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: P638961

Luminaire Tested: GWS-SA4F-830-U-RW-W-GRSBK

Issue Date: 1/10/2023

Report Generated By 670246102 / DESKTOP-G35701P

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

Scaled Data Report

**Test Information**

| | |
|---|---|
| Test Method: | LM-79-2019 |
| Report Number: | P638961 |
| | TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-50) |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Issue Date: | 1/10/2023 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS |
| Product Line: | McGRAW-EDISON |
| Catalog Number: | GWS-SA4F-830-U-RW-W-GRSBK |
| Description: | GALLEON WALL SLIM LUMINAIRE. (4) LIGHTSQUARES WITH 16 LEDS EACH AND RECTANGULAR WIDE OPTICS W/ FACTORY INSTALLED GLARE SHIELD, BK |
| Light Source: | (64) 3000K CCT, 80 CRI LEDS |
| Ballast/Driver: | - |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 17517.9 lumens |
| Efficiency: | N/A |
| Efficacy: | 77.8 lumens/watt |
| Luminous Opening: | Rectangular (W 1' x L: 1' x H: 0') |
| IES Classification: | Type V - Short |
| BUG Rating: | B4 - U0 - G0 |

| | |
|---|---|
| Input Watts (W): | 225.3 |
| 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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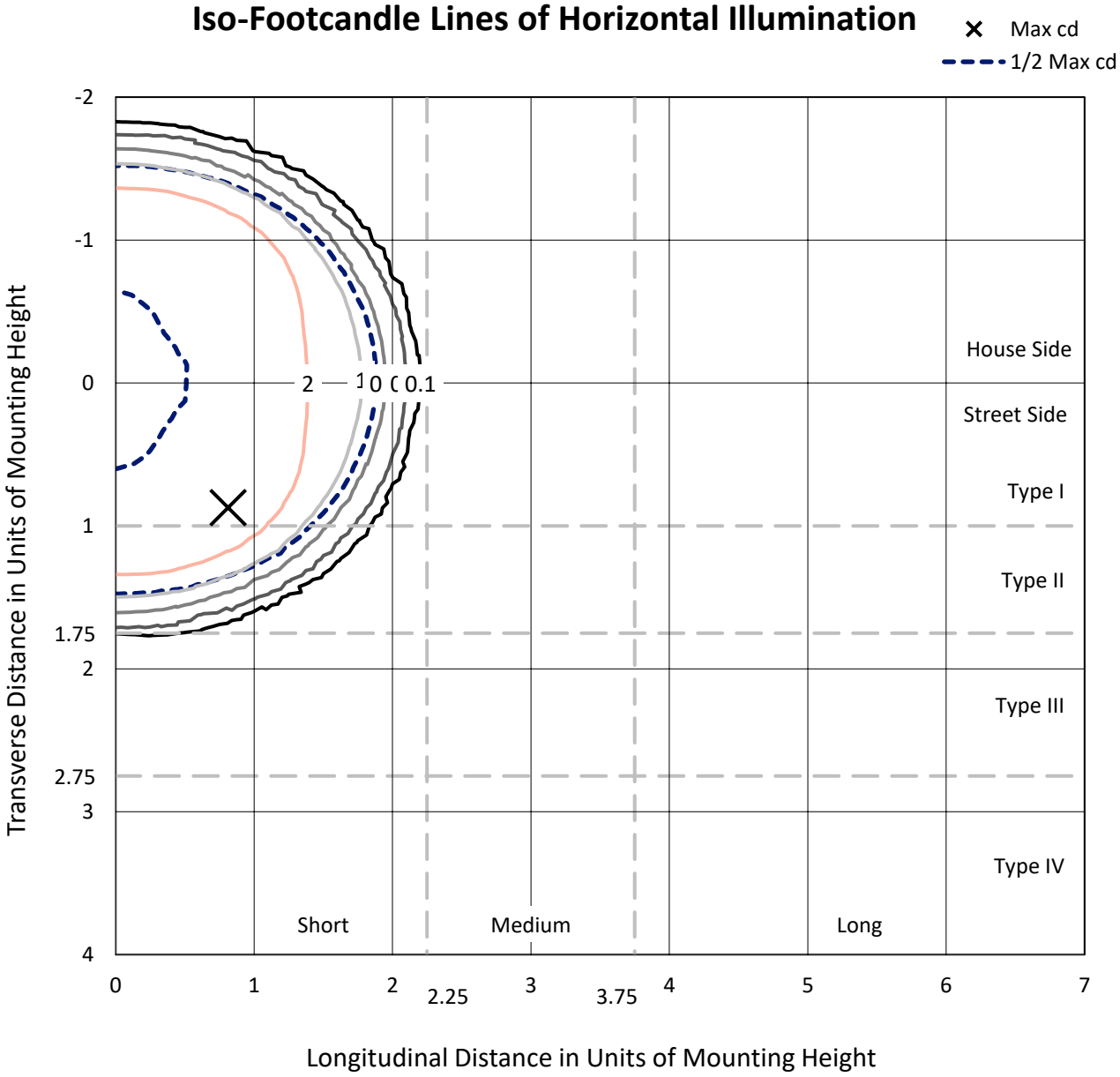
Scaled Data Report

REPORT NUMBER: P638961
CATALOG NUMBER: GWS-SA4F-830-U-RW-W-GRSBK

## Iso-Footcandle Lines of Horizontal Illumination




Based on 25 foot mounting height. Maximum calculated value = 4.8 fc
Type V - Short - N/A

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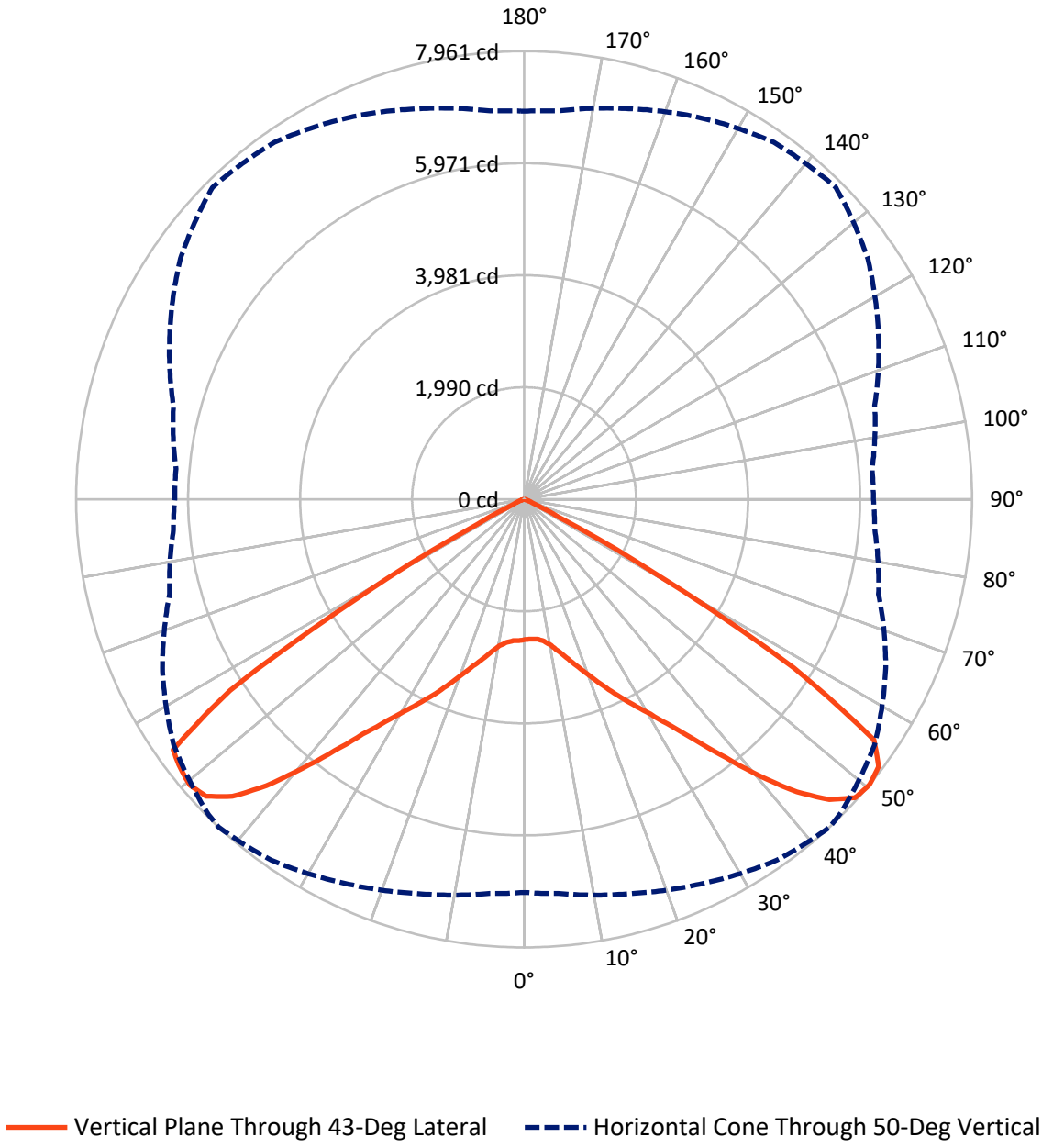
## Luminous Intensity Polar Plot



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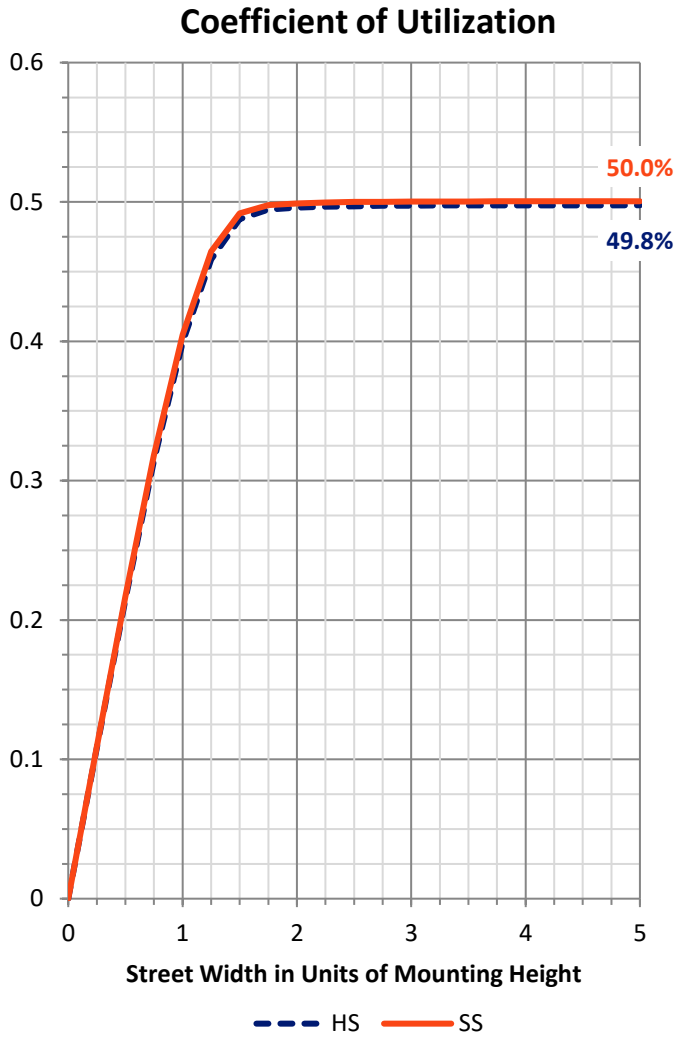
REPORT NUMBER: P638961
CATALOG NUMBER: GWS-SA4F-830-U-RW-W-GRSBK

**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 8758.7 | 0.0 | 8758.7 |
| | % Fixture | 50.0 | 0.0 | 50.0 |
| **Street Side** | Lumens | 8759.2 | 0.0 | 8759.2 |
| | % Fixture | 50.0 | 0.0 | 50.0 |
| **Total** | Lumens | 17517.9 | 0.0 | 17517.9 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 245.4 | 1.4 |
| 10°-20° | 844.4 | 4.8 |
| 20°-30° | 1708.3 | 9.8 |
| 30°-40° | 3169.6 | 18.1 |
| 40°-50° | 5261.3 | 30.0 |
| 50°-60° | 5369.4 | 30.7 |
| 60°-70° | 880.5 | 5.0 |
| 70°-80° | 38.6 | 0.2 |
| 80°-90° | 0.5 | 0.0 |
| 90°-100° | 0.0 | 0.0 |
| 100°-110° | 0.0 | 0.0 |
| 110°-120° | 0.0 | 0.0 |
| 120°-130° | 0.0 | 0.0 |
| 130°-140° | 0.0 | 0.0 |
| 140°-150° | 0.0 | 0.0 |
| 150°-160° | 0.0 | 0.0 |
| 160°-170° | 0.0 | 0.0 |
| 170°-180° | 0.0 | 0.0 |
| 0°-90° | 17517.9 | 100.0 |
| 0°-180° | 17517.9 | 100.0 |



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REPORT NUMBER: P638961
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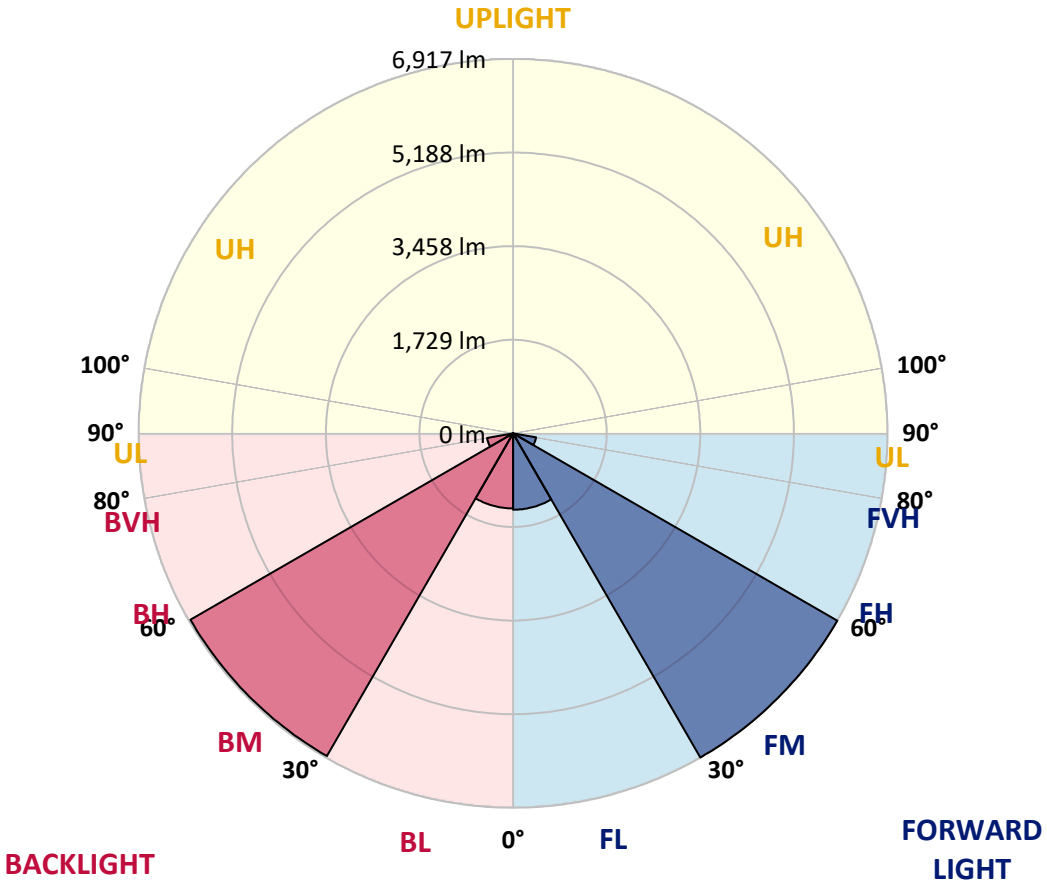
## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 1411.3 | 8.1 | | | |
| FM | (30°-60°) | 6916.9 | 39.5 | | | |
| FH | (60°-80°) | 430.8 | 2.5 | | | G0/660 |
| FVH | (80°-90°) | 0.2 | 0.0 | | | G0/10 |
| BL | (0°-30°) | 1386.8 | 7.9 | B3/2500 | | |
| BM | (30°-60°) | 6883.3 | 39.3 | B4/8500 | | |
| BH | (60°-80°) | 488.3 | 2.8 | B1/500 | | G0/660 |
| BVH | (80°-90°) | 0.3 | 0.0 | | | G0/10 |
| UL | (90°-100°) | 0.0 | 0.0 | | U0/0 | |
| UH | (100°-180°) | 0.0 | 0.0 | | U0/0 | |

**BUG Rating: B4-U0-G0**
Type V Short



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REPORT NUMBER: P638961
CATALOG NUMBER: GWS-SA4F-830-U-RW-W-GRSBK

**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 43° | 45° | 55° | 65° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 2491.6 | 2491.6 | 2491.6 | 2491.6 | 2491.6 | 2491.6 | 2491.6 | 2491.6 | 2491.6 | 2491.6 | 2491.6 |
| 2.5° | 2445.1 | 2451.0 | 2458.7 | 2466.5 | 2476.1 | 2485.8 | 2491.6 | 2509.1 | 2505.2 | 2520.7 | 2520.7 |
| 5° | 2418.0 | 2423.8 | 2433.5 | 2451.0 | 2472.3 | 2493.6 | 2509.1 | 2544.0 | 2563.3 | 2594.3 | 2606.0 |
| 7.5° | 2431.6 | 2439.3 | 2451.0 | 2478.1 | 2511.0 | 2544.0 | 2561.4 | 2617.6 | 2656.3 | 2714.5 | 2747.4 |
| 10° | 2476.1 | 2483.9 | 2503.3 | 2549.8 | 2592.4 | 2638.9 | 2660.2 | 2731.9 | 2793.9 | 2873.3 | 2919.8 |
| 12.5° | 2526.5 | 2536.2 | 2575.0 | 2644.7 | 2718.3 | 2780.3 | 2809.4 | 2888.8 | 2952.8 | 3041.9 | 3115.5 |
| 15° | 2578.8 | 2594.3 | 2654.4 | 2757.1 | 2861.7 | 2945.0 | 2976.0 | 3061.3 | 3125.2 | 3220.1 | 3303.5 |
| 17.5° | 2700.9 | 2718.3 | 2786.1 | 2896.6 | 3040.0 | 3136.8 | 3164.0 | 3253.1 | 3301.5 | 3365.5 | 3452.7 |
| 20° | 2854.0 | 2886.9 | 2970.2 | 3103.9 | 3260.8 | 3353.8 | 3373.2 | 3460.4 | 3456.5 | 3483.7 | 3559.2 |
| 22.5° | 3043.8 | 3067.1 | 3158.1 | 3317.0 | 3493.3 | 3596.0 | 3640.6 | 3677.4 | 3629.0 | 3605.7 | 3654.2 |
| 25° | 3241.5 | 3268.6 | 3367.4 | 3541.8 | 3739.4 | 3857.6 | 3894.4 | 3923.5 | 3846.0 | 3758.8 | 3764.6 |
| 27.5° | 3497.2 | 3516.6 | 3613.5 | 3799.5 | 3997.1 | 4130.8 | 4163.7 | 4214.1 | 4111.4 | 3971.9 | 3933.2 |
| 30° | 3801.4 | 3820.8 | 3923.5 | 4119.2 | 4314.8 | 4429.2 | 4479.5 | 4541.5 | 4429.2 | 4254.8 | 4210.2 |
| 32.5° | 4157.9 | 4177.3 | 4309.0 | 4510.5 | 4671.3 | 4795.3 | 4843.8 | 4909.7 | 4820.5 | 4624.8 | 4574.5 |
| 35° | 4584.2 | 4595.8 | 4750.8 | 4969.7 | 5140.2 | 5260.4 | 5293.3 | 5370.8 | 5272.0 | 5076.3 | 5049.2 |
| 37.5° | 5078.2 | 5091.8 | 5260.4 | 5514.2 | 5688.5 | 5822.2 | 5874.5 | 5895.9 | 5775.7 | 5556.8 | 5535.5 |
| 40° | 5620.7 | 5665.3 | 5830.0 | 6103.2 | 6298.9 | 6467.4 | 6513.9 | 6442.2 | 6273.7 | 5975.3 | 5936.5 |
| 42.5° | 6186.5 | 6225.2 | 6409.3 | 6705.7 | 6932.4 | 7104.9 | 7106.8 | 6951.8 | 6665.1 | 6252.4 | 6194.2 |
| 45° | 6657.3 | 6672.8 | 6911.1 | 7209.5 | 7488.5 | 7610.6 | 7622.2 | 7341.2 | 6909.2 | 6413.2 | 6289.2 |
| 47.5° | 6980.9 | 7006.1 | 7213.4 | 7500.1 | 7808.2 | 7918.6 | 7895.4 | 7544.7 | 7025.4 | 6517.8 | 6312.4 |
| 50° | 6984.7 | 7027.4 | 7252.1 | 7529.2 | 7827.6 | 7961.2 | 7928.3 | 7602.8 | 7091.3 | 6521.7 | 6256.2 |
| 52.5° | 6366.7 | 6436.4 | 6802.6 | 7203.7 | 7660.9 | 7889.6 | 7897.3 | 7678.4 | 7066.1 | 6459.7 | 6205.9 |
| 55° | 4803.1 | 4878.7 | 5339.8 | 6023.7 | 6907.2 | 7544.7 | 7655.1 | 7589.2 | 7037.1 | 6486.8 | 6295.0 |
| 57.5° | 2542.0 | 2483.9 | 2739.6 | 3417.8 | 4528.0 | 5655.6 | 5979.2 | 6506.2 | 6713.5 | 6519.7 | 6459.7 |
| 60° | 554.1 | 590.9 | 786.6 | 1059.8 | 1767.0 | 2660.2 | 2976.0 | 3878.9 | 4952.3 | 5428.9 | 5773.8 |
| 62.5° | 238.3 | 234.4 | 244.1 | 277.1 | 404.9 | 674.3 | 823.4 | 1344.6 | 2121.6 | 2914.0 | 3450.7 |
| 65° | 195.7 | 197.6 | 205.4 | 205.4 | 191.8 | 193.8 | 203.4 | 308.1 | 496.0 | 695.6 | 933.9 |
| 67.5° | 147.3 | 149.2 | 162.8 | 166.6 | 156.9 | 139.5 | 137.6 | 116.3 | 122.1 | 153.1 | 158.9 |
| 70° | 93.0 | 93.0 | 100.8 | 104.6 | 104.6 | 96.9 | 94.9 | 83.3 | 81.4 | 93.0 | 104.6 |
| 72.5° | 50.4 | 50.4 | 54.3 | 56.2 | 54.3 | 52.3 | 52.3 | 50.4 | 48.4 | 56.2 | 71.7 |
| 75° | 21.3 | 21.3 | 23.3 | 23.3 | 21.3 | 21.3 | 21.3 | 21.3 | 21.3 | 25.2 | 38.8 |
| 77.5° | 3.9 | 5.8 | 7.8 | 5.8 | 3.9 | 3.9 | 3.9 | 5.8 | 5.8 | 7.8 | 11.6 |
| 80° | 1.9 | 1.9 | 3.9 | 1.9 | 0.0 | 0.0 | 0.0 | 0.0 | 1.9 | 1.9 | 1.9 |
| 82.5° | 1.9 | 1.9 | 1.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.9 |
| 85° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 87.5° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 90° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

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Scaled Data Report

REPORT NUMBER: P638961
CATALOG NUMBER: GWS-SA4F-830-U-RW-W-GRSBK

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 2491.6 | 2491.6 | 2491.6 | 2491.6 | 2491.6 | 2491.6 | 2491.6 | 2491.6 | 2491.6 | 2491.6 | 2491.6 |
| 2.5° | 2534.3 | 2513.0 | 2520.7 | 2524.6 | 2518.8 | 2514.9 | 2493.6 | 2487.8 | 2478.1 | 2462.6 | 2458.7 |
| 5° | 2619.5 | 2602.1 | 2600.1 | 2588.5 | 2561.4 | 2528.5 | 2487.8 | 2470.3 | 2451.0 | 2431.6 | 2427.7 |
| 7.5° | 2762.9 | 2741.6 | 2728.0 | 2689.3 | 2627.3 | 2575.0 | 2507.1 | 2470.3 | 2445.1 | 2420.0 | 2414.1 |
| 10° | 2947.0 | 2921.8 | 2883.0 | 2811.3 | 2728.0 | 2652.5 | 2573.0 | 2524.6 | 2485.8 | 2451.0 | 2449.0 |
| 12.5° | 3142.6 | 3115.5 | 3045.8 | 2954.7 | 2854.0 | 2784.2 | 2683.5 | 2615.6 | 2557.5 | 2505.2 | 2499.4 |
| 15° | 3348.0 | 3315.1 | 3220.1 | 3111.6 | 3018.6 | 2947.0 | 2836.5 | 2728.0 | 2638.9 | 2563.3 | 2555.6 |
| 17.5° | 3505.0 | 3464.3 | 3351.9 | 3270.5 | 3195.0 | 3121.3 | 2997.3 | 2854.0 | 2735.8 | 2644.7 | 2623.4 |
| 20° | 3603.8 | 3565.0 | 3458.5 | 3413.9 | 3379.0 | 3326.7 | 3179.5 | 3030.3 | 2898.5 | 2786.1 | 2766.8 |
| 22.5° | 3698.7 | 3652.2 | 3559.2 | 3559.2 | 3586.3 | 3565.0 | 3406.2 | 3235.6 | 3080.6 | 2950.8 | 2921.8 |
| 25° | 3805.3 | 3768.5 | 3702.6 | 3756.8 | 3824.7 | 3822.7 | 3660.0 | 3446.8 | 3268.6 | 3123.3 | 3094.2 |
| 27.5° | 3960.3 | 3923.5 | 3900.2 | 4002.9 | 4088.2 | 4082.3 | 3904.1 | 3673.5 | 3485.6 | 3342.2 | 3315.1 |
| 30° | 4233.5 | 4198.6 | 4173.4 | 4297.4 | 4405.9 | 4365.2 | 4169.5 | 3946.7 | 3756.8 | 3594.1 | 3574.7 |
| 32.5° | 4597.7 | 4560.9 | 4528.0 | 4652.0 | 4748.8 | 4696.5 | 4510.5 | 4301.3 | 4082.3 | 3923.5 | 3884.7 |
| 35° | 5076.3 | 4998.8 | 4965.9 | 5113.1 | 5153.8 | 5095.7 | 4917.4 | 4733.3 | 4500.8 | 4318.7 | 4293.5 |
| 37.5° | 5570.4 | 5479.3 | 5456.0 | 5583.9 | 5649.8 | 5628.5 | 5419.2 | 5227.4 | 4975.5 | 4774.0 | 4745.0 |
| 40° | 5992.7 | 5909.4 | 5868.7 | 6068.3 | 6217.5 | 6231.0 | 6043.1 | 5808.7 | 5512.2 | 5303.0 | 5250.7 |
| 42.5° | 6240.7 | 6169.0 | 6159.4 | 6469.4 | 6713.5 | 6887.9 | 6663.1 | 6420.9 | 6109.0 | 5872.6 | 5830.0 |
| 45° | 6296.9 | 6250.4 | 6331.8 | 6738.7 | 7118.4 | 7436.2 | 7244.4 | 6988.6 | 6651.5 | 6401.5 | 6360.9 |
| 47.5° | 6291.1 | 6275.6 | 6420.9 | 6878.2 | 7358.7 | 7750.1 | 7655.1 | 7366.4 | 7040.9 | 6779.4 | 6740.6 |
| 50° | *6207.8* | *6209.7* | *6451.9* | *6947.9* | *7455.6* | *7835.3* | *7740.4* | *7473.0* | *7182.4* | *6924.7* | *6893.7* |
| 52.5° | 6174.9 | 6163.2 | 6393.8 | 6926.6 | 7554.4 | 7796.6 | 7583.4 | 7283.1 | 6959.6 | 6641.8 | 6595.3 |
| 55° | 6291.1 | 6262.0 | 6401.5 | 6909.2 | 7566.0 | 7775.2 | 7213.4 | 6562.4 | 5899.7 | 5523.9 | 5492.9 |
| 57.5° | 6465.5 | 6434.5 | 6500.4 | 6781.3 | 6959.6 | 6465.5 | 5308.8 | 4258.7 | 3576.7 | 3288.0 | 3162.0 |
| 60° | 5773.8 | 5752.5 | 5702.1 | 5363.0 | 4599.7 | 3470.1 | 2363.8 | 1507.4 | 1083.1 | 875.8 | 875.8 |
| 62.5° | 3582.5 | 3553.4 | 3280.2 | 2437.4 | 1770.9 | 1024.9 | 563.8 | 352.6 | 267.4 | 249.9 | 248.0 |
| 65° | 1005.6 | 999.8 | 827.3 | 585.1 | 372.0 | 230.6 | 203.4 | 207.3 | 203.4 | 197.6 | 195.7 |
| 67.5° | 151.1 | 166.6 | 166.6 | 135.6 | 129.8 | 145.3 | 170.5 | 182.1 | 172.4 | 162.8 | 158.9 |
| 70° | 96.9 | 104.6 | 100.8 | 87.2 | 93.0 | 108.5 | 122.1 | 124.0 | 118.2 | 108.5 | 106.6 |
| 72.5° | 67.8 | 75.6 | 62.0 | 56.2 | 58.1 | 63.9 | 69.8 | 69.8 | 67.8 | 63.9 | 60.1 |
| 75° | 40.7 | 40.7 | 29.1 | 27.1 | 27.1 | 29.1 | 29.1 | 32.9 | 32.9 | 31.0 | 29.1 |
| 77.5° | 13.6 | 15.5 | 9.7 | 7.8 | 7.8 | 7.8 | 9.7 | 11.6 | 11.6 | 9.7 | 7.8 |
| 80° | 1.9 | 3.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 3.9 | 3.9 | 1.9 |
| 82.5° | 1.9 | 1.9 | 1.9 | 0.0 | 0.0 | 0.0 | 0.0 | 1.9 | 1.9 | 1.9 | 1.9 |
| 85° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.9 | 1.9 |
| 87.5° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 90° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

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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

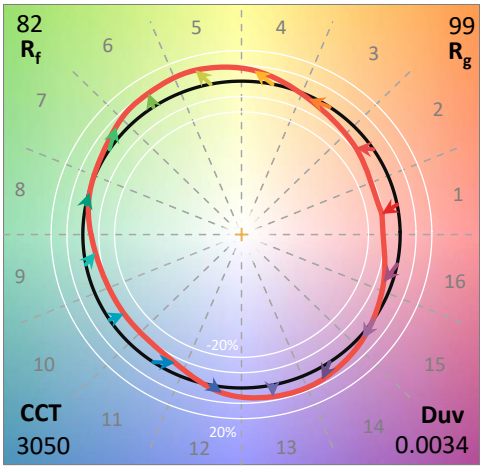
## Test Information

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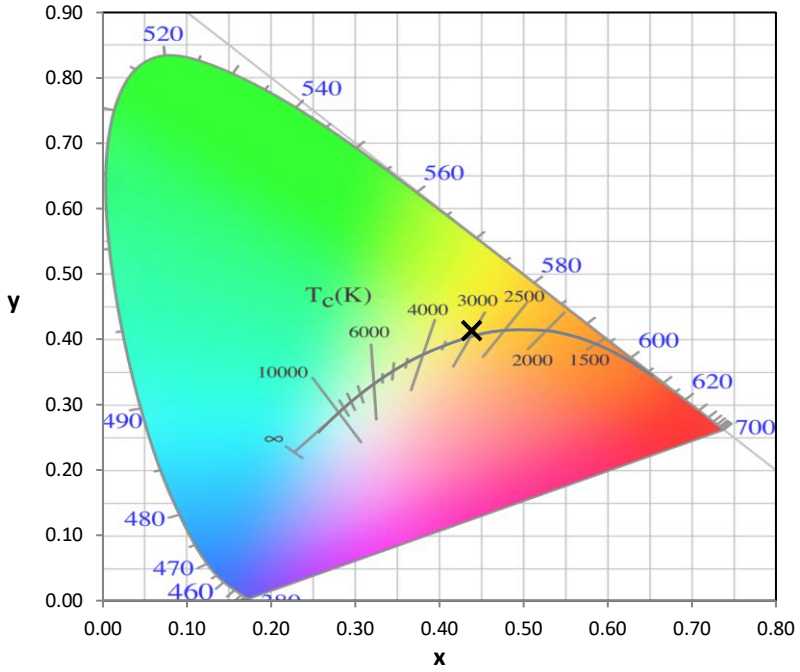
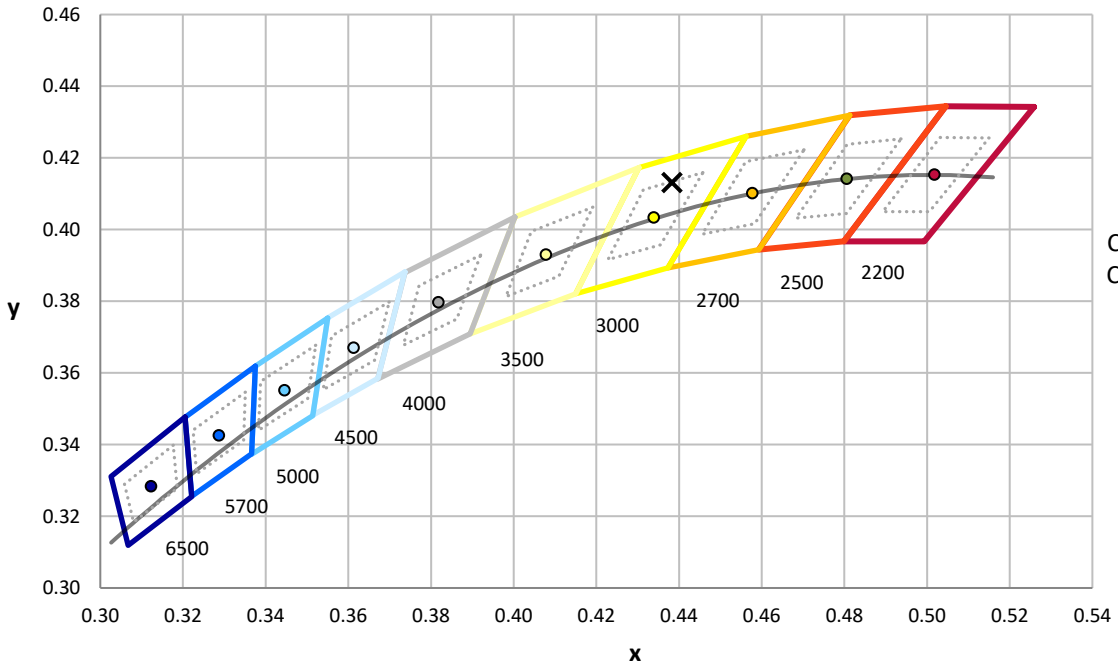
## CIE 1931 Chromaticity Diagram




## 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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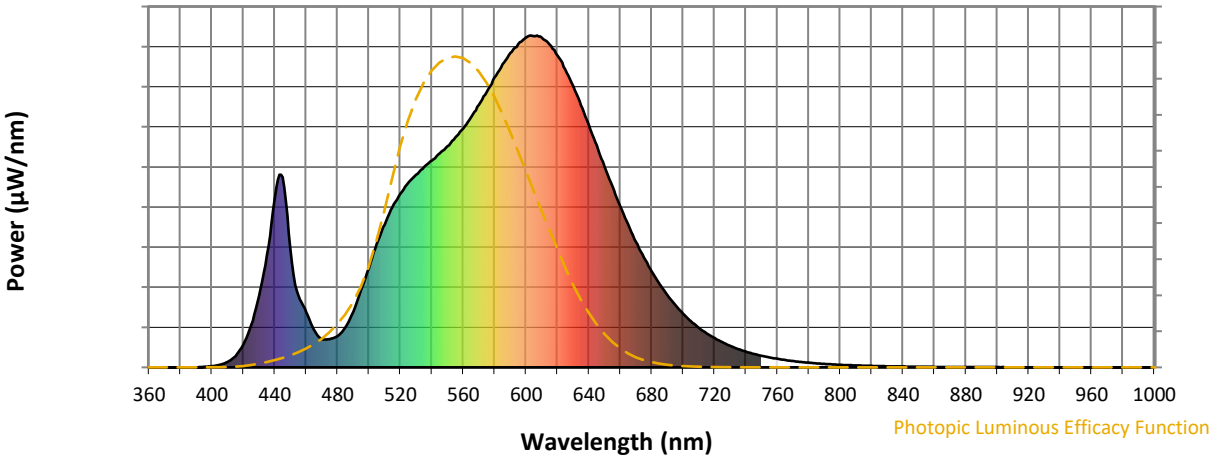
## Photopic Flux vs. Wavelength




## 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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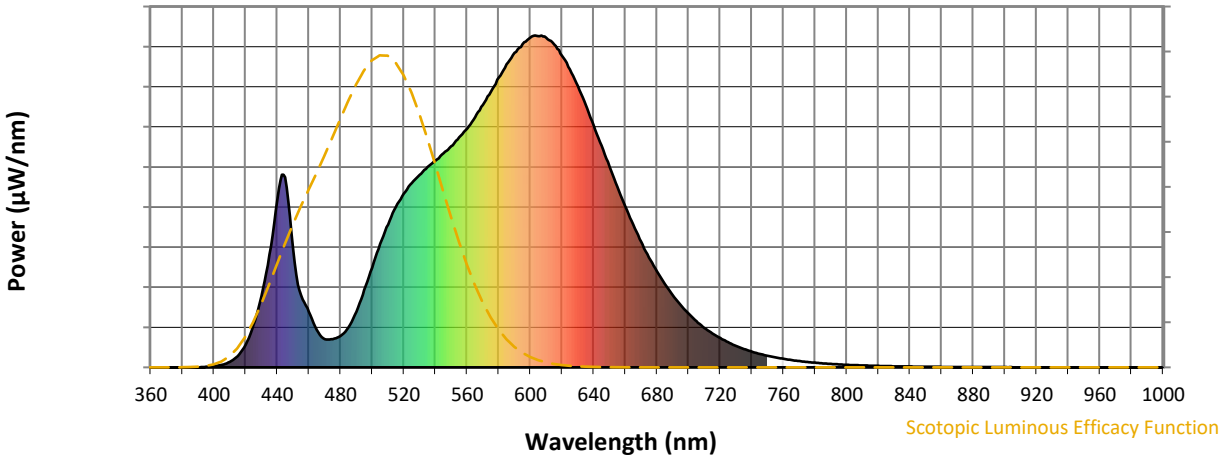
## Scotopic Flux vs. Wavelength




**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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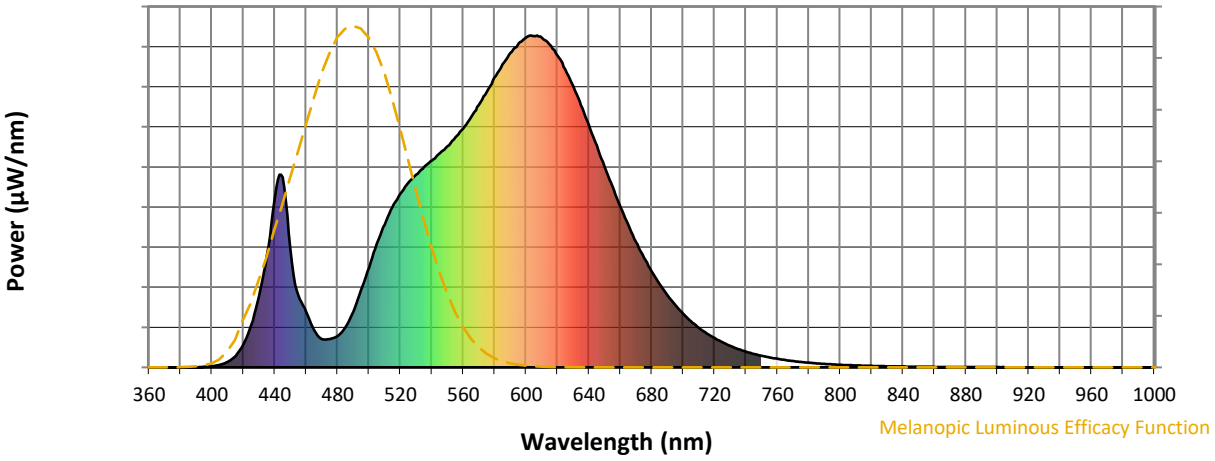
## Melanopic Flux vs. Wavelength




**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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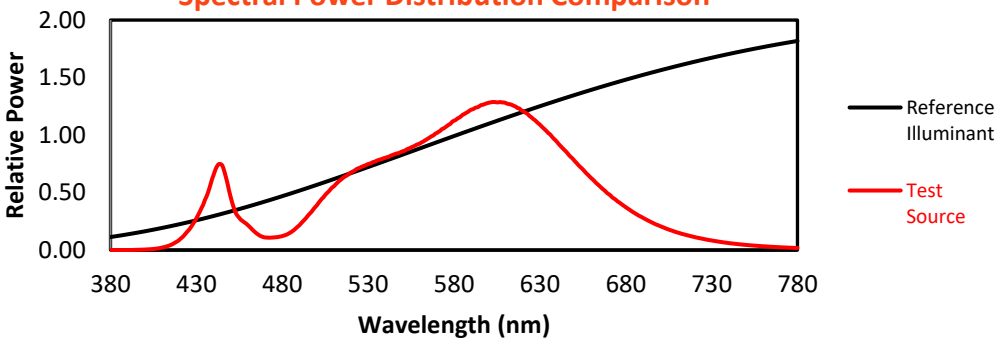
# TM-30-18

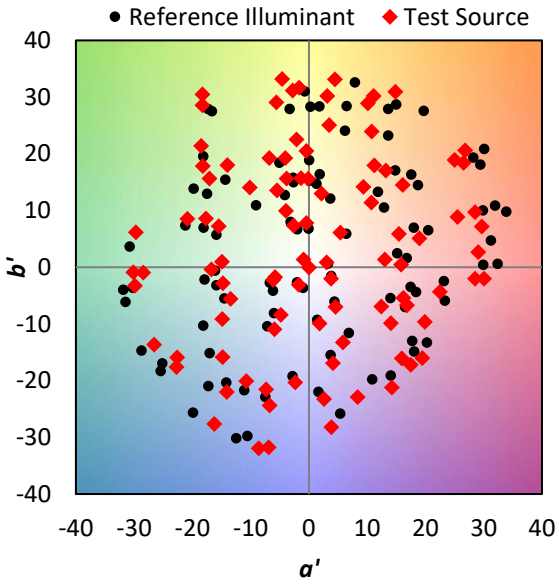
## Summary

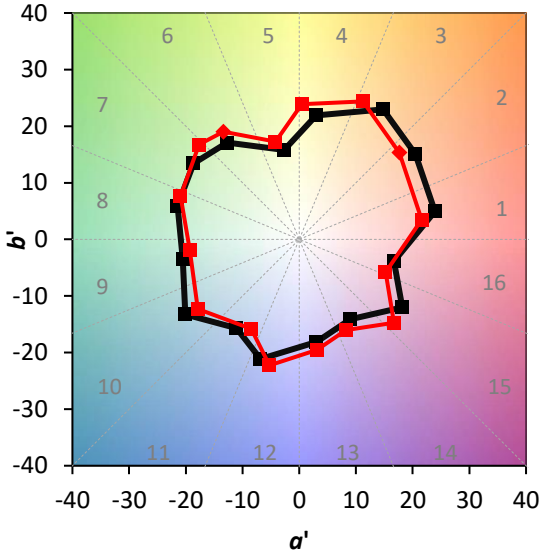
$R_f$ = 81.5
$R_g$ = 99.2
CIE $R_a$ = 81.0
$R_9$ = 7.1

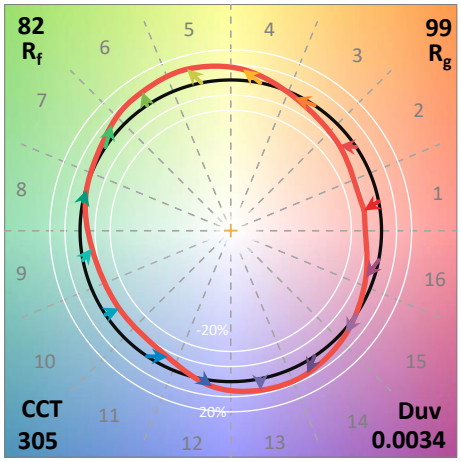
## Spectral Power Distribution Comparison

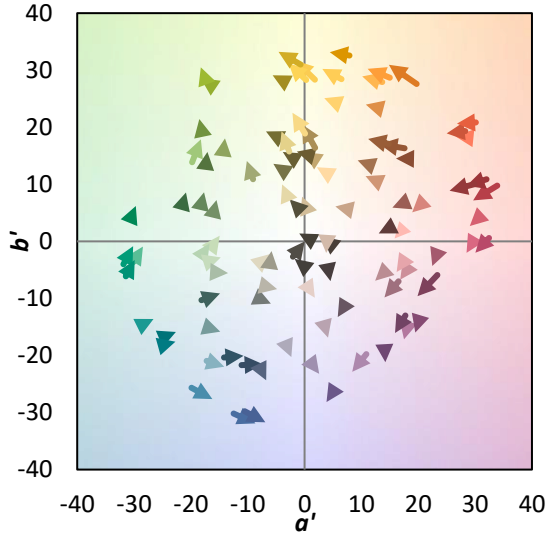



## Color Vector Graphics



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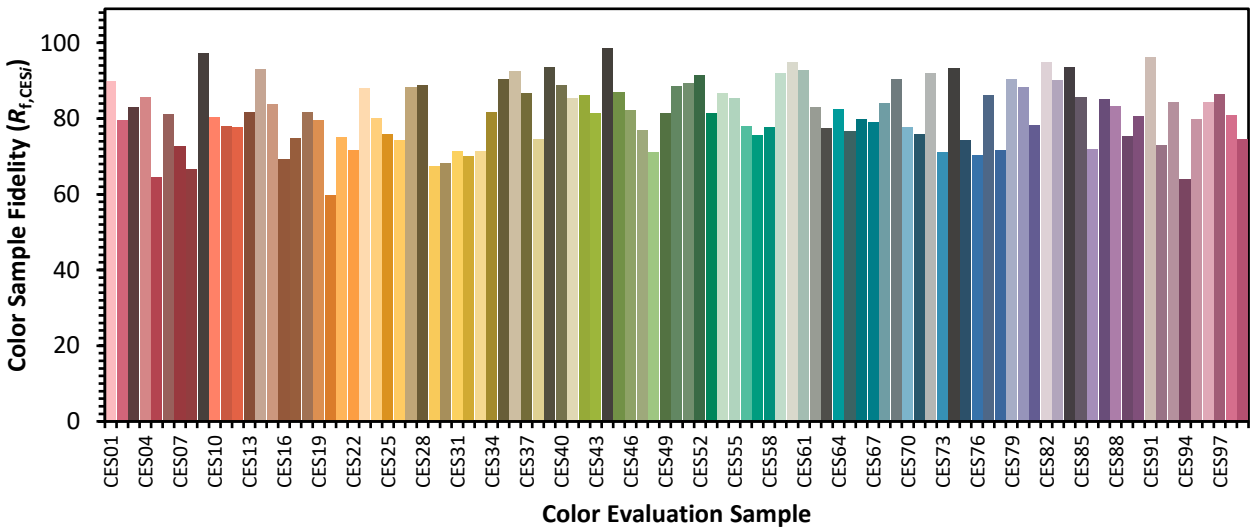
# TM-30-18

**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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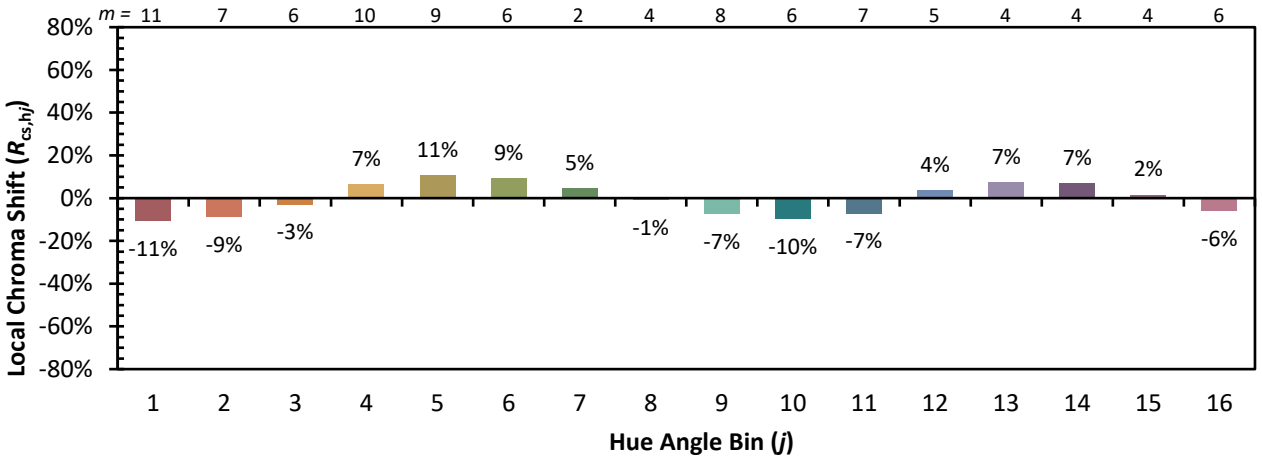
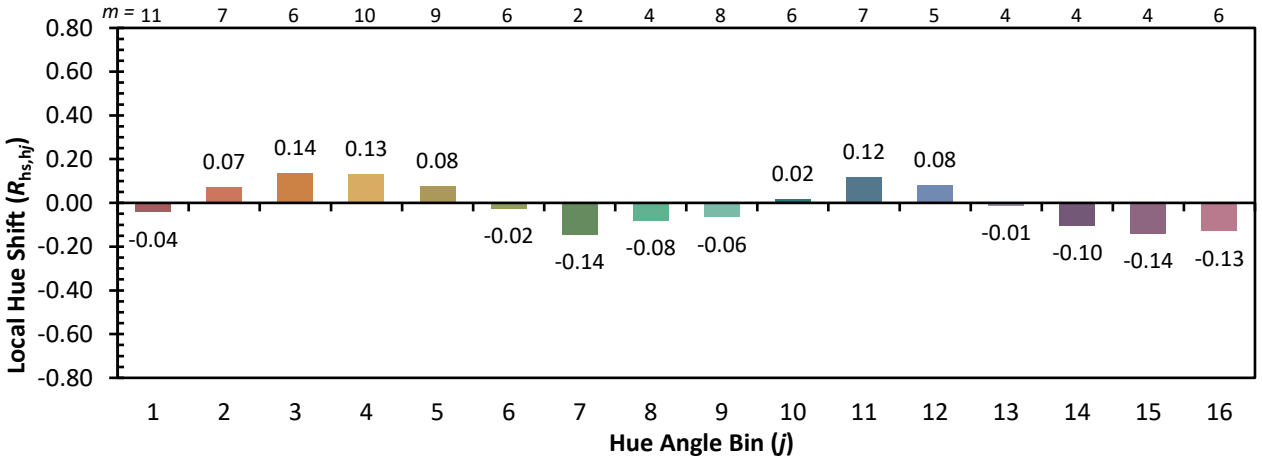
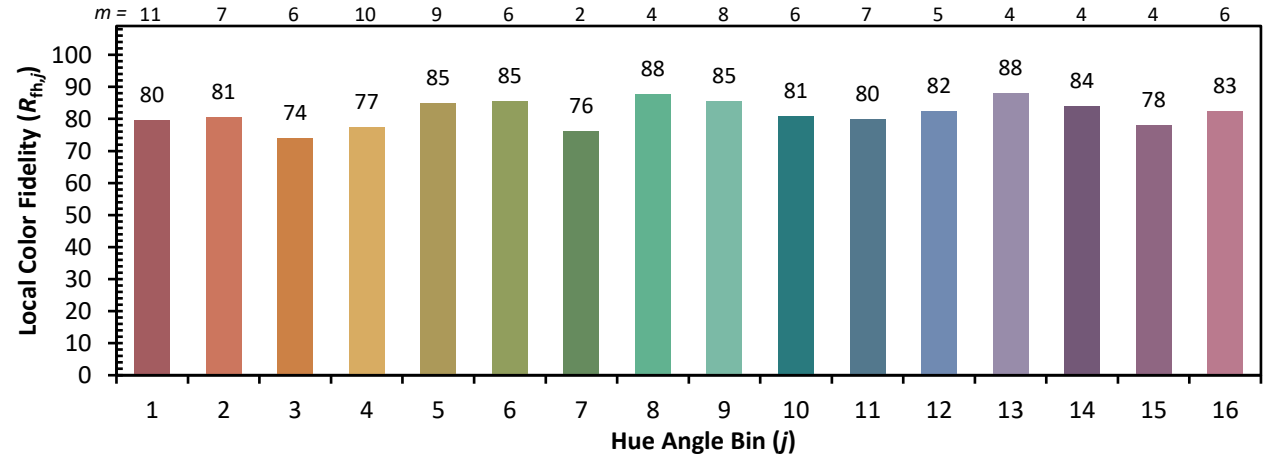
## Color Rendition by Hue-Angle Bin



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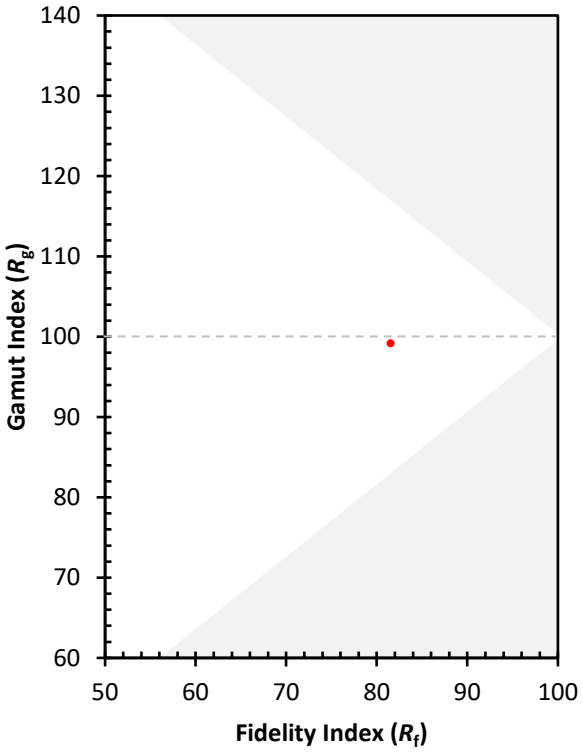
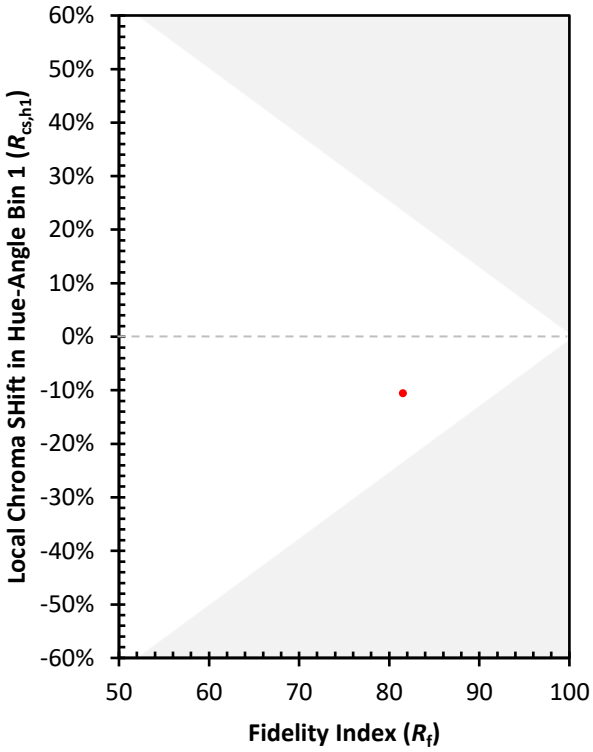
### Measure Comparisons




(END OF REPORT)