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: P638496

Luminaire Tested: GWS-SA4E-830-U-T3-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: | P638496 |
| | TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-24) |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Issue Date: | 1/10/2023 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS |
| Product Line: | McGRAW-EDISON |
| Catalog Number: | GWS-SA4E-830-U-T3-W-GRSBK |
| Description: | GALLEON WALL SLIM LUMINAIRE. (4) LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III 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: | 15012 lumens |
| Efficiency: | N/A |
| Efficacy: | 74.1 lumens/watt |
| Luminous Opening: | Rectangular (W 1' x L: 1' x H: 0') |
| IES Classification: | Type II - Short |
| BUG Rating: | B3 - U0 - G1 |

| | |
|---|---|
| Input Watts (W): | 202.6 |
| 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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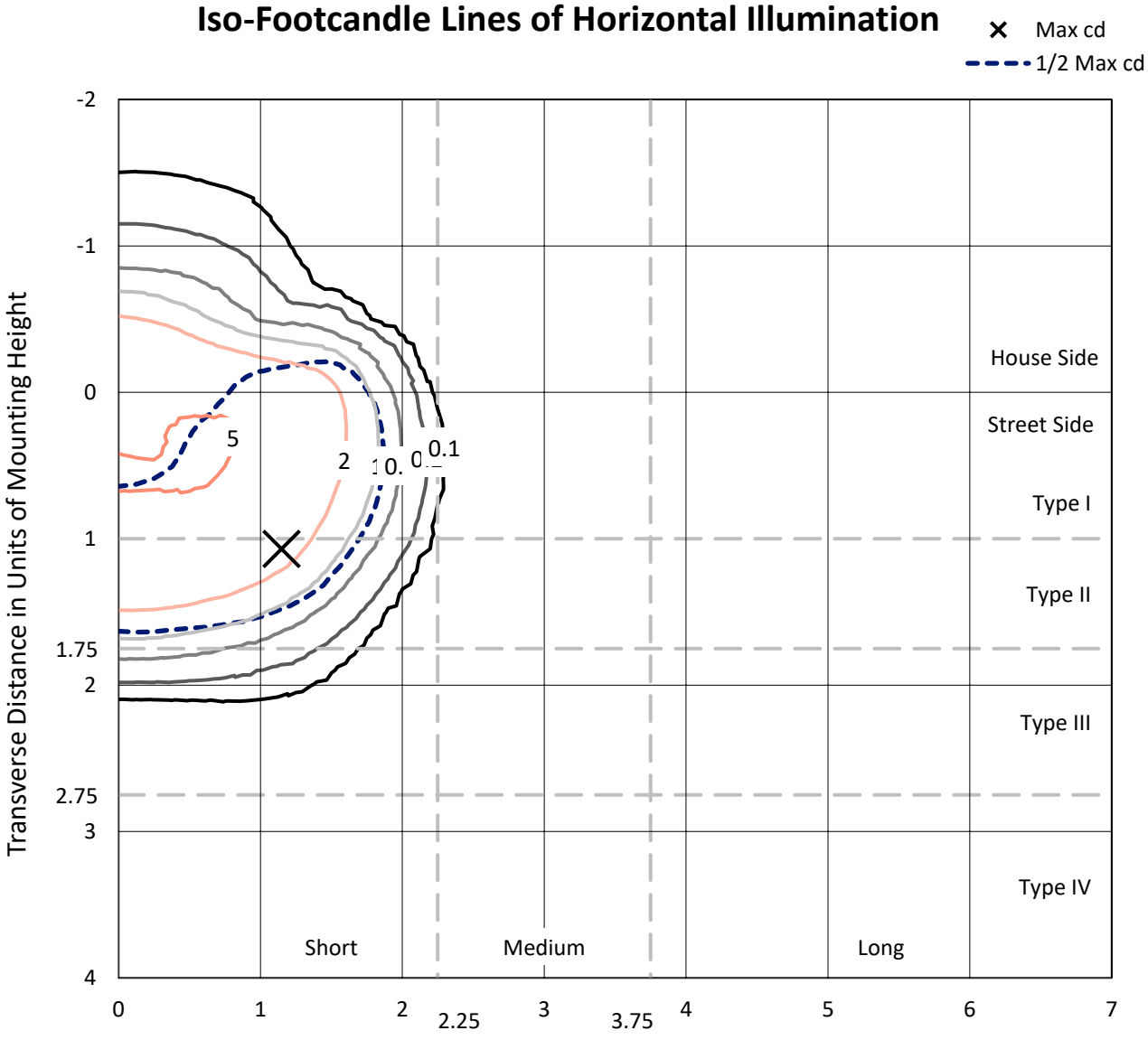
Scaled Data Report

REPORT NUMBER: P638496
CATALOG NUMBER: GWS-SA4E-830-U-T3-W-GRSBK

## Iso-Footcandle Lines of Horizontal Illumination




Based on 25 foot mounting height. Maximum calculated value = 5.7 fc
Type II - Short - N/A

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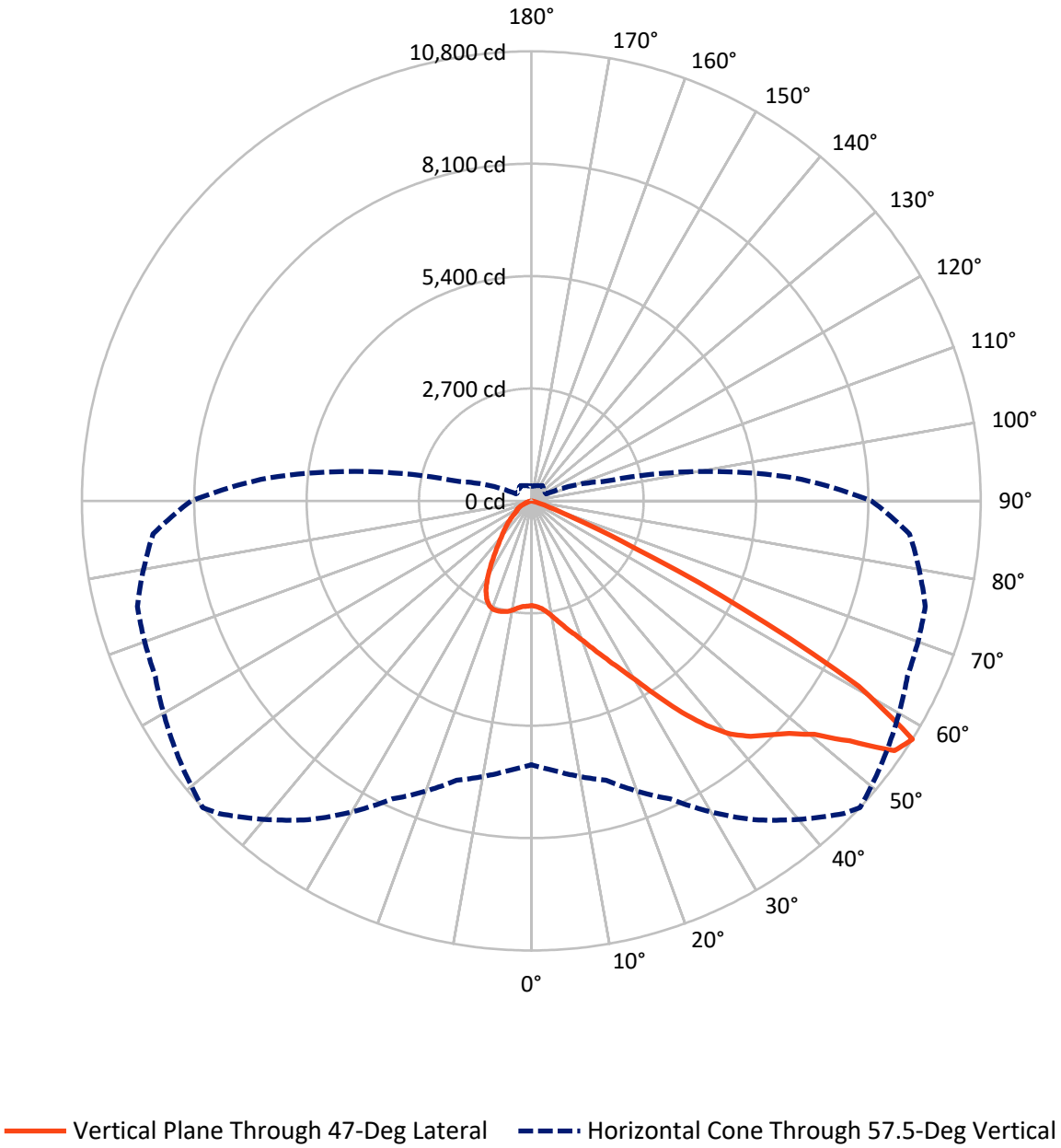
## Luminous Intensity Polar Plot



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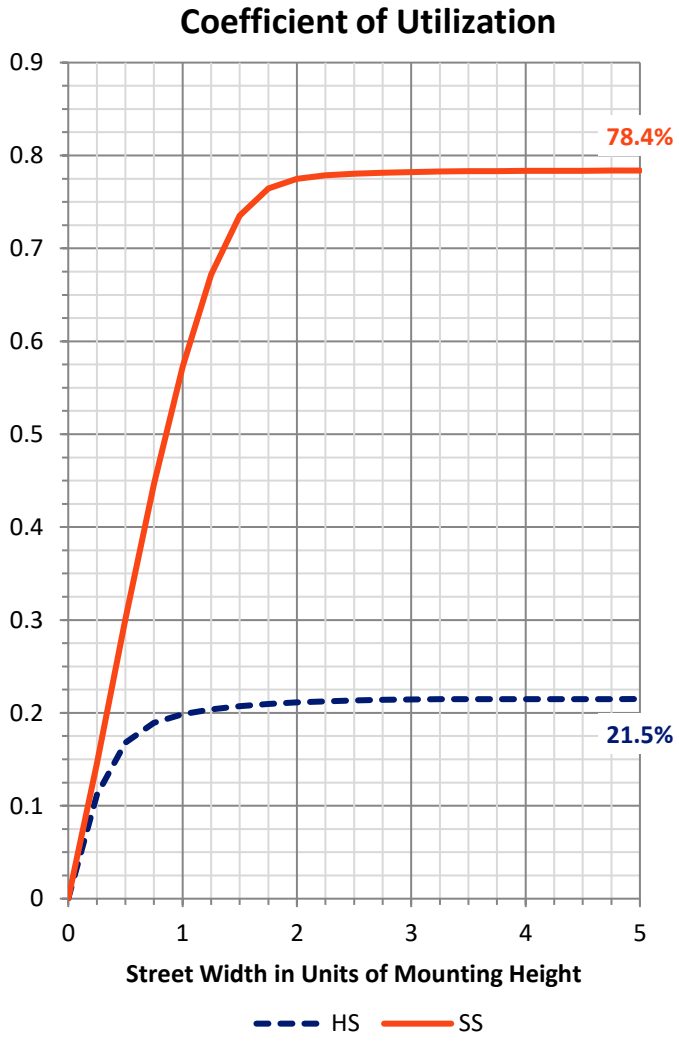
REPORT NUMBER: P638496
CATALOG NUMBER: GWS-SA4E-830-U-T3-W-GRSBK

**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 3256.8 | 0.0 | 3256.8 |
| | % Fixture | 21.7 | 0.0 | 21.7 |
| **Street Side** | Lumens | 11755.2 | 0.0 | 11755.2 |
| | % Fixture | 78.3 | 0.0 | 78.3 |
| **Total** | Lumens | 15012.0 | 0.0 | 15012.0 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 250.0 | 1.7 |
| 10°-20° | 843.6 | 5.6 |
| 20°-30° | 1566.4 | 10.4 |
| 30°-40° | 2507.5 | 16.7 |
| 40°-50° | 3665.4 | 24.4 |
| 50°-60° | 4523.7 | 30.1 |
| 60°-70° | 1511.6 | 10.1 |
| 70°-80° | 140.8 | 0.9 |
| 80°-90° | 2.9 | 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° | 15012.0 | 100.0 |
| 0°-180° | 15012.0 | 100.0 |



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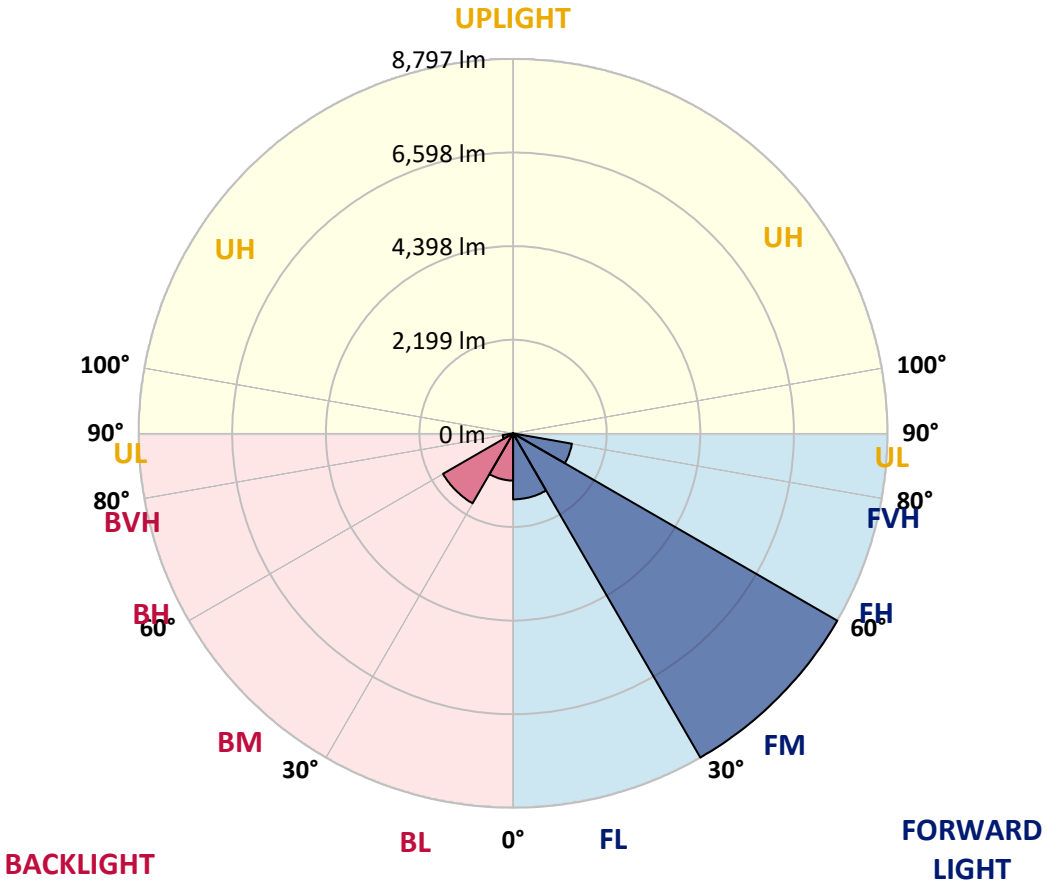
REPORT NUMBER: P638496
CATALOG NUMBER: GWS-SA4E-830-U-T3-W-GRSBK

## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 1551.4 | 10.3 | | | |
| FM | (30°-60°) | 8796.9 | 58.6 | | | |
| FH | (60°-80°) | 1404.8 | 9.4 | | | G1/1800 |
| FVH | (80°-90°) | 2.0 | 0.0 | | | G0/10 |
| BL | (0°-30°) | 1108.6 | 7.4 | B3/2500 | | |
| BM | (30°-60°) | 1899.7 | 12.7 | B2/2500 | | |
| BH | (60°-80°) | 247.6 | 1.6 | B1/500 | | G1/500 |
| BVH | (80°-90°) | 0.9 | 0.0 | | | G0/10 |
| UL | (90°-100°) | 0.0 | 0.0 | | U0/0 | |
| UH | (100°-180°) | 0.0 | 0.0 | | U0/0 | |

**BUG Rating: B3-U0-G1**
Type II Short



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Scaled Data Report

REPORT NUMBER: P638496
CATALOG NUMBER: GWS-SA4E-830-U-T3-W-GRSBK

**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 45° | 47° | 55° | 65° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 2513.0 | 2513.0 | 2513.0 | 2513.0 | 2513.0 | 2513.0 | 2513.0 | 2513.0 | 2513.0 | 2513.0 | 2513.0 |
| 2.5° | 2539.2 | 2537.4 | 2535.7 | 2546.1 | 2542.7 | 2540.9 | 2544.4 | 2544.4 | 2544.4 | 2533.9 | 2513.0 |
| 5° | 2600.2 | 2600.2 | 2598.4 | 2608.9 | 2600.2 | 2594.9 | 2596.7 | 2596.7 | 2589.7 | 2570.5 | 2544.4 |
| 7.5° | 2696.0 | 2692.5 | 2689.0 | 2699.5 | 2690.8 | 2689.0 | 2692.5 | 2682.1 | 2669.9 | 2638.5 | 2601.9 |
| 10° | 2833.7 | 2833.7 | 2828.5 | 2838.9 | 2831.9 | 2828.5 | 2828.5 | 2821.5 | 2798.8 | 2750.0 | 2696.0 |
| 12.5° | 3023.6 | 3014.9 | 3002.7 | 2994.0 | 2990.5 | 2988.8 | 2990.5 | 2980.1 | 2955.7 | 2892.9 | 2818.0 |
| 15° | 3231.0 | 3224.1 | 3204.9 | 3190.9 | 3171.8 | 3168.3 | 3178.7 | 3170.0 | 3145.6 | 3060.2 | 2953.9 |
| 17.5° | 3492.4 | 3501.2 | 3452.4 | 3422.7 | 3367.0 | 3363.5 | 3367.0 | 3380.9 | 3363.5 | 3253.7 | 3098.6 |
| 20° | 3715.5 | 3722.5 | 3685.9 | 3665.0 | 3614.4 | 3591.8 | 3598.7 | 3621.4 | 3602.2 | 3473.3 | 3257.2 |
| 22.5° | 3954.3 | 3963.0 | 3924.6 | 3881.1 | 3858.4 | 3858.4 | 3884.6 | 3915.9 | 3889.8 | 3720.7 | 3438.4 |
| 25° | 4240.1 | 4247.0 | 4215.7 | 4158.2 | 4118.1 | 4168.6 | 4207.0 | 4290.6 | 4247.0 | 4017.0 | 3652.8 |
| 27.5° | 4567.7 | 4569.5 | 4524.1 | 4464.9 | 4444.0 | 4538.1 | 4576.4 | 4705.4 | 4688.0 | 4349.9 | 3879.3 |
| 30° | 4918.0 | 4919.7 | 4909.3 | 4869.2 | 4850.0 | 4973.8 | 5026.0 | 5212.5 | 5200.3 | 4762.9 | 4187.8 |
| 32.5° | 5282.2 | 5282.2 | 5301.4 | 5297.9 | 5320.6 | 5522.7 | 5606.4 | 5819.0 | 5806.8 | 5268.3 | 4571.2 |
| 35° | 5648.2 | 5649.9 | 5683.1 | 5766.7 | 5860.8 | 6129.2 | 6239.0 | 6496.9 | 6469.0 | 5873.0 | 5060.9 |
| 37.5° | 6064.7 | 6047.3 | 6092.6 | 6218.1 | 6427.2 | 6737.4 | 6842.0 | 7087.7 | 7056.3 | 6491.7 | 5700.5 |
| 40° | 6566.6 | 6535.3 | 6535.3 | 6681.6 | 6918.7 | 7275.9 | 7364.8 | 7486.8 | 7380.5 | 6991.9 | 6327.9 |
| 42.5° | 7120.8 | 7091.2 | 7052.9 | 7181.8 | 7380.5 | 7659.3 | 7732.5 | 7699.4 | 7612.3 | 7464.1 | 7042.4 |
| 45° | 7682.0 | 7636.7 | 7662.8 | 7741.2 | 7856.3 | 7988.7 | 8016.6 | 7863.2 | 7823.1 | 7865.0 | 7633.2 |
| 47.5° | 8108.9 | 8077.6 | 8142.1 | 8251.9 | 8346.0 | 8365.1 | 8346.0 | 8133.3 | 8129.9 | 8278.0 | 8042.7 |
| 50° | 8251.9 | 8255.3 | 8433.1 | 8673.6 | 8825.2 | 8840.9 | 8814.8 | 8570.8 | 8537.7 | 8581.2 | 8264.1 |
| 52.5° | 8265.8 | 8279.7 | 8539.4 | 8997.7 | 9410.8 | 9599.0 | 9578.1 | 9314.9 | 8990.8 | 8943.7 | 8598.7 |
| 55° | 7929.4 | 8011.4 | 8373.8 | 9043.1 | 9921.4 | 10522.6 | 10592.3 | 10088.7 | 9607.7 | 9567.6 | 9318.4 |
| 57.5° | 6338.3 | 6505.6 | 6943.1 | 7896.3 | 9351.5 | 10618.5 | 10799.7 | 10437.2 | 9971.9 | 9801.1 | 9125.0 |
| 60° | 3788.7 | 3996.1 | 4416.1 | 5585.5 | 7117.3 | 8727.6 | 9039.6 | 9090.1 | 8875.8 | 8382.6 | 7000.6 |
| 62.5° | 1626.0 | 1608.5 | 2126.1 | 3021.9 | 4233.1 | 5547.1 | 5688.3 | 5907.9 | 6094.3 | 5578.5 | 4248.8 |
| 65° | 557.7 | 606.5 | 843.5 | 1362.8 | 2119.2 | 2575.8 | 2701.2 | 2898.2 | 3163.1 | 2610.6 | 1556.3 |
| 67.5° | 345.1 | 366.0 | 486.2 | 805.1 | 1143.2 | 1125.8 | 1070.0 | 1038.7 | 1010.8 | 691.9 | 427.0 |
| 70° | 251.0 | 268.4 | 341.6 | 554.2 | 768.5 | 540.2 | 468.8 | 379.9 | 421.7 | 388.6 | 303.2 |
| 72.5° | 169.0 | 183.0 | 235.3 | 336.3 | 393.9 | 263.2 | 244.0 | 277.1 | 334.6 | 318.9 | 247.5 |
| 75° | 101.1 | 109.8 | 134.2 | 163.8 | 160.3 | 135.9 | 137.7 | 195.2 | 256.2 | 238.8 | 176.0 |
| 77.5° | 69.7 | 73.2 | 88.9 | 106.3 | 78.4 | 41.8 | 38.3 | 54.0 | 87.1 | 87.1 | 59.3 |
| 80° | 17.4 | 22.7 | 22.7 | 13.9 | 12.2 | 10.5 | 10.5 | 15.7 | 24.4 | 17.4 | 8.7 |
| 82.5° | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 3.5 | 3.5 | 3.5 | 3.5 |
| 85° | 0.0 | 0.0 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 3.5 | 3.5 | 3.5 |
| 87.5° | 0.0 | 0.0 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 3.5 | 3.5 |
| 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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Scaled Data Report

REPORT NUMBER: P638496
CATALOG NUMBER: GWS-SA4E-830-U-T3-W-GRSBK

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 2513.0 | 2513.0 | 2513.0 | 2513.0 | 2513.0 | 2513.0 | 2513.0 | 2513.0 | 2513.0 | 2513.0 | 2513.0 |
| 2.5° | 2525.2 | 2504.3 | 2518.3 | 2514.8 | 2525.2 | 2528.7 | 2513.0 | 2509.5 | 2511.3 | 2490.4 | 2483.4 |
| 5° | 2549.6 | 2525.2 | 2532.2 | 2525.2 | 2537.4 | 2547.9 | 2542.7 | 2549.6 | 2558.3 | 2542.7 | 2535.7 |
| 7.5° | 2601.9 | 2577.5 | 2575.8 | 2565.3 | 2582.7 | 2589.7 | 2588.0 | 2607.1 | 2624.6 | 2614.1 | 2603.6 |
| 10° | 2692.5 | 2659.4 | 2655.9 | 2647.2 | 2652.4 | 2657.7 | 2638.5 | 2642.0 | 2657.7 | 2645.5 | 2640.2 |
| 12.5° | 2804.1 | 2764.0 | 2755.3 | 2734.4 | 2734.4 | 2708.2 | 2666.4 | 2657.7 | 2669.9 | 2661.2 | 2652.4 |
| 15° | 2924.3 | 2870.3 | 2856.3 | 2819.7 | 2784.9 | 2736.1 | 2692.5 | 2682.1 | 2690.8 | 2680.3 | 2673.4 |
| 17.5° | 3058.5 | 2997.5 | 2952.2 | 2887.7 | 2811.0 | 2753.5 | 2704.7 | 2682.1 | 2668.1 | 2647.2 | 2645.5 |
| 20° | 3190.9 | 3110.8 | 3034.1 | 2931.3 | 2830.2 | 2743.1 | 2662.9 | 2603.6 | 2553.1 | 2521.7 | 2509.5 |
| 22.5° | 3344.3 | 3225.8 | 3102.1 | 2957.4 | 2812.8 | 2680.3 | 2539.2 | 2438.1 | 2351.0 | 2321.3 | 2307.4 |
| 25° | 3508.1 | 3354.8 | 3170.0 | 2981.8 | 2753.5 | 2540.9 | 2349.2 | 2199.3 | 2084.3 | 2046.0 | 2030.3 |
| 27.5° | 3689.4 | 3478.5 | 3239.7 | 2976.6 | 2631.5 | 2342.2 | 2087.8 | 1901.3 | 1788.0 | 1753.2 | 1765.4 |
| 30° | 3919.4 | 3638.8 | 3326.9 | 2922.6 | 2448.5 | 2063.4 | 1765.4 | 1608.5 | 1523.2 | 1490.0 | 1491.8 |
| 32.5° | 4226.1 | 3868.9 | 3454.1 | 2807.5 | 2213.3 | 1746.2 | 1484.8 | 1369.8 | 1312.3 | 1268.7 | 1265.2 |
| 35° | 4665.3 | 4219.2 | 3572.6 | 2622.8 | 1927.5 | 1463.9 | 1273.9 | 1183.3 | 1103.2 | 1052.6 | 1061.3 |
| 37.5° | 5191.6 | 4660.1 | 3637.1 | 2373.6 | 1606.8 | 1244.3 | 1115.4 | 1023.0 | 932.4 | 857.4 | 866.1 |
| 40° | 5815.5 | 5236.9 | 3631.9 | 2046.0 | 1314.0 | 1094.4 | 982.9 | 874.9 | 761.6 | 693.6 | 700.6 |
| 42.5° | 6510.9 | 5782.4 | 3518.6 | 1699.2 | 1089.2 | 972.4 | 855.7 | 719.7 | 610.0 | 568.1 | 569.9 |
| 45° | 7113.8 | 6225.1 | 3319.9 | 1340.2 | 916.7 | 853.9 | 723.2 | 583.8 | 535.0 | 505.4 | 503.7 |
| 47.5° | 7560.0 | 6549.2 | 3035.8 | 1054.4 | 777.3 | 745.9 | 594.3 | 522.8 | 484.5 | 460.1 | 456.6 |
| 50° | 7809.2 | 6662.5 | 2722.2 | 826.1 | 657.0 | 632.6 | 531.5 | 474.0 | 447.9 | 432.2 | 428.7 |
| 52.5° | 8143.8 | 6798.4 | 2497.3 | 651.8 | 550.7 | 517.6 | 489.7 | 440.9 | 423.5 | 411.3 | 406.1 |
| 55° | 8673.6 | 7061.6 | 2302.2 | 517.6 | 458.3 | 451.4 | 461.8 | 421.7 | 411.3 | 392.1 | 385.1 |
| 57.5° | *8175.2* | *6343.6* | *1788.0* | *400.8* | *386.9* | *413.0* | *446.1* | *402.6* | *376.4* | *359.0* | *352.0* |
| 60° | 5752.8 | 4217.4 | 899.3 | 322.4 | 345.1 | 386.9 | 420.0 | 364.2 | 338.1 | 341.6 | 338.1 |
| 62.5° | 3171.8 | 2110.5 | 404.3 | 270.1 | 299.8 | 341.6 | 359.0 | 315.4 | 298.0 | 327.6 | 332.9 |
| 65° | 1036.9 | 718.0 | 233.5 | 209.1 | 237.0 | 278.8 | 310.2 | 299.8 | 296.3 | 331.1 | 341.6 |
| 67.5° | 318.9 | 237.0 | 158.6 | 149.9 | 163.8 | 205.6 | 261.4 | 324.1 | 348.5 | 359.0 | 364.2 |
| 70° | 238.8 | 186.5 | 135.9 | 127.2 | 134.2 | 156.8 | 221.3 | 270.1 | 254.4 | 256.2 | 252.7 |
| 72.5° | 191.7 | 148.1 | 116.8 | 111.5 | 111.5 | 108.0 | 116.8 | 146.4 | 165.6 | 174.3 | 174.3 |
| 75° | 134.2 | 104.6 | 88.9 | 81.9 | 64.5 | 52.3 | 47.1 | 47.1 | 41.8 | 40.1 | 38.3 |
| 77.5° | 45.3 | 38.3 | 34.9 | 27.9 | 19.2 | 15.7 | 13.9 | 12.2 | 8.7 | 5.2 | 3.5 |
| 80° | 7.0 | 5.2 | 3.5 | 3.5 | 3.5 | 1.7 | 1.7 | 1.7 | 0.0 | 0.0 | 0.0 |
| 82.5° | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 1.7 | 1.7 | 0.0 | 0.0 | 0.0 | 0.0 |
| 85° | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 1.7 | 1.7 | 0.0 | 0.0 | 0.0 | 0.0 |
| 87.5° | 3.5 | 3.5 | 3.5 | 3.5 | 1.7 | 1.7 | 1.7 | 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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# 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

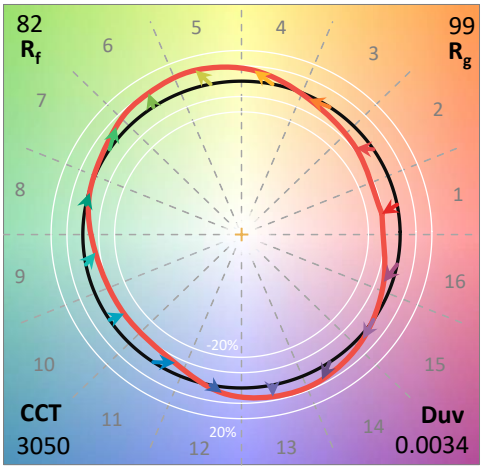
## Test Information

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

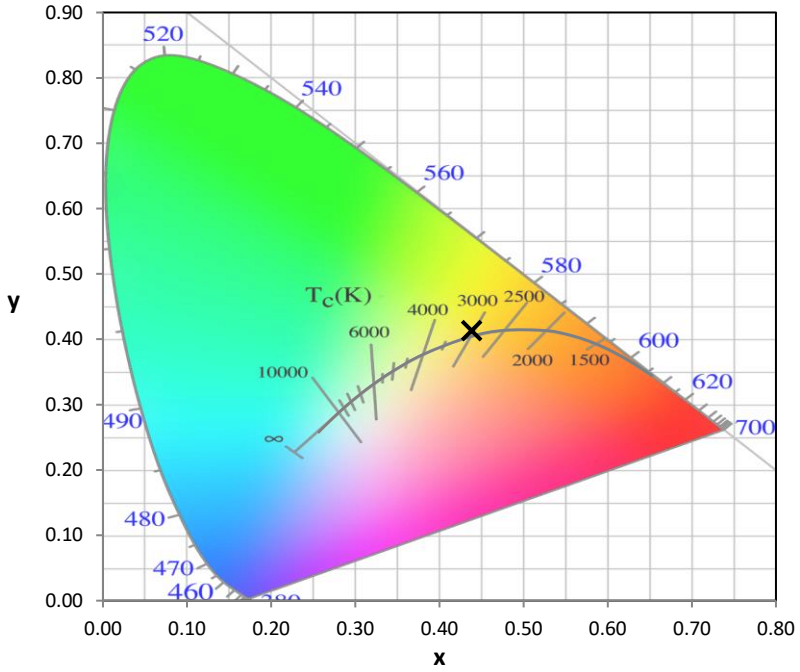
| | |
|---|---|
| Stabilization Time: | 20M |
| Operation Time: | 1H 20M |
| Sphere Temperature (°C): | 24.2 |

REPORT NUMBER: SP1-2408-195-9

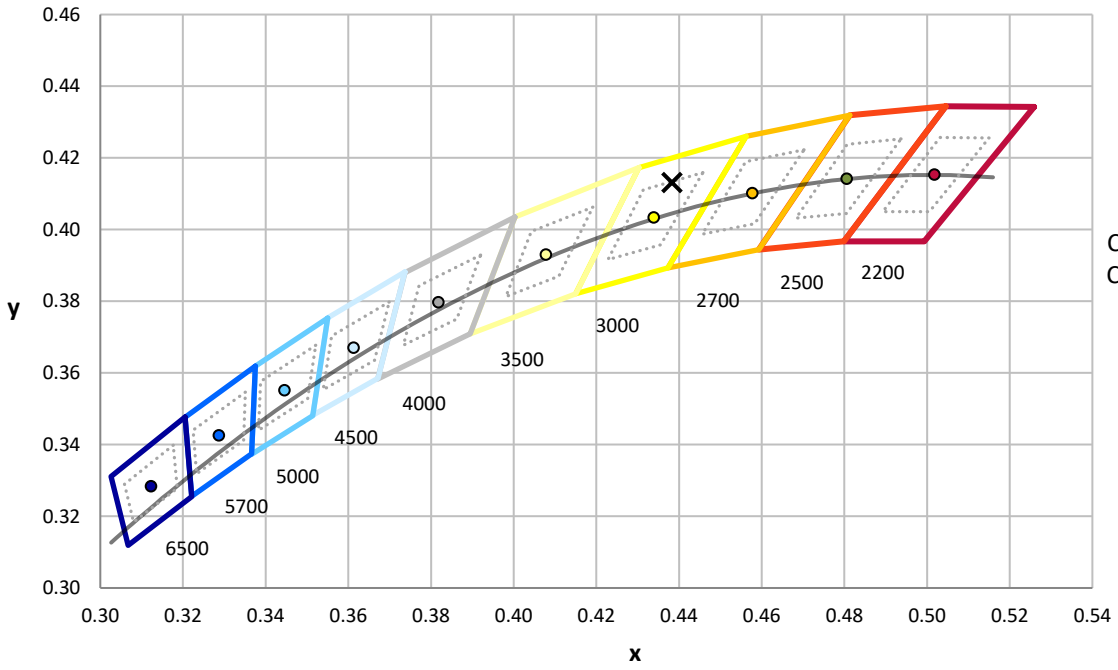
| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 6/18/2024 | 12/18/2024 |
| Power Meter | INXT2011004 | 2/8/2024 | 2/8/2025 |
| AC Power Source | IN0063 | 10/24/2023 | 10/24/2024 |
| DC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

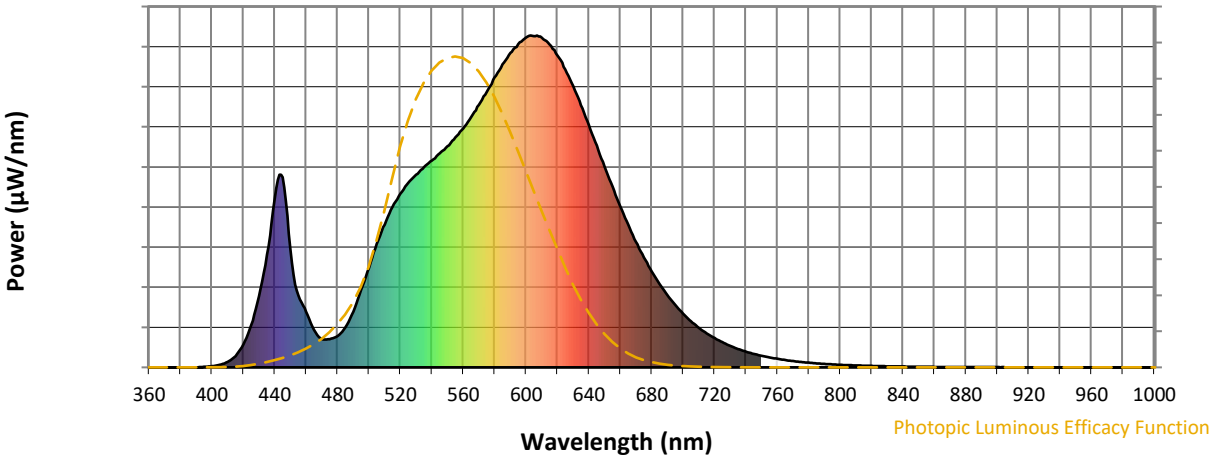



CCT = 3050K
CIE x = 0.4383
CIE y = 0.4131
Duv = 0.0034

Point lies inside the ANSI 3000K 4-step quadrangle

REPORT NUMBER: SP1-2408-195-9

## Photopic Flux vs. Wavelength

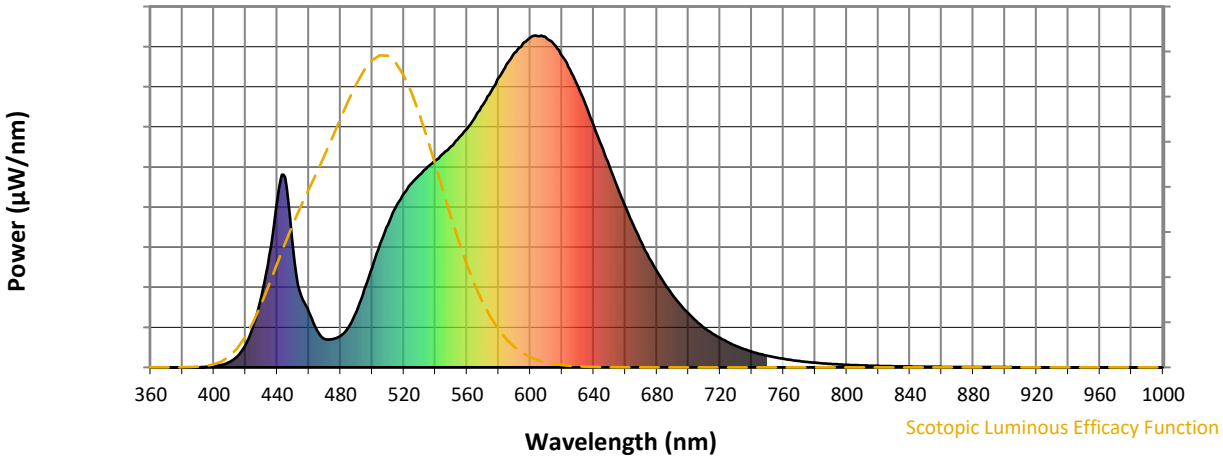



## Photopic Lumens: NR

| 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 | | | |

REPORT NUMBER: SP1-2408-195-9

## Scotopic Flux vs. Wavelength

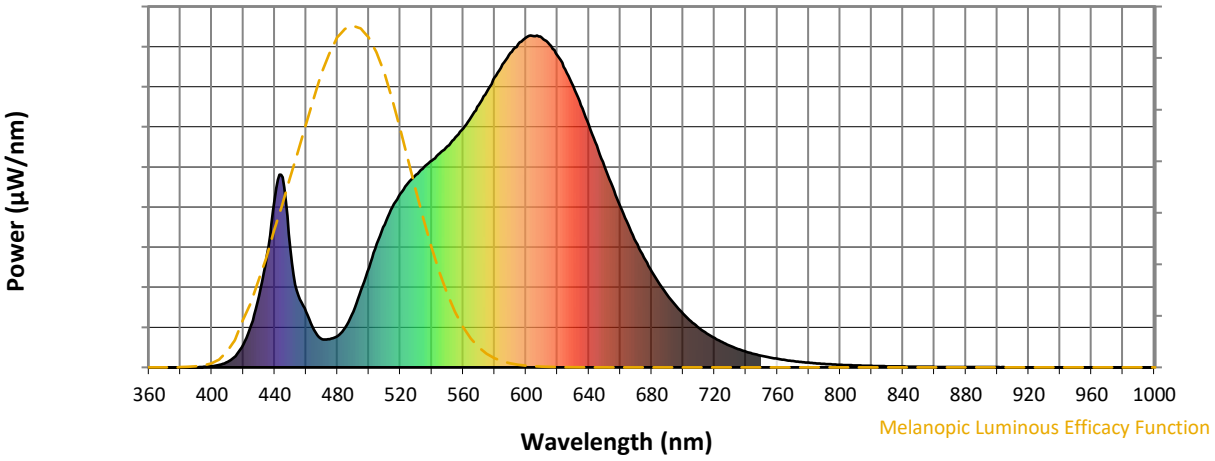



**Scotopic Lumens: NR** **S/P: 1.27**

| 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 | | | |

REPORT NUMBER: SP1-2408-195-9

## 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 | | | |

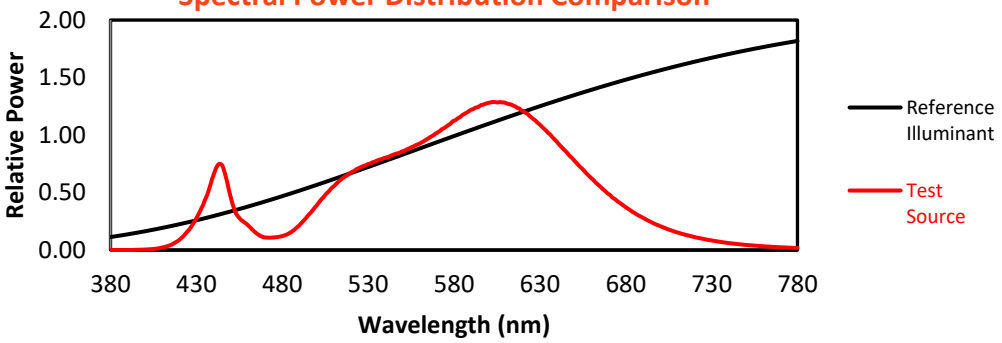
REPORT NUMBER: SP1-2408-195-9

# TM-30-18

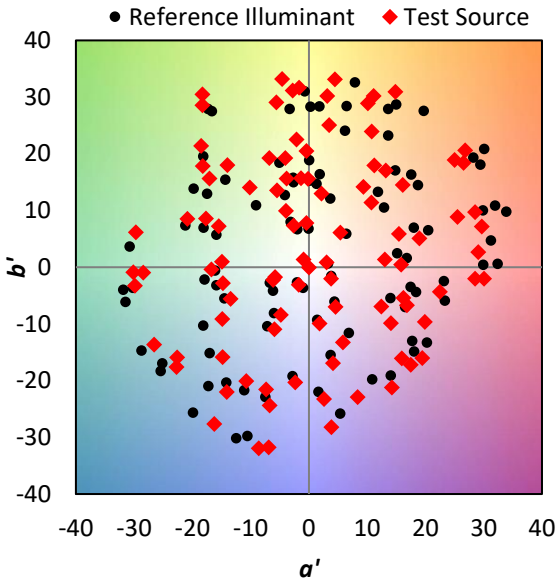
## Summary

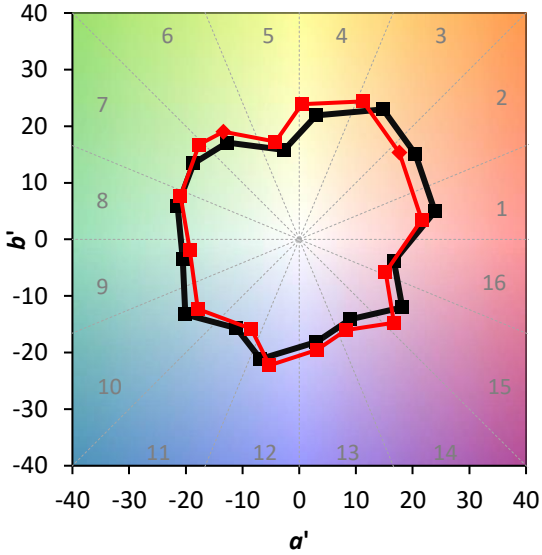
$R_f$ = 81.5
$R_g$ = 99.2
CIE $R_a$ = 81.0
$R_9$ = 7.1

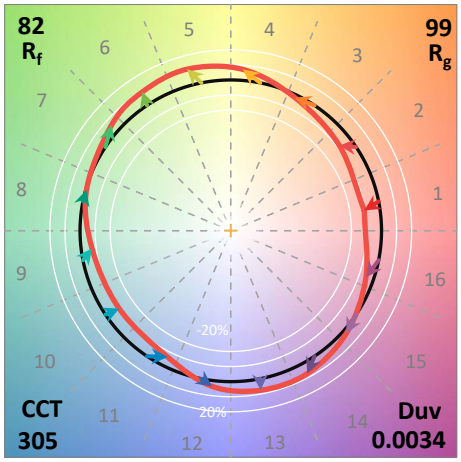
## Spectral Power Distribution Comparison

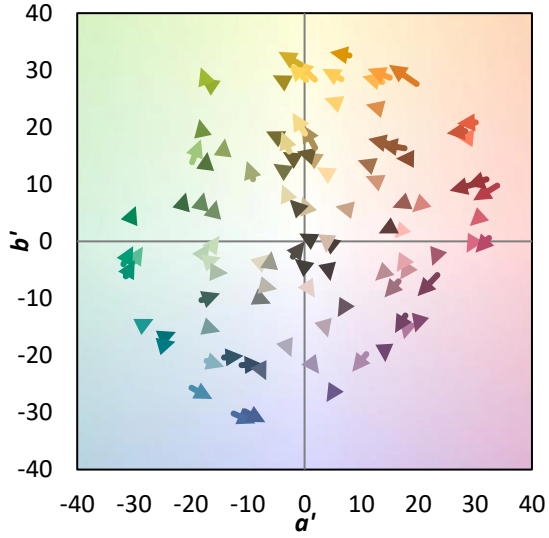



## Color Vector Graphics



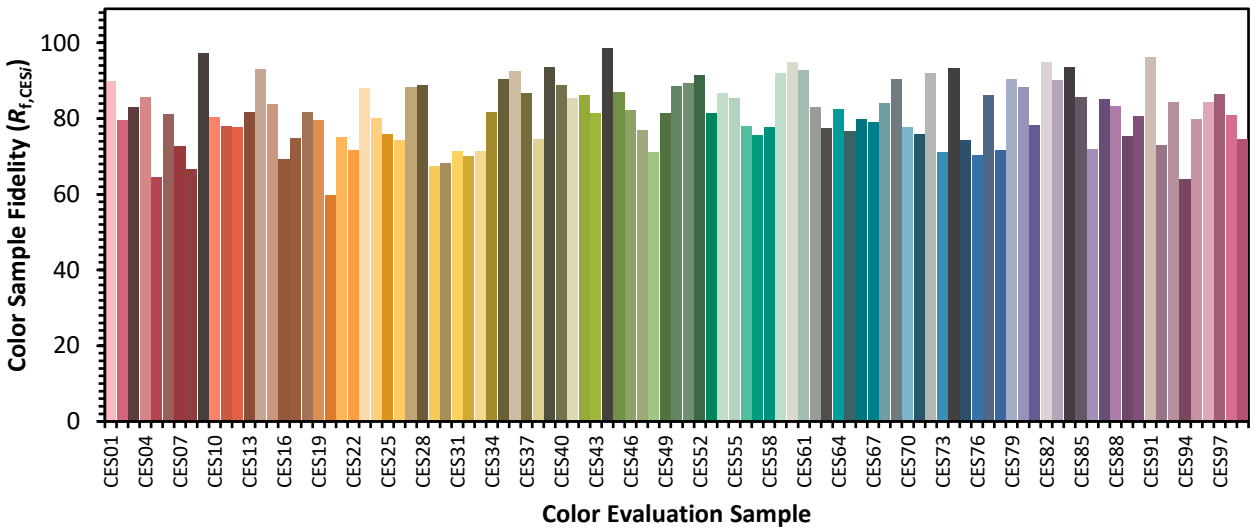



REPORT NUMBER: SP1-2408-195-9

# TM-30-18

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

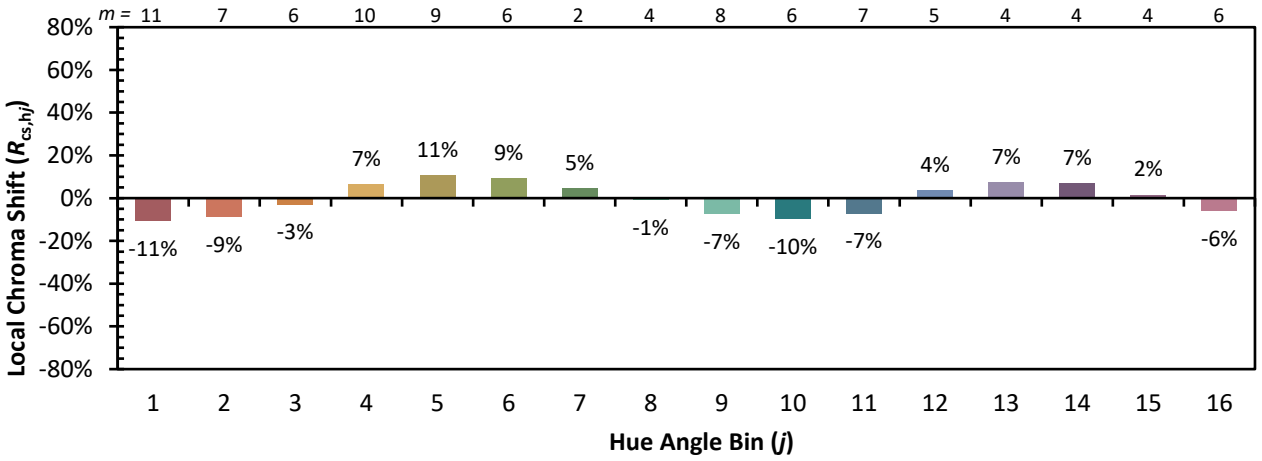
| | | | |
|---|---|---|---|
| CES01 = 86 | CES26 = 74 | CES51 = 89 | CES76 = 70 |
| CES02 = 63 | CES27 = 88 | CES52 = 92 | CES77 = 86 |
| CES03 = 31 | CES28 = 89 | CES53 = 81 | CES78 = 72 |
| CES04 = 70 | CES29 = 67 | CES54 = 87 | CES79 = 90 |
| CES05 = 50 | CES30 = 68 | CES55 = 85 | CES80 = 88 |
| CES06 = 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 | |

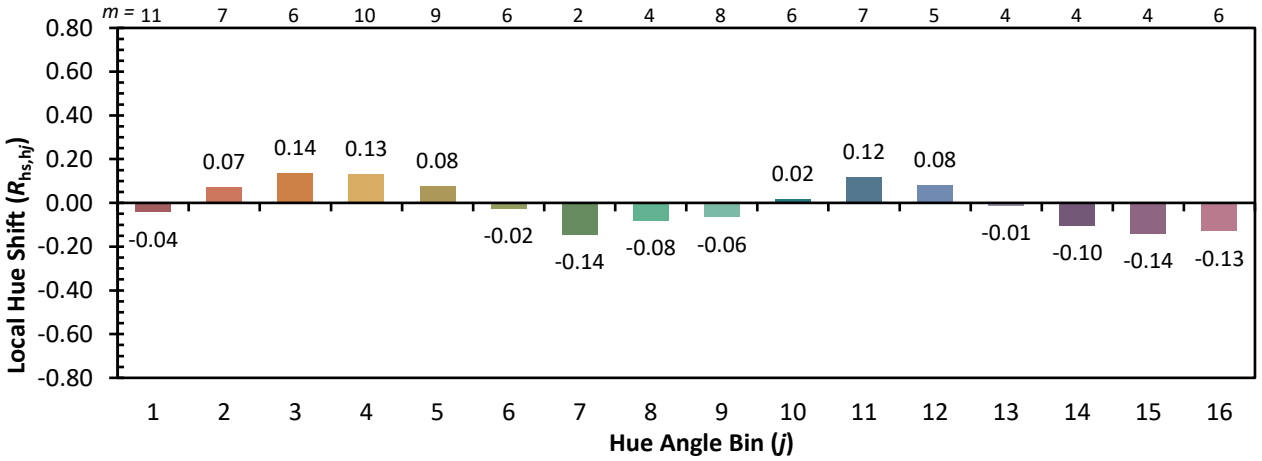


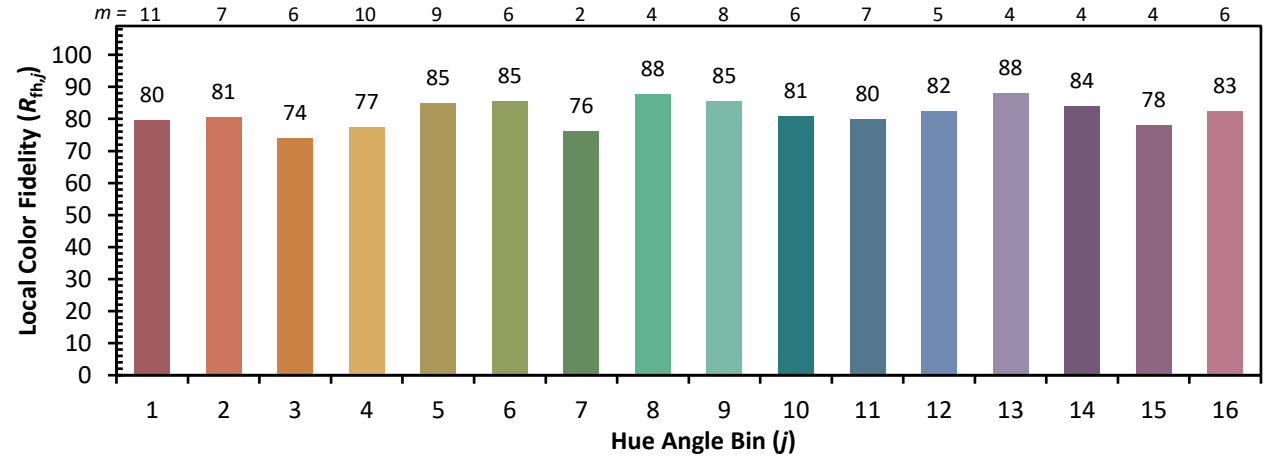
REPORT NUMBER: SP1-2408-195-9

# TM-30-18

## Color Rendition by Hue-Angle Bin



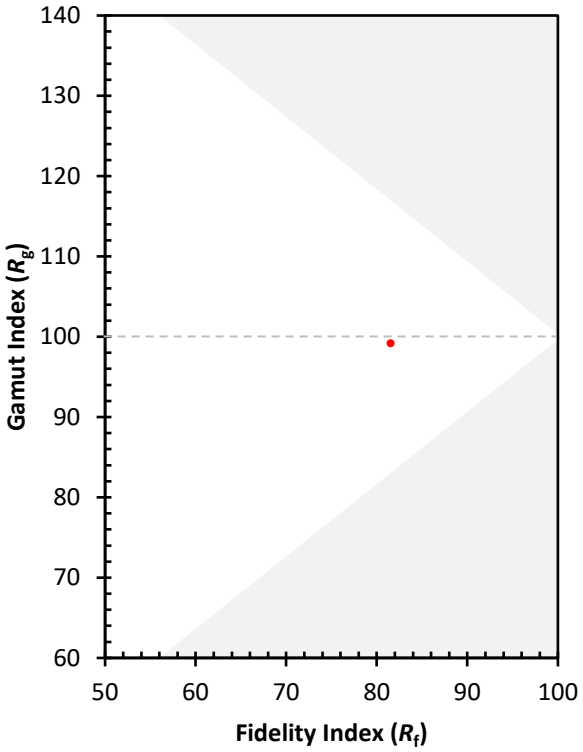



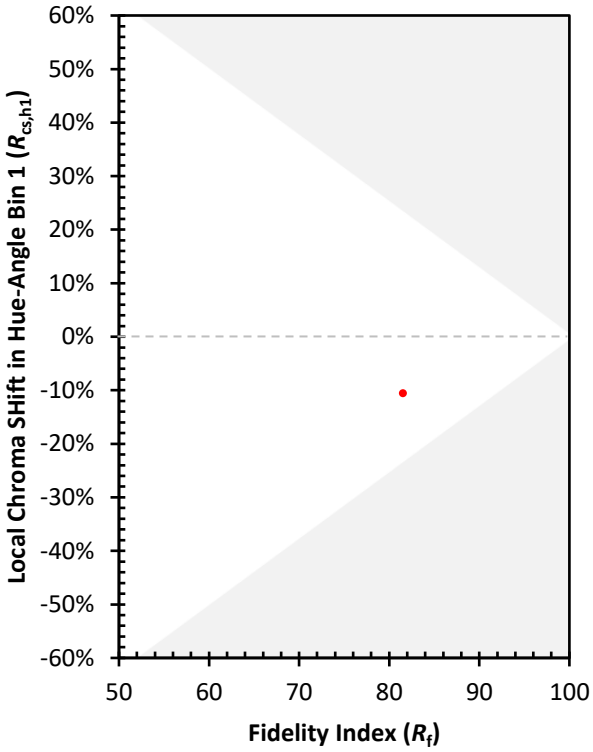



REPORT NUMBER: SP1-2408-195-9

## TM-30-18

### Measure Comparisons

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