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: P639452

Luminaire Tested: GWS-SA5B-830-U-AFL-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: | P639452 |
| | TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-46) |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Issue Date: | 1/10/2023 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS |
| Product Line: | McGRAW-EDISON |
| Catalog Number: | GWS-SA5B-830-U-AFL-W-GRSBK |
| Description: | GALLEON WALL SLIM LUMINAIRE. (5) LIGHTSQUARES WITH 16 LEDS EACH AND AUTOMOTIVE FRONTLINE OPTICS W/ FACTORY INSTALLED GLARE SHIELD, BK |
| Light Source: | (80) 3000K CCT, 80 CRI LEDS |
| Ballast/Driver: | - |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 10623.1 lumens |
| Efficiency: | N/A |
| Efficacy: | 91.8 lumens/watt |
| Luminous Opening: | Rectangular (W 1.5' x L: 1' x H: 0') |
| IES Classification: | Type II - Short |
| BUG Rating: | B2 - U0 - G0 |

| | |
|---|---|
| Input Watts (W): | 115.7 |
| 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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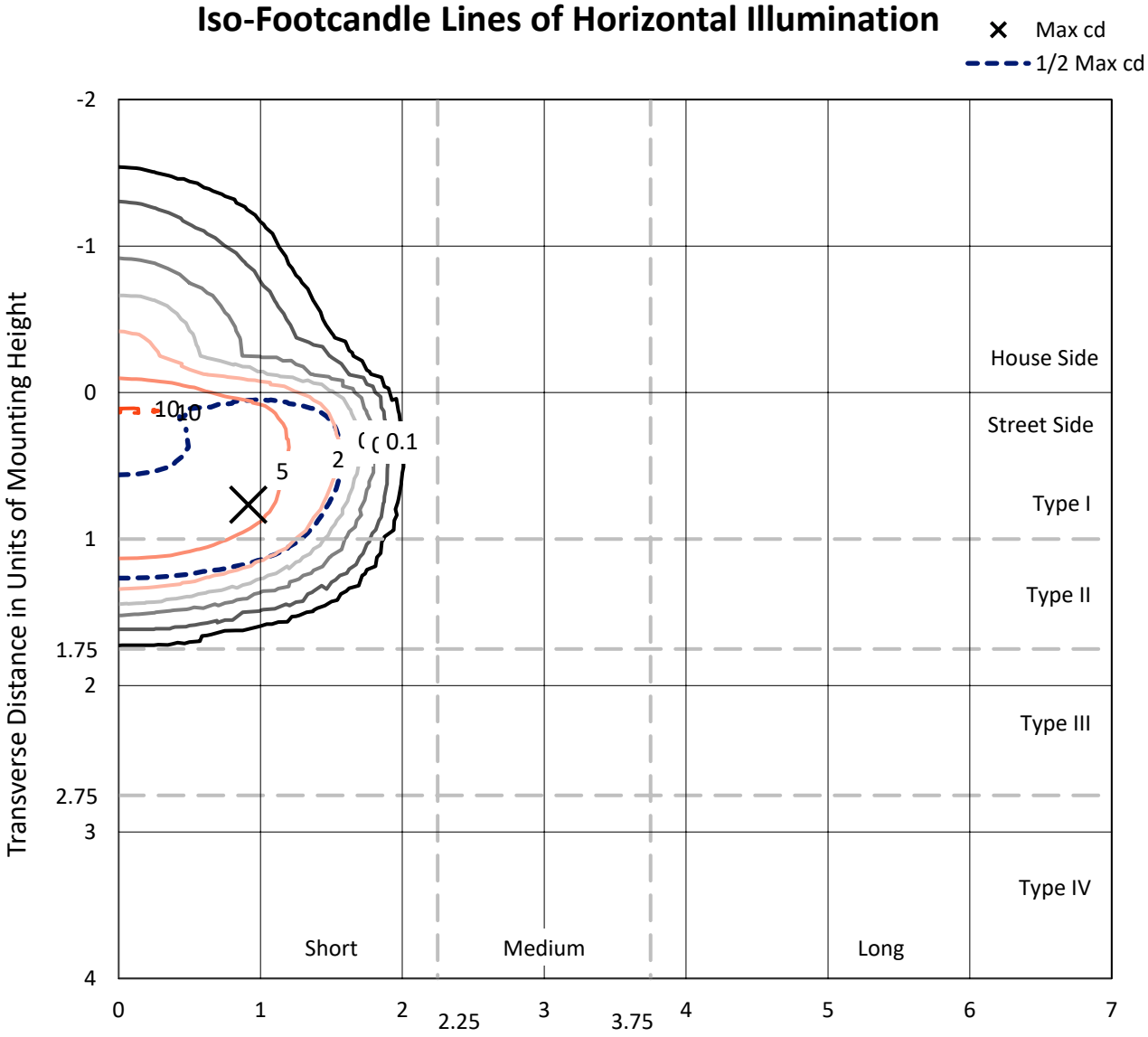
Scaled Data Report

REPORT NUMBER: P639452
CATALOG NUMBER: GWS-SA5B-830-U-AFL-W-GRSBK

## Iso-Footcandle Lines of Horizontal Illumination




Based on 20 foot mounting height. Maximum calculated value = 10.3 fc
Type II - Short - N/A

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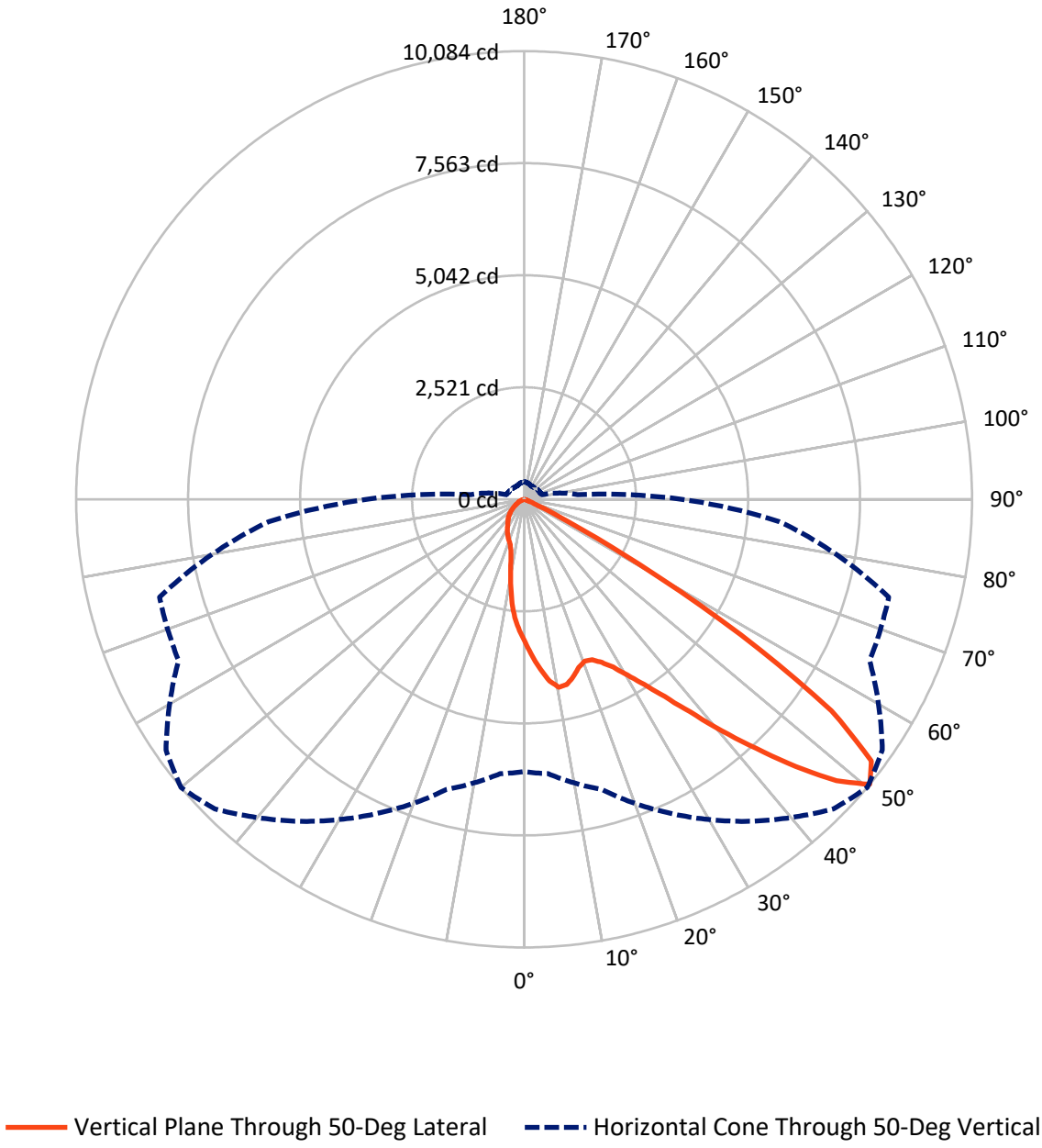
## Luminous Intensity Polar Plot



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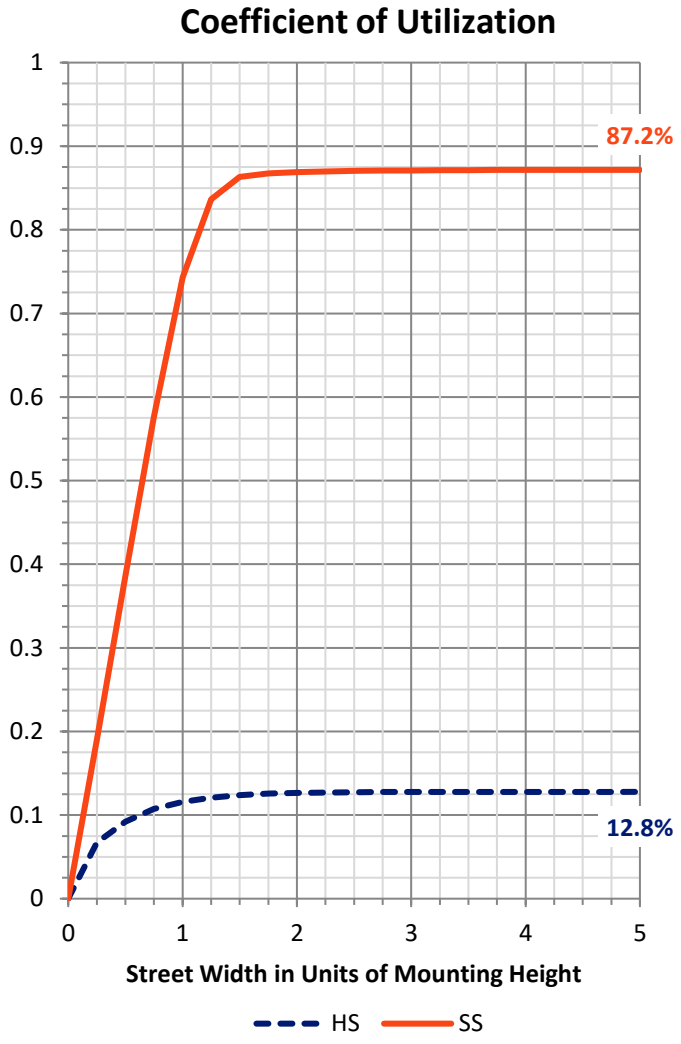
CATALOG NUMBER: GWS-SA5B-830-U-AFL-W-GRSBK

**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 1364.9 | 0.0 | 1364.9 |
| | % Fixture | 12.8 | 0.0 | 12.8 |
| **Street Side** | Lumens | 9258.2 | 0.0 | 9258.2 |
| | % Fixture | 87.2 | 0.0 | 87.2 |
| **Total** | Lumens | 10623.1 | 0.0 | 10623.1 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 298.6 | 2.8 |
| 10°-20° | 770.3 | 7.3 |
| 20°-30° | 1271.3 | 12.0 |
| 30°-40° | 2097.8 | 19.7 |
| 40°-50° | 3319.3 | 31.2 |
| 50°-60° | 2513.1 | 23.7 |
| 60°-70° | 314.5 | 3.0 |
| 70°-80° | 35.6 | 0.3 |
| 80°-90° | 2.7 | 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° | 10623.1 | 100.0 |
| 0°-180° | 10623.1 | 100.0 |



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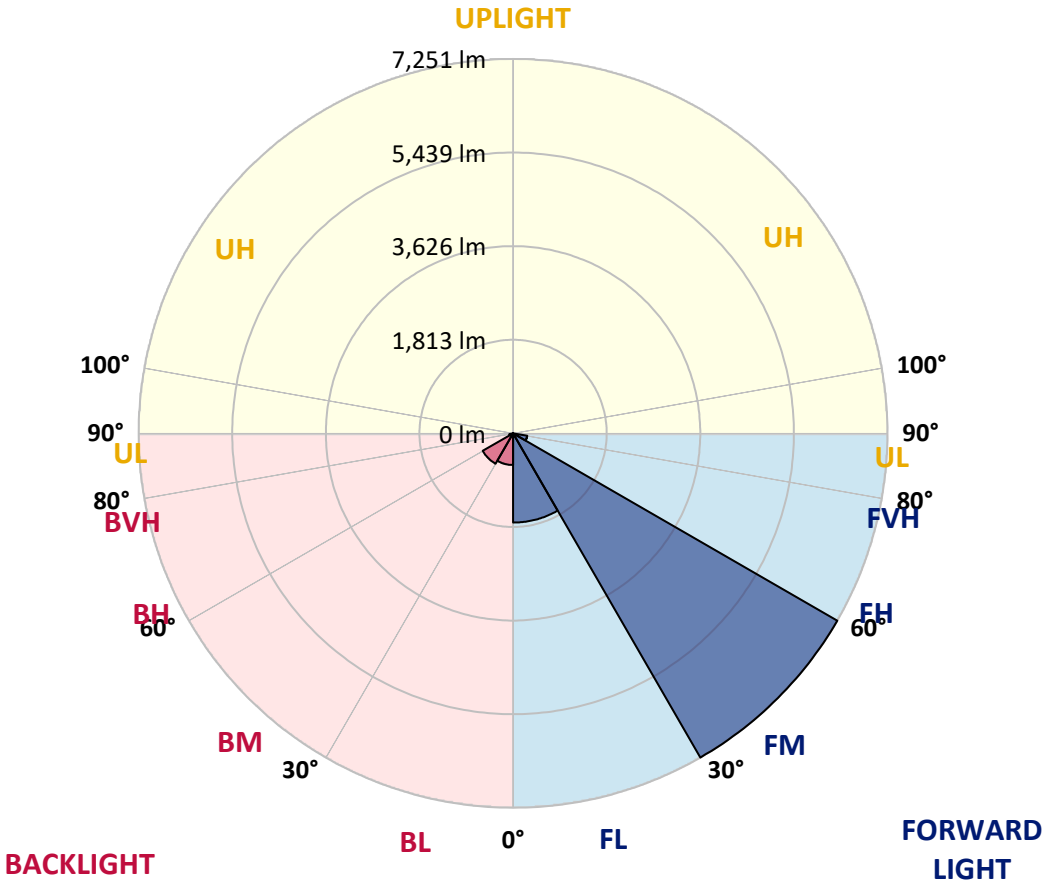
## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 1727.5 | 16.3 | | | |
| FM | (30°-60°) | 7251.4 | 68.3 | | | |
| FH | (60°-80°) | 278.1 | 2.6 | | | G0/660 |
| FVH | (80°-90°) | 1.3 | 0.0 | | | G0/10 |
| BL | (0°-30°) | 612.6 | 5.8 | B2/1000 | | |
| BM | (30°-60°) | 678.8 | 6.4 | B1/1000 | | |
| BH | (60°-80°) | 72.0 | 0.7 | B0/110 | | G0/110 |
| BVH | (80°-90°) | 1.4 | 0.0 | | | G0/10 |
| UL | (90°-100°) | 0.0 | 0.0 | | U0/0 | |
| UH | (100°-180°) | 0.0 | 0.0 | | U0/0 | |

**BUG Rating: B2-U0-G0**
Type II Short



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REPORT NUMBER: P639452
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**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 45° | 50° | 55° | 65° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 3218.4 | 3218.4 | 3218.4 | 3218.4 | 3218.4 | 3218.4 | 3218.4 | 3218.4 | 3218.4 | 3218.4 | 3218.4 |
| 2.5° | 3667.3 | 3696.6 | 3688.5 | 3650.1 | 3608.7 | 3579.3 | 3533.8 | 3519.7 | 3416.6 | 3344.8 | 3268.9 |
| 5° | 4110.2 | 4119.3 | 4109.2 | 4062.7 | 3989.9 | 3920.1 | 3845.3 | 3801.8 | 3628.9 | 3473.2 | 3314.4 |
| 7.5° | 4216.3 | 4205.2 | 4224.4 | 4247.7 | 4237.6 | 4207.2 | 4128.4 | 4080.9 | 3874.6 | 3620.8 | 3380.2 |
| 10° | 3884.7 | 3859.4 | 3931.2 | 4051.5 | 4177.9 | 4320.5 | 4300.3 | 4304.3 | 4114.2 | 3806.8 | 3466.1 |
| 12.5° | 3444.9 | 3434.8 | 3488.3 | 3627.9 | 3875.6 | 4199.2 | 4277.0 | 4407.4 | 4333.6 | 4008.1 | 3564.2 |
| 15° | 3251.7 | 3256.8 | 3289.2 | 3377.1 | 3555.1 | 3957.5 | 4144.6 | 4380.1 | 4529.8 | 4203.2 | 3672.4 |
| 17.5° | 3281.1 | 3299.3 | 3298.3 | 3327.6 | 3435.8 | 3758.3 | 3976.7 | 4294.2 | 4681.5 | 4427.7 | 3796.7 |
| 20° | 3480.3 | 3498.5 | 3471.2 | 3448.9 | 3485.3 | 3707.8 | 3888.7 | 4207.2 | 4783.6 | 4654.2 | 3928.2 |
| 22.5° | 3778.5 | 3799.8 | 3735.1 | 3671.4 | 3648.1 | 3790.7 | 3922.1 | 4171.9 | 4861.4 | 4861.4 | 4045.5 |
| 25° | 4139.5 | 4168.8 | 4068.7 | 3955.5 | 3890.8 | 3965.6 | 4064.7 | 4251.7 | 4941.3 | 5047.5 | 4125.3 |
| 27.5° | 4542.9 | 4543.9 | 4458.0 | 4330.6 | 4209.3 | 4218.4 | 4278.0 | 4431.7 | 5029.3 | 5247.7 | 4188.0 |
| 30° | 4996.9 | 5000.0 | 4885.7 | 4733.0 | 4580.3 | 4538.9 | 4589.4 | 4705.7 | 5212.3 | 5499.5 | 4275.0 |
| 32.5° | 5583.4 | 5597.5 | 5433.7 | 5209.3 | 5011.1 | 4933.2 | 4962.5 | 5084.9 | 5503.5 | 5814.9 | 4405.4 |
| 35° | 6376.1 | 6391.3 | 6149.6 | 5853.3 | 5537.9 | 5420.6 | 5449.9 | 5573.3 | 5925.1 | 6262.8 | 4613.7 |
| 37.5° | 7158.7 | 7178.9 | 6934.2 | 6658.2 | 6225.4 | 6031.3 | 6061.6 | 6178.9 | 6558.1 | 6881.6 | 4947.4 |
| 40° | 7699.6 | 7726.9 | 7651.1 | 7465.1 | 7063.6 | 6808.8 | 6845.2 | 6887.7 | 7254.7 | 7621.8 | 5380.1 |
| 42.5° | 7984.8 | 8023.2 | 8055.5 | 8150.6 | 7939.3 | 7725.9 | 7664.2 | 7667.3 | 7963.5 | 8376.1 | 5830.1 |
| 45° | 8002.0 | 8039.4 | 8205.2 | 8572.2 | 8733.0 | 8688.5 | 8576.3 | 8500.4 | 8504.5 | 8878.6 | 6111.2 |
| 47.5° | 7445.8 | 7515.6 | 7826.0 | 8544.9 | 9149.6 | 9518.6 | 9462.0 | 9282.0 | 8732.0 | 8912.0 | 6080.8 |
| 50° | 6128.4 | 6197.1 | 6761.3 | 7795.7 | 8846.2 | 9850.3 | 10083.8 | 9842.2 | 8583.3 | 8496.4 | 5768.4 |
| 52.5° | 4450.9 | 4458.0 | 4824.0 | 6032.3 | 7616.7 | 9238.6 | 9788.6 | 9765.3 | 8356.9 | 7992.9 | 5341.7 |
| 55° | 2114.2 | 2089.0 | 2500.5 | 3404.4 | 5267.9 | 7472.1 | 8399.3 | 8662.2 | 8035.3 | 7628.9 | 5011.1 |
| 57.5° | 615.8 | 627.9 | 810.9 | 1328.6 | 2635.0 | 4775.5 | 5752.2 | 6241.6 | 6595.5 | 6271.9 | 3886.7 |
| 60° | 276.0 | 277.0 | 308.4 | 404.4 | 877.6 | 2221.4 | 2973.7 | 3579.3 | 3943.3 | 3654.2 | 1928.2 |
| 62.5° | 200.2 | 201.2 | 213.3 | 228.5 | 298.3 | 752.3 | 1115.3 | 1486.3 | 1513.6 | 990.9 | 488.4 |
| 65° | 166.8 | 166.8 | 168.9 | 168.9 | 179.0 | 269.0 | 338.7 | 436.8 | 368.0 | 273.0 | 191.1 |
| 67.5° | 134.5 | 135.5 | 137.5 | 137.5 | 134.5 | 134.5 | 145.6 | 159.8 | 170.9 | 211.3 | 175.9 |
| 70° | 105.2 | 104.1 | 104.1 | 105.2 | 102.1 | 87.0 | 94.0 | 107.2 | 117.3 | 164.8 | 152.7 |
| 72.5° | 81.9 | 82.9 | 81.9 | 77.9 | 70.8 | 51.6 | 55.6 | 69.8 | 74.8 | 103.1 | 103.1 |
| 75° | 61.7 | 62.7 | 58.6 | 44.5 | 29.3 | 16.2 | 21.2 | 34.4 | 43.5 | 50.6 | 37.4 |
| 77.5° | 8.1 | 8.1 | 6.1 | 6.1 | 5.1 | 6.1 | 6.1 | 8.1 | 12.1 | 12.1 | 9.1 |
| 80° | 1.0 | 1.0 | 1.0 | 2.0 | 3.0 | 4.0 | 4.0 | 4.0 | 4.0 | 5.1 | 5.1 |
| 82.5° | 1.0 | 1.0 | 1.0 | 1.0 | 3.0 | 3.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| 85° | 0.0 | 0.0 | 0.0 | 1.0 | 2.0 | 3.0 | 3.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| 87.5° | 0.0 | 0.0 | 0.0 | 1.0 | 2.0 | 3.0 | 3.0 | 3.0 | 4.0 | 4.0 | 4.0 |
| 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: P639452
CATALOG NUMBER: GWS-SA5B-830-U-AFL-W-GRSBK

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 3218.4 | 3218.4 | 3218.4 | 3218.4 | 3218.4 | 3218.4 | 3218.4 | 3218.4 | 3218.4 | 3218.4 | 3218.4 |
| 2.5° | 3223.4 | 3164.8 | 3094.0 | 3045.5 | 2976.7 | 2931.2 | 2866.5 | 2823.0 | 2785.6 | 2756.3 | 2772.5 |
| 5° | 3224.4 | 3131.4 | 2986.8 | 2863.5 | 2729.0 | 2605.6 | 2473.2 | 2369.0 | 2275.0 | 2232.5 | 2255.8 |
| 7.5° | 3244.7 | 3111.2 | 2889.8 | 2670.4 | 2412.5 | 2157.7 | 1919.1 | 1725.0 | 1628.9 | 1583.4 | 1597.6 |
| 10° | 3284.1 | 3102.1 | 2781.6 | 2417.6 | 1999.0 | 1651.1 | 1419.6 | 1288.2 | 1234.6 | 1206.3 | 1211.3 |
| 12.5° | 3320.5 | 3096.0 | 2641.0 | 2084.9 | 1577.3 | 1281.1 | 1160.8 | 1142.6 | 1153.7 | 1154.7 | 1153.7 |
| 15° | 3370.0 | 3084.9 | 2467.1 | 1743.2 | 1261.9 | 1107.2 | 1110.2 | 1136.5 | 1162.8 | 1170.9 | 1168.8 |
| 17.5° | 3422.6 | 3067.7 | 2242.7 | 1415.6 | 1070.8 | 1056.6 | 1092.0 | 1127.4 | 1153.7 | 1157.7 | 1158.7 |
| 20° | 3477.2 | 3032.3 | 1986.8 | 1155.7 | 981.8 | 1018.2 | 1057.6 | 1083.9 | 1103.1 | 1109.2 | 1111.2 |
| 22.5° | 3502.5 | 2957.5 | 1691.6 | 969.7 | 922.1 | 970.7 | 1000.0 | 1034.4 | 1040.4 | 1018.2 | 1022.2 |
| 25° | 3489.4 | 2831.1 | 1403.4 | 844.3 | 862.5 | 911.0 | 954.5 | 937.3 | 912.0 | 895.8 | 900.9 |
| 27.5° | 3447.9 | 2663.3 | 1121.3 | 752.3 | 798.8 | 860.5 | 865.5 | 846.3 | 842.3 | 829.1 | 833.2 |
| 30° | 3403.4 | 2470.2 | 901.9 | 678.5 | 734.1 | 798.8 | 783.6 | 790.7 | 791.7 | 776.5 | 781.6 |
| 32.5° | 3376.1 | 2267.9 | 717.9 | 628.9 | 692.6 | 704.7 | 735.1 | 749.2 | 750.2 | 714.9 | 720.9 |
| 35° | 3385.2 | 2068.7 | 607.7 | 588.5 | 654.2 | 651.2 | 693.6 | 701.7 | 643.1 | 594.5 | 599.6 |
| 37.5° | 3459.0 | 1884.7 | 545.0 | 557.1 | 587.5 | 610.7 | 643.1 | 589.5 | 576.3 | 554.1 | 557.1 |
| 40° | 3596.5 | 1728.0 | 507.6 | 537.9 | 542.0 | 579.4 | 529.8 | 536.9 | 537.9 | 523.8 | 526.8 |
| 42.5° | 3757.3 | 1597.6 | 485.3 | 526.8 | 516.7 | 522.7 | 473.2 | 487.4 | 502.5 | 496.5 | 497.5 |
| 45° | 3838.2 | 1470.2 | 466.1 | 488.4 | 491.4 | 433.8 | 422.6 | 437.8 | 457.0 | 460.1 | 461.1 |
| 47.5° | 3766.4 | 1348.8 | 445.9 | 432.8 | 453.0 | 395.3 | 382.2 | 387.3 | 409.5 | 421.6 | 423.7 |
| 50° | *3547.0* | *1209.3* | *415.6* | *383.2* | *372.1* | *354.9* | *342.8* | *343.8* | *369.1* | *390.3* | *394.3* |
| 52.5° | 3238.6 | 1063.7 | 366.0 | 324.6 | 299.3 | 312.4 | 315.5 | 309.4 | 332.7 | 353.9 | 357.9 |
| 55° | 2939.3 | 881.7 | 290.2 | 263.9 | 240.6 | 269.0 | 277.0 | 269.0 | 276.0 | 290.2 | 291.2 |
| 57.5° | 2069.8 | 498.5 | 222.4 | 218.4 | 199.2 | 230.5 | 243.7 | 231.5 | 219.4 | 228.5 | 230.5 |
| 60° | 959.5 | 260.9 | 170.9 | 170.9 | 165.8 | 198.2 | 220.4 | 203.2 | 180.0 | 184.0 | 187.1 |
| 62.5° | 300.3 | 164.8 | 125.4 | 118.3 | 135.5 | 168.9 | 187.1 | 169.9 | 142.6 | 142.6 | 146.6 |
| 65° | 169.9 | 141.6 | 99.1 | 91.0 | 110.2 | 135.5 | 146.6 | 128.4 | 104.1 | 102.1 | 102.1 |
| 67.5° | 157.7 | 134.5 | 88.0 | 73.8 | 77.9 | 87.0 | 91.0 | 78.9 | 71.8 | 70.8 | 71.8 |
| 70° | 130.4 | 112.2 | 70.8 | 50.6 | 47.5 | 46.5 | 48.5 | 45.5 | 43.5 | 44.5 | 47.5 |
| 72.5° | 80.9 | 67.7 | 44.5 | 30.3 | 26.3 | 25.3 | 25.3 | 25.3 | 24.3 | 24.3 | 24.3 |
| 75° | 29.3 | 25.3 | 20.2 | 15.2 | 13.1 | 12.1 | 12.1 | 13.1 | 12.1 | 11.1 | 10.1 |
| 77.5° | 9.1 | 8.1 | 8.1 | 8.1 | 7.1 | 6.1 | 5.1 | 5.1 | 4.0 | 3.0 | 3.0 |
| 80° | 5.1 | 5.1 | 5.1 | 5.1 | 4.0 | 4.0 | 3.0 | 2.0 | 1.0 | 1.0 | 0.0 |
| 82.5° | 5.1 | 5.1 | 5.1 | 4.0 | 4.0 | 4.0 | 3.0 | 2.0 | 1.0 | 0.0 | 0.0 |
| 85° | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 3.0 | 2.0 | 1.0 | 0.0 | 0.0 |
| 87.5° | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 3.0 | 2.0 | 1.0 | 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

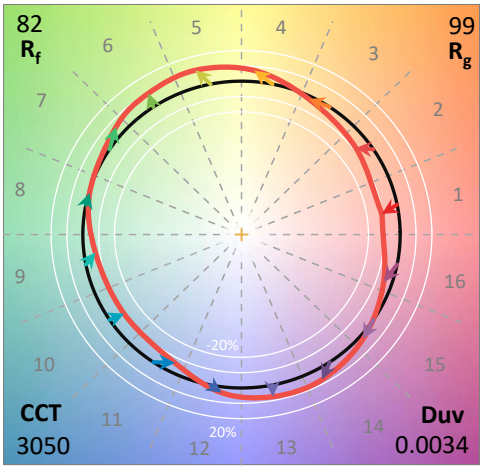
## Test Information

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

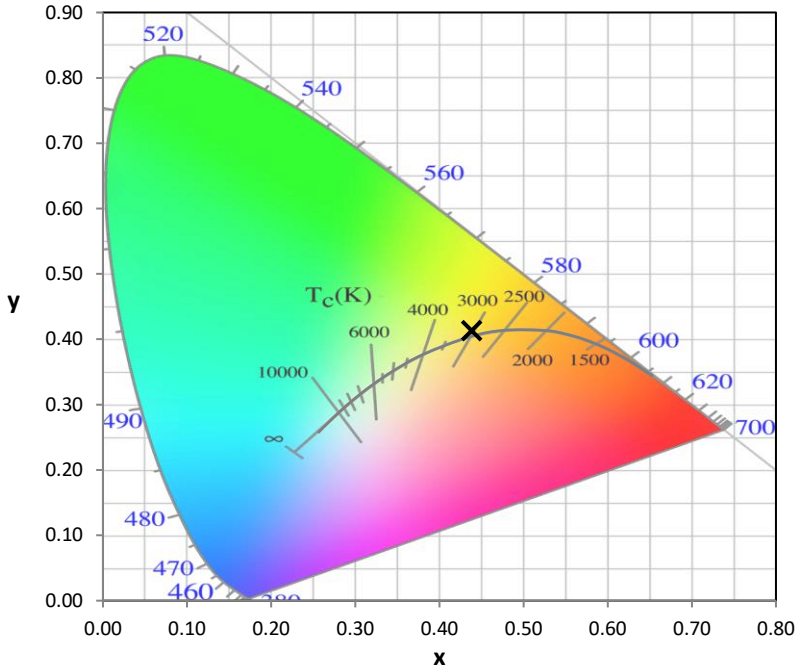
| | |
|---|---|
| Stabilization Time: | 20M |
| Operation Time: | 1H 20M |
| Sphere Temperature (°C): | 24.2 |

REPORT NUMBER: SP1-2408-195-9

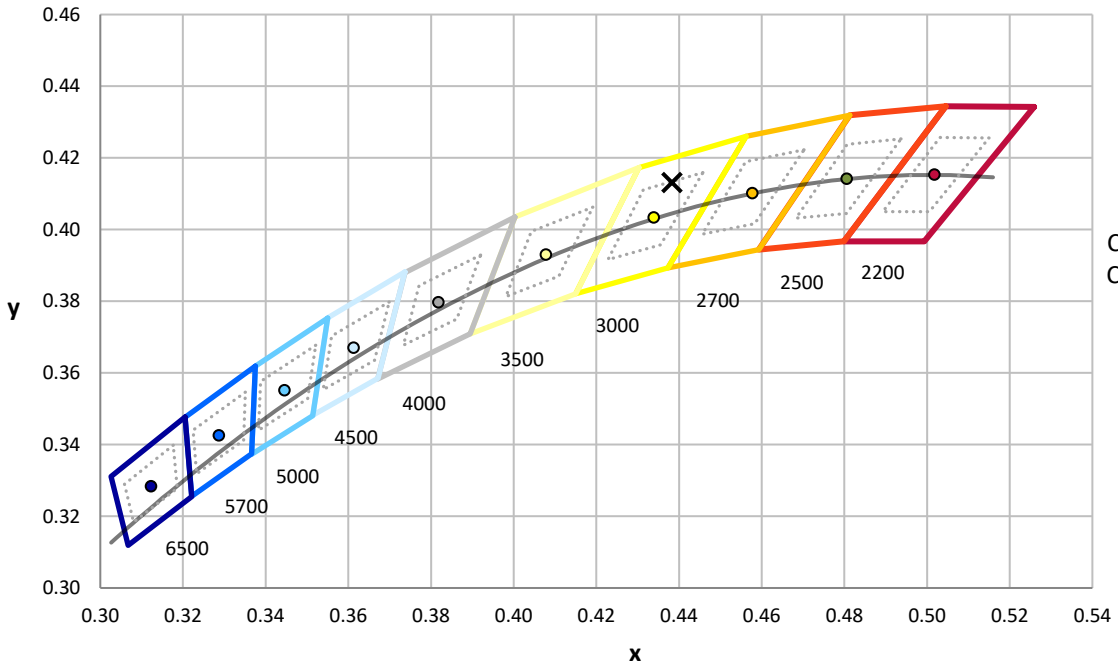
| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 6/18/2024 | 12/18/2024 |
| Power Meter | INXT2011004 | 2/8/2024 | 2/8/2025 |
| AC Power Source | IN0063 | 10/24/2023 | 10/24/2024 |
| DC 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 |

REPORT NUMBER: SP1-2408-195-9

## 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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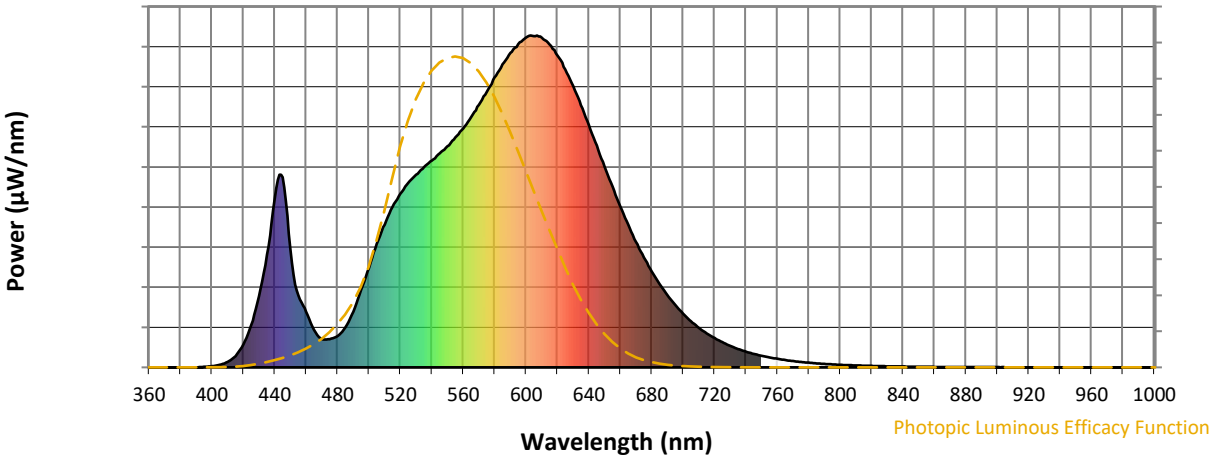
## Photopic Flux vs. Wavelength




## 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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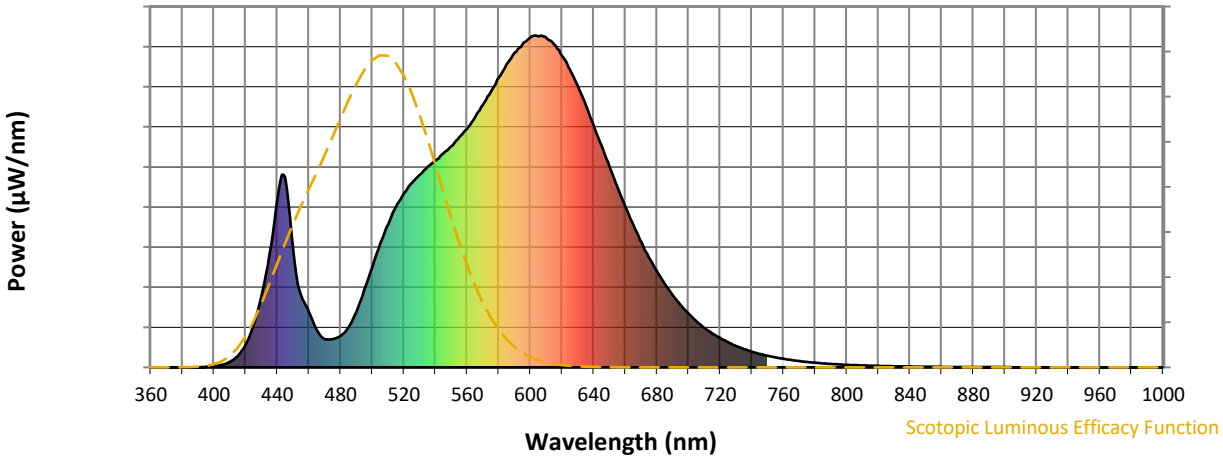
## Scotopic Flux vs. Wavelength




**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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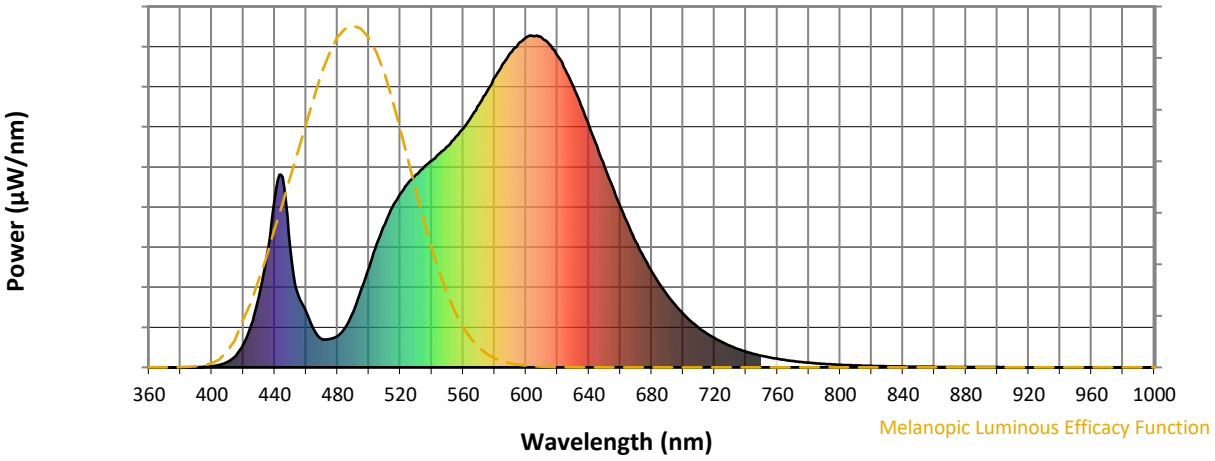
## Melanopic Flux vs. Wavelength




**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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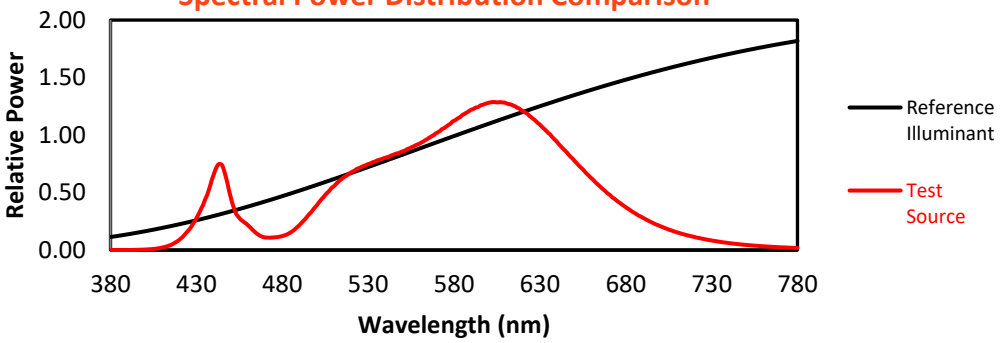
# TM-30-18

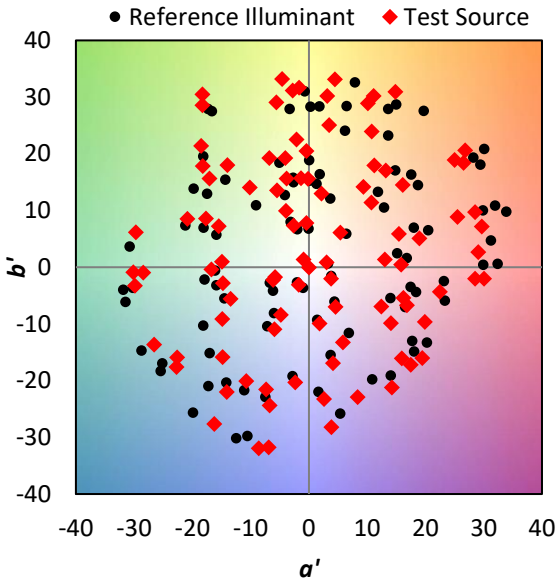
## Summary

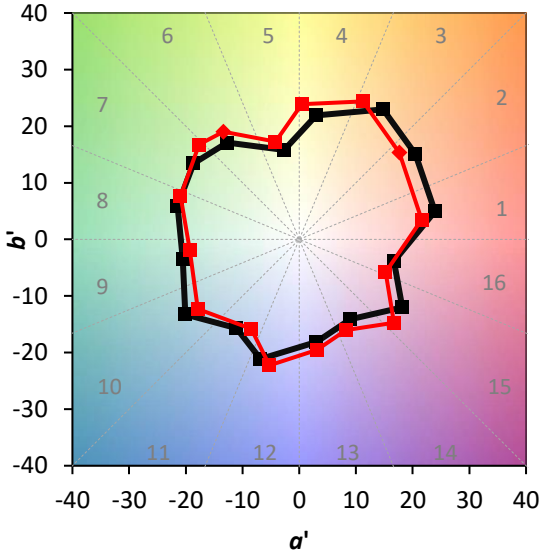
$R_f$ = 81.5
$R_g$ = 99.2
CIE $R_a$ = 81.0
$R_9$ = 7.1

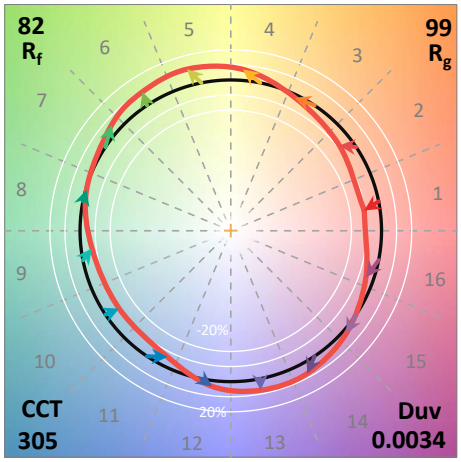
## Spectral Power Distribution Comparison

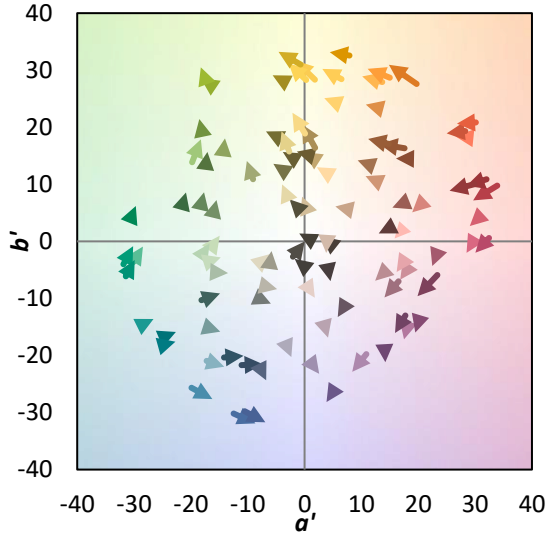



## Color Vector Graphics



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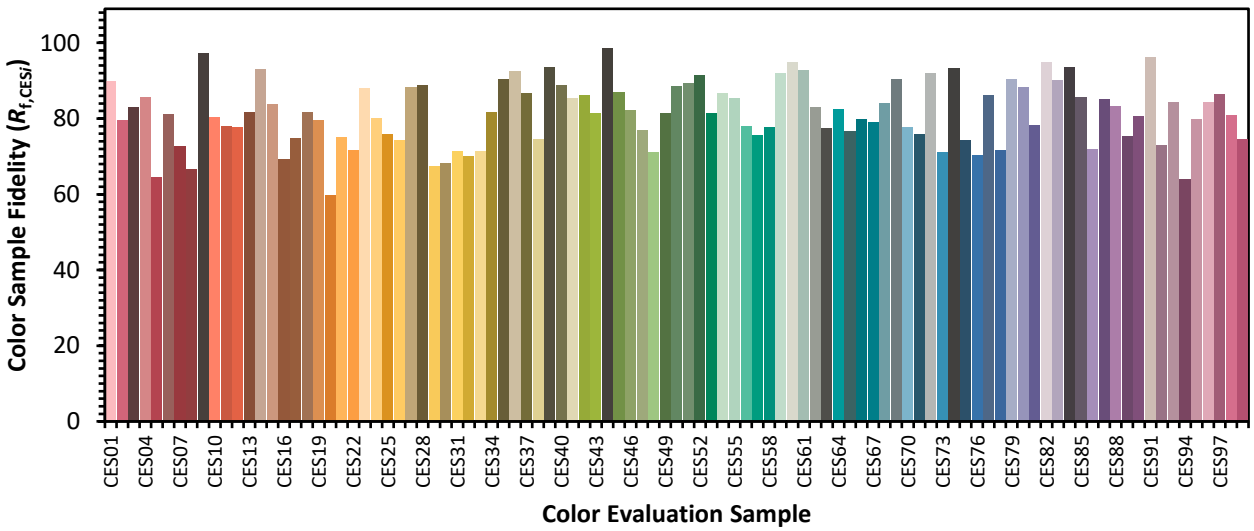
# TM-30-18

**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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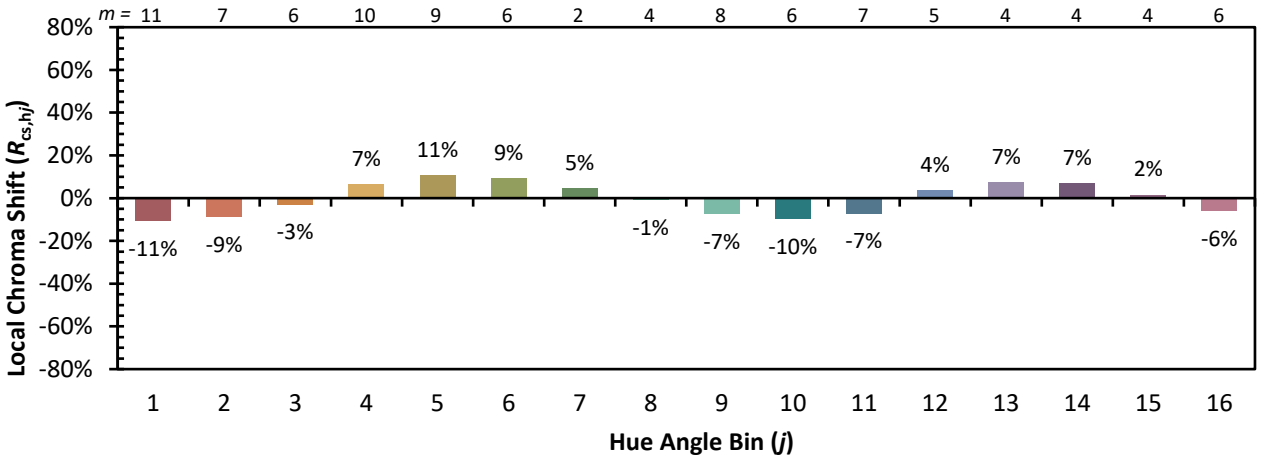
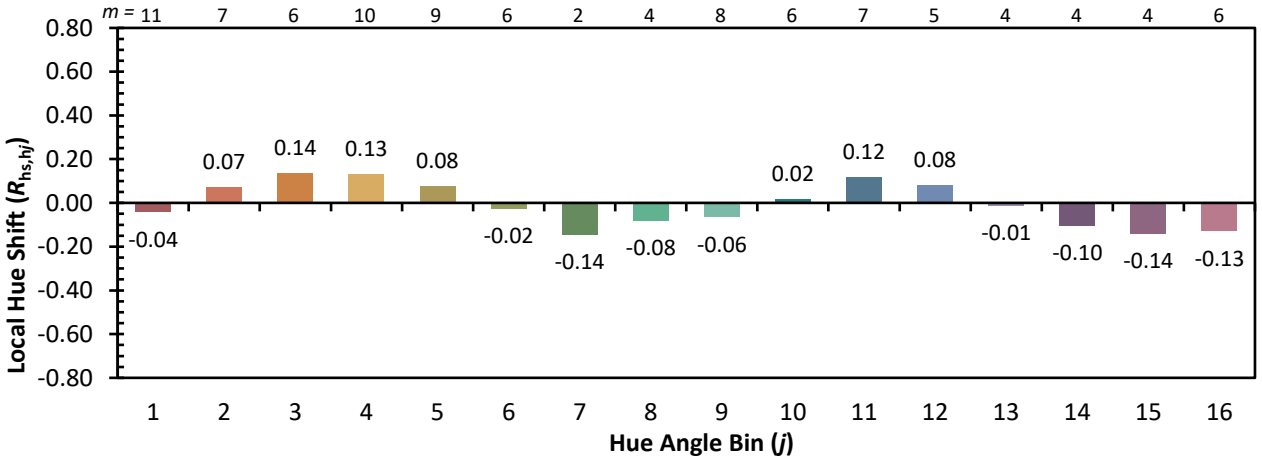
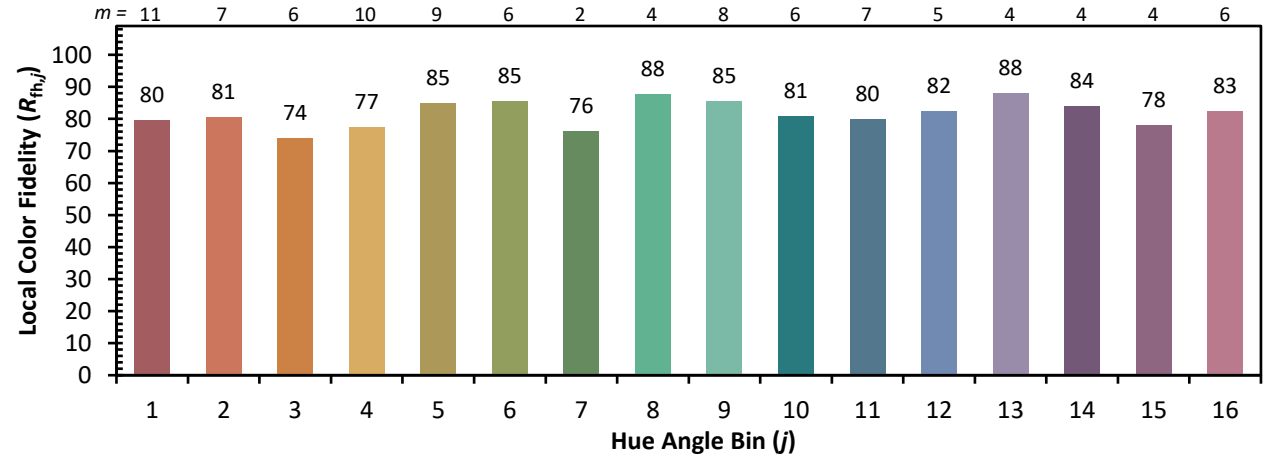
## Color Rendition by Hue-Angle Bin



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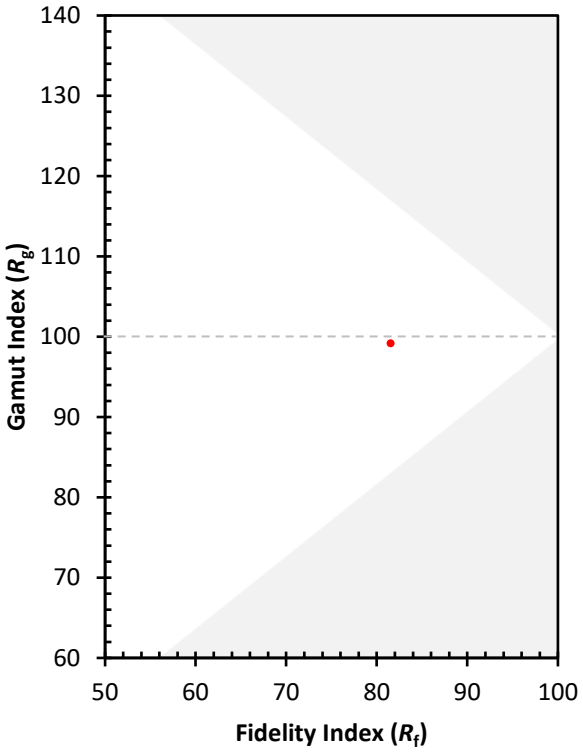
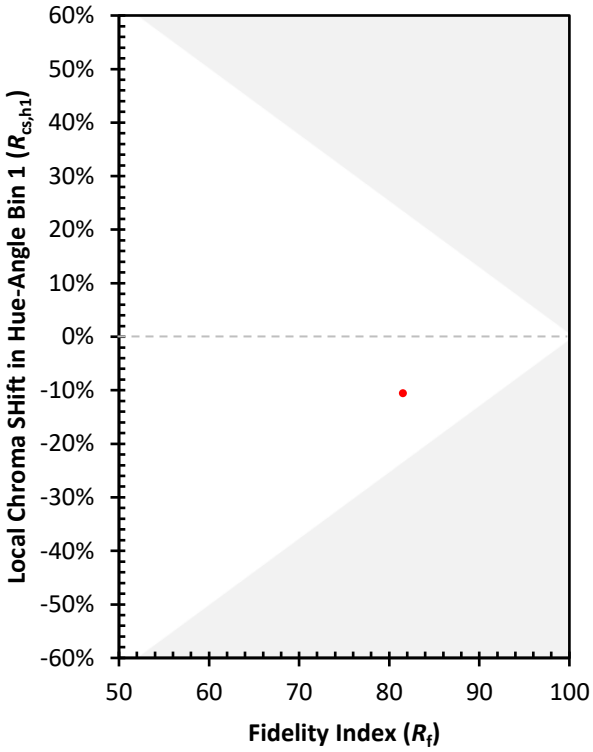
## TM-30-18

### Measure Comparisons

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