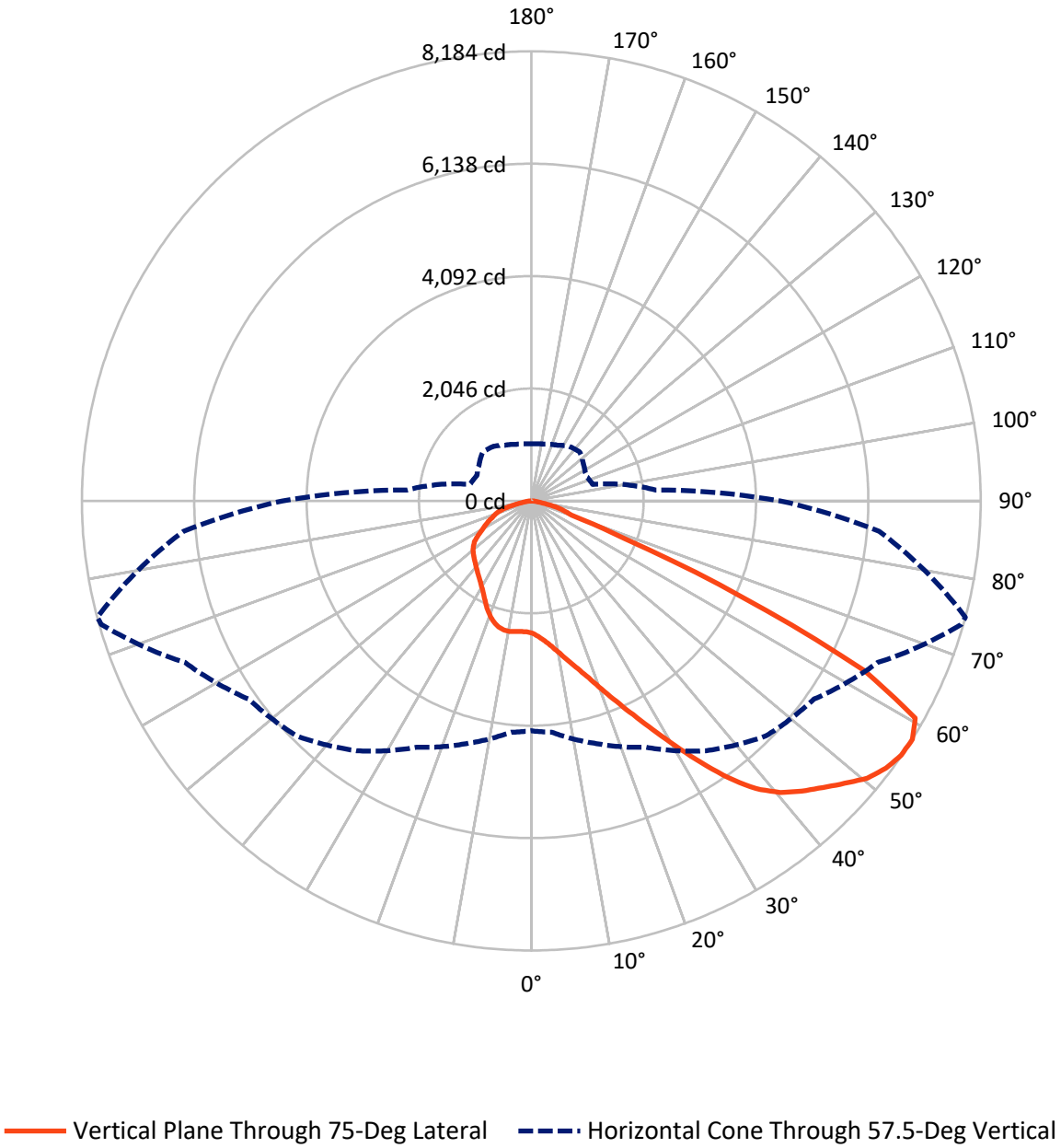
## Luminous Intensity Polar Plot



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REPORT NUMBER: P637499
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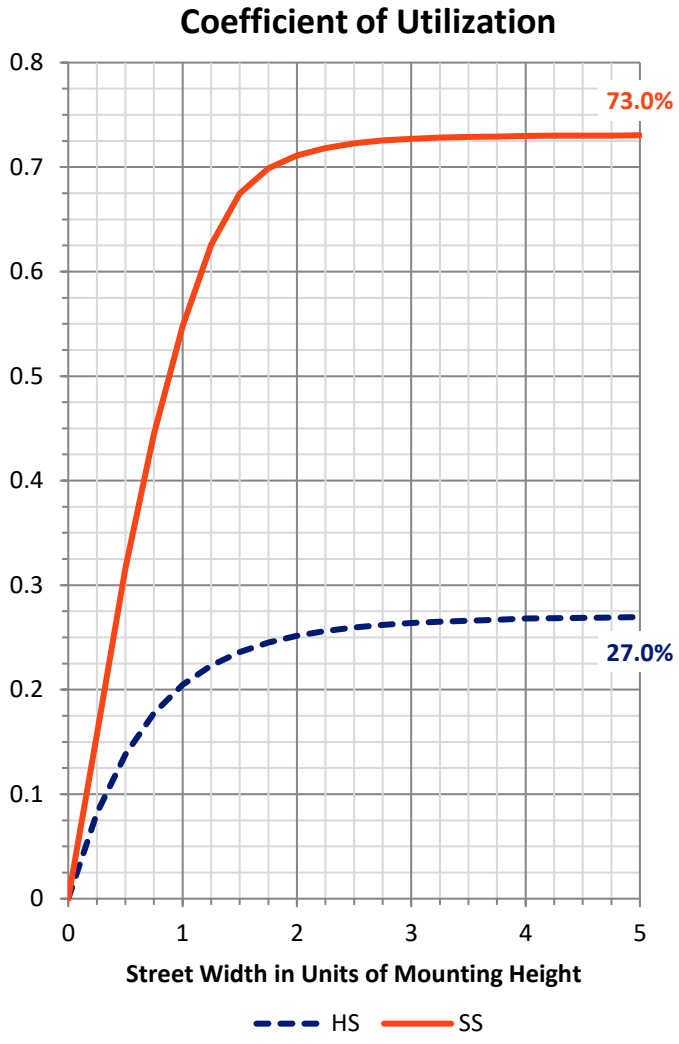
**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 3477.9 | 0.0 | 3477.9 |
| | % Fixture | 27.1 | 0.0 | 27.1 |
| **Street Side** | Lumens | 9378.4 | 0.0 | 9378.4 |
| | % Fixture | 72.9 | 0.0 | 72.9 |
| **Total** | Lumens | 12856.3 | 0.0 | 12856.3 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 240.9 | 1.9 |
| 10°-20° | 767.1 | 6.0 |
| 20°-30° | 1360.4 | 10.6 |
| 30°-40° | 2082.6 | 16.2 |
| 40°-50° | 2899.8 | 22.6 |
| 50°-60° | 3322.6 | 25.8 |
| 60°-70° | 1707.2 | 13.3 |
| 70°-80° | 429.8 | 3.3 |
| 80°-90° | 45.9 | 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° | 12856.3 | 100.0 |
| 0°-180° | 12856.3 | 100.0 |



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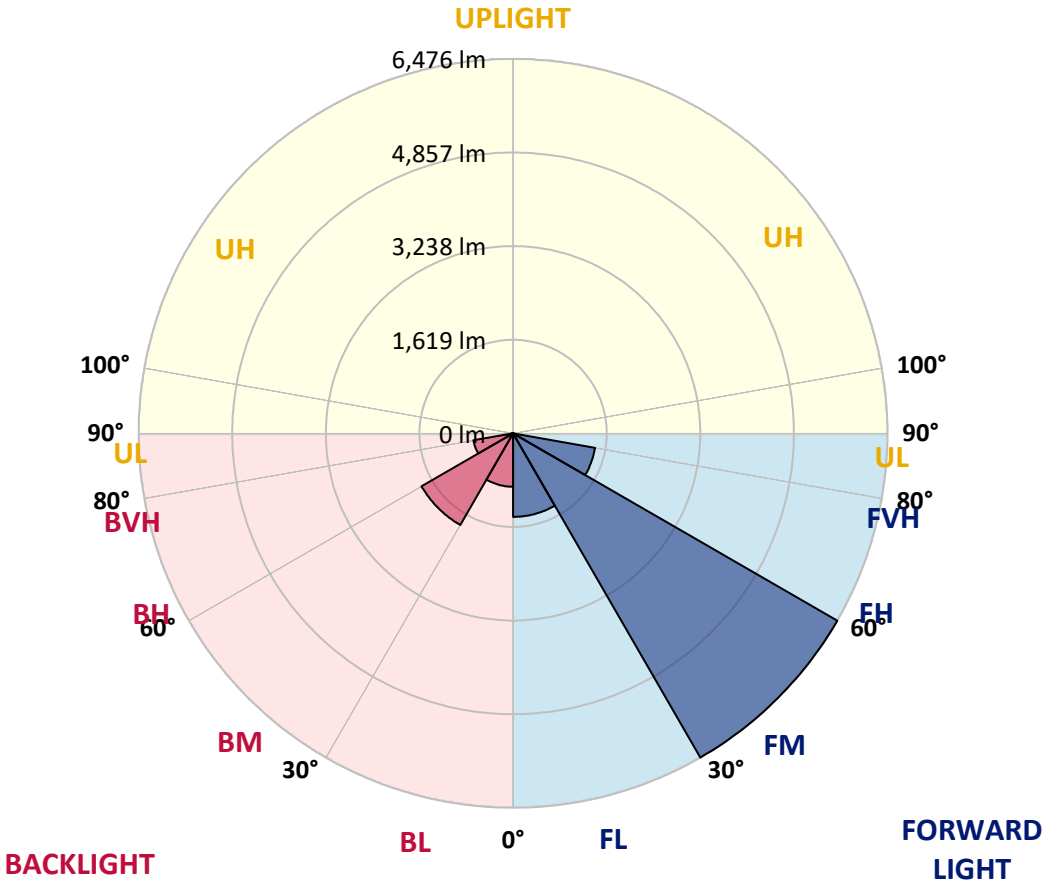
REPORT NUMBER: P637499
CATALOG NUMBER: GWS-SA4C-830-U-T2-W-GRSWH

## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 1444.5 | 11.2 | | | |
| FM | (30°-60°) | 6475.9 | 50.4 | | | |
| FH | (60°-80°) | 1441.1 | 11.2 | | | G1/1800 |
| FVH | (80°-90°) | 17.0 | 0.1 | | | G1/100 |
| BL | (0°-30°) | 923.9 | 7.2 | B2/1000 | | |
| BM | (30°-60°) | 1829.1 | 14.2 | B2/2500 | | |
| BH | (60°-80°) | 695.9 | 5.4 | B2/1000 | | G2/1000 |
| BVH | (80°-90°) | 28.9 | 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: P637499
CATALOG NUMBER: GWS-SA4C-830-U-T2-W-GRSWH

**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 65° | 74° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 2407.7 | 2407.7 | 2407.7 | 2407.7 | 2407.7 | 2407.7 | 2407.7 | 2407.7 | 2407.7 | *2407.7* | 2407.7 |
| 2.5° | 2586.8 | 2593.4 | 2586.8 | 2597.8 | 2575.7 | 2565.8 | 2541.4 | 2505.0 | 2476.2 | *2471.8* | 2439.7 |
| 5° | 2788.0 | 2802.3 | 2793.5 | 2789.1 | 2759.2 | 2737.1 | 2700.6 | 2627.7 | 2568.0 | *2559.1* | 2496.1 |
| 7.5° | 2917.3 | 2927.2 | 2927.2 | 2930.6 | 2919.5 | 2894.1 | 2855.4 | 2769.2 | 2685.1 | *2671.9* | 2576.8 |
| 10° | 2960.4 | 2968.1 | 2982.5 | 3010.1 | 3032.3 | 3040.0 | 3014.6 | 2931.7 | 2828.9 | *2815.6* | 2682.9 |
| 12.5° | 2970.4 | 2979.2 | 3001.3 | 3052.2 | 3113.0 | 3168.2 | 3172.6 | 3111.8 | 2996.9 | *2982.5* | 2805.6 |
| 15° | 2989.1 | 2998.0 | 3027.8 | 3090.8 | 3180.4 | 3286.5 | 3351.7 | 3309.7 | 3182.6 | *3167.1* | 2944.9 |
| 17.5° | 2986.9 | 2996.9 | 3041.1 | 3125.1 | 3245.6 | 3399.3 | 3525.3 | 3543.0 | 3411.4 | *3384.9* | 3103.0 |
| 20° | 2981.4 | 2990.3 | 3037.8 | 3140.6 | 3289.8 | 3501.0 | 3728.7 | 3820.4 | 3678.9 | *3654.6* | 3287.6 |
| 22.5° | 3025.6 | 3035.6 | 3072.1 | 3157.2 | 3313.0 | 3579.5 | 3916.6 | 4137.7 | 3996.2 | *3961.9* | 3499.9 |
| 25° | 3125.1 | 3139.5 | 3161.6 | 3220.2 | 3355.0 | 3649.1 | 4109.0 | 4497.0 | 4352.2 | *4311.3* | 3730.9 |
| 27.5° | 3278.8 | 3296.5 | 3327.4 | 3355.0 | 3449.0 | 3737.5 | 4300.2 | 4899.4 | 4754.6 | *4711.4* | 3975.2 |
| 30° | 3466.7 | 3489.9 | 3529.7 | 3548.5 | 3612.6 | 3868.0 | 4508.0 | 5313.9 | 5229.9 | *5170.2* | 4250.5 |
| 32.5° | 3726.5 | 3758.5 | 3796.1 | 3801.7 | 3840.3 | 4065.9 | 4713.7 | 5725.1 | 5724.0 | *5682.0* | 4563.3 |
| 35° | 4064.8 | 4099.0 | 4106.8 | 4114.5 | 4133.3 | 4337.8 | 4962.4 | 6099.9 | 6244.7 | *6196.1* | 4903.8 |
| 37.5° | 4434.0 | 4483.7 | 4495.9 | 4461.6 | 4488.1 | 4665.0 | 5242.1 | 6400.6 | 6697.9 | *6646.0* | 5233.2 |
| 40° | 4828.6 | 4848.5 | 4881.7 | 4827.5 | 4860.7 | 5039.8 | 5516.2 | 6592.9 | 7036.2 | *6980.9* | 5493.0 |
| 42.5° | 5111.6 | 5148.1 | 5197.8 | 5177.9 | 5196.7 | 5360.3 | 5708.6 | 6685.8 | 7277.2 | *7221.9* | 5679.8 |
| 45° | 5418.9 | 5430.0 | 5462.0 | 5457.6 | 5468.7 | 5621.2 | 5846.7 | 6726.7 | 7492.8 | *7443.0* | 5839.0 |
| 47.5° | 5686.4 | 5703.0 | 5724.0 | 5699.7 | 5675.4 | 5774.9 | 5959.5 | 6762.1 | 7741.5 | *7681.8* | 6005.9 |
| 50° | 5944.0 | 5958.4 | 5983.8 | 5913.1 | 5822.4 | 5847.8 | 6014.8 | 6810.7 | 7974.7 | *7932.7* | 6137.5 |
| 52.5° | 5991.6 | 6007.0 | 6126.4 | 6140.8 | 6024.7 | 5935.2 | 6112.0 | 6917.9 | 8111.8 | *8085.3* | 6185.0 |
| 55° | 5393.5 | 5421.1 | 5658.8 | 5931.9 | 6218.2 | 6189.4 | 6267.9 | 6974.3 | 8166.0 | *8172.6* | 6270.1 |
| 57.5° | *4186.4* | *4226.1* | *4573.3* | *4948.0* | *5550.5* | *6049.0* | *6287.8* | *6959.9* | *8147.2* | *8183.7* | *6357.5* |
| 60° | 2745.9 | 2769.2 | 3180.4 | 3600.5 | 4225.0 | 4914.8 | 5627.9 | 6701.3 | 7980.3 | *8032.2* | 6335.4 |
| 62.5° | 1658.2 | 1684.7 | 2015.2 | 2333.6 | 2701.7 | 3162.7 | 3817.1 | 5385.8 | 6689.1 | *6805.2* | 5074.0 |
| 65° | 1157.4 | 1192.8 | 1482.4 | 1744.4 | 1871.5 | 1776.5 | 1933.4 | 3007.9 | 4167.6 | *4216.2* | 3100.8 |
| 67.5° | 839.0 | 863.4 | 1101.0 | 1412.8 | 1553.2 | 1254.7 | 956.2 | 1332.1 | 1815.2 | *1832.8* | 1279.0 |
| 70° | 549.4 | 577.0 | 792.6 | 1075.6 | 1268.0 | 1017.0 | 715.2 | 720.8 | 763.9 | *772.7* | 742.9 |
| 72.5° | 301.8 | 318.4 | 489.7 | 714.1 | 749.5 | 608.0 | 558.3 | 599.2 | 629.0 | *629.0* | 636.7 |
| 75° | 155.9 | 170.2 | 200.1 | 235.5 | 284.1 | 332.7 | 402.4 | 463.2 | 495.2 | *497.5* | 494.1 |
| 77.5° | 79.6 | 85.1 | 107.2 | 116.1 | 127.1 | 148.1 | 192.3 | 246.5 | 275.3 | *286.3* | 284.1 |
| 80° | 37.6 | 39.8 | 45.3 | 53.1 | 65.2 | 82.9 | 103.9 | 123.8 | 141.5 | *143.7* | 155.9 |
| 82.5° | 19.9 | 22.1 | 24.3 | 28.7 | 35.4 | 44.2 | 60.8 | 73.0 | 84.0 | *86.2* | 96.2 |
| 85° | 7.7 | 8.8 | 9.9 | 11.1 | 15.5 | 18.8 | 25.4 | 34.3 | 42.0 | *42.0* | 49.7 |
| 87.5° | 0.0 | 0.0 | 0.0 | 0.0 | 1.1 | 2.2 | 4.4 | 5.5 | 7.7 | *7.7* | 13.3 |
| 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: P637499
CATALOG NUMBER: GWS-SA4C-830-U-T2-W-GRSWH

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 2407.7 | 2407.7 | 2407.7 | 2407.7 | 2407.7 | 2407.7 | 2407.7 | 2407.7 | 2407.7 | 2407.7 | 2407.7 |
| 2.5° | 2432.0 | 2399.9 | 2385.6 | 2362.4 | 2343.6 | 2322.6 | 2306.0 | 2293.8 | 2286.1 | 2281.7 | 2277.2 |
| 5° | 2471.8 | 2423.2 | 2384.5 | 2338.0 | 2306.0 | 2275.0 | 2249.6 | 2231.9 | 2223.1 | 2216.4 | 2212.0 |
| 7.5° | 2533.7 | 2468.5 | 2395.5 | 2323.7 | 2267.3 | 2217.5 | 2185.5 | 2166.7 | 2154.5 | 2150.1 | 2146.8 |
| 10° | 2618.8 | 2528.2 | 2407.7 | 2293.8 | 2209.8 | 2155.6 | 2133.5 | 2124.7 | 2125.8 | 2123.6 | 2122.5 |
| 12.5° | 2715.0 | 2591.2 | 2404.4 | 2240.8 | 2147.9 | 2115.8 | 2116.9 | 2131.3 | 2147.9 | 2152.3 | 2153.4 |
| 15° | 2818.9 | 2653.1 | 2372.3 | 2172.2 | 2099.3 | 2102.6 | 2131.3 | 2165.6 | 2196.5 | 2208.7 | 2210.9 |
| 17.5° | 2931.7 | 2705.0 | 2313.7 | 2097.0 | 2059.5 | 2094.8 | 2147.9 | 2204.3 | 2249.6 | 2269.5 | 2275.0 |
| 20° | 3057.7 | 2749.3 | 2230.8 | 2023.0 | 2021.9 | 2080.5 | 2157.8 | 2231.9 | 2289.4 | 2315.9 | 2320.3 |
| 22.5° | 3191.4 | 2776.9 | 2129.1 | 1954.4 | 1983.2 | 2061.7 | 2150.1 | 2227.5 | 2288.3 | 2314.8 | 2320.3 |
| 25° | 3326.3 | 2785.7 | 2017.5 | 1891.4 | 1943.4 | 2031.8 | 2112.5 | 2174.4 | 2231.9 | 2255.1 | 2259.5 |
| 27.5° | 3452.3 | 2760.3 | 1911.3 | 1837.3 | 1906.9 | 1987.6 | 2041.8 | 2074.9 | 2114.7 | 2132.4 | 2135.7 |
| 30° | 3580.6 | 2709.5 | 1821.8 | 1794.2 | 1866.0 | 1926.8 | 1951.1 | 1953.3 | 1968.8 | 1968.8 | 1971.0 |
| 32.5° | 3709.9 | 2634.3 | 1743.3 | 1752.1 | 1815.2 | 1854.9 | 1858.3 | 1832.8 | 1814.0 | 1783.1 | 1782.0 |
| 35° | 3859.1 | 2558.0 | 1679.2 | 1704.6 | 1755.5 | 1779.8 | 1769.8 | 1721.2 | 1675.9 | 1625.0 | 1622.8 |
| 37.5° | 3997.3 | 2479.5 | 1625.0 | 1656.0 | 1688.0 | 1705.7 | 1682.5 | 1623.9 | 1586.3 | 1534.4 | 1526.6 |
| 40° | 4111.2 | 2408.8 | 1573.1 | 1605.1 | 1620.6 | 1636.1 | 1598.5 | 1551.0 | 1556.5 | 1527.7 | 1526.6 |
| 42.5° | 4177.5 | 2340.2 | 1524.4 | 1548.7 | 1558.7 | 1569.7 | 1536.6 | 1501.2 | 1531.1 | 1508.9 | 1510.0 |
| 45° | 4226.1 | 2280.5 | 1480.2 | 1489.0 | 1513.4 | 1529.9 | 1499.0 | 1459.2 | 1465.8 | 1380.7 | 1360.8 |
| 47.5° | 4281.4 | 2247.4 | 1438.2 | 1429.4 | 1472.5 | 1501.2 | 1453.7 | 1396.2 | 1356.4 | 1272.4 | 1264.6 |
| 50° | 4340.0 | 2235.2 | 1394.0 | 1369.7 | 1421.6 | 1449.2 | 1394.0 | 1322.1 | 1270.2 | 1224.8 | 1220.4 |
| 52.5° | 4359.9 | 2234.1 | 1338.7 | 1297.8 | 1349.8 | 1388.4 | 1342.0 | 1269.1 | 1207.2 | 1162.9 | 1160.7 |
| 55° | 4438.4 | 2266.2 | 1268.0 | 1199.4 | 1248.1 | 1327.6 | 1293.4 | 1188.4 | 1138.6 | 1118.7 | 1116.5 |
| 57.5° | *4530.1* | *2271.7* | *1156.3* | *1092.2* | *1159.6* | *1253.6* | *1210.5* | *1119.8* | *1065.7* | *1041.3* | *1039.1* |
| 60° | 4492.6 | 2135.7 | 1036.9 | 1010.4 | 1084.4 | 1183.9 | 1144.1 | 1065.7 | 1002.6 | 979.4 | 977.2 |
| 62.5° | 3423.6 | 1507.8 | 949.6 | 939.6 | 1003.8 | 1083.3 | 1075.6 | 993.8 | 934.1 | 917.5 | 915.3 |
| 65° | 2059.5 | 1059.0 | 865.6 | 864.5 | 909.8 | 986.1 | 996.0 | 929.7 | 866.7 | 843.5 | 843.5 |
| 67.5° | 1018.1 | 810.3 | 770.5 | 765.0 | 793.7 | 847.9 | 889.9 | 835.7 | 782.7 | 760.6 | 757.2 |
| 70° | 719.6 | 714.1 | 700.9 | 685.4 | 690.9 | 713.0 | 730.7 | 685.4 | 629.0 | 606.9 | 602.5 |
| 72.5° | 622.4 | 623.5 | 614.6 | 602.5 | 598.1 | 582.6 | 567.1 | 533.9 | 499.7 | 476.5 | 478.7 |
| 75° | 483.1 | 485.3 | 490.8 | 486.4 | 474.2 | 457.7 | 441.1 | 399.1 | 371.4 | 349.3 | 344.9 |
| 77.5° | 281.9 | 292.9 | 310.6 | 306.2 | 308.4 | 285.2 | 278.6 | 237.7 | 212.2 | 196.8 | 193.5 |
| 80° | 159.2 | 165.8 | 173.6 | 179.1 | 172.5 | 162.5 | 148.1 | 126.0 | 118.3 | 107.2 | 105.0 |
| 82.5° | 96.2 | 102.8 | 106.1 | 110.5 | 108.3 | 95.1 | 84.0 | 69.6 | 63.0 | 57.5 | 56.4 |
| 85° | 48.6 | 53.1 | 56.4 | 58.6 | 52.0 | 43.1 | 38.7 | 31.0 | 26.5 | 23.2 | 23.2 |
| 87.5° | 12.2 | 13.3 | 15.5 | 13.3 | 12.2 | 5.5 | 4.4 | 1.1 | 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

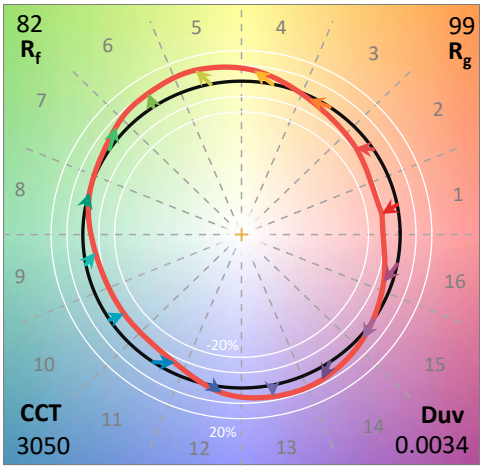
## Test Information

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

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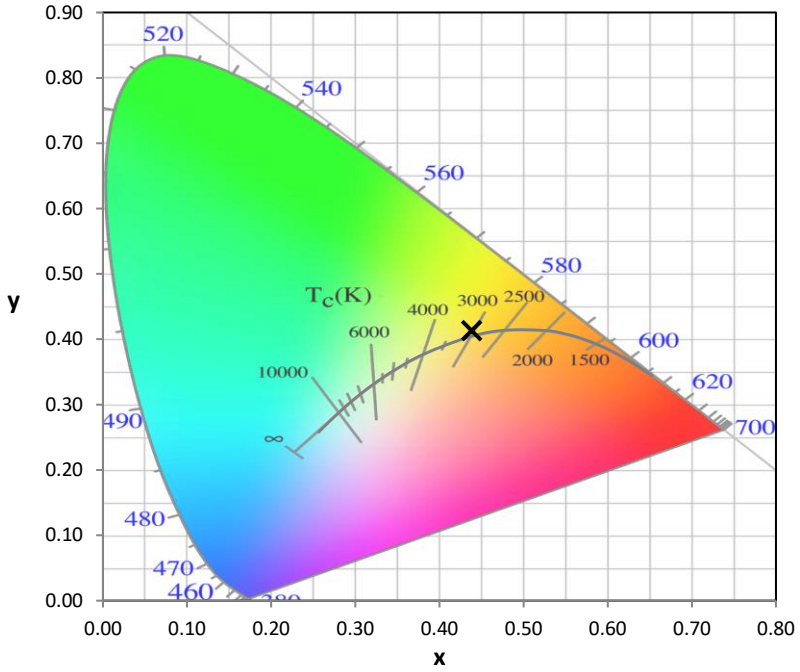
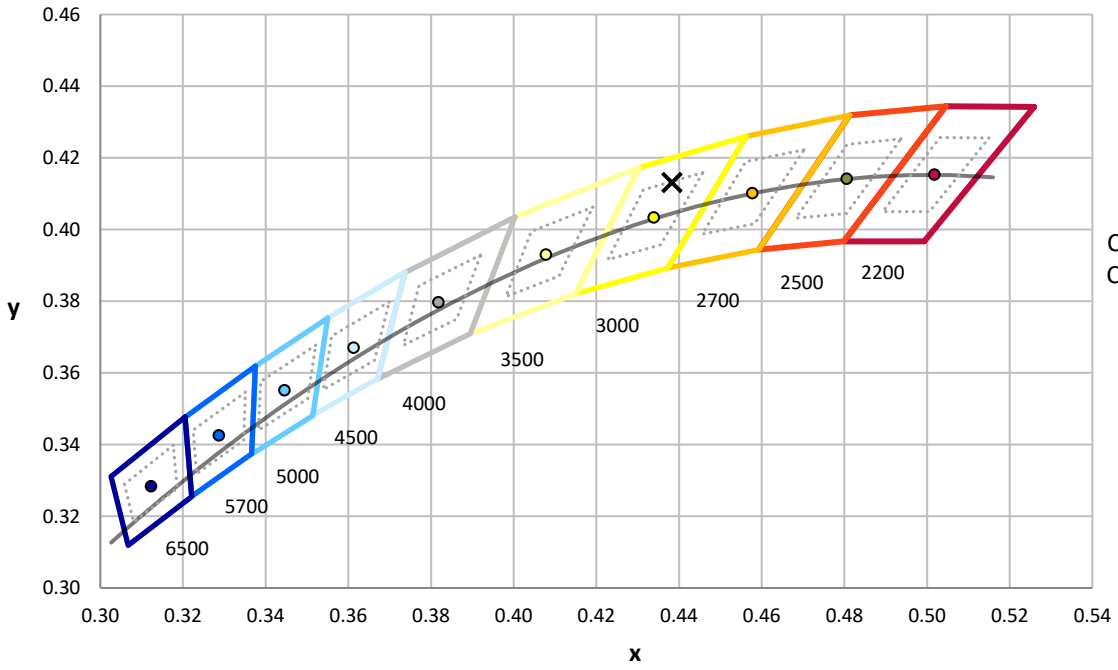
## CIE 1931 Chromaticity Diagram




## 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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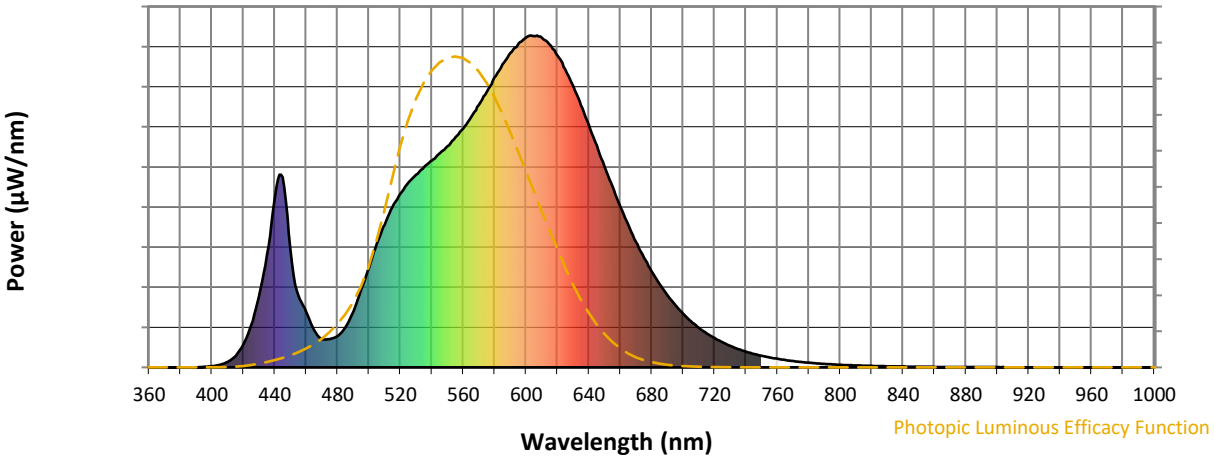
## Photopic Flux vs. Wavelength




## 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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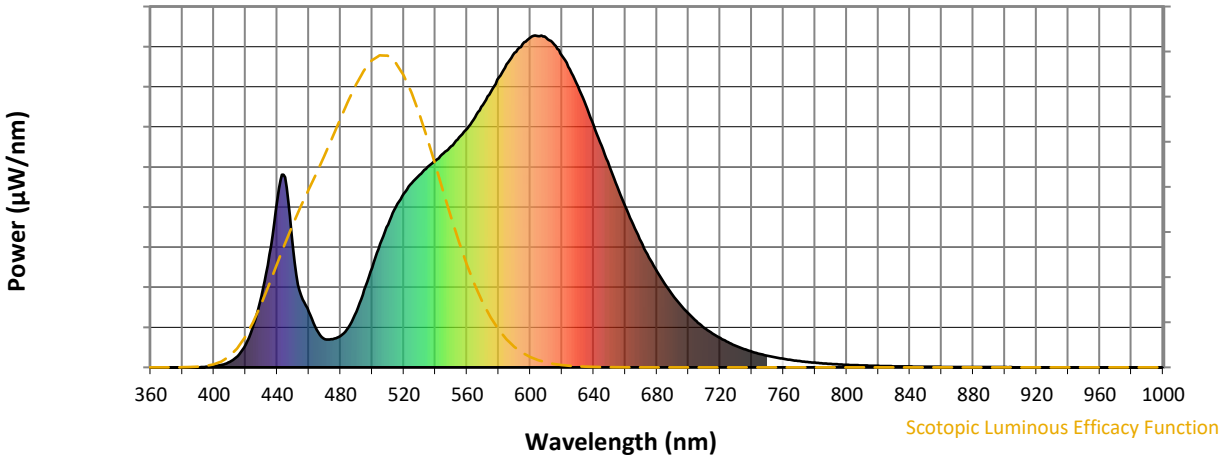
## Scotopic Flux vs. Wavelength




**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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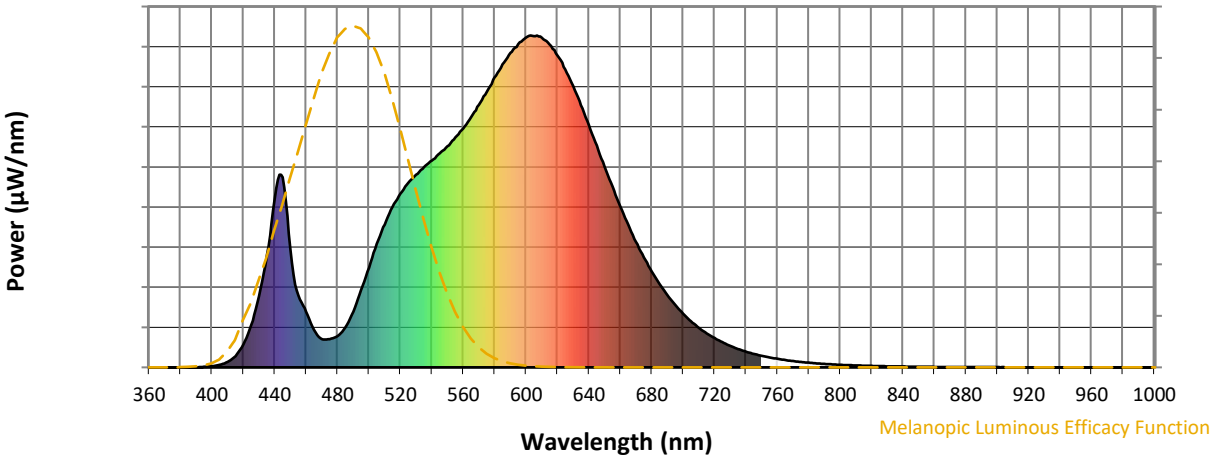
## Melanopic Flux vs. Wavelength




**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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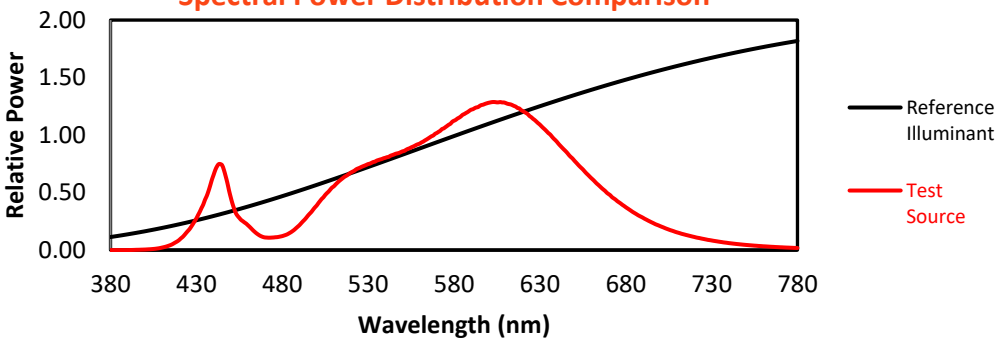
# TM-30-18

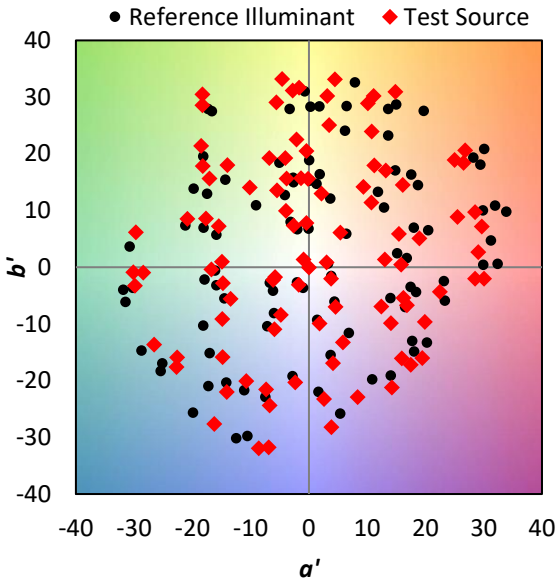
## Summary

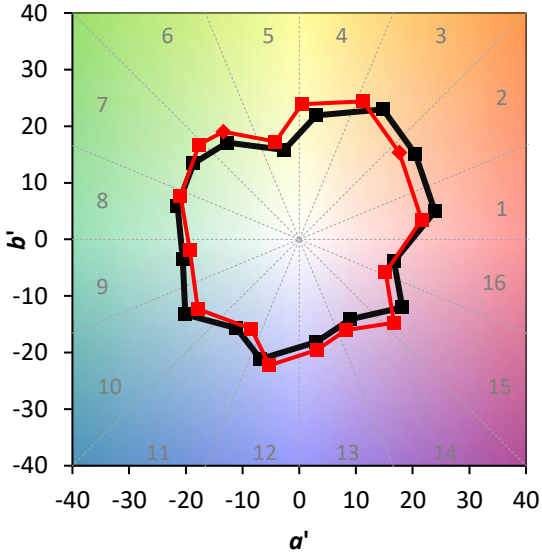
$R_f$ = 81.5
$R_g$ = 99.2
CIE $R_a$ = 81.0
$R_9$ = 7.1

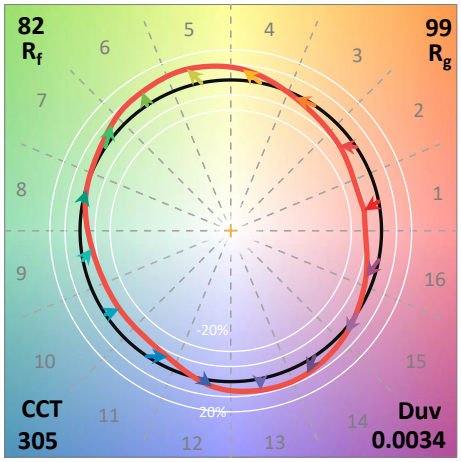
## Spectral Power Distribution Comparison

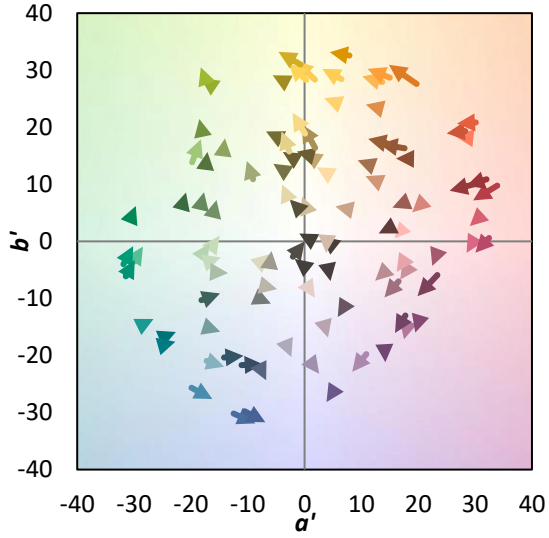



## Color Vector Graphics



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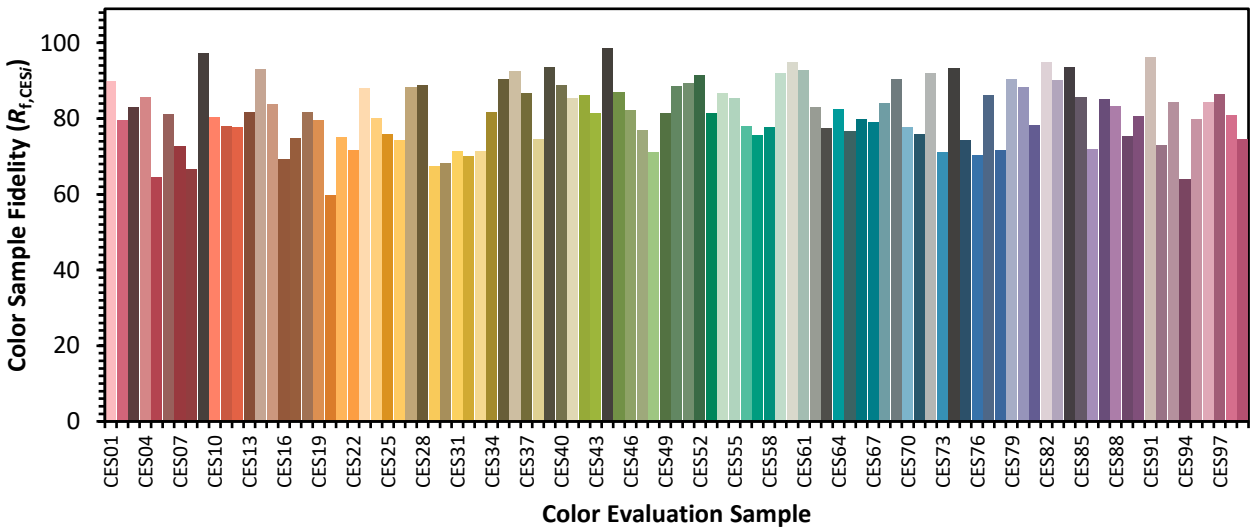
# TM-30-18

**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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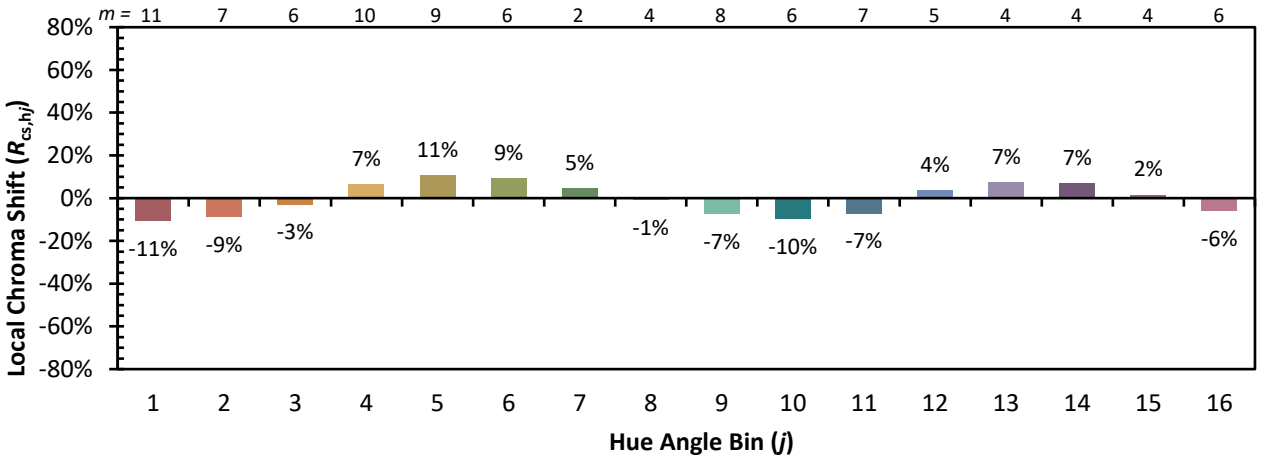
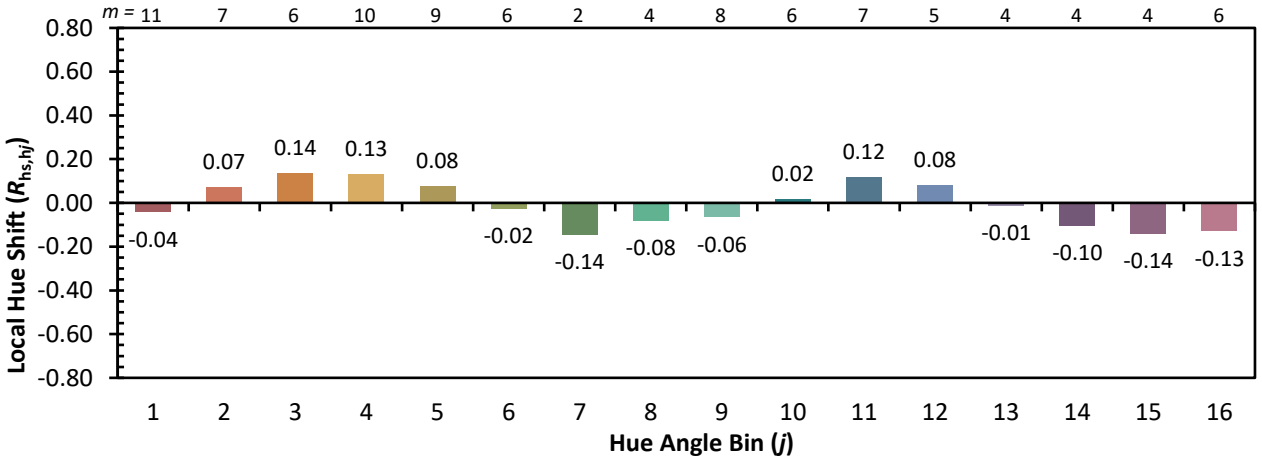
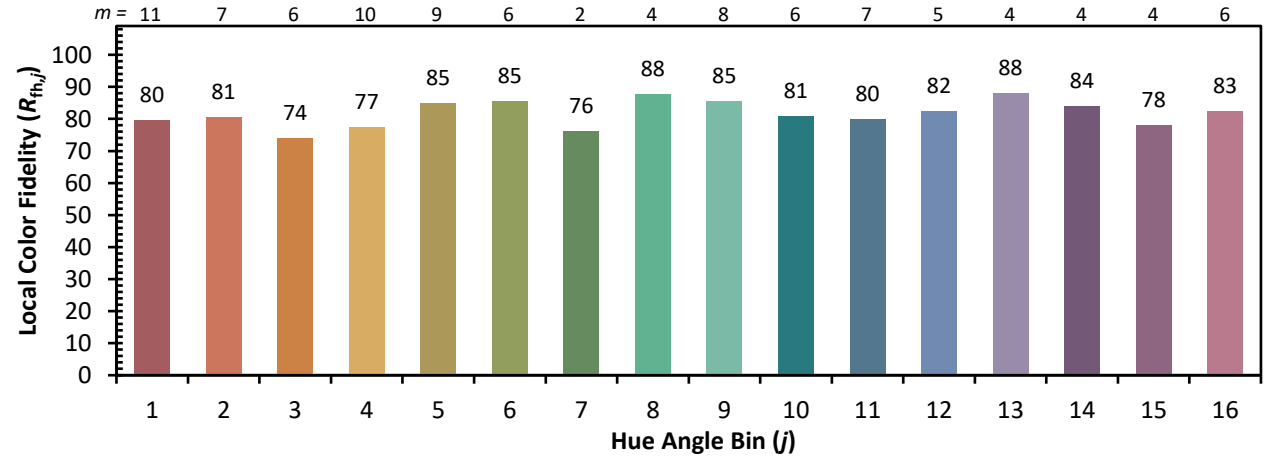
## Color Rendition by Hue-Angle Bin



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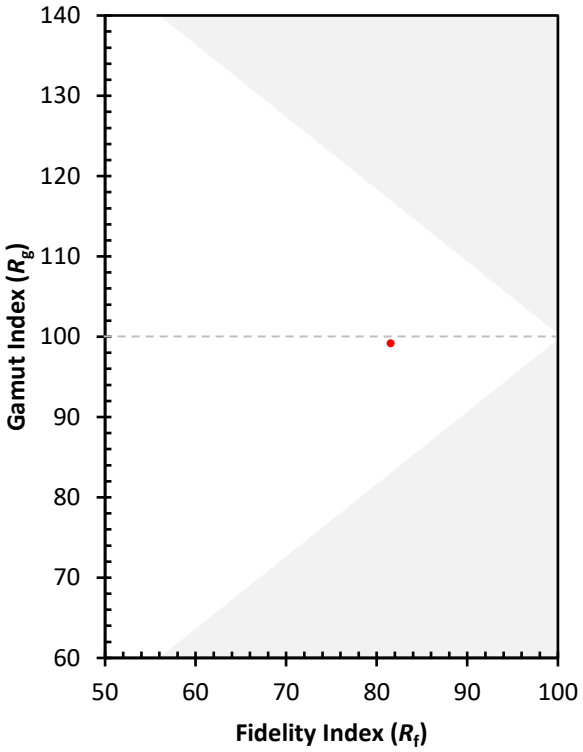
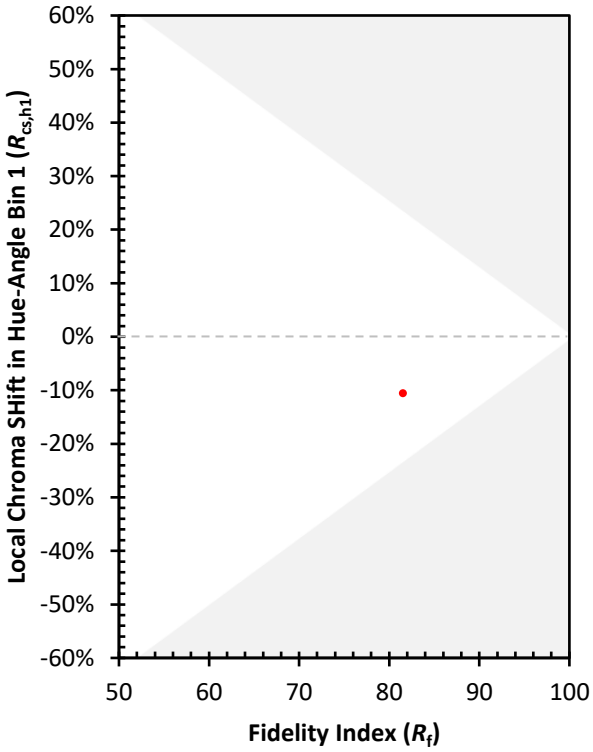
### Measure Comparisons

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