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: P629559

Luminaire Tested: GWS-SA1B-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: | P629559 |
| | 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-SA1B-830-U-RW-W-GRSWH |
| Description: | GALLEON WALL SLIM LUMINAIRE. (1) LIGHTSQUARES WITH 16 LEDS EACH AND RECTANGULAR WIDE OPTICS W/ FACTORY INSTALLED GLARE SHIELD, WH |
| Light Source: | (16) 3000K CCT, 80 CRI LEDS |
| Ballast/Driver: | - |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 2509.8 lumens |
| Efficiency: | N/A |
| Efficacy: | 100.4 lumens/watt |
| Luminous Opening: | Rectangular (W 0.5' x L: 0.5' x H: 0') |
| IES Classification: | Type V - Short |
| BUG Rating: | B1 - U0 - G0 |

| | |
|---|---|
| Input Watts (W): | 25 |
| 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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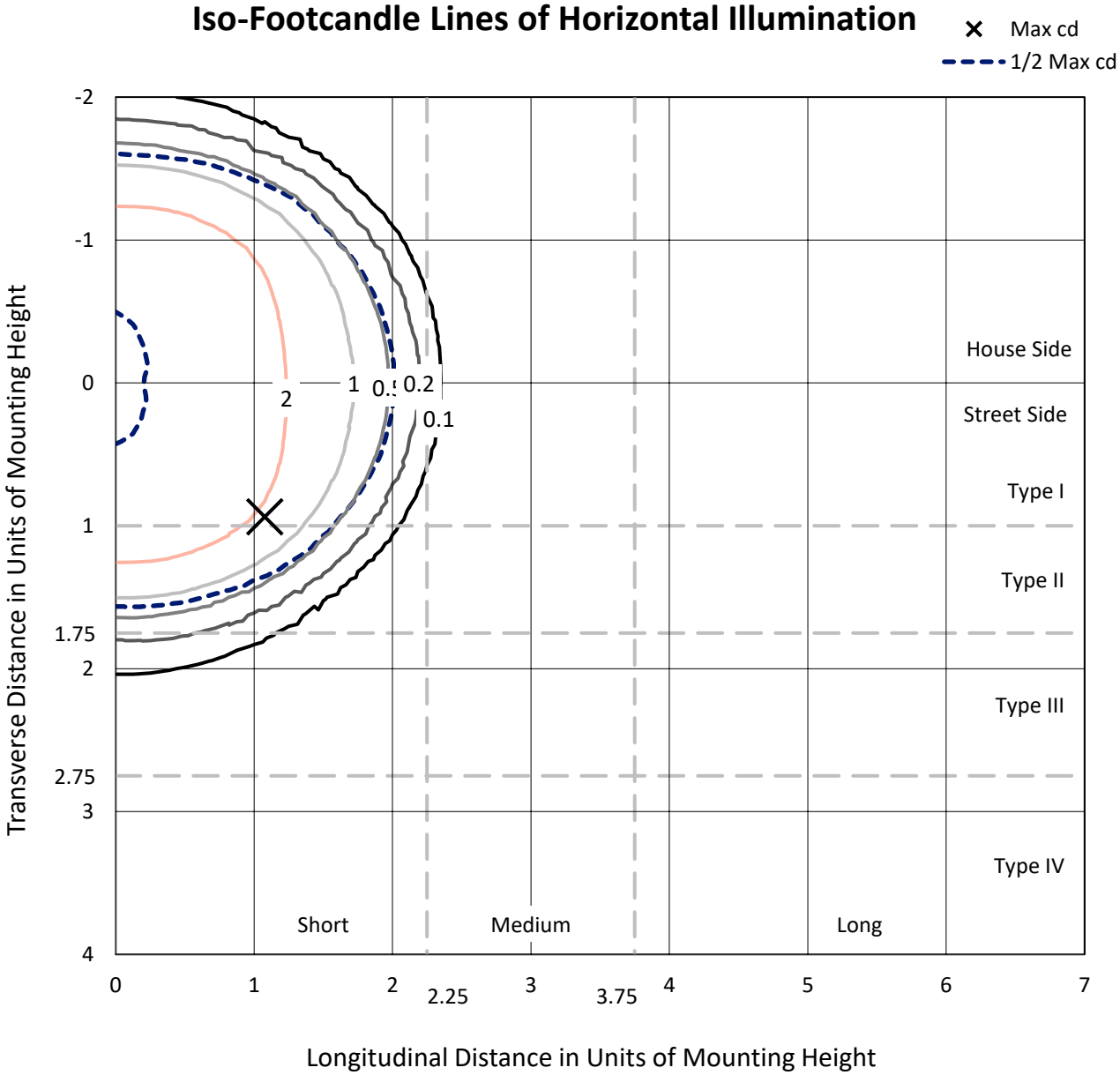
Scaled Data Report

REPORT NUMBER: P629559
CATALOG NUMBER: GWS-SA1B-830-U-RW-W-GRSWH

## Iso-Footcandle Lines of Horizontal Illumination




Based on 10 foot mounting height. Maximum calculated value = 4.6 fc
Type V - Short - N/A

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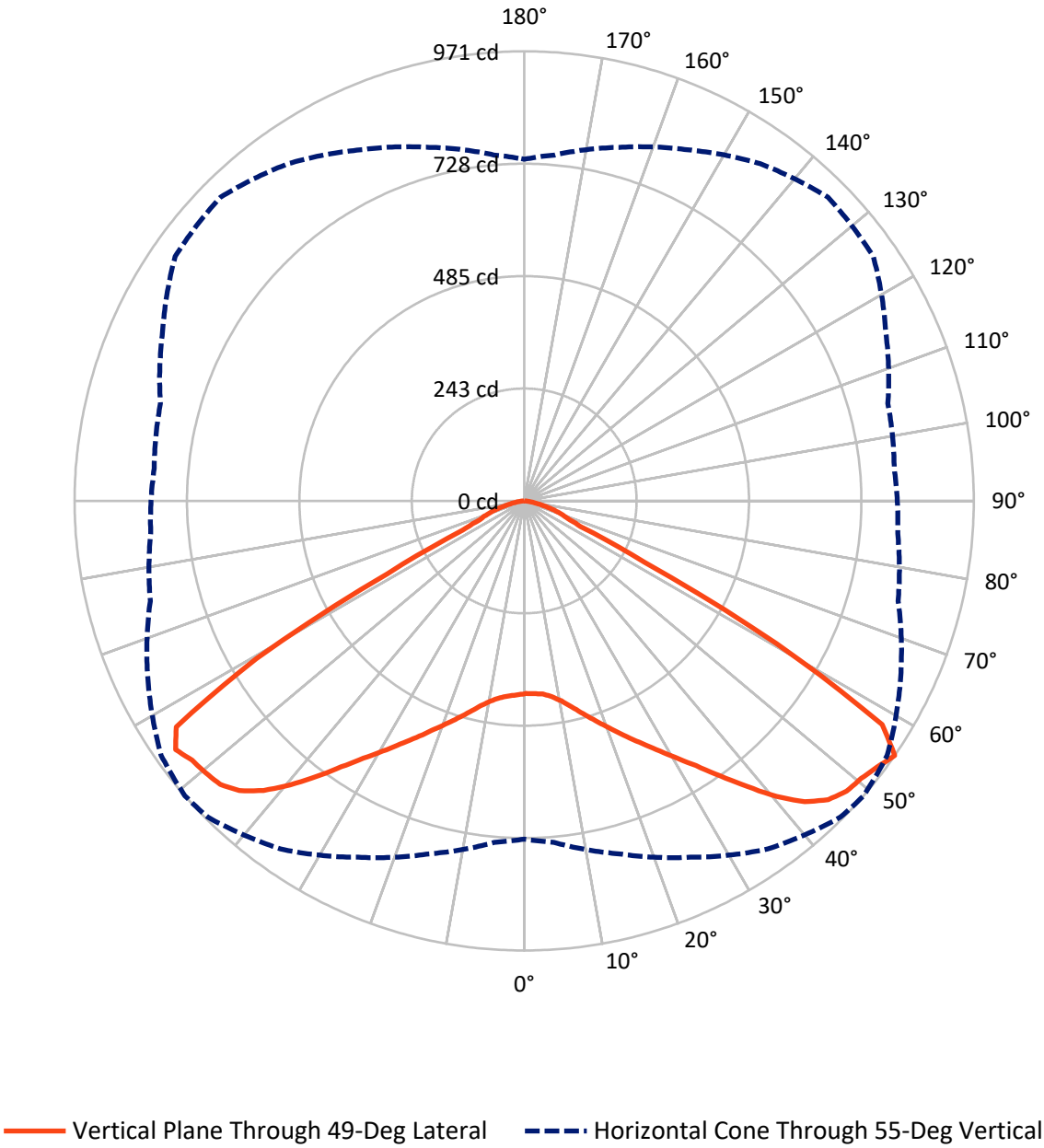
## Luminous Intensity Polar Plot



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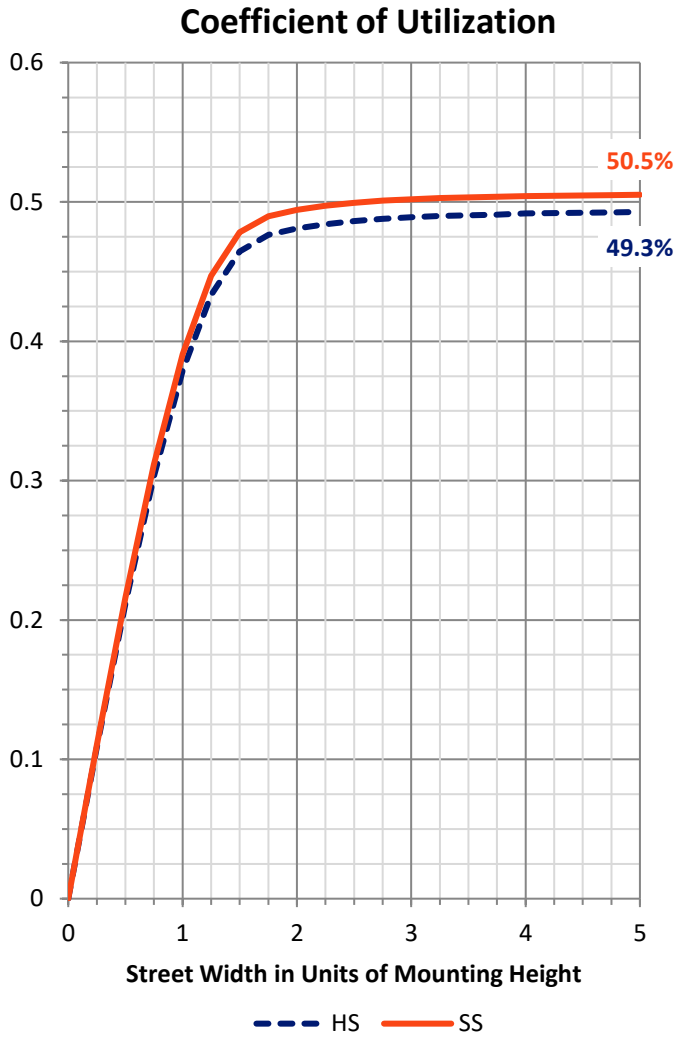
REPORT NUMBER: P629559
CATALOG NUMBER: GWS-SA1B-830-U-RW-W-GRSWH

**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 1242.6 | 0.0 | 1242.6 |
| | % Fixture | 49.5 | 0.0 | 49.5 |
| **Street Side** | Lumens | 1267.2 | 0.0 | 1267.2 |
| | % Fixture | 50.5 | 0.0 | 50.5 |
| **Total** | Lumens | 2509.8 | 0.0 | 2509.8 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 40.6 | 1.6 |
| 10°-20° | 133.8 | 5.3 |
| 20°-30° | 254.8 | 10.2 |
| 30°-40° | 432.0 | 17.2 |
| 40°-50° | 650.1 | 25.9 |
| 50°-60° | 711.5 | 28.4 |
| 60°-70° | 225.0 | 9.0 |
| 70°-80° | 54.0 | 2.2 |
| 80°-90° | 8.1 | 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° | 2509.8 | 100.0 |
| 0°-180° | 2509.8 | 100.0 |



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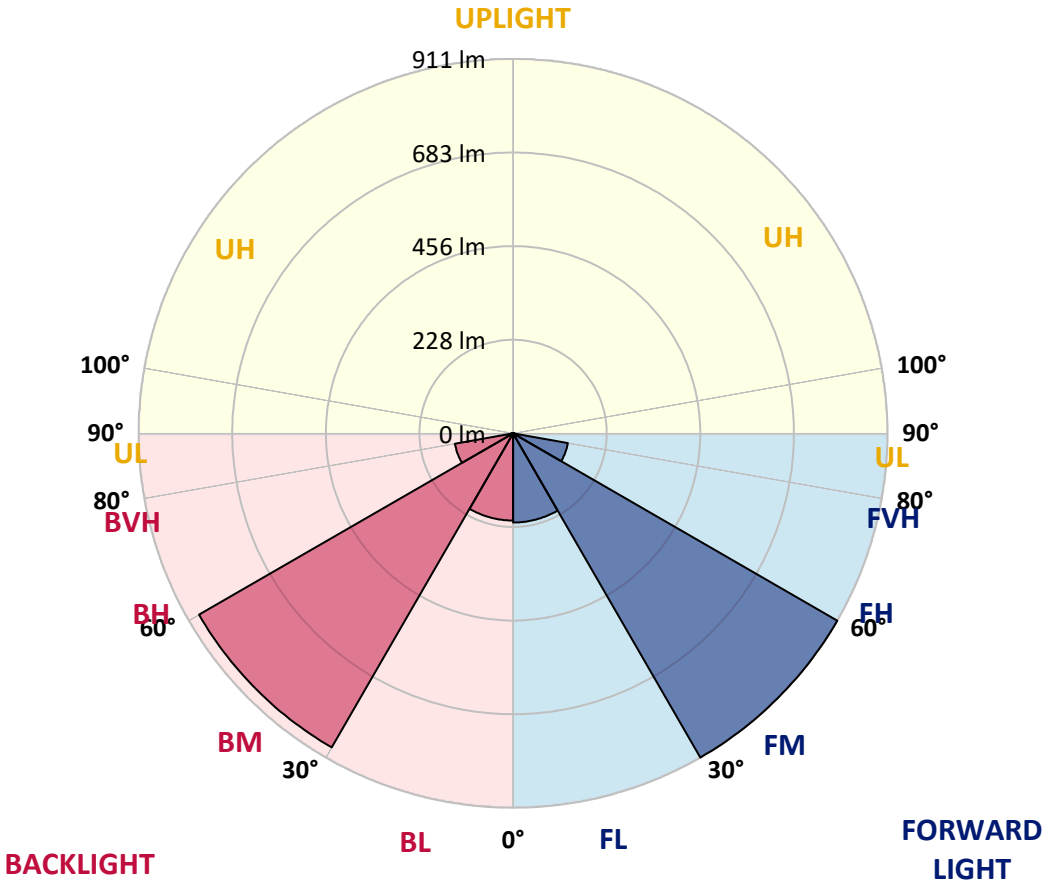
REPORT NUMBER: P629559
CATALOG NUMBER: GWS-SA1B-830-U-RW-W-GRSWH

## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 217.0 | 8.6 | | | |
| FM | (30°-60°) | 911.1 | 36.3 | | | |
| FH | (60°-80°) | 135.3 | 5.4 | | | G0/660 |
| FVH | (80°-90°) | 3.8 | 0.1 | | | G0/10 |
| BL | (0°-30°) | 212.1 | 8.5 | B1/500 | | |
| BM | (30°-60°) | 882.4 | 35.2 | B1/1000 | | |
| BH | (60°-80°) | 143.7 | 5.7 | B1/500 | | G0/660 |
| BVH | (80°-90°) | 4.4 | 0.2 | | | G0/10 |
| UL | (90°-100°) | 0.0 | 0.0 | | U0/0 | |
| UH | (100°-180°) | 0.0 | 0.0 | | U0/0 | |

**BUG Rating: B1-U0-G0**
Type V Short



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Scaled Data Report

REPORT NUMBER: P629559
CATALOG NUMBER: GWS-SA1B-830-U-RW-W-GRSWH

**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 45° | 49° | 55° | 65° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 415.8 | 415.8 | 415.8 | 415.8 | 415.8 | 415.8 | 415.8 | 415.8 | 415.8 | 415.8 | 415.8 |
| 2.5° | 409.6 | 410.0 | 410.9 | 412.3 | 413.7 | 415.8 | 416.6 | 417.6 | 417.4 | 418.6 | 418.6 |
| 5° | 407.6 | 408.2 | 409.4 | 411.5 | 413.9 | 417.8 | 418.8 | 421.3 | 423.7 | 426.8 | 427.8 |
| 7.5° | 410.0 | 410.9 | 412.3 | 415.6 | 419.2 | 424.3 | 426.4 | 430.5 | 435.2 | 440.7 | 442.9 |
| 10° | 414.7 | 415.8 | 418.2 | 423.5 | 429.4 | 437.2 | 439.0 | 444.1 | 451.7 | 459.2 | 463.7 |
| 12.5° | 420.0 | 421.7 | 426.2 | 434.5 | 443.3 | 453.5 | 456.4 | 462.7 | 470.9 | 480.7 | 486.8 |
| 15° | 426.2 | 427.6 | 434.5 | 446.4 | 460.1 | 473.5 | 476.8 | 482.9 | 492.1 | 501.7 | 510.3 |
| 17.5° | 439.0 | 441.5 | 449.6 | 463.3 | 479.2 | 495.2 | 498.8 | 505.8 | 513.1 | 520.7 | 528.8 |
| 20° | 456.6 | 458.6 | 469.0 | 486.0 | 504.8 | 519.2 | 522.9 | 529.0 | 532.5 | 536.4 | 543.3 |
| 22.5° | 474.1 | 477.0 | 488.8 | 508.8 | 530.9 | 546.6 | 549.5 | 555.2 | 552.7 | 551.5 | 556.0 |
| 25° | 496.0 | 499.9 | 511.5 | 533.3 | 555.8 | 575.2 | 577.4 | 582.3 | 578.2 | 571.9 | 571.7 |
| 27.5° | 523.1 | 526.6 | 538.6 | 561.1 | 583.3 | 603.5 | 607.8 | 614.4 | 605.4 | 597.6 | 592.1 |
| 30° | 555.4 | 557.6 | 570.9 | 594.8 | 617.6 | 636.8 | 642.3 | 648.9 | 642.1 | 629.3 | 623.7 |
| 32.5° | 592.9 | 596.0 | 611.3 | 636.4 | 656.8 | 676.0 | 681.5 | 689.7 | 682.3 | 667.8 | 660.9 |
| 35° | 638.0 | 641.1 | 657.2 | 684.6 | 705.4 | 725.2 | 729.1 | 735.8 | 726.6 | 709.9 | 704.4 |
| 37.5° | 687.0 | 690.9 | 711.3 | 737.2 | 759.1 | 782.1 | 782.3 | 784.4 | 771.3 | 750.5 | 744.4 |
| 40° | 742.1 | 747.2 | 767.6 | 794.6 | 820.9 | 839.7 | 839.5 | 833.8 | 811.7 | 779.5 | 770.1 |
| 42.5° | 796.6 | 800.7 | 821.3 | 849.1 | 875.4 | 893.2 | 887.9 | 874.0 | 842.1 | 798.3 | 785.8 |
| 45° | 836.0 | 839.1 | 860.7 | 891.9 | 918.7 | 929.7 | 920.1 | 903.4 | 860.3 | 810.1 | 791.7 |
| 47.5° | 854.6 | 858.7 | 880.5 | 911.5 | 941.7 | 948.1 | 936.6 | 920.9 | 870.9 | 821.1 | 796.4 |
| 50° | 844.6 | 849.9 | 874.6 | 903.4 | 937.5 | 950.5 | 942.4 | 926.6 | 882.1 | 831.9 | 804.8 |
| 52.5° | 818.7 | 823.8 | 855.0 | 889.9 | 928.5 | 954.4 | 954.2 | 941.3 | 895.0 | 835.0 | 805.2 |
| 55° | 730.1 | 740.1 | 788.7 | 848.9 | 917.5 | 965.8 | 970.7 | 957.1 | 897.0 | 835.8 | 809.5 |
| 57.5° | 475.2 | 492.7 | 538.8 | 617.2 | 754.8 | 878.5 | 911.5 | 914.8 | 882.3 | 832.3 | 810.3 |
| 60° | 198.4 | 212.5 | 249.0 | 301.1 | 414.7 | 561.9 | 626.0 | 690.3 | 767.8 | 796.0 | 802.7 |
| 62.5° | 123.3 | 124.5 | 128.2 | 140.0 | 178.0 | 249.8 | 291.1 | 351.3 | 466.6 | 564.8 | 610.1 |
| 65° | 111.2 | 111.8 | 112.7 | 111.8 | 113.7 | 122.5 | 133.5 | 154.5 | 201.5 | 250.2 | 308.2 |
| 67.5° | 98.0 | 98.8 | 99.4 | 98.8 | 99.4 | 99.8 | 101.0 | 102.9 | 111.4 | 118.4 | 123.7 |
| 70° | 79.2 | 80.4 | 81.4 | 81.0 | 83.5 | 83.5 | 84.7 | 86.1 | 90.4 | 95.5 | 99.2 |
| 72.5° | 60.4 | 59.4 | 60.6 | 61.0 | 63.3 | 64.5 | 66.3 | 68.0 | 72.9 | 75.9 | 80.6 |
| 75° | 39.2 | 38.2 | 40.0 | 41.0 | 44.1 | 45.7 | 47.4 | 49.0 | 52.5 | 54.5 | 59.0 |
| 77.5° | 21.2 | 21.0 | 22.9 | 24.3 | 27.6 | 29.6 | 30.8 | 32.0 | 34.9 | 35.5 | 38.4 |
| 80° | 12.2 | 12.2 | 13.5 | 14.5 | 16.5 | 18.8 | 20.0 | 21.0 | 23.1 | 23.7 | 24.9 |
| 82.5° | 6.7 | 6.7 | 7.3 | 8.0 | 9.6 | 10.8 | 11.8 | 12.7 | 14.5 | 15.1 | 15.7 |
| 85° | 3.3 | 3.1 | 3.5 | 3.9 | 4.5 | 5.1 | 5.7 | 6.1 | 7.6 | 8.0 | 8.8 |
| 87.5° | 0.4 | 0.4 | 0.4 | 0.6 | 0.8 | 1.2 | 1.4 | 1.4 | 2.2 | 2.7 | 3.1 |
| 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: P629559
CATALOG NUMBER: GWS-SA1B-830-U-RW-W-GRSWH

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 415.8 | 415.8 | 415.8 | 415.8 | 415.8 | 415.8 | 415.8 | 415.8 | 415.8 | 415.8 | 415.8 |
| 2.5° | 419.8 | 417.2 | 418.8 | 419.4 | 419.4 | 418.8 | 416.2 | 415.4 | 414.1 | 412.3 | 412.3 |
| 5° | 429.2 | 427.2 | 427.6 | 426.6 | 424.1 | 421.1 | 416.2 | 413.7 | 411.7 | 409.4 | 409.2 |
| 7.5° | 445.4 | 442.7 | 442.3 | 438.4 | 431.9 | 425.4 | 418.0 | 413.5 | 410.5 | 407.6 | 407.4 |
| 10° | 466.4 | 463.9 | 460.9 | 453.1 | 443.5 | 433.9 | 423.9 | 417.8 | 413.3 | 409.2 | 409.0 |
| 12.5° | 489.9 | 487.0 | 481.3 | 469.9 | 457.8 | 448.4 | 437.0 | 427.6 | 420.9 | 415.4 | 414.3 |
| 15° | 515.4 | 511.3 | 501.5 | 488.0 | 476.2 | 466.2 | 453.9 | 440.5 | 430.3 | 421.5 | 420.5 |
| 17.5° | 535.0 | 529.7 | 519.0 | 506.4 | 496.6 | 486.6 | 470.7 | 453.7 | 439.0 | 428.0 | 426.4 |
| 20° | 548.4 | 544.1 | 532.1 | 522.7 | 517.0 | 508.2 | 489.6 | 470.5 | 453.9 | 440.1 | 439.2 |
| 22.5° | 560.9 | 555.8 | 543.9 | 538.4 | 538.4 | 532.5 | 514.8 | 492.1 | 472.7 | 456.6 | 454.5 |
| 25° | 575.0 | 569.5 | 560.5 | 559.9 | 562.7 | 560.1 | 538.6 | 514.3 | 491.7 | 473.5 | 470.3 |
| 27.5° | 594.6 | 588.4 | 583.1 | 586.8 | 590.9 | 588.0 | 564.1 | 536.0 | 512.1 | 493.7 | 490.9 |
| 30° | 625.8 | 618.2 | 613.3 | 617.8 | 625.8 | 617.4 | 591.5 | 561.7 | 537.6 | 517.4 | 516.0 |
| 32.5° | 662.1 | 653.5 | 648.4 | 655.6 | 662.7 | 649.7 | 624.0 | 595.4 | 570.1 | 548.8 | 546.4 |
| 35° | 705.8 | 695.0 | 687.4 | 697.0 | 704.4 | 691.5 | 666.0 | 638.9 | 610.7 | 588.6 | 585.4 |
| 37.5° | 744.6 | 731.5 | 726.4 | 739.9 | 749.7 | 741.3 | 713.6 | 688.0 | 657.2 | 633.1 | 631.7 |
| 40° | 772.7 | 759.9 | 756.2 | 778.5 | 795.6 | 793.6 | 768.7 | 739.5 | 710.5 | 682.7 | 680.1 |
| 42.5° | 785.0 | 776.0 | 776.8 | 806.8 | 833.4 | 846.4 | 824.2 | 793.0 | 765.0 | 736.2 | 734.4 |
| 45° | 787.6 | 782.1 | 788.7 | 826.2 | 861.1 | 887.9 | 868.9 | 842.8 | 811.1 | 783.4 | 782.5 |
| 47.5° | 790.5 | 787.4 | 797.4 | 837.2 | 878.7 | 909.7 | 899.1 | 872.1 | 840.1 | 813.0 | 810.9 |
| 50° | 797.2 | 796.0 | 807.2 | 845.0 | 887.0 | 915.6 | 903.6 | 876.8 | 844.0 | 817.2 | 812.3 |
| 52.5° | 799.3 | 797.2 | 813.4 | 857.0 | 900.9 | 915.4 | 889.5 | 854.6 | 821.5 | 791.7 | 786.6 |
| 55° | *805.6* | *801.9* | *813.0* | *861.5* | *920.1* | *927.3* | *888.7* | *836.4* | *790.3* | *749.7* | *737.6* |
| 57.5° | 807.2 | 803.2 | 810.3 | 854.2 | 899.3 | 893.0 | 781.1 | 675.0 | 588.0 | 542.9 | 548.0 |
| 60° | 798.5 | 799.7 | 787.4 | 782.5 | 721.3 | 636.8 | 478.2 | 382.3 | 300.2 | 265.5 | 273.1 |
| 62.5° | 607.8 | 612.9 | 571.1 | 496.6 | 381.9 | 302.7 | 200.2 | 155.5 | 131.6 | 125.5 | 126.5 |
| 65° | 306.8 | 313.7 | 270.2 | 223.5 | 166.1 | 134.3 | 116.1 | 112.5 | 111.2 | 109.8 | 109.8 |
| 67.5° | 121.4 | 123.5 | 121.9 | 114.1 | 106.1 | 103.3 | 102.5 | 102.1 | 100.6 | 99.8 | 100.0 |
| 70° | 97.6 | 99.2 | 96.7 | 91.8 | 88.6 | 88.4 | 88.0 | 87.2 | 86.1 | 86.1 | 86.7 |
| 72.5° | 79.6 | 81.2 | 77.8 | 74.7 | 72.3 | 70.4 | 69.4 | 68.8 | 67.4 | 67.4 | 68.0 |
| 75° | 58.6 | 59.6 | 56.7 | 56.3 | 53.7 | 51.8 | 50.2 | 49.4 | 47.6 | 46.7 | 47.4 |
| 77.5° | 39.0 | 38.8 | 37.4 | 37.4 | 36.3 | 34.1 | 32.2 | 30.4 | 28.0 | 26.3 | 26.7 |
| 80° | 25.3 | 25.3 | 24.7 | 24.7 | 23.7 | 21.8 | 19.6 | 17.8 | 16.3 | 15.1 | 15.1 |
| 82.5° | 16.1 | 15.9 | 15.7 | 15.5 | 15.1 | 13.3 | 11.6 | 10.4 | 9.4 | 8.6 | 8.8 |
| 85° | 9.0 | 9.0 | 8.6 | 8.6 | 7.8 | 6.7 | 5.9 | 5.1 | 4.5 | 4.3 | 4.3 |
| 87.5° | 3.1 | 3.1 | 2.9 | 2.9 | 2.4 | 1.8 | 1.4 | 1.2 | 1.0 | 0.8 | 1.0 |
| 90° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

Cooper Lighting Solutions Photometric Lab
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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

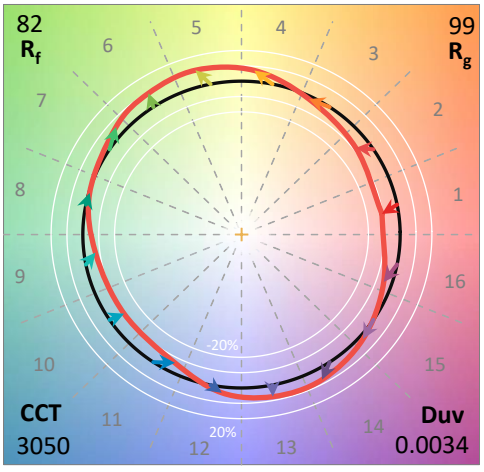
## Test Information

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

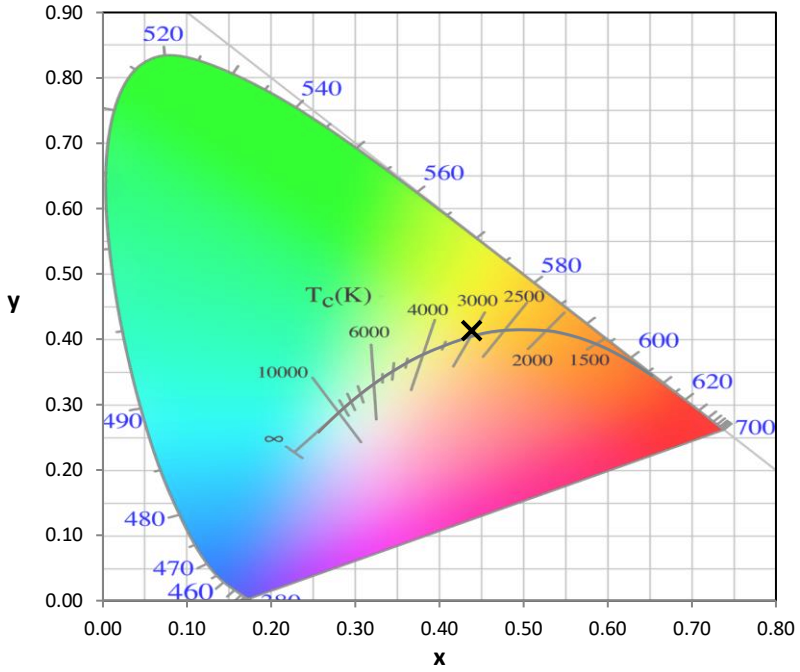
| | |
|---|---|
| Stabilization Time: | 20M |
| Operation Time: | 1H 20M |
| Sphere Temperature (°C): | 24.2 |

REPORT NUMBER: SP1-2408-195-9

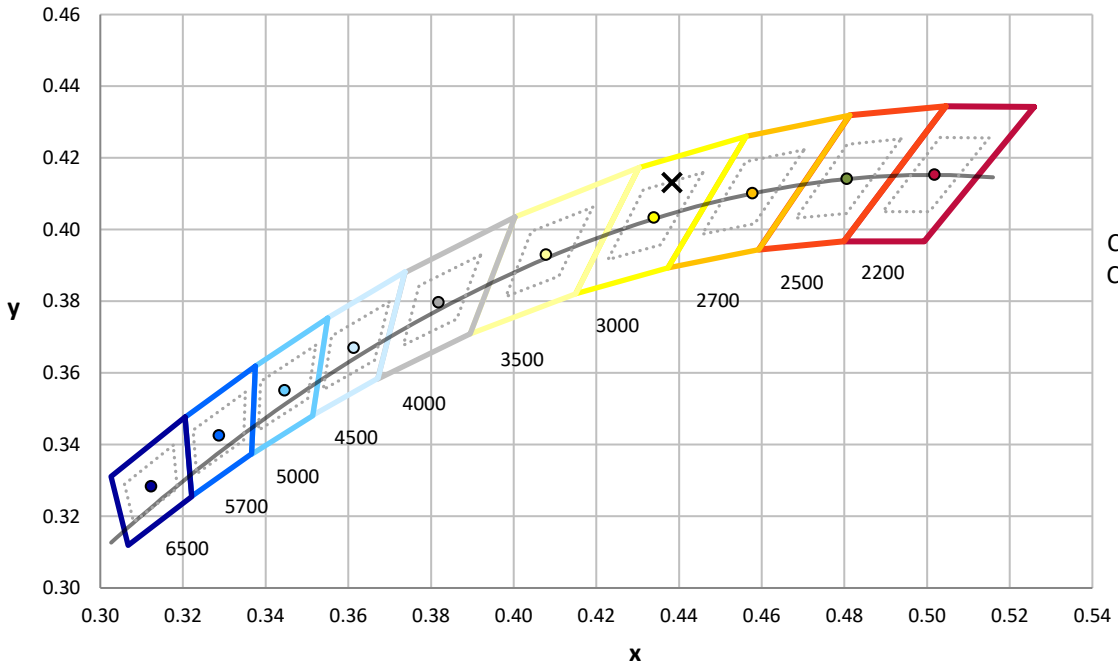
| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 6/18/2024 | 12/18/2024 |
| Power Meter | INXT2011004 | 2/8/2024 | 2/8/2025 |
| AC Power Source | IN0063 | 10/24/2023 | 10/24/2024 |
| DC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

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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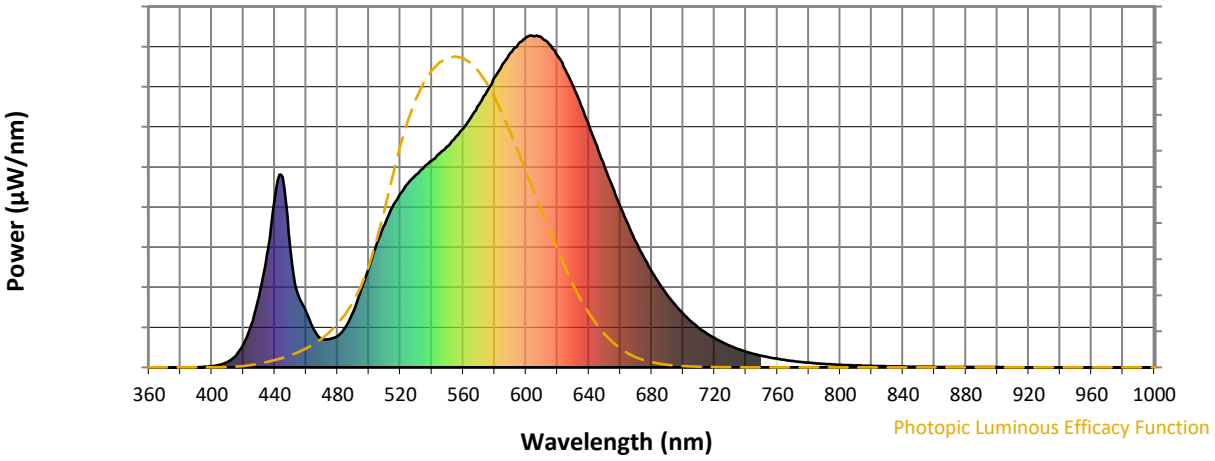
## Photopic Flux vs. Wavelength




## 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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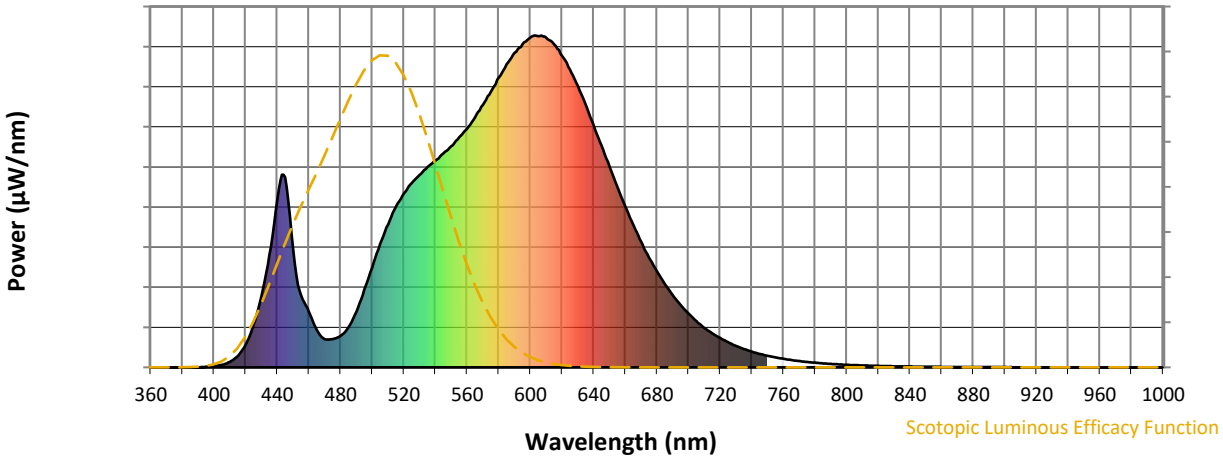
## Scotopic Flux vs. Wavelength




**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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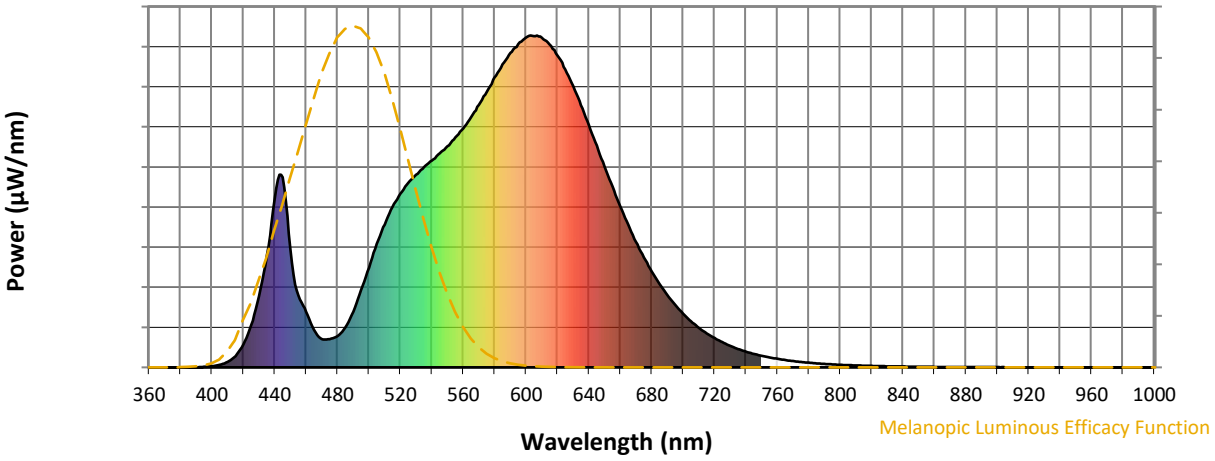
## Melanopic Flux vs. Wavelength




**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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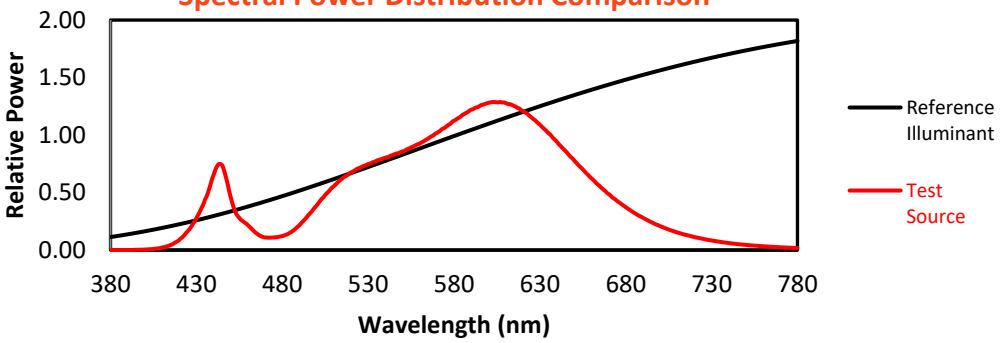
# TM-30-18

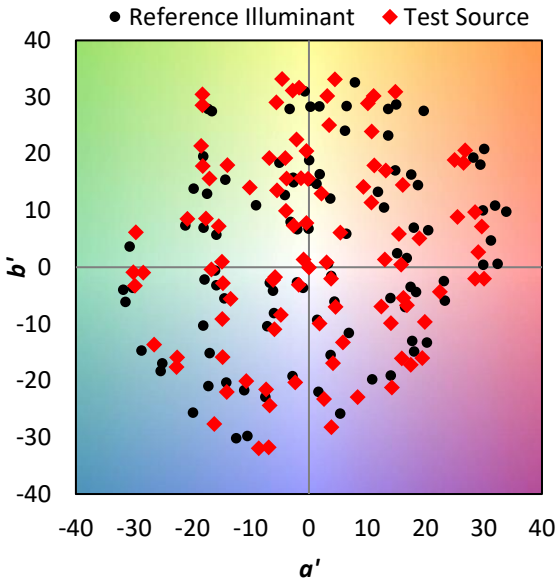
## Summary

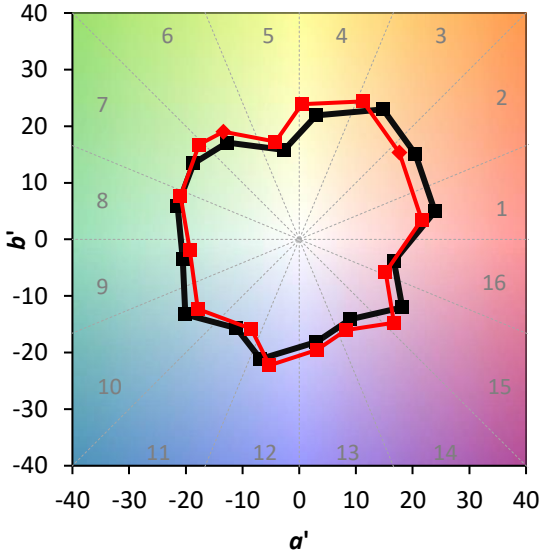
$R_f$ = 81.5
$R_g$ = 99.2
CIE $R_a$ = 81.0
$R_9$ = 7.1

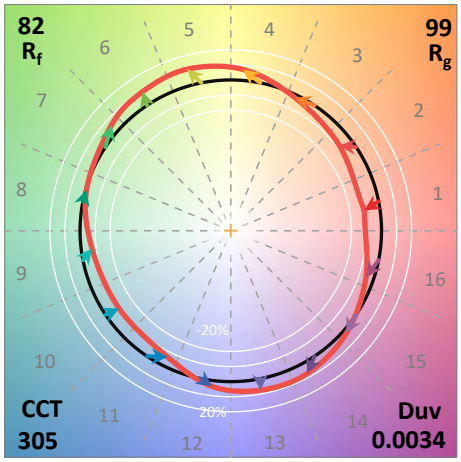
## Spectral Power Distribution Comparison

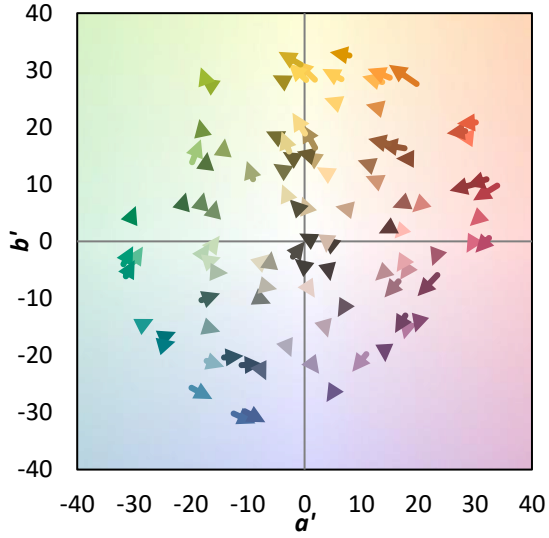



## Color Vector Graphics



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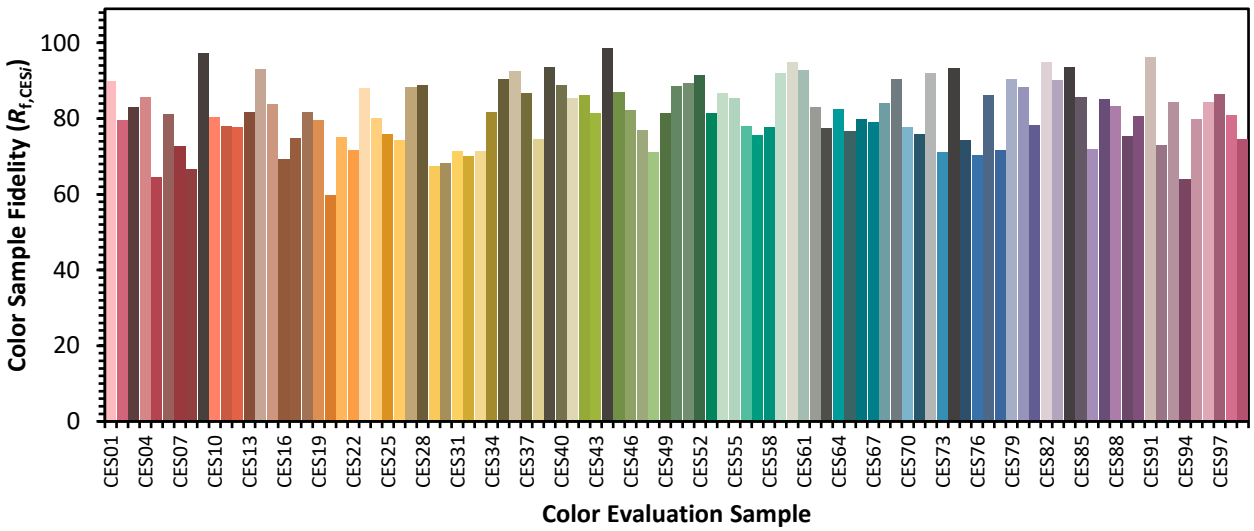
# TM-30-18

**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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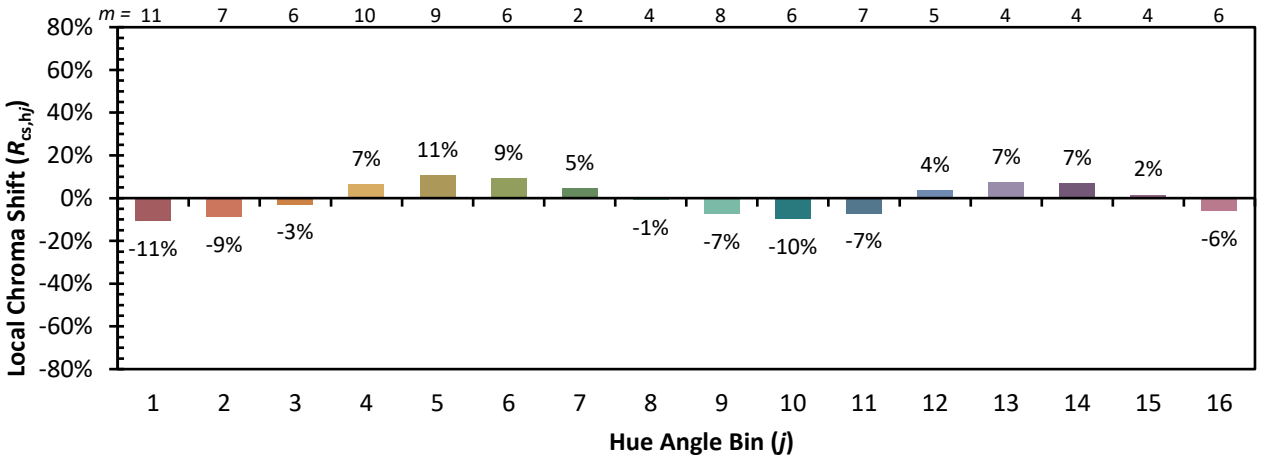
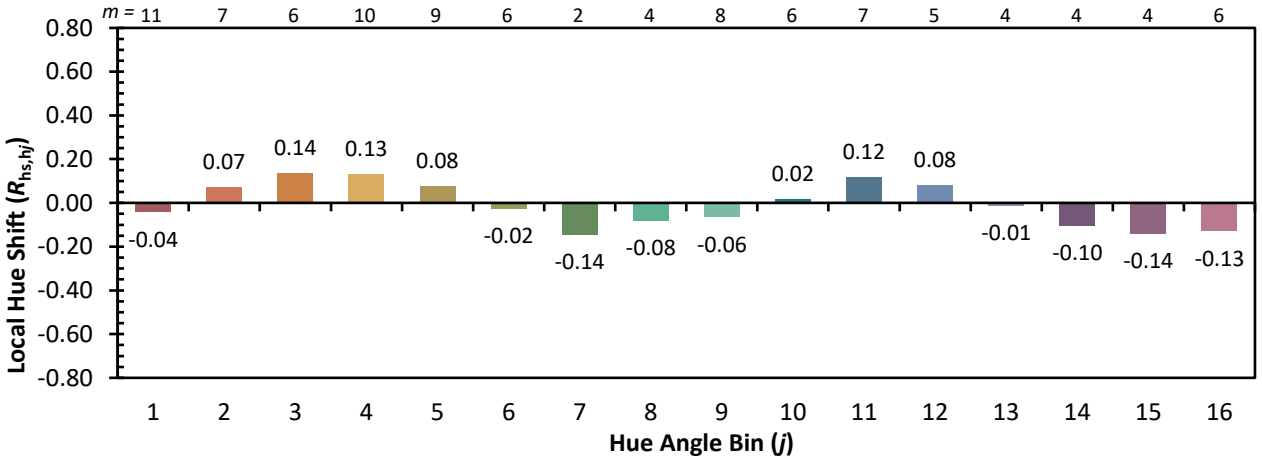
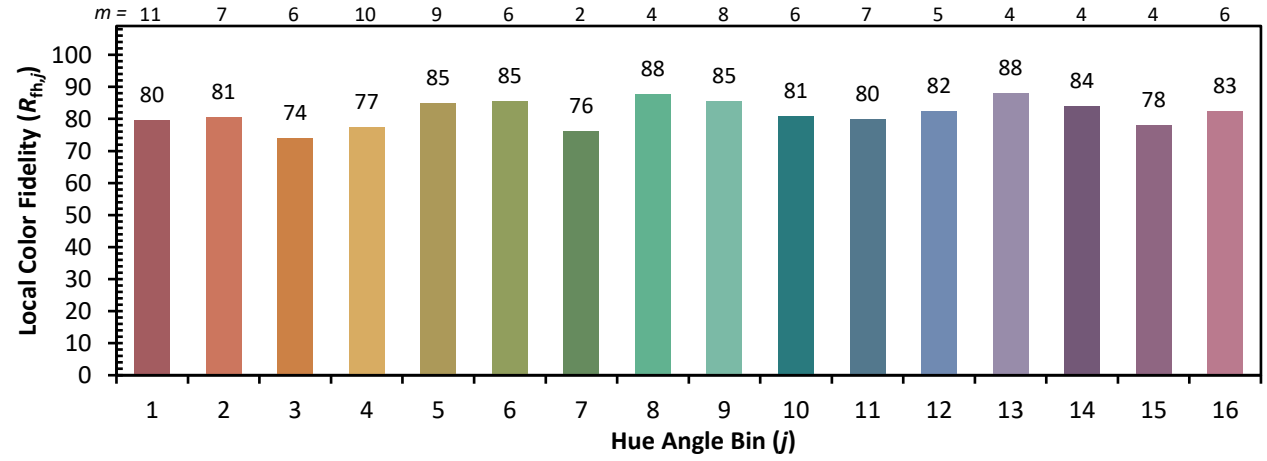
# TM-30-18

## Color Rendition by Hue-Angle Bin



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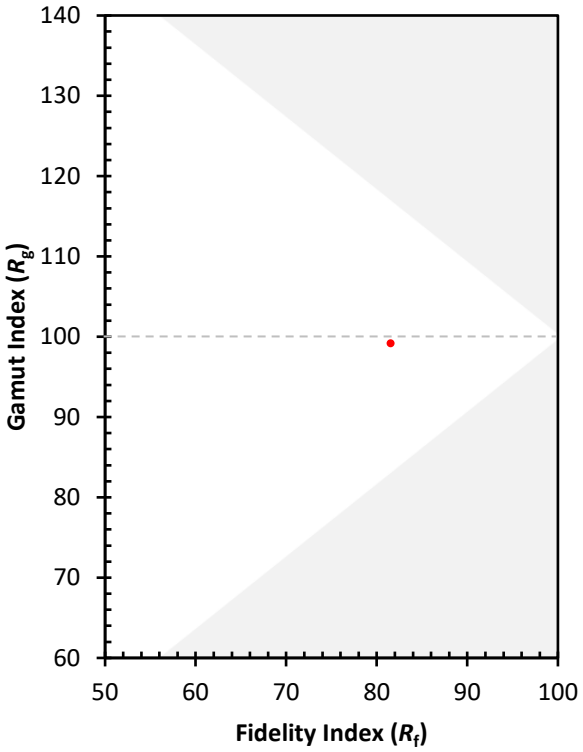
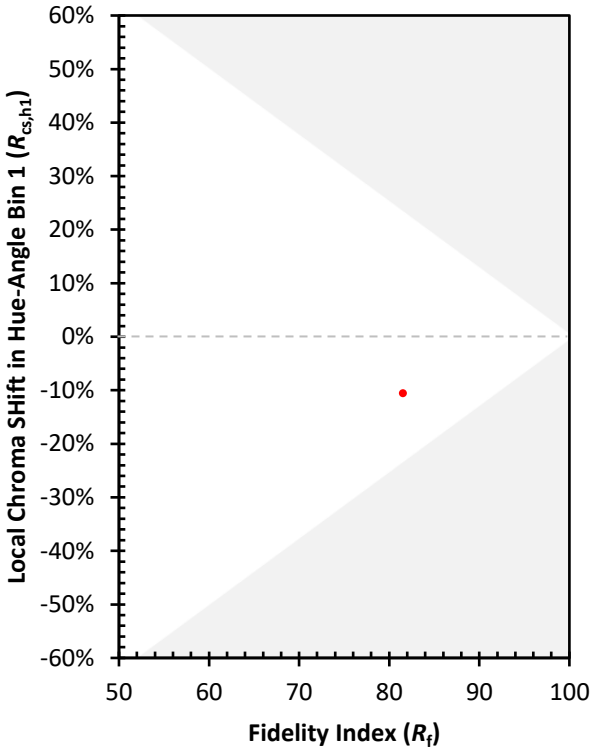
## TM-30-18

### Measure Comparisons




(END OF REPORT)