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: P633513

Luminaire Tested: GWS-SA2E-830-U-AFL-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: | P633513 |
| | TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-47) |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Issue Date: | 1/10/2023 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS |
| Product Line: | McGRAW-EDISON |
| Catalog Number: | GWS-SA2E-830-U-AFL-W-GRSWH |
| Description: | GALLEON WALL SLIM LUMINAIRE. (2) LIGHTSQUARES WITH 16 LEDS EACH AND AUTOMOTIVE FRONTLINE OPTICS W/ FACTORY INSTALLED GLARE SHIELD, WH |
| Light Source: | (32) 3000K CCT, 80 CRI LEDS |
| Ballast/Driver: | - |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 10515.3 lumens |
| Efficiency: | N/A |
| Efficacy: | 97.2 lumens/watt |
| Luminous Opening: | Rectangular (W 1' x L: 0.5' x H: 0') |
| IES Classification: | Type II - Short |
| BUG Rating: | B2 - U0 - G1 |

| | |
|---|---|
| Input Watts (W): | 108.2 |
| 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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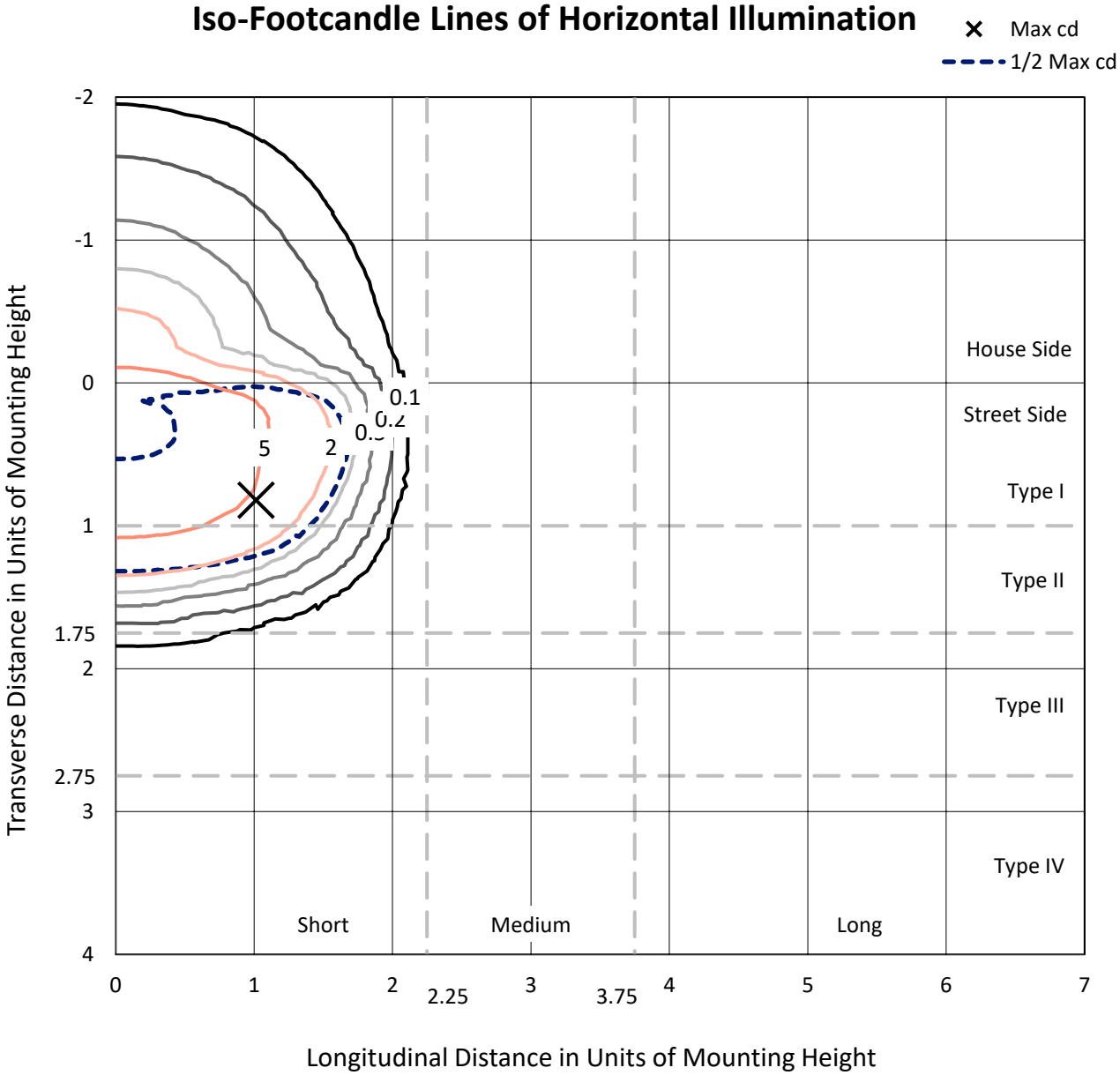
Scaled Data Report

REPORT NUMBER: P633513
CATALOG NUMBER: GWS-SA2E-830-U-AFL-W-GRSWH

## Iso-Footcandle Lines of Horizontal Illumination




Based on 20 foot mounting height. Maximum calculated value = 9.6 fc
Type II - Short - N/A

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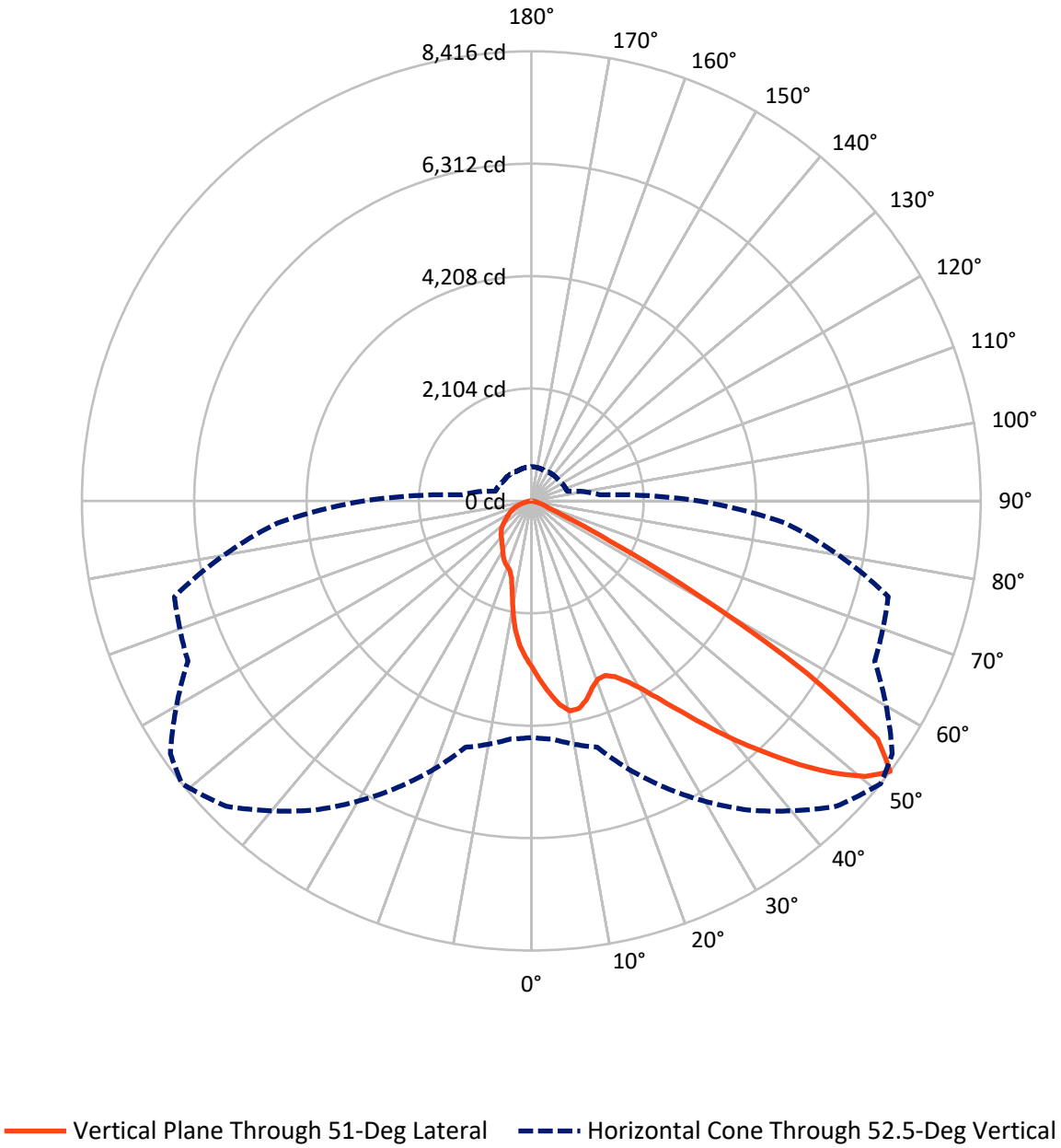
## Luminous Intensity Polar Plot



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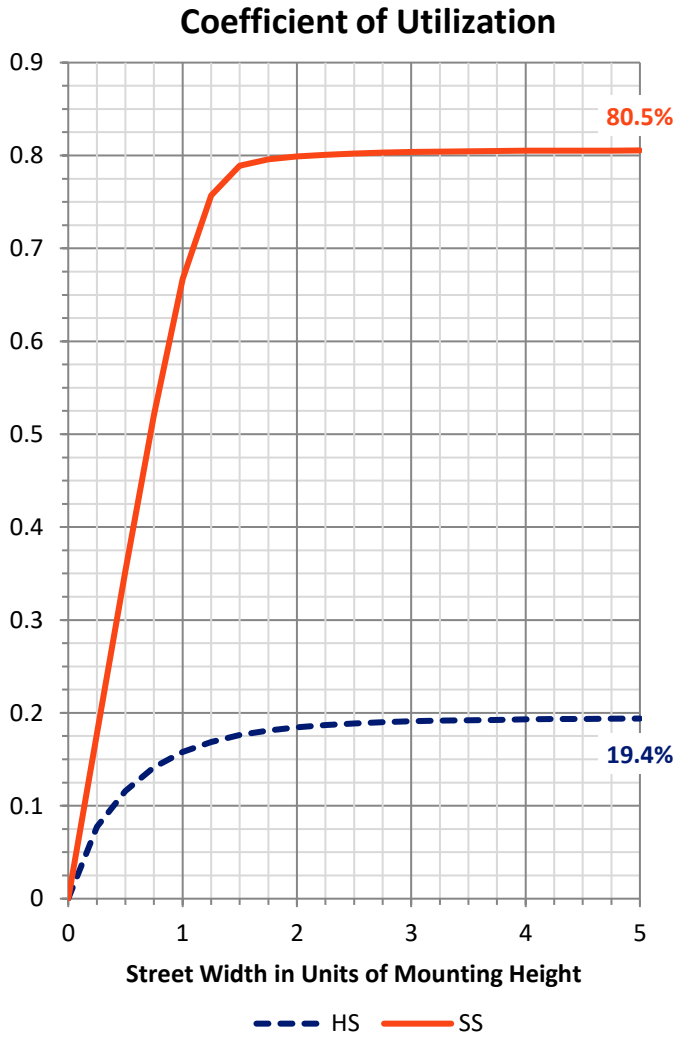
REPORT NUMBER: P633513
CATALOG NUMBER: GWS-SA2E-830-U-AFL-W-GRSWH

**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 2048.8 | 0.0 | 2048.8 |
| | % Fixture | 19.5 | 0.0 | 19.5 |
| **Street Side** | Lumens | 8466.5 | 0.0 | 8466.5 |
| | % Fixture | 80.5 | 0.0 | 80.5 |
| **Total** | Lumens | 10515.3 | 0.0 | 10515.3 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 292.2 | 2.8 |
| 10°-20° | 759.1 | 7.2 |
| 20°-30° | 1234.3 | 11.7 |
| 30°-40° | 1956.1 | 18.6 |
| 40°-50° | 2950.2 | 28.1 |
| 50°-60° | 2552.2 | 24.3 |
| 60°-70° | 578.6 | 5.5 |
| 70°-80° | 170.6 | 1.6 |
| 80°-90° | 22.0 | 0.2 |
| 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° | 10515.3 | 100.0 |
| 0°-180° | 10515.3 | 100.0 |



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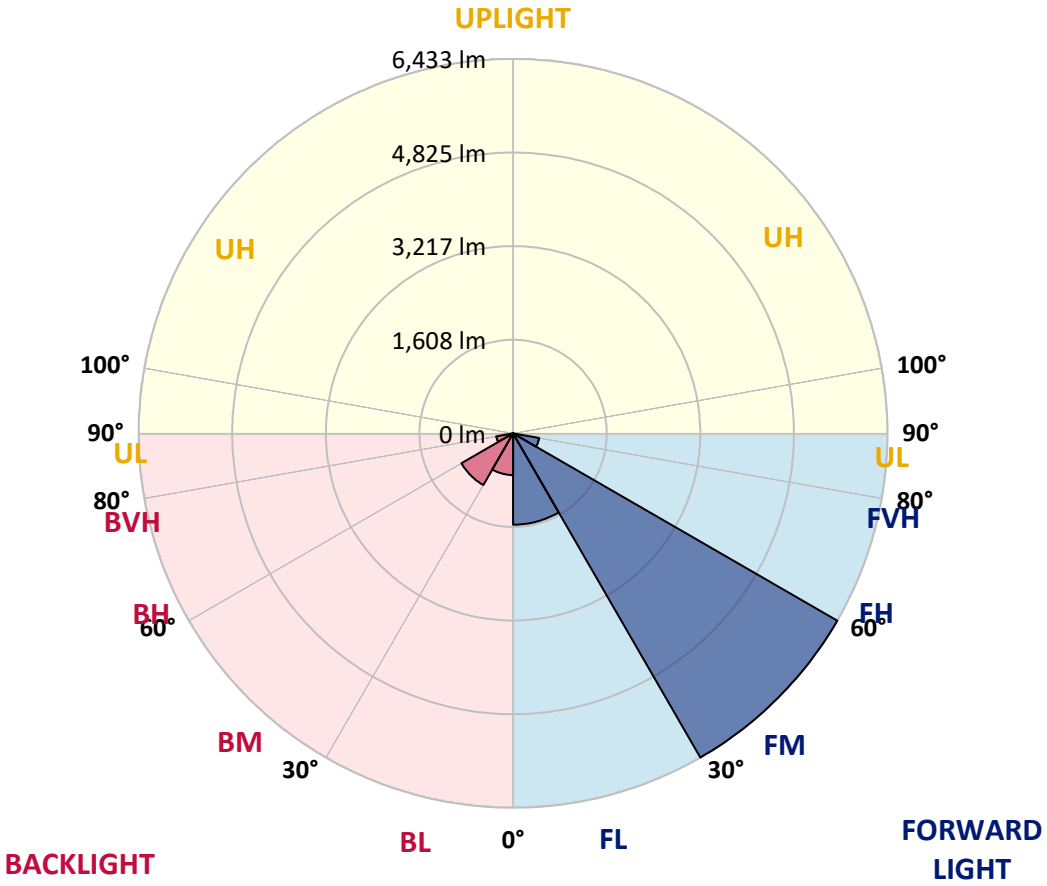
REPORT NUMBER: P633513
CATALOG NUMBER: GWS-SA2E-830-U-AFL-W-GRSWH

## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 1569.4 | 14.9 | | | |
| FM | (30°-60°) | 6433.4 | 61.2 | | | |
| FH | (60°-80°) | 455.4 | 4.3 | | | G0/660 |
| FVH | (80°-90°) | 8.3 | 0.1 | | | G0/10 |
| BL | (0°-30°) | 716.2 | 6.8 | B2/1000 | | |
| BM | (30°-60°) | 1025.1 | 9.7 | B2/2500 | | |
| BH | (60°-80°) | 293.9 | 2.8 | B1/500 | | G1/500 |
| BVH | (80°-90°) | 13.7 | 0.1 | | | G1/100 |
| UL | (90°-100°) | 0.0 | 0.0 | | U0/0 | |
| UH | (100°-180°) | 0.0 | 0.0 | | U0/0 | |

**BUG Rating: B2-U0-G1**
Type II Short



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REPORT NUMBER: P633513
CATALOG NUMBER: GWS-SA2E-830-U-AFL-W-GRSWH

**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 45° | 51° | 55° | 65° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 3130.9 | 3130.9 | 3130.9 | 3130.9 | 3130.9 | 3130.9 | *3130.9* | 3130.9 | 3130.9 | 3130.9 | 3130.9 |
| 2.5° | 3489.1 | 3509.0 | 3478.3 | 3466.6 | 3447.5 | 3414.3 | *3376.1* | 3365.3 | 3283.0 | 3229.0 | 3168.3 |
| 5° | 3839.7 | 3850.5 | 3825.6 | 3800.7 | 3753.3 | 3694.3 | *3620.3* | 3604.6 | 3455.0 | 3331.2 | 3202.4 |
| 7.5° | 3917.8 | 3913.7 | 3935.3 | 3949.4 | 3943.6 | 3920.3 | *3854.7* | 3823.9 | 3645.3 | 3449.2 | 3258.9 |
| 10° | 3608.7 | 3585.4 | 3665.2 | 3759.9 | 3873.8 | 4005.1 | *3997.6* | 3995.1 | 3839.7 | 3607.9 | 3331.2 |
| 12.5° | 3199.1 | 3187.4 | 3252.2 | 3371.1 | 3586.3 | 3877.1 | *3986.0* | 4070.7 | 4015.0 | 3759.1 | 3411.8 |
| 15° | 2964.7 | 2960.6 | 3004.6 | 3090.2 | 3261.4 | 3628.7 | *3861.3* | 4029.2 | 4165.4 | 3921.1 | 3497.4 |
| 17.5° | 2922.4 | 2924.9 | 2939.8 | 2988.8 | 3111.8 | 3414.3 | *3683.5* | 3917.8 | 4282.6 | 4099.0 | 3604.6 |
| 20° | 3046.2 | 3062.8 | 3037.0 | 3044.5 | 3111.0 | 3337.0 | *3562.2* | 3805.6 | 4357.4 | 4277.6 | 3720.1 |
| 22.5° | 3321.2 | 3315.4 | 3258.9 | 3225.7 | 3226.5 | 3384.4 | *3548.9* | 3753.3 | 4406.4 | 4451.3 | 3824.8 |
| 25° | 3632.8 | 3626.2 | 3558.9 | 3484.9 | 3438.4 | 3513.2 | *3644.4* | 3809.0 | 4450.4 | 4610.0 | 3908.7 |
| 27.5° | 4000.9 | 3980.1 | 3905.4 | 3810.6 | 3707.6 | 3740.0 | *3828.9* | 3959.4 | 4518.6 | 4766.2 | 3964.3 |
| 30° | 4357.4 | 4381.5 | 4274.3 | 4162.1 | 4053.3 | 4033.3 | *4084.8* | 4202.8 | 4657.3 | 4949.0 | 4030.8 |
| 32.5° | 4830.2 | 4821.9 | 4703.0 | 4556.8 | 4401.4 | 4386.5 | *4427.2* | 4535.2 | 4906.6 | 5201.6 | 4132.2 |
| 35° | 5402.7 | 5404.3 | 5235.7 | 5037.9 | 4816.9 | 4777.0 | *4845.1* | 4949.8 | 5278.0 | 5543.9 | 4292.6 |
| 37.5° | 5997.6 | 5995.1 | 5848.1 | 5623.7 | 5322.1 | 5265.6 | *5343.7* | 5421.8 | 5742.5 | 6010.1 | 4541.8 |
| 40° | 6414.7 | 6431.4 | 6362.4 | 6244.4 | 5958.6 | 5820.6 | *5889.6* | 5943.6 | 6247.7 | 6558.5 | 4870.1 |
| 42.5° | 6651.6 | 6676.5 | 6691.4 | 6762.1 | 6611.7 | 6464.6 | *6439.7* | 6467.9 | 6698.9 | 7067.9 | 5178.3 |
| 45° | 6702.2 | 6735.5 | 6844.3 | 7106.1 | 7164.2 | 7122.7 | *7041.3* | 6973.1 | 7035.5 | 7429.3 | 5380.2 |
| 47.5° | 6478.7 | 6536.9 | 6769.6 | 7227.4 | 7567.2 | 7697.7 | *7607.1* | 7503.3 | 7229.9 | 7522.4 | 5359.5 |
| 50° | 5593.0 | 5661.1 | 6185.4 | 6979.8 | 7624.6 | 8099.9 | *8108.2* | 7954.5 | 7206.6 | 7254.0 | 5098.6 |
| 52.5° | *4428.0* | *4474.5* | *4774.5* | *5917.0* | *7062.0* | *8083.2* | *8415.6* | *8251.1* | *7094.4* | *6918.3* | *4772.0* |
| 55° | 2646.5 | 2721.3 | 3001.3 | 3903.7 | 5501.6 | 7164.2 | *7872.2* | 7952.0 | 7039.6 | 6636.6 | 4549.3 |
| 57.5° | 893.2 | 929.8 | 1197.4 | 1724.2 | 3242.3 | 5245.6 | *6082.4* | 6406.4 | 6390.7 | 6206.2 | 4114.7 |
| 60° | 425.4 | 433.7 | 487.8 | 653.9 | 1297.9 | 2741.2 | *3600.4* | 3974.3 | 4315.0 | 4349.1 | 2560.1 |
| 62.5° | 324.1 | 329.0 | 356.5 | 392.2 | 521.8 | 1155.0 | *1650.2* | 1936.1 | 2068.2 | 1774.9 | 932.3 |
| 65° | 270.9 | 275.0 | 295.8 | 318.2 | 354.8 | 500.2 | *633.2* | 730.4 | 658.1 | 512.7 | 444.5 |
| 67.5° | 226.0 | 229.3 | 245.1 | 269.2 | 294.1 | 334.9 | *351.5* | 361.5 | 378.9 | 425.4 | 408.8 |
| 70° | 177.0 | 180.3 | 196.9 | 217.7 | 241.8 | 251.8 | *267.6* | 277.5 | 312.4 | 372.3 | 370.6 |
| 72.5° | 136.3 | 140.4 | 149.6 | 162.9 | 182.8 | 192.8 | *210.2* | 221.9 | 241.8 | 290.0 | 309.9 |
| 75° | 99.7 | 102.2 | 110.5 | 114.7 | 117.2 | 114.7 | *132.1* | 145.4 | 172.0 | 190.3 | 195.3 |
| 77.5° | 40.7 | 45.7 | 44.0 | 44.0 | 52.3 | 63.2 | *72.3* | 80.6 | 98.9 | 109.7 | 110.5 |
| 80° | 16.6 | 18.3 | 21.6 | 24.1 | 29.1 | 37.4 | *43.2* | 46.5 | 54.8 | 61.5 | 66.5 |
| 82.5° | 10.0 | 10.8 | 12.5 | 13.3 | 16.6 | 21.6 | *24.9* | 27.4 | 34.1 | 40.7 | 43.2 |
| 85° | 5.0 | 5.0 | 5.8 | 6.6 | 8.3 | 10.0 | *11.6* | 13.3 | 17.4 | 21.6 | 24.1 |
| 87.5° | 0.8 | 0.8 | 0.8 | 1.7 | 2.5 | 3.3 | *4.2* | 5.0 | 5.8 | 6.6 | 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: P633513
CATALOG NUMBER: GWS-SA2E-830-U-AFL-W-GRSWH

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 3130.9 | 3130.9 | 3130.9 | 3130.9 | 3130.9 | 3130.9 | 3130.9 | 3130.9 | 3130.9 | 3130.9 | 3130.9 |
| 2.5° | 3132.6 | 3087.7 | 3035.4 | 2993.8 | 2945.6 | 2909.9 | 2859.2 | 2827.6 | 2797.7 | 2772.8 | 2754.5 |
| 5° | 3135.9 | 3060.3 | 2951.4 | 2855.1 | 2755.4 | 2660.6 | 2563.4 | 2484.5 | 2413.8 | 2354.8 | 2349.9 |
| 7.5° | 3155.0 | 3046.2 | 2875.8 | 2707.2 | 2512.7 | 2324.9 | 2137.1 | 1984.3 | 1867.9 | 1807.3 | 1794.8 |
| 10° | 3187.4 | 3044.5 | 2798.6 | 2529.3 | 2197.8 | 1895.3 | 1672.7 | 1556.3 | 1489.0 | 1464.9 | 1456.6 |
| 12.5° | 3221.5 | 3040.4 | 2699.7 | 2278.4 | 1818.1 | 1553.0 | 1430.9 | 1416.7 | 1429.2 | 1430.9 | 1430.0 |
| 15° | 3263.0 | 3037.9 | 2575.0 | 1984.3 | 1540.5 | 1394.3 | 1402.6 | 1432.5 | 1461.6 | 1468.2 | 1468.2 |
| 17.5° | 3313.7 | 3032.0 | 2405.5 | 1696.8 | 1366.9 | 1363.5 | 1407.6 | 1447.5 | 1474.9 | 1479.9 | 1479.9 |
| 20° | 3366.9 | 3017.1 | 2197.0 | 1462.4 | 1296.2 | 1344.4 | 1391.8 | 1422.5 | 1441.7 | 1448.3 | 1449.1 |
| 22.5° | 3403.5 | 2977.2 | 1956.8 | 1288.8 | 1252.2 | 1307.9 | 1341.9 | 1373.5 | 1373.5 | 1356.9 | 1351.9 |
| 25° | 3411.0 | 2891.6 | 1696.8 | 1169.9 | 1199.9 | 1251.4 | 1286.3 | 1268.0 | 1233.9 | 1220.6 | 1219.8 |
| 27.5° | 3383.5 | 2767.0 | 1440.0 | 1085.2 | 1136.7 | 1188.2 | 1182.4 | 1155.8 | 1140.9 | 1127.6 | 1132.6 |
| 30° | 3350.3 | 2617.4 | 1217.3 | 1015.4 | 1063.6 | 1114.3 | 1094.3 | 1085.2 | 1074.4 | 1059.4 | 1062.8 |
| 32.5° | 3327.9 | 2450.4 | 1046.1 | 961.4 | 1014.6 | 1022.9 | 1037.0 | 1036.2 | 1026.2 | 997.9 | 996.3 |
| 35° | 3334.5 | 2281.7 | 931.5 | 917.3 | 973.8 | 970.5 | 997.1 | 992.1 | 923.2 | 884.1 | 881.6 |
| 37.5° | 3387.7 | 2119.7 | 864.2 | 882.4 | 909.0 | 929.8 | 953.1 | 893.2 | 869.1 | 844.2 | 845.9 |
| 40° | 3489.1 | 1969.3 | 827.6 | 863.3 | 870.0 | 900.7 | 846.7 | 845.9 | 835.1 | 812.6 | 811.8 |
| 42.5° | 3603.7 | 1842.2 | 802.7 | 854.2 | 845.1 | 850.9 | 793.5 | 800.2 | 799.4 | 785.2 | 781.1 |
| 45° | 3673.5 | 1725.0 | 782.7 | 820.1 | 822.6 | 764.5 | 747.0 | 754.5 | 758.6 | 751.2 | 750.3 |
| 47.5° | 3601.2 | 1590.4 | 762.0 | 767.8 | 789.4 | 725.4 | 703.8 | 704.6 | 712.1 | 712.9 | 709.6 |
| 50° | 3398.5 | 1440.0 | 737.0 | 722.9 | 708.8 | 684.7 | 664.7 | 660.6 | 668.1 | 675.5 | 678.0 |
| 52.5° | *3136.7* | *1296.2* | *695.5* | *673.9* | *640.6* | *640.6* | *631.5* | *618.2* | *628.2* | *638.2* | *641.5* |
| 55° | 2944.8 | 1189.9 | 636.5 | 612.4 | 575.8 | 588.3 | 586.6 | 575.0 | 588.3 | 595.8 | 598.3 |
| 57.5° | 2551.8 | 956.4 | 560.0 | 552.6 | 521.8 | 536.8 | 540.1 | 525.1 | 518.5 | 520.2 | 522.7 |
| 60° | 1514.8 | 617.4 | 505.2 | 504.4 | 477.0 | 494.4 | 504.4 | 489.4 | 469.5 | 472.0 | 475.3 |
| 62.5° | 679.7 | 472.0 | 436.2 | 432.9 | 432.1 | 454.5 | 465.3 | 451.2 | 422.9 | 425.4 | 428.8 |
| 65° | 427.9 | 408.0 | 378.9 | 378.9 | 392.2 | 411.3 | 419.6 | 408.0 | 375.6 | 371.4 | 374.7 |
| 67.5° | 397.2 | 379.7 | 349.8 | 344.0 | 350.7 | 366.4 | 367.3 | 344.8 | 325.7 | 322.4 | 322.4 |
| 70° | 356.5 | 343.2 | 314.1 | 302.5 | 300.0 | 299.1 | 296.6 | 290.8 | 278.4 | 275.0 | 276.7 |
| 72.5° | 295.0 | 285.8 | 267.6 | 255.1 | 248.4 | 247.6 | 237.6 | 232.7 | 221.9 | 220.2 | 219.4 |
| 75° | 195.3 | 197.8 | 197.8 | 196.1 | 190.3 | 187.8 | 177.0 | 172.0 | 159.5 | 154.6 | 153.7 |
| 77.5° | 115.5 | 118.0 | 121.3 | 122.1 | 121.3 | 121.3 | 111.3 | 105.5 | 93.1 | 86.4 | 84.8 |
| 80° | 70.6 | 72.3 | 74.0 | 76.4 | 73.1 | 70.6 | 61.5 | 55.7 | 49.9 | 45.7 | 44.9 |
| 82.5° | 45.7 | 47.4 | 48.2 | 49.9 | 48.2 | 44.9 | 37.4 | 34.1 | 29.9 | 26.6 | 25.8 |
| 85° | 25.8 | 26.6 | 28.3 | 28.3 | 25.8 | 23.3 | 19.1 | 16.6 | 14.1 | 12.5 | 12.5 |
| 87.5° | 9.1 | 9.1 | 9.1 | 10.0 | 8.3 | 7.5 | 5.0 | 3.3 | 2.5 | 2.5 | 2.5 |
| 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

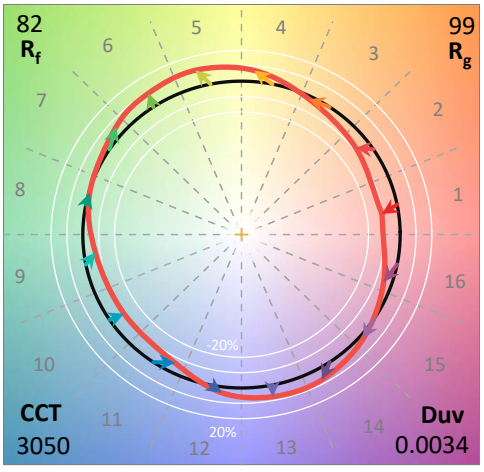
## Test Information

| | |
|---|---|
| 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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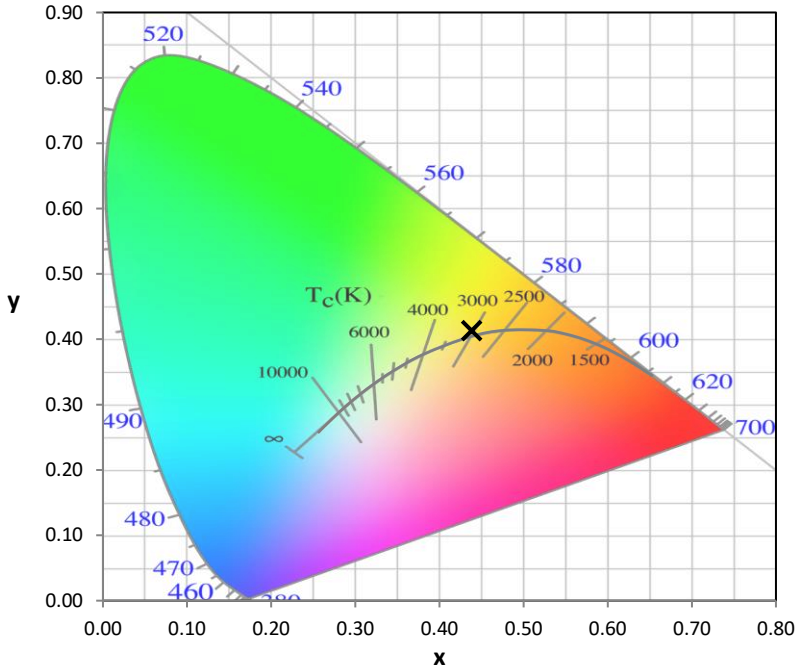
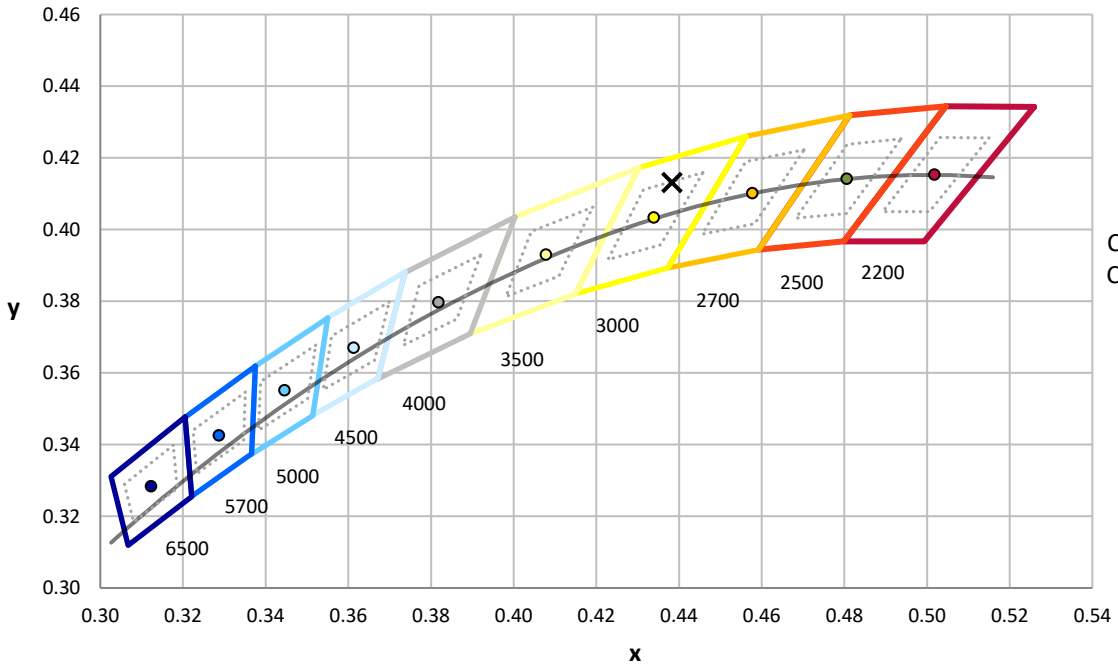
## CIE 1931 Chromaticity Diagram




## 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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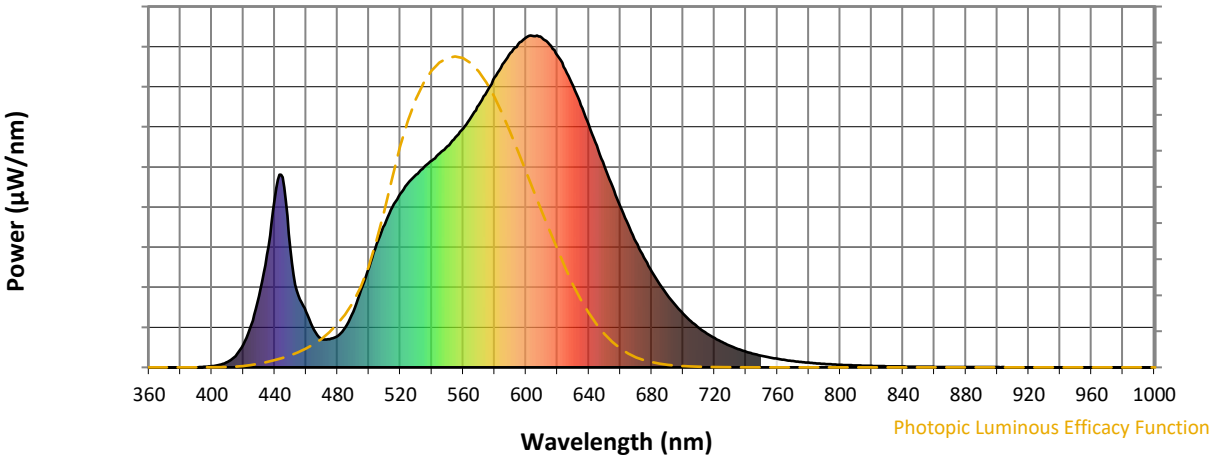
## Photopic Flux vs. Wavelength




## 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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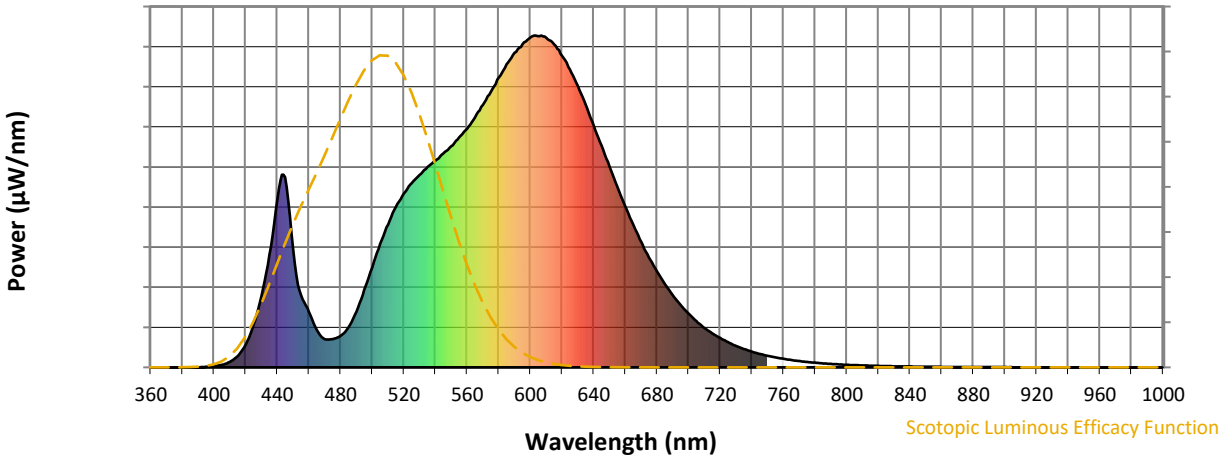
## Scotopic Flux vs. Wavelength




**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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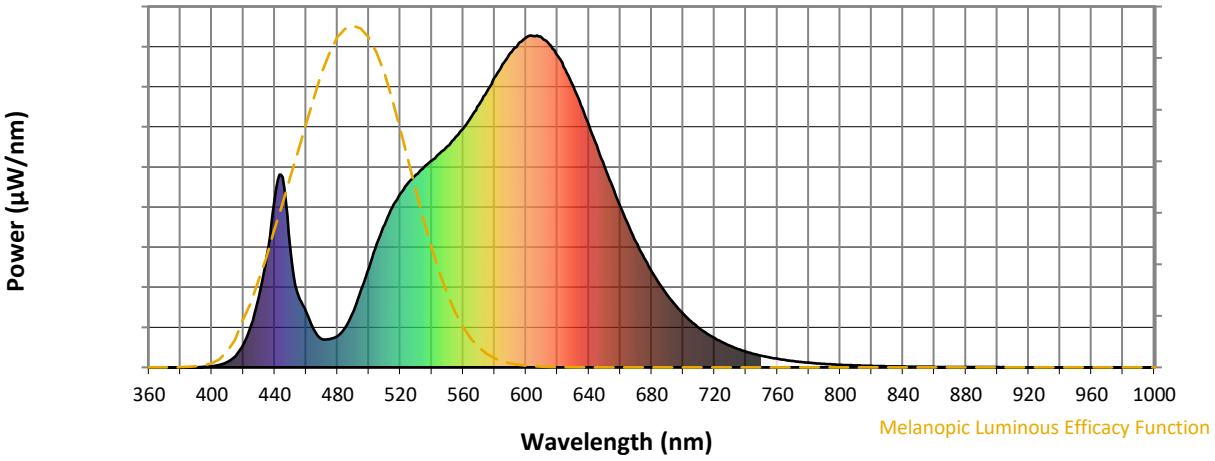
## Melanopic Flux vs. Wavelength




**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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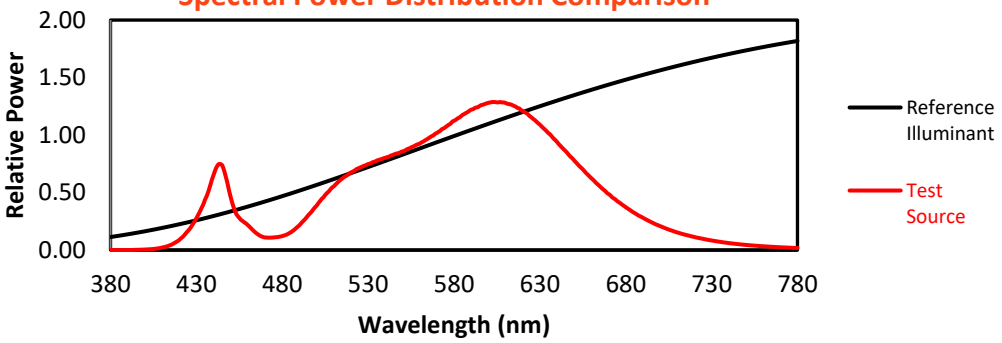
# TM-30-18

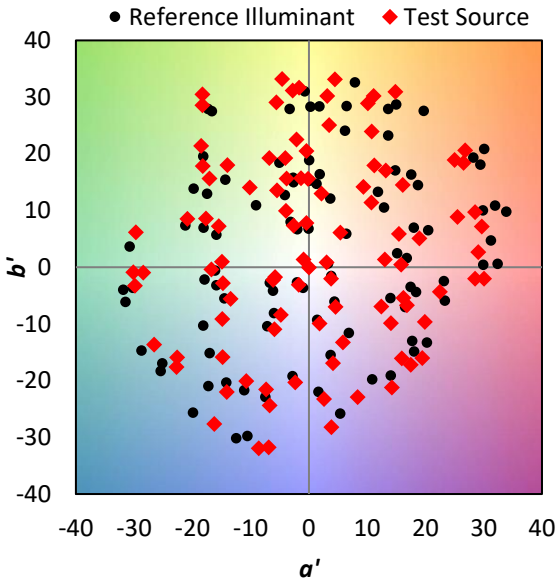
## Summary

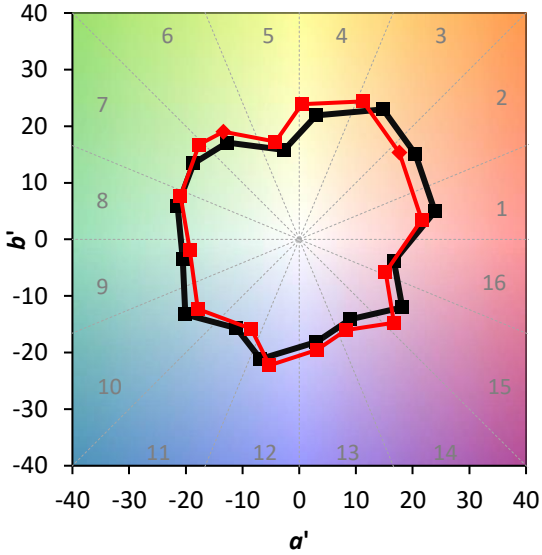
$R_f$ = 81.5
$R_g$ = 99.2
CIE $R_a$ = 81.0
$R_9$ = 7.1

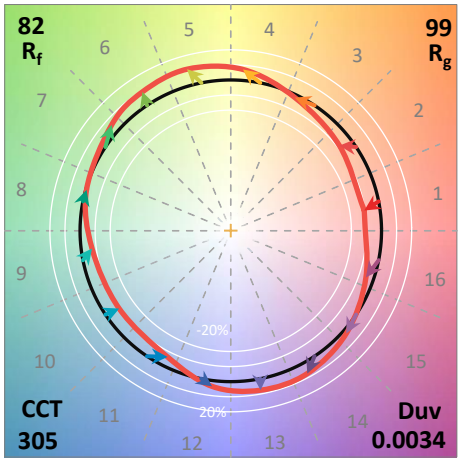
## Spectral Power Distribution Comparison

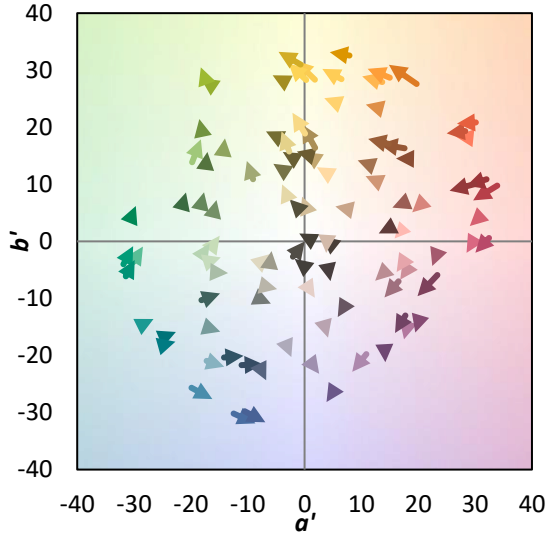



## Color Vector Graphics



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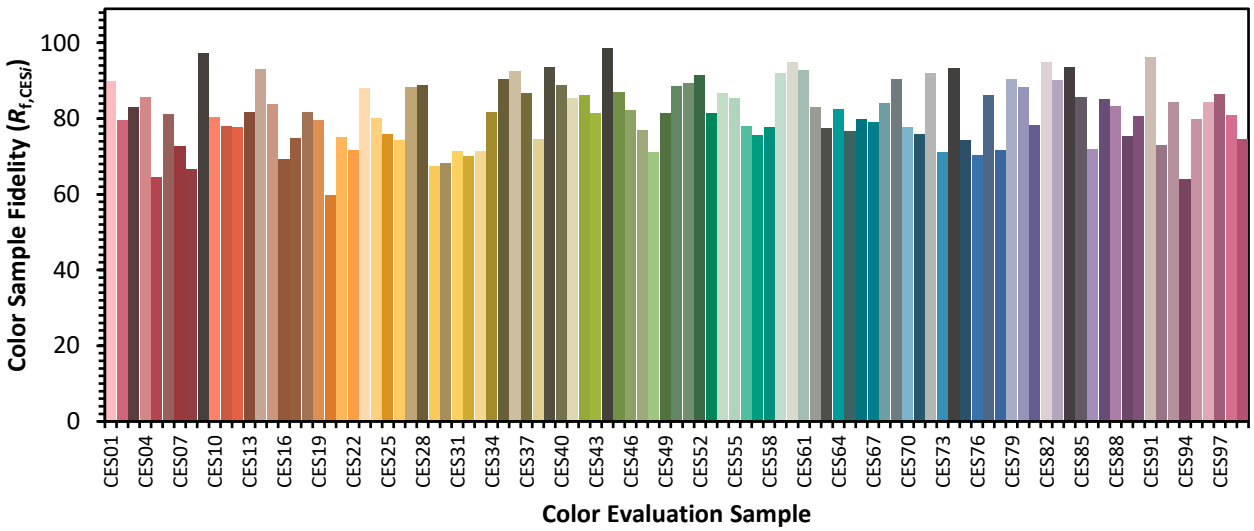
**Individual Sample Fidelity Index ($R_{f,i}$)**

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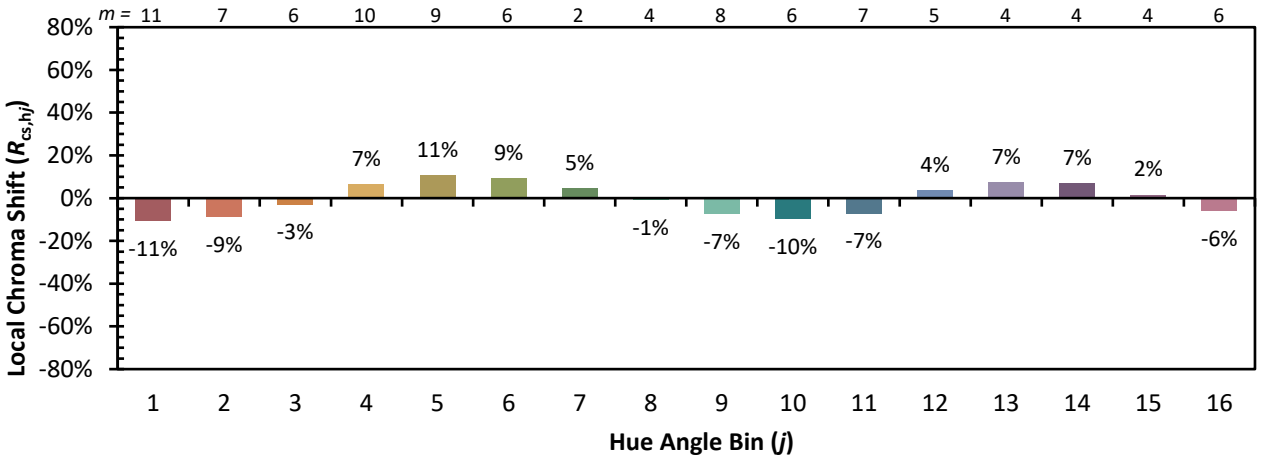
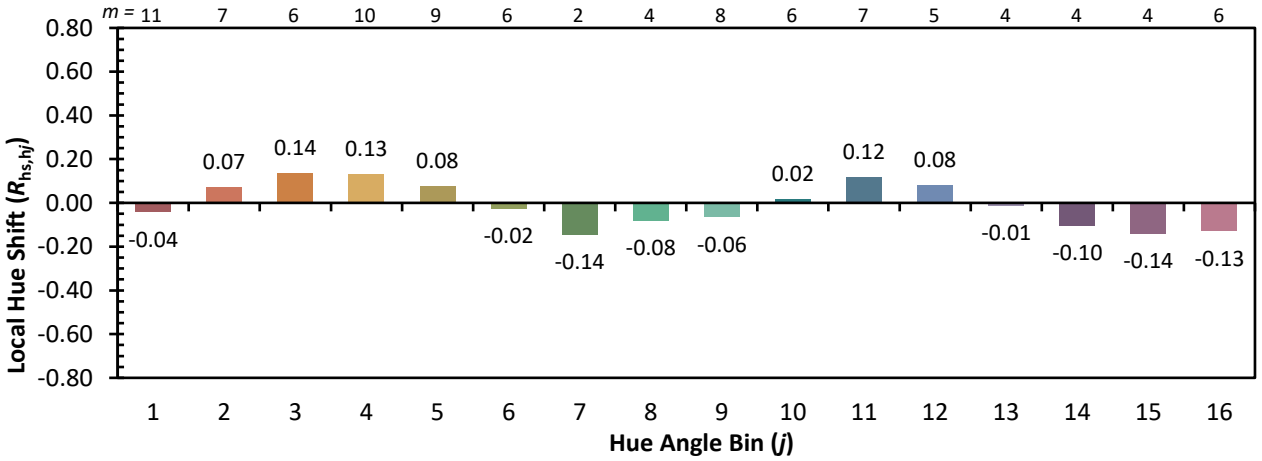
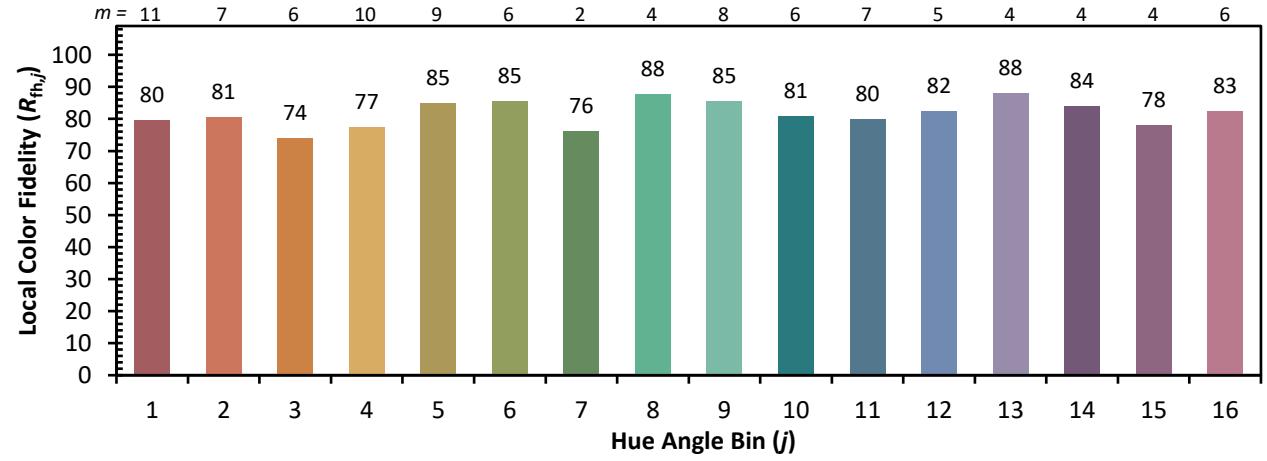
## Color Rendition by Hue-Angle Bin



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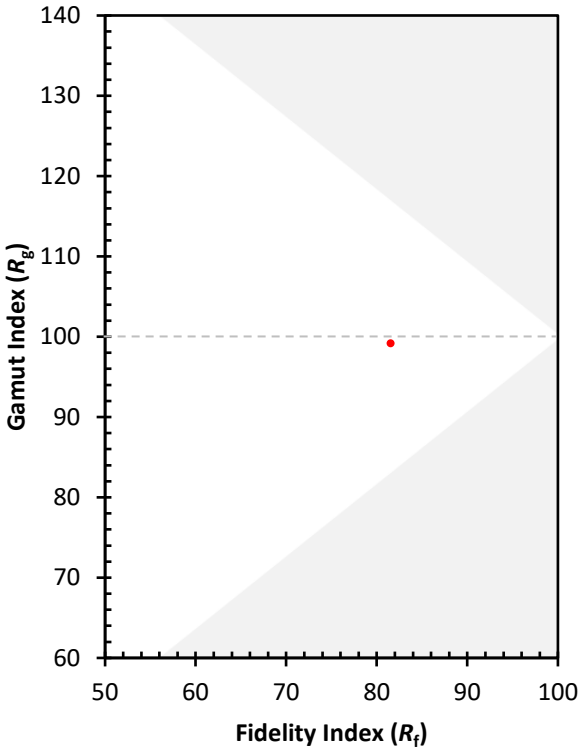
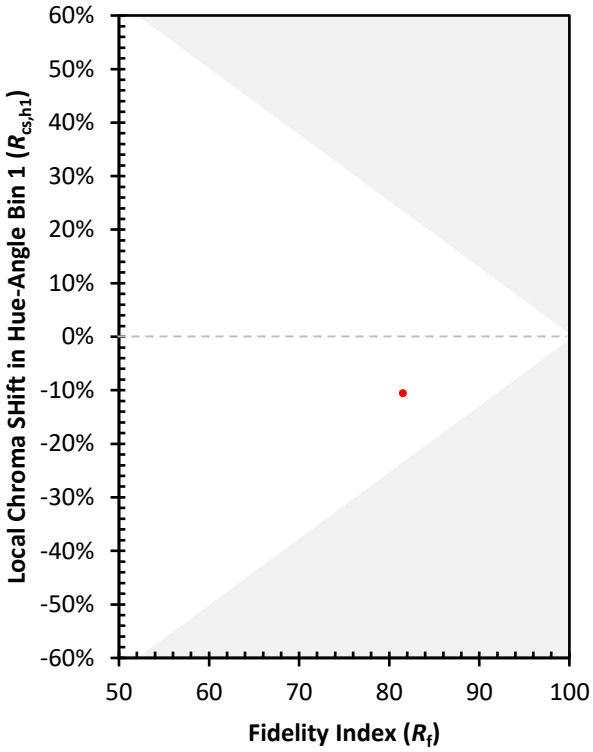
### Measure Comparisons




(END OF REPORT)