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: P636487

Luminaire Tested: GWS-SA3F-830-U-RW-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: | P636487 |
| | TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-51) |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Issue Date: | 1/10/2023 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS |
| Product Line: | McGRAW-EDISON |
| Catalog Number: | GWS-SA3F-830-U-RW-W-GRSWH |
| Description: | GALLEON WALL SLIM LUMINAIRE. (3) LIGHTSQUARES WITH 16 LEDS EACH AND RECTANGULAR WIDE OPTICS W/ FACTORY INSTALLED GLARE SHIELD, WH |
| Light Source: | (48) 3000K CCT, 80 CRI LEDS |
| Ballast/Driver: | - |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 17122.3 lumens |
| Efficiency: | N/A |
| Efficacy: | 93.5 lumens/watt |
| Luminous Opening: | Rectangular (W 1.5' x L: 0.5' x H: 0') |
| IES Classification: | Type V - Short |
| BUG Rating: | B4 - U0 - G1 |

| | |
|---|---|
| Input Watts (W): | 183.2 |
| 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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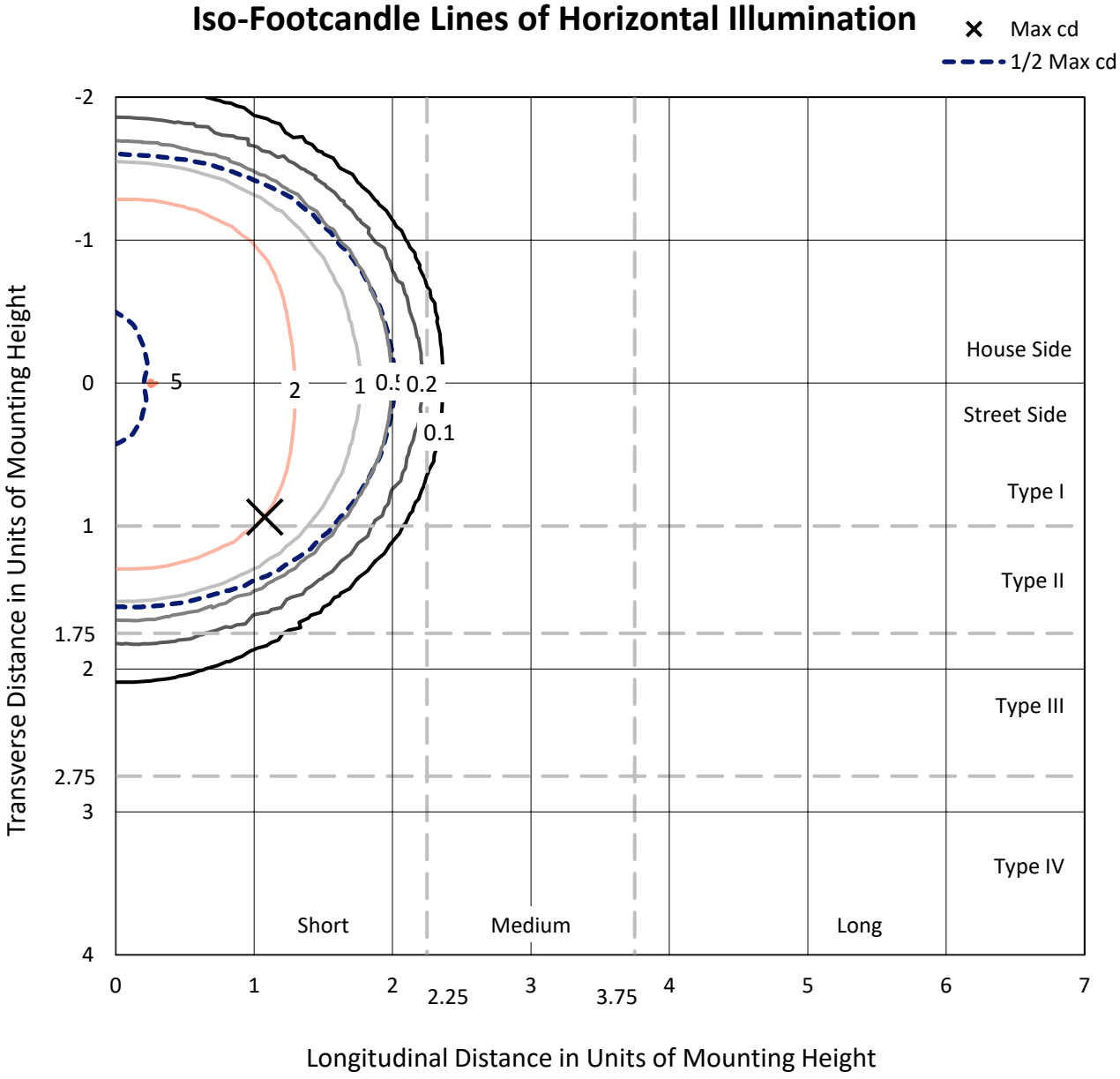
Scaled Data Report

REPORT NUMBER: P636487
CATALOG NUMBER: GWS-SA3F-830-U-RW-W-GRSWH

## Iso-Footcandle Lines of Horizontal Illumination




Based on 25 foot mounting height. Maximum calculated value = 5 fc
Type V - Short - N/A

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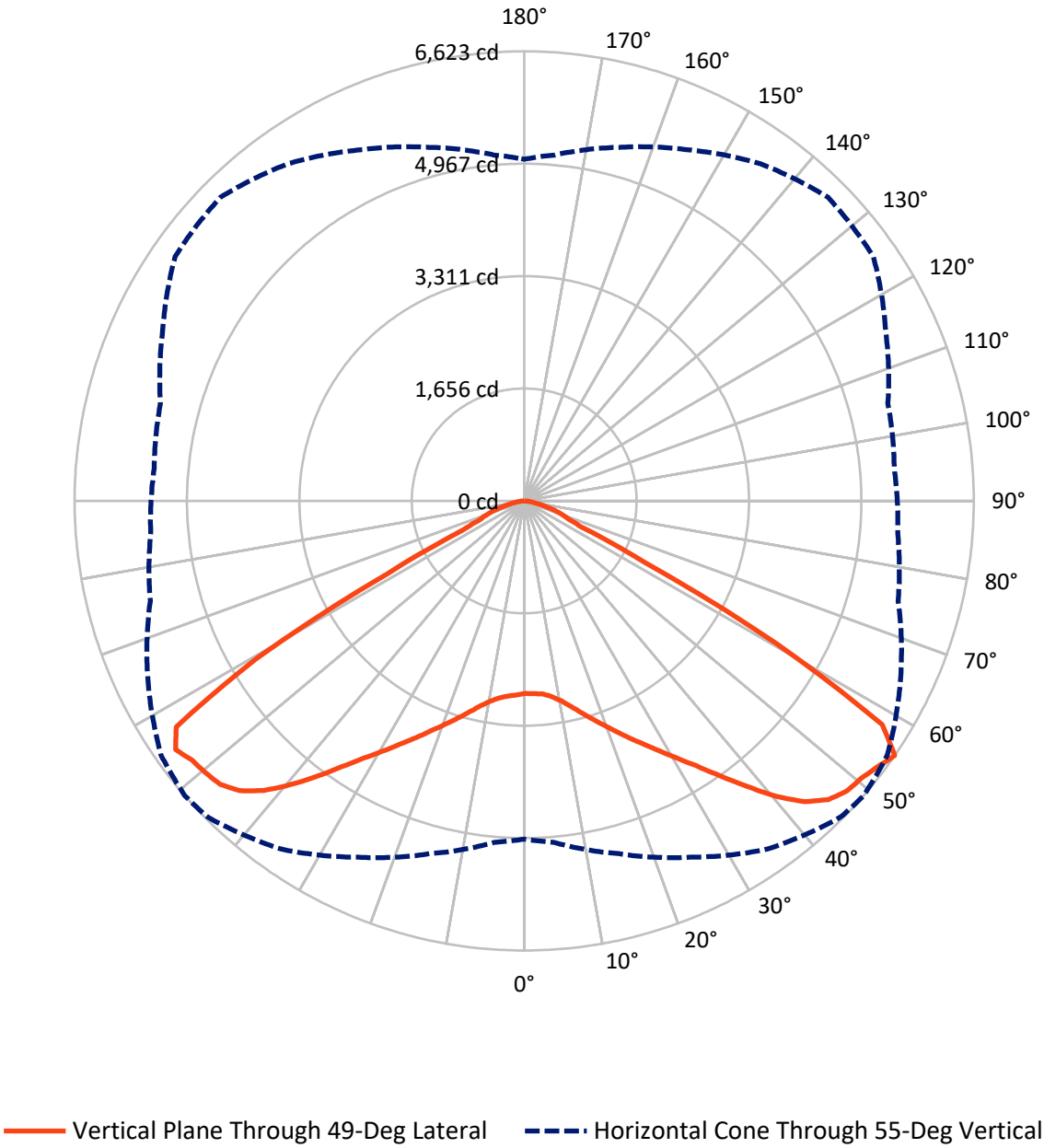
## Luminous Intensity Polar Plot



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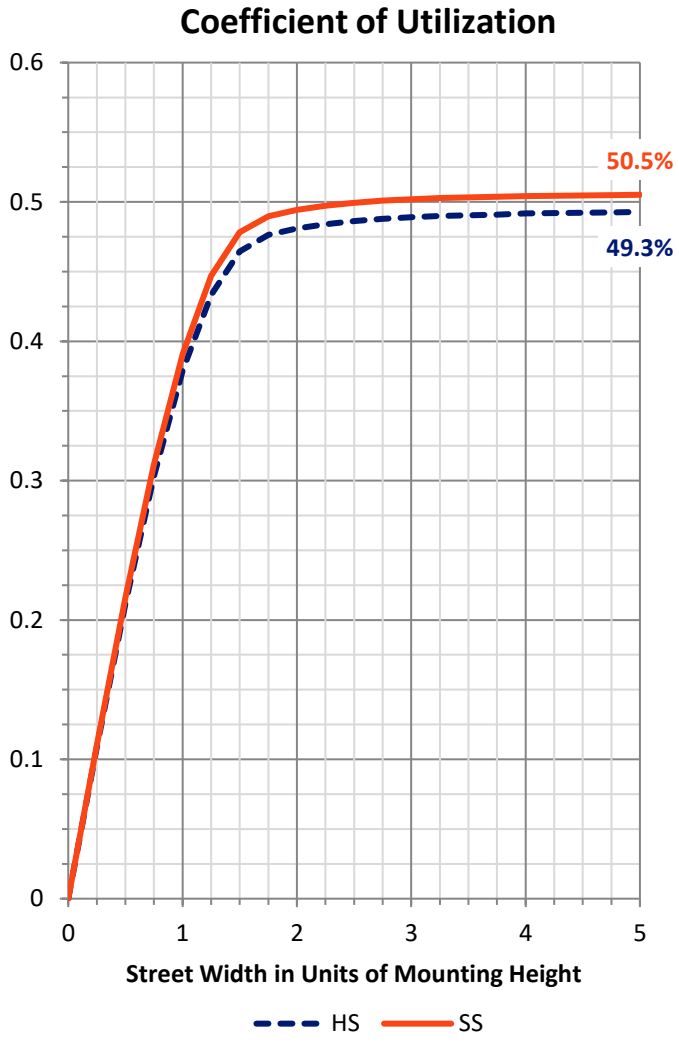
REPORT NUMBER: P636487
CATALOG NUMBER: GWS-SA3F-830-U-RW-W-GRSWH

**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 8477.2 | 0.0 | 8477.2 |
| | % Fixture | 49.5 | 0.0 | 49.5 |
| **Street Side** | Lumens | 8645.1 | 0.0 | 8645.1 |
| | % Fixture | 50.5 | 0.0 | 50.5 |
| **Total** | Lumens | 17122.3 | 0.0 | 17122.3 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 276.7 | 1.6 |
| 10°-20° | 912.7 | 5.3 |
| 20°-30° | 1738.3 | 10.2 |
| 30°-40° | 2946.9 | 17.2 |
| 40°-50° | 4434.8 | 25.9 |
| 50°-60° | 4854.3 | 28.4 |
| 60°-70° | 1535.0 | 9.0 |
| 70°-80° | 368.4 | 2.2 |
| 80°-90° | 55.3 | 0.3 |
| 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° | 17122.3 | 100.0 |
| 0°-180° | 17122.3 | 100.0 |



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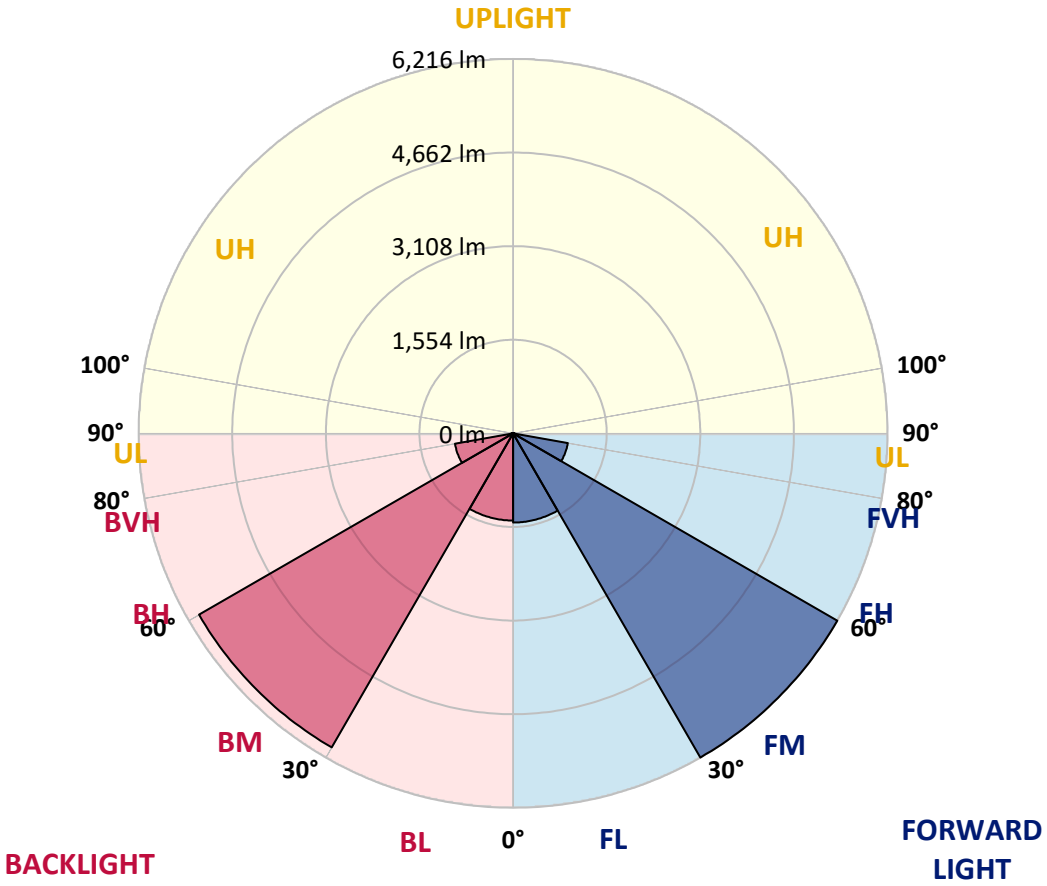
REPORT NUMBER: P636487
CATALOG NUMBER: GWS-SA3F-830-U-RW-W-GRSWH

## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 1480.4 | 8.6 | | | |
| FM | (30°-60°) | 6215.9 | 36.3 | | | |
| FH | (60°-80°) | 923.3 | 5.4 | | | G1/1800 |
| FVH | (80°-90°) | 25.6 | 0.1 | | | G1/100 |
| BL | (0°-30°) | 1447.3 | 8.5 | B3/2500 | | |
| BM | (30°-60°) | 6020.1 | 35.2 | B4/8500 | | |
| BH | (60°-80°) | 980.0 | 5.7 | B2/1000 | | G1/1800 |
| BVH | (80°-90°) | 29.7 | 0.2 | | | G1/100 |
| UL | (90°-100°) | 0.0 | 0.0 | | U0/0 | |
| UH | (100°-180°) | 0.0 | 0.0 | | U0/0 | |

**BUG Rating: B4-U0-G1**
Type V Short



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REPORT NUMBER: P636487
CATALOG NUMBER: GWS-SA3F-830-U-RW-W-GRSWH

**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 45° | 49° | 55° | 65° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 2836.4 | 2836.4 | 2836.4 | 2836.4 | 2836.4 | 2836.4 | *2836.4* | 2836.4 | 2836.4 | 2836.4 | 2836.4 |
| 2.5° | 2794.6 | 2797.4 | 2803.0 | 2812.7 | 2822.5 | 2836.4 | *2842.0* | 2848.9 | 2847.6 | 2855.9 | 2855.9 |
| 5° | 2780.7 | 2784.9 | 2793.2 | 2807.2 | 2823.9 | 2850.3 | *2857.3* | 2874.0 | 2890.7 | 2911.6 | 2918.6 |
| 7.5° | 2797.4 | 2803.0 | 2812.7 | 2835.0 | 2860.1 | 2894.9 | *2908.8* | 2936.7 | 2968.7 | 3006.3 | 3021.6 |
| 10° | 2829.5 | 2836.4 | 2853.1 | 2889.3 | 2929.7 | 2982.6 | *2995.2* | 3030.0 | 3081.5 | 3133.0 | 3163.6 |
| 12.5° | 2865.7 | 2876.8 | 2907.4 | 2964.5 | 3024.4 | 3094.0 | *3113.5* | 3156.7 | 3212.4 | 3279.2 | 3321.0 |
| 15° | 2907.4 | 2917.2 | 2964.5 | 3045.3 | 3138.6 | 3230.5 | *3252.8* | 3294.5 | 3357.2 | 3422.6 | 3481.1 |
| 17.5° | 2995.2 | 3011.9 | 3067.6 | 3160.9 | 3269.5 | 3378.1 | *3403.1* | 3450.5 | 3500.6 | 3552.1 | 3607.8 |
| 20° | 3114.9 | 3128.8 | 3199.8 | 3315.4 | 3443.5 | 3542.4 | *3567.4* | 3609.2 | 3632.9 | 3659.3 | 3706.7 |
| 22.5° | 3234.7 | 3254.1 | 3334.9 | 3471.4 | 3621.8 | 3729.0 | *3748.5* | 3787.5 | 3770.7 | 3762.4 | 3793.0 |
| 25° | 3383.6 | 3410.1 | 3489.5 | 3638.5 | 3791.6 | 3923.9 | *3939.2* | 3972.6 | 3944.8 | 3901.6 | 3900.2 |
| 27.5° | 3568.8 | 3592.5 | 3674.7 | 3827.8 | 3979.6 | 4117.5 | *4146.7* | 4191.3 | 4130.0 | 4077.1 | 4039.5 |
| 30° | 3788.8 | 3804.2 | 3894.7 | 4057.6 | 4213.5 | 4344.4 | *4382.0* | 4426.6 | 4380.6 | 4292.9 | 4255.3 |
| 32.5° | 4045.1 | 4065.9 | 4170.4 | 4341.6 | 4480.9 | 4611.8 | *4649.4* | 4705.1 | 4654.9 | 4556.1 | 4508.7 |
| 35° | 4352.8 | 4373.7 | 4483.7 | 4670.3 | 4812.3 | 4947.4 | *4973.8* | 5019.8 | 4957.1 | 4842.9 | 4805.3 |
| 37.5° | 4687.0 | 4713.4 | 4852.7 | 5029.5 | 5178.5 | 5335.9 | *5337.2* | 5351.2 | 5262.1 | 5120.0 | 5078.3 |
| 40° | 5062.9 | 5097.7 | 5237.0 | 5420.8 | 5600.4 | 5728.5 | *5727.1* | 5688.1 | 5537.8 | 5317.8 | 5253.7 |
| 42.5° | 5434.7 | 5462.6 | 5603.2 | 5792.6 | 5972.2 | 6093.3 | *6057.1* | 5962.5 | 5745.2 | 5445.9 | 5360.9 |
| 45° | 5703.5 | 5724.3 | 5871.9 | 6085.0 | 6267.4 | 6342.6 | *6277.1* | 6163.0 | 5869.2 | 5526.6 | 5401.3 |
| 47.5° | 5830.2 | 5858.0 | 6007.0 | 6218.7 | 6424.7 | 6467.9 | *6389.9* | 6282.7 | 5941.6 | 5601.8 | 5433.3 |
| 50° | 5761.9 | 5798.1 | 5966.6 | 6163.0 | 6395.5 | 6484.6 | *6428.9* | 6321.7 | 6018.2 | 5675.6 | 5490.4 |
| 52.5° | 5585.1 | 5619.9 | 5833.0 | 6071.1 | 6334.2 | 6511.1 | *6509.7* | 6422.0 | 6105.9 | 5696.5 | 5493.2 |
| 55° | *4980.8* | *5049.0* | *5380.4* | *5791.2* | *6259.0* | *6589.1* | *6622.5* | *6529.2* | *6119.8* | *5702.1* | *5522.4* |
| 57.5° | 3241.6 | 3361.4 | 3676.1 | 4210.8 | 5149.3 | 5993.1 | *6218.7* | 6240.9 | 6019.5 | 5678.4 | 5528.0 |
| 60° | 1353.5 | 1449.5 | 1698.8 | 2053.9 | 2829.5 | 3833.4 | *4270.6* | 4709.3 | 5238.4 | 5430.5 | 5476.5 |
| 62.5° | 841.0 | 849.4 | 874.5 | 955.2 | 1214.2 | 1704.4 | *1985.6* | 2396.4 | 3183.1 | 3852.9 | 4162.0 |
| 65° | 758.9 | 763.1 | 768.6 | 763.1 | 775.6 | 835.5 | *910.7* | 1054.1 | 1374.3 | 1707.1 | 2102.6 |
| 67.5° | 668.4 | 673.9 | 678.1 | 673.9 | 678.1 | 680.9 | *689.3* | 701.8 | 760.3 | 807.6 | 843.8 |
| 70° | 540.3 | 548.6 | 555.6 | 552.8 | 569.5 | 569.5 | *577.9* | 587.6 | 616.9 | 651.7 | 676.7 |
| 72.5° | 412.2 | 405.2 | 413.6 | 416.3 | 431.7 | 440.0 | *452.5* | 463.7 | 497.1 | 518.0 | 550.0 |
| 75° | 267.3 | 260.4 | 272.9 | 279.9 | 300.8 | 311.9 | *323.0* | 334.2 | 357.9 | 371.8 | 402.4 |
| 77.5° | 144.8 | 143.4 | 156.0 | 165.7 | 188.0 | 201.9 | *210.3* | 218.6 | 238.1 | 242.3 | 261.8 |
| 80° | 83.5 | 83.5 | 91.9 | 98.9 | 112.8 | 128.1 | *136.5* | 143.4 | 157.3 | 161.5 | 169.9 |
| 82.5° | 46.0 | 46.0 | 50.1 | 54.3 | 65.4 | 73.8 | *80.8* | 86.3 | 98.9 | 103.0 | 107.2 |
| 85° | 22.3 | 20.9 | 23.7 | 26.5 | 30.6 | 34.8 | *39.0* | 41.8 | 51.5 | 54.3 | 59.9 |
| 87.5° | 2.8 | 2.8 | 2.8 | 4.2 | 5.6 | 8.4 | *9.7* | 9.7 | 15.3 | 18.1 | 20.9 |
| 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: P636487
CATALOG NUMBER: GWS-SA3F-830-U-RW-W-GRSWH

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 2836.4 | 2836.4 | 2836.4 | 2836.4 | 2836.4 | 2836.4 | 2836.4 | 2836.4 | 2836.4 | 2836.4 | 2836.4 |
| 2.5° | 2864.3 | 2846.2 | 2857.3 | 2861.5 | 2861.5 | 2857.3 | 2839.2 | 2833.6 | 2825.3 | 2812.7 | 2812.7 |
| 5° | 2928.3 | 2914.4 | 2917.2 | 2910.2 | 2893.5 | 2872.6 | 2839.2 | 2822.5 | 2808.6 | 2793.2 | 2791.9 |
| 7.5° | 3038.3 | 3020.2 | 3017.4 | 2991.0 | 2946.4 | 2901.9 | 2851.7 | 2821.1 | 2800.2 | 2780.7 | 2779.3 |
| 10° | 3181.7 | 3165.0 | 3144.1 | 3091.2 | 3025.8 | 2960.3 | 2892.1 | 2850.3 | 2819.7 | 2791.9 | 2790.5 |
| 12.5° | 3341.9 | 3322.4 | 3283.4 | 3205.4 | 3123.3 | 3059.2 | 2981.2 | 2917.2 | 2871.2 | 2833.6 | 2826.7 |
| 15° | 3515.9 | 3488.1 | 3421.2 | 3329.3 | 3248.6 | 3180.3 | 3096.8 | 3004.9 | 2935.3 | 2875.4 | 2868.4 |
| 17.5° | 3649.6 | 3613.4 | 3541.0 | 3454.7 | 3387.8 | 3319.6 | 3211.0 | 3095.4 | 2995.2 | 2920.0 | 2908.8 |
| 20° | 3741.5 | 3712.3 | 3630.1 | 3566.1 | 3527.1 | 3467.2 | 3340.5 | 3209.6 | 3096.8 | 3002.1 | 2996.5 |
| 22.5° | 3826.4 | 3791.6 | 3710.9 | 3673.3 | 3673.3 | 3632.9 | 3511.7 | 3357.2 | 3224.9 | 3114.9 | 3101.0 |
| 25° | 3922.5 | 3884.9 | 3823.7 | 3819.5 | 3839.0 | 3820.9 | 3674.7 | 3509.0 | 3354.4 | 3230.5 | 3208.2 |
| 27.5° | 4056.2 | 4014.4 | 3978.2 | 4003.3 | 4031.1 | 4011.6 | 3848.7 | 3656.6 | 3493.6 | 3368.3 | 3348.8 |
| 30° | 4269.2 | 4217.7 | 4184.3 | 4214.9 | 4269.2 | 4212.1 | 4035.3 | 3832.0 | 3667.7 | 3529.9 | 3520.1 |
| 32.5° | 4517.1 | 4458.6 | 4423.8 | 4472.5 | 4521.3 | 4432.2 | 4256.7 | 4061.8 | 3889.1 | 3744.3 | 3727.6 |
| 35° | 4815.1 | 4741.3 | 4689.8 | 4755.2 | 4805.3 | 4717.6 | 4543.6 | 4358.4 | 4166.2 | 4015.8 | 3993.5 |
| 37.5° | 5079.6 | 4990.5 | 4955.7 | 5047.6 | 5114.5 | 5057.4 | 4868.0 | 4693.9 | 4483.7 | 4319.4 | 4309.6 |
| 40° | 5271.8 | 5184.1 | 5159.0 | 5310.8 | 5427.8 | 5413.8 | 5244.0 | 5044.8 | 4847.1 | 4657.7 | 4639.6 |
| 42.5° | 5355.3 | 5294.1 | 5299.7 | 5504.3 | 5685.4 | 5774.5 | 5622.7 | 5409.7 | 5218.9 | 5022.6 | 5010.0 |
| 45° | 5373.4 | 5335.9 | 5380.4 | 5636.6 | 5874.7 | 6057.1 | 5927.6 | 5749.4 | 5533.6 | 5344.2 | 5338.6 |
| 47.5° | 5392.9 | 5372.1 | 5440.3 | 5711.8 | 5994.5 | 6206.1 | 6133.7 | 5949.9 | 5731.3 | 5546.1 | 5532.2 |
| 50° | 5438.9 | 5430.5 | 5507.1 | 5764.7 | 6051.6 | 6246.5 | 6164.4 | 5981.9 | 5757.8 | 5575.4 | 5541.9 |
| 52.5° | 5452.8 | 5438.9 | 5548.9 | 5846.9 | 6146.3 | 6245.1 | 6068.3 | 5830.2 | 5604.6 | 5401.3 | 5366.5 |
| 55° | *5496.0* | *5470.9* | *5546.1* | *5877.5* | *6277.1* | *6325.9* | *6062.7* | *5706.2* | *5391.6* | *5114.5* | *5032.3* |
| 57.5° | 5507.1 | 5479.3 | 5528.0 | 5827.4 | 6135.1 | 6092.0 | 5328.9 | 4604.8 | 4011.6 | 3703.9 | 3738.7 |
| 60° | 5447.2 | 5455.6 | 5372.1 | 5338.6 | 4920.9 | 4344.4 | 3262.5 | 2608.1 | 2048.3 | 1811.6 | 1863.1 |
| 62.5° | 4146.7 | 4181.5 | 3896.1 | 3387.8 | 2605.3 | 2065.0 | 1366.0 | 1061.0 | 898.1 | 856.4 | 863.3 |
| 65° | 2092.8 | 2140.2 | 1843.6 | 1524.7 | 1133.5 | 916.2 | 792.3 | 767.2 | 758.9 | 749.1 | 749.1 |
| 67.5° | 828.5 | 842.4 | 831.3 | 778.4 | 724.1 | 704.6 | 699.0 | 696.2 | 686.5 | 680.9 | 682.3 |
| 70° | 665.6 | 676.7 | 660.0 | 626.6 | 604.3 | 602.9 | 600.1 | 594.6 | 587.6 | 587.6 | 591.8 |
| 72.5° | 543.1 | 554.2 | 530.5 | 509.6 | 492.9 | 480.4 | 473.4 | 469.3 | 459.5 | 459.5 | 463.7 |
| 75° | 399.6 | 406.6 | 387.1 | 384.3 | 366.2 | 353.7 | 342.5 | 337.0 | 324.4 | 318.9 | 323.0 |
| 77.5° | 266.0 | 264.6 | 254.8 | 254.8 | 247.9 | 232.5 | 220.0 | 207.5 | 190.8 | 179.6 | 182.4 |
| 80° | 172.7 | 172.7 | 168.5 | 168.5 | 161.5 | 149.0 | 133.7 | 121.1 | 111.4 | 103.0 | 103.0 |
| 82.5° | 110.0 | 108.6 | 107.2 | 105.8 | 103.0 | 90.5 | 79.4 | 71.0 | 64.1 | 58.5 | 59.9 |
| 85° | 61.3 | 61.3 | 58.5 | 58.5 | 52.9 | 46.0 | 40.4 | 34.8 | 30.6 | 29.2 | 29.2 |
| 87.5° | 20.9 | 20.9 | 19.5 | 19.5 | 16.7 | 12.5 | 9.7 | 8.4 | 7.0 | 5.6 | 7.0 |
| 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

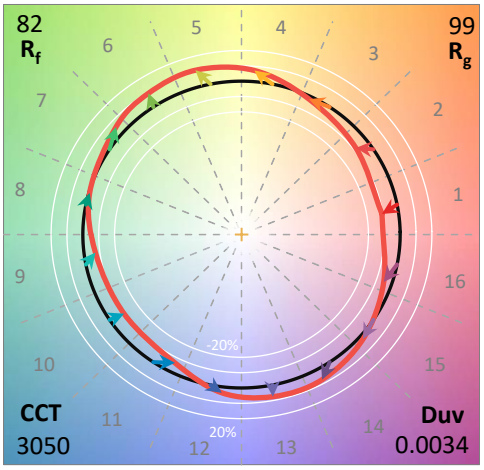
## Test Information

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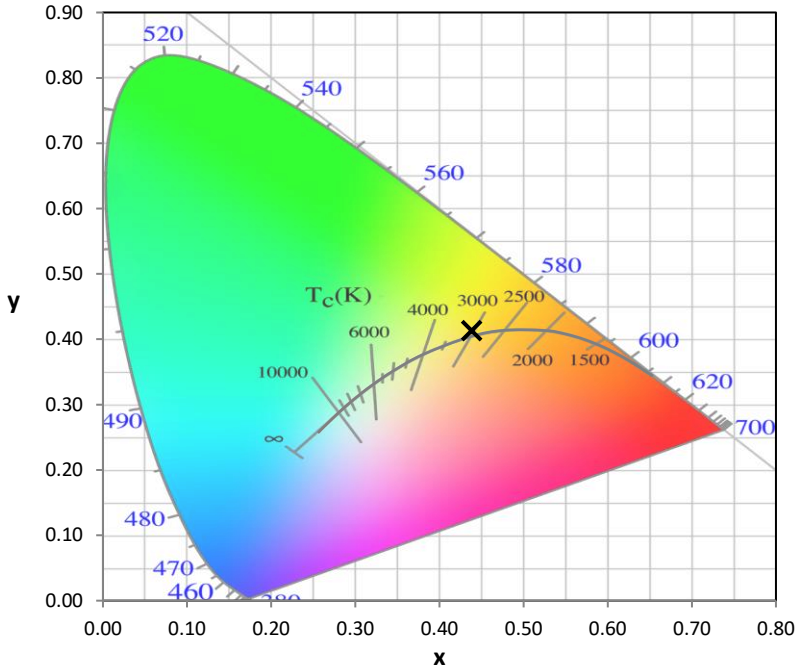
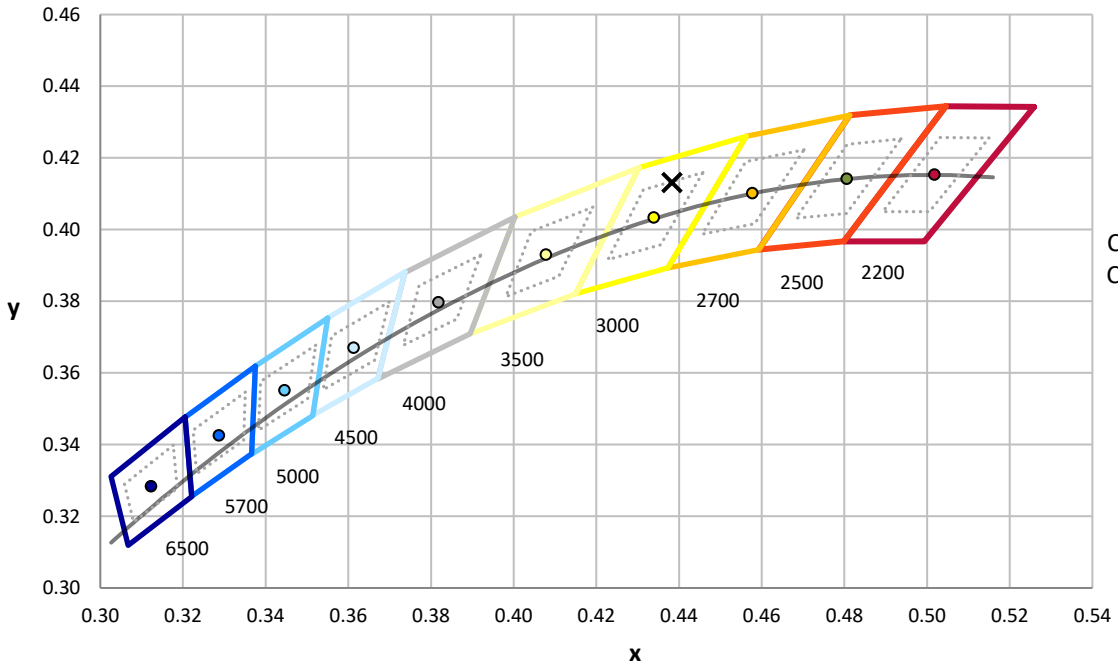
## CIE 1931 Chromaticity Diagram




## 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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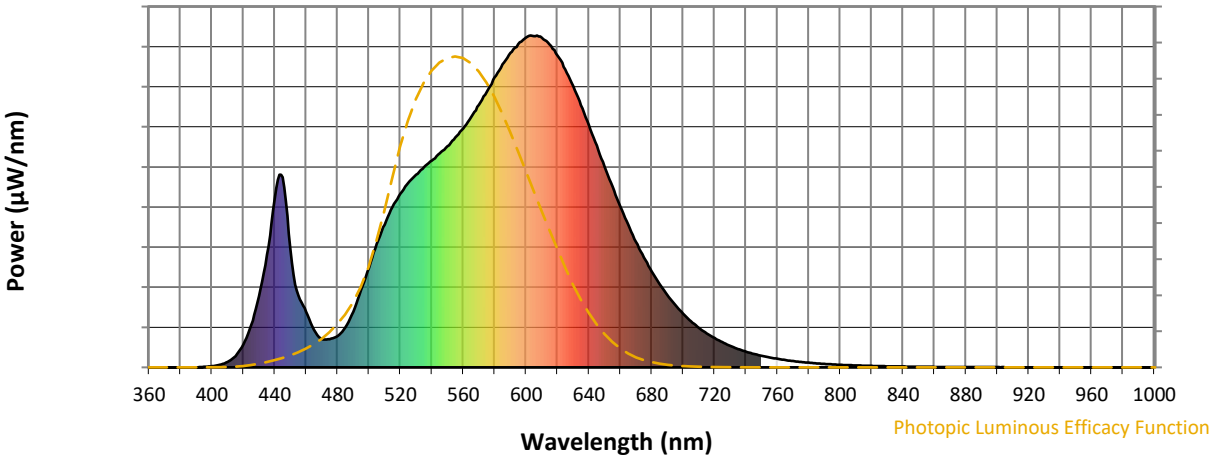
## Photopic Flux vs. Wavelength




## 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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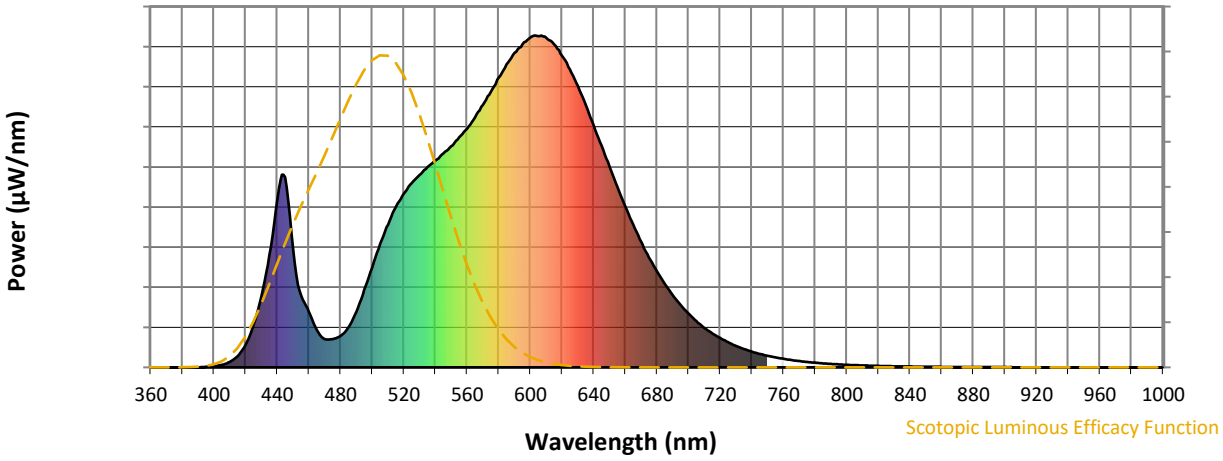
## Scotopic Flux vs. Wavelength




**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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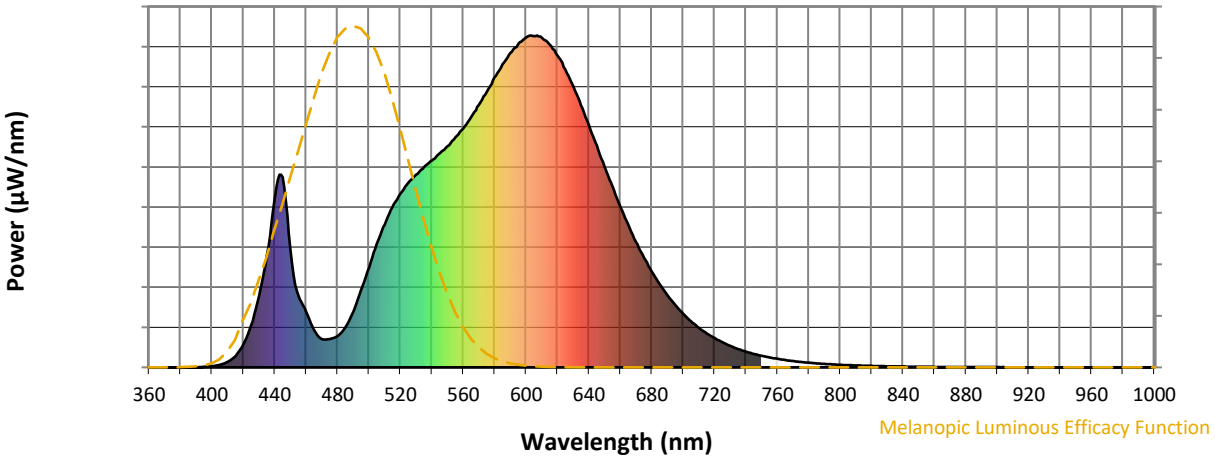
## Melanopic Flux vs. Wavelength




**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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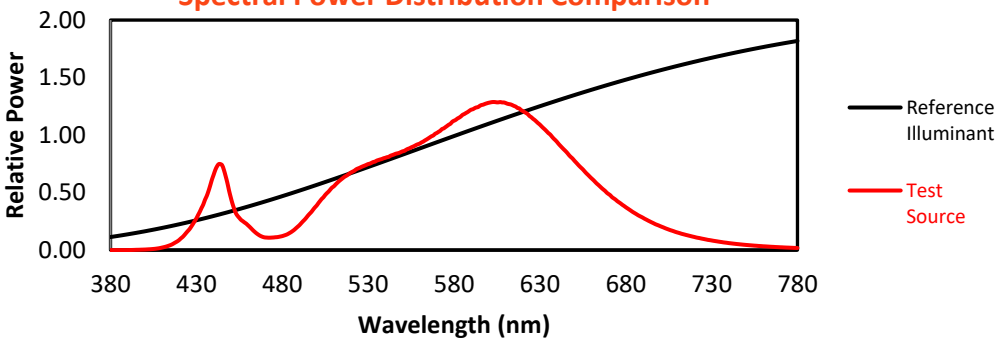
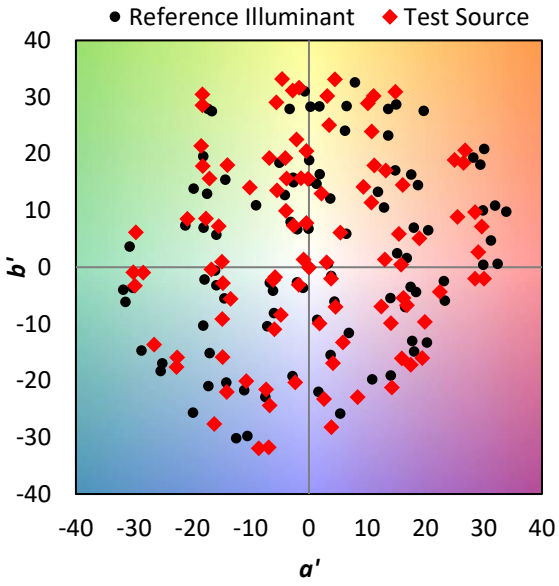
## Summary

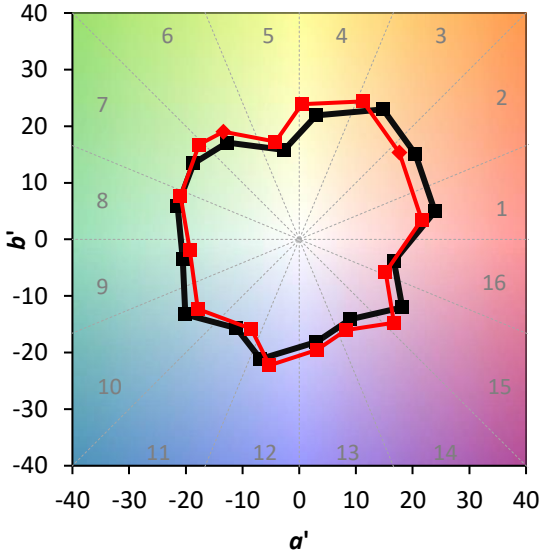
$R_f$ = 81.5
$R_g$ = 99.2
CIE $R_a$ = 81.0
$R_9$ = 7.1

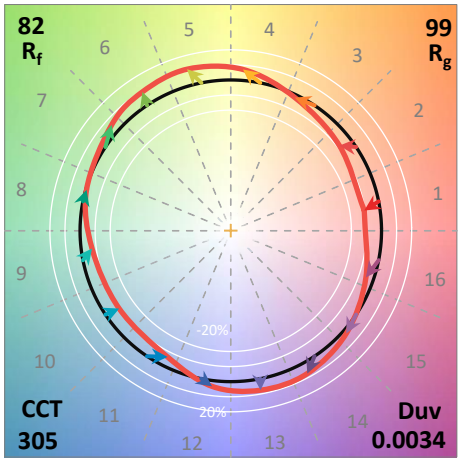
## Spectral Power Distribution Comparison

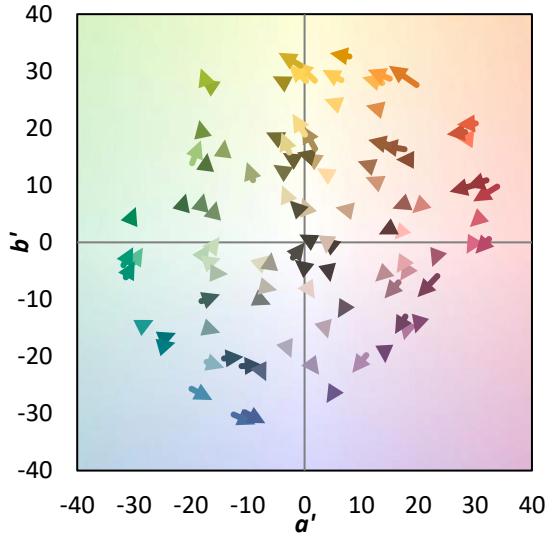



## Color Vector Graphics



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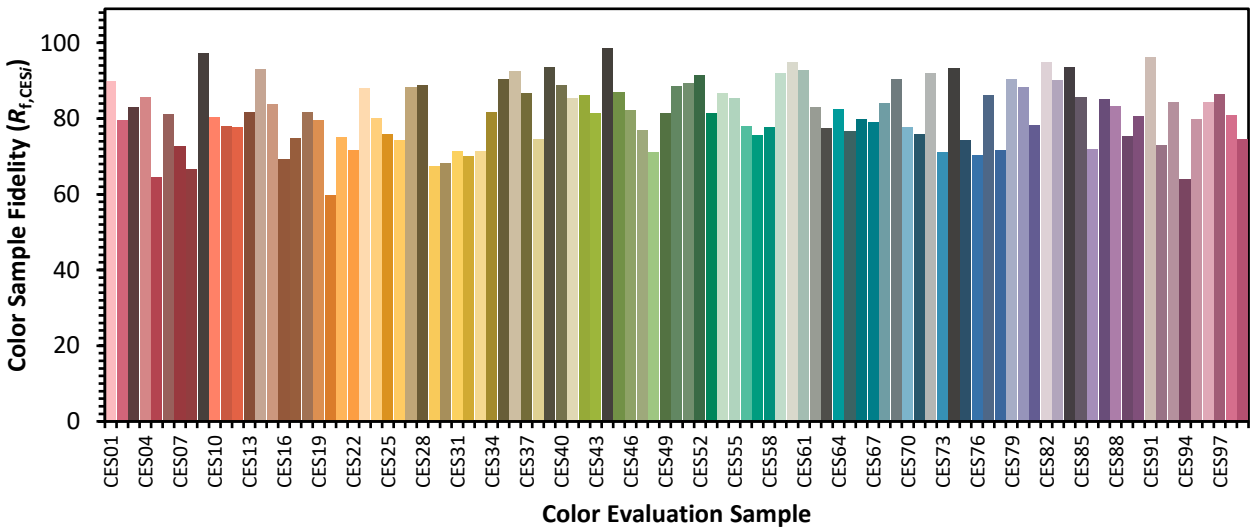
## Individual Sample Fidelity Index ($R_{f,i}$)

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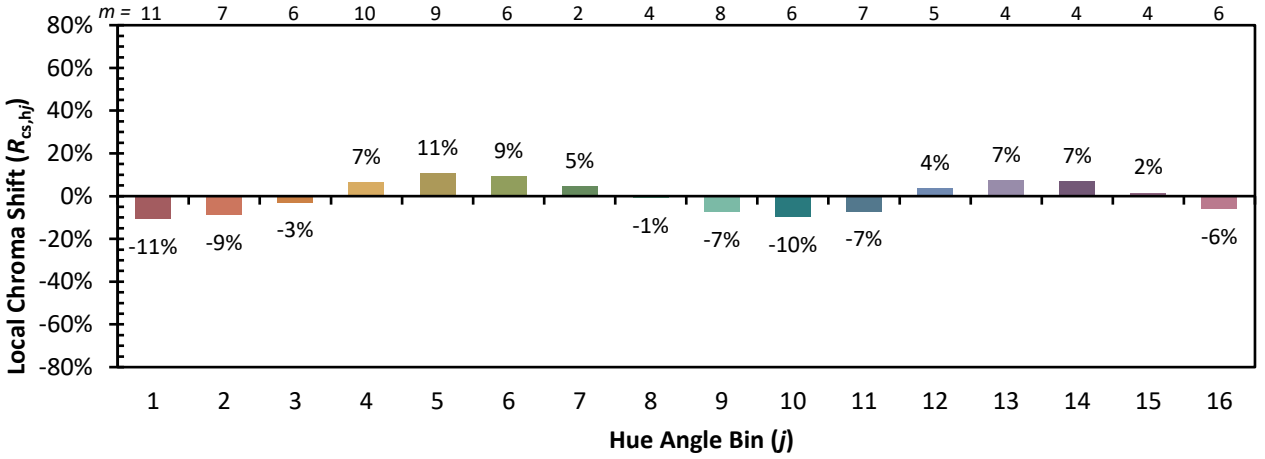
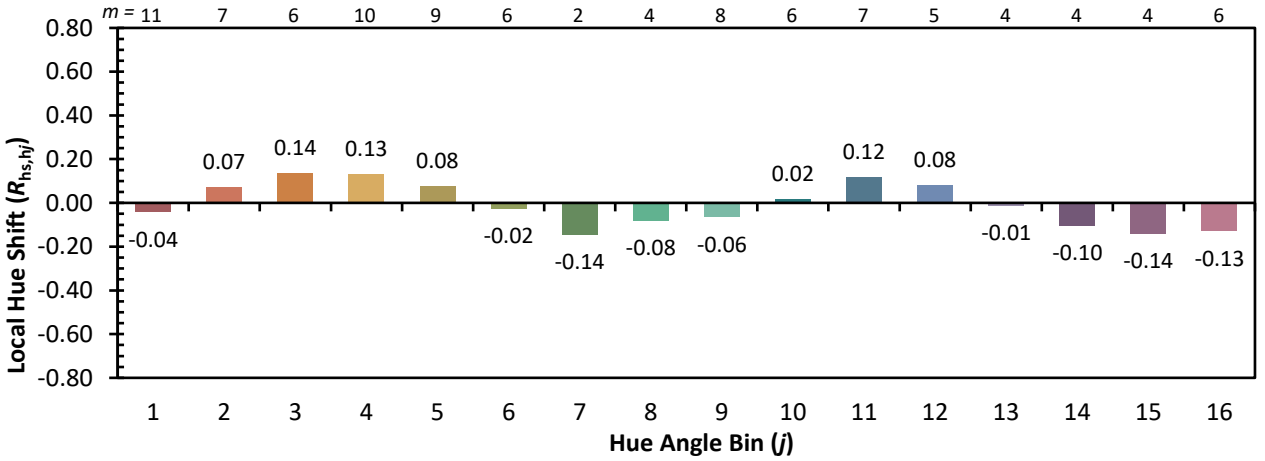
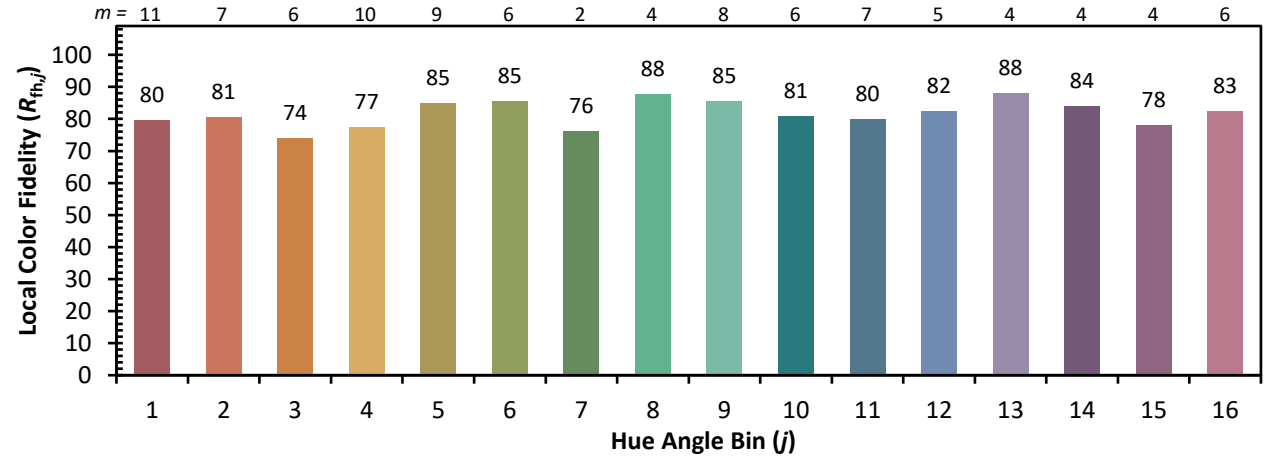
## Color Rendition by Hue-Angle Bin



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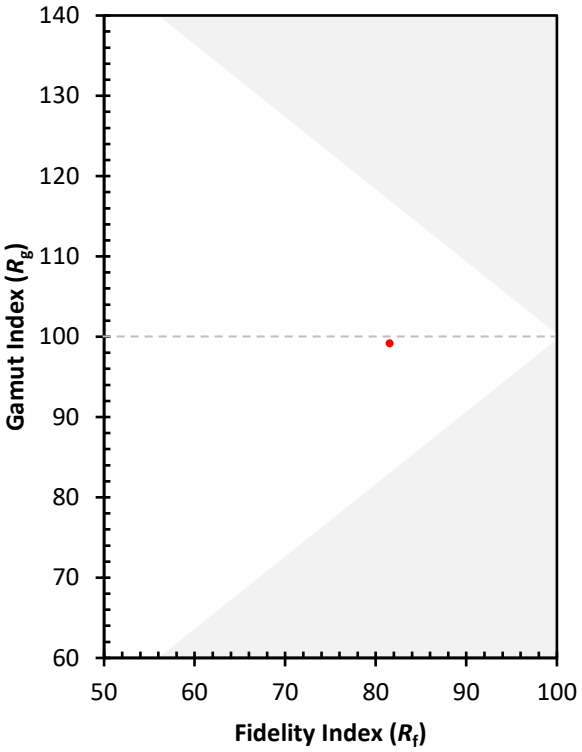
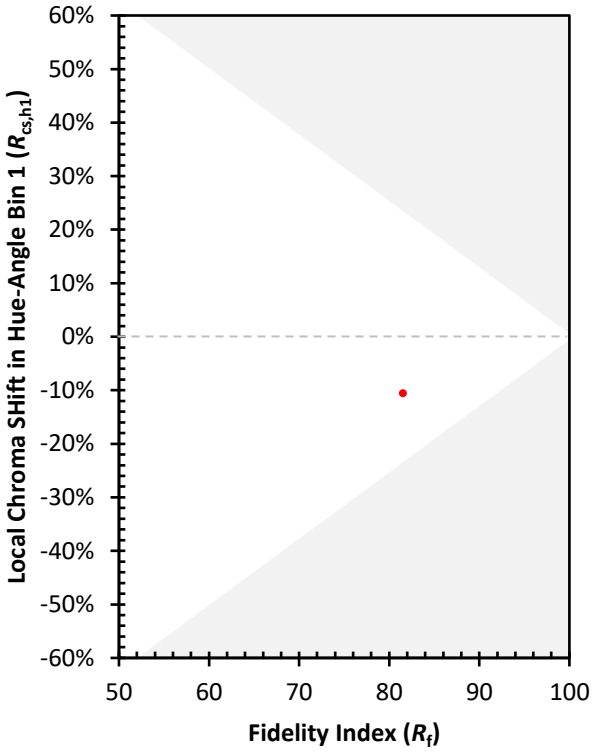
## Measure Comparisons




(END OF REPORT)