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: P631066

Luminaire Tested: GWS-SA1E-830-U-T2-W

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: | P631066 |
| | TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-19) |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Issue Date: | 1/10/2023 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS |
| Product Line: | McGRAW-EDISON |
| Catalog Number: | GWS-SA1E-830-U-T2-W |
| Description: | GALLEON WALL SLIM LUMINAIRE. (1) LIGHTSQUARES WITH 16 LEDS EACH AND TYPE II OPTICS |
| Light Source: | (16) 3000K CCT, 80 CRI LEDS |
| Ballast/Driver: | - |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 5972.3 lumens |
| Efficiency: | N/A |
| Efficacy: | 102.3 lumens/watt |
| Luminous Opening: | Rectangular (W 0.5' x L: 0.5' x H: 0') |
| IES Classification: | Type II - Medium |
| BUG Rating: | B1 - U0 - G2 |

| | |
|---|---|
| Input Watts (W): | 58.4 |
| 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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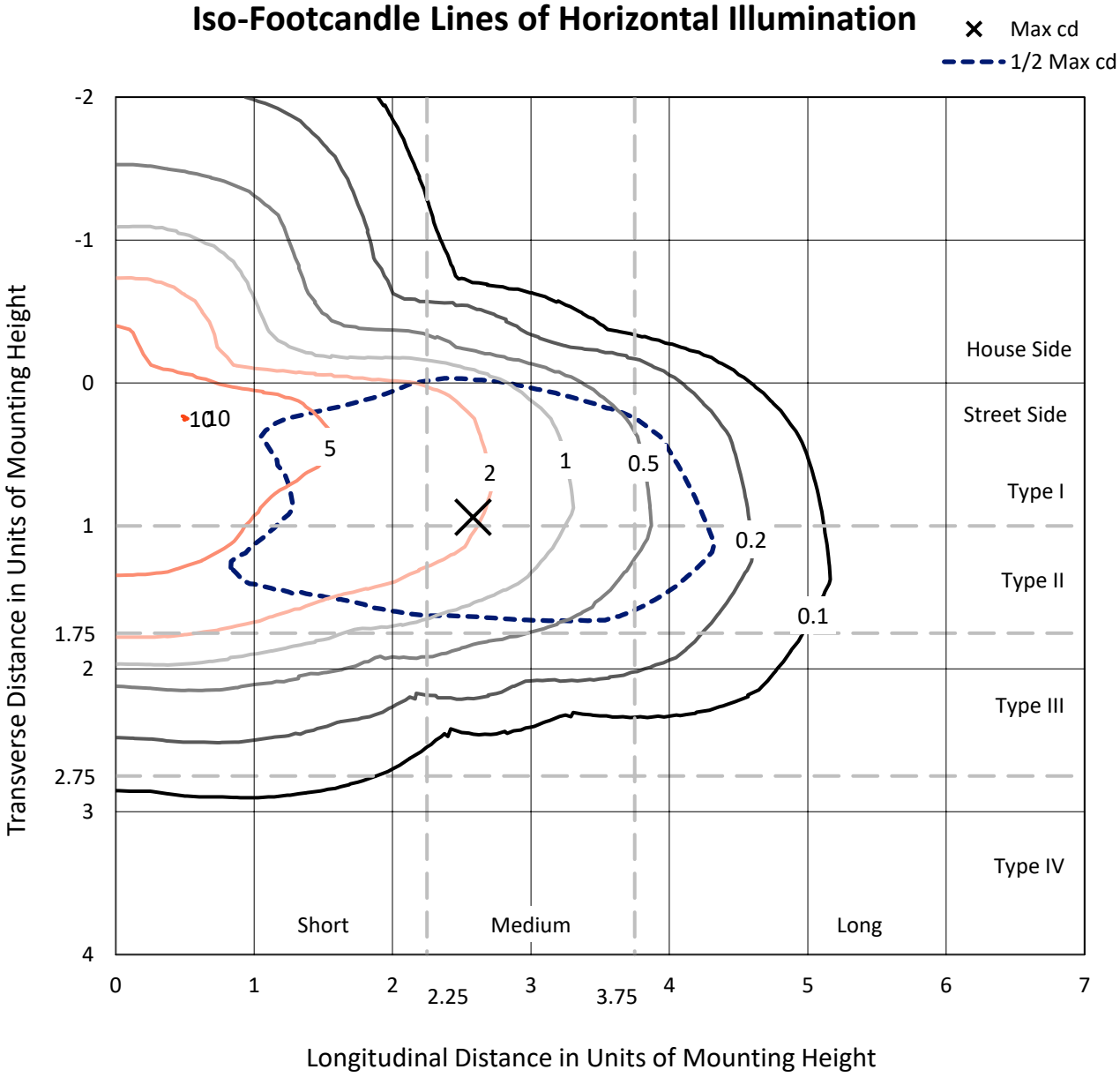
Scaled Data Report

REPORT NUMBER: P631066
CATALOG NUMBER: GWS-SA1E-830-U-T2-W

## Iso-Footcandle Lines of Horizontal Illumination




Based on 10 foot mounting height. Maximum calculated value = 10.1 fc
Type II - Medium - N/A

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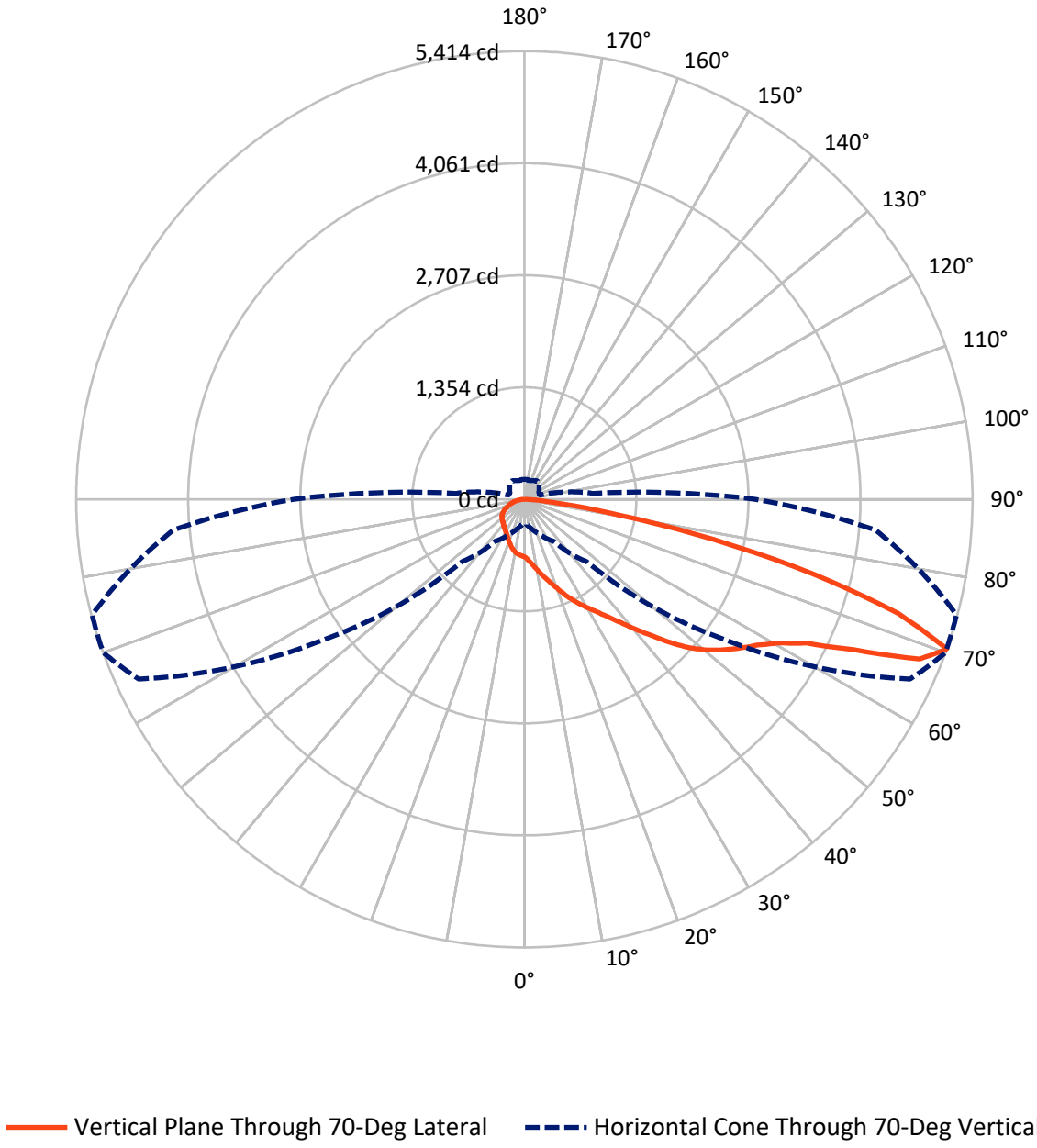
## Luminous Intensity Polar Plot



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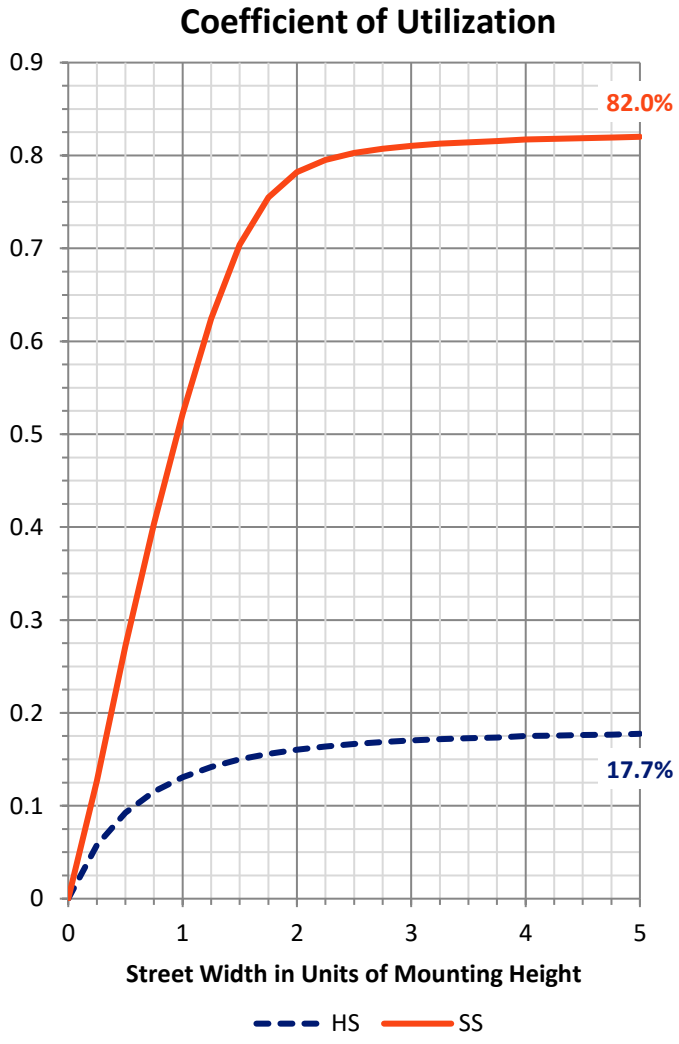
REPORT NUMBER: P631066
CATALOG NUMBER: GWS-SA1E-830-U-T2-W

**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 1070.2 | 0.0 | 1070.2 |
| | % Fixture | 17.9 | 0.0 | 17.9 |
| **Street Side** | Lumens | 4902.0 | 0.0 | 4902.0 |
| | % Fixture | 82.1 | 0.0 | 82.1 |
| **Total** | Lumens | 5972.3 | 0.0 | 5972.3 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 70.8 | 1.2 |
| 10°-20° | 230.3 | 3.9 |
| 20°-30° | 407.9 | 6.8 |
| 30°-40° | 614.0 | 10.3 |
| 40°-50° | 928.9 | 15.6 |
| 50°-60° | 1330.7 | 22.3 |
| 60°-70° | 1470.9 | 24.6 |
| 70°-80° | 830.1 | 13.9 |
| 80°-90° | 88.8 | 1.5 |
| 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° | 5972.3 | 100.0 |
| 0°-180° | 5972.3 | 100.0 |



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REPORT NUMBER: P631066
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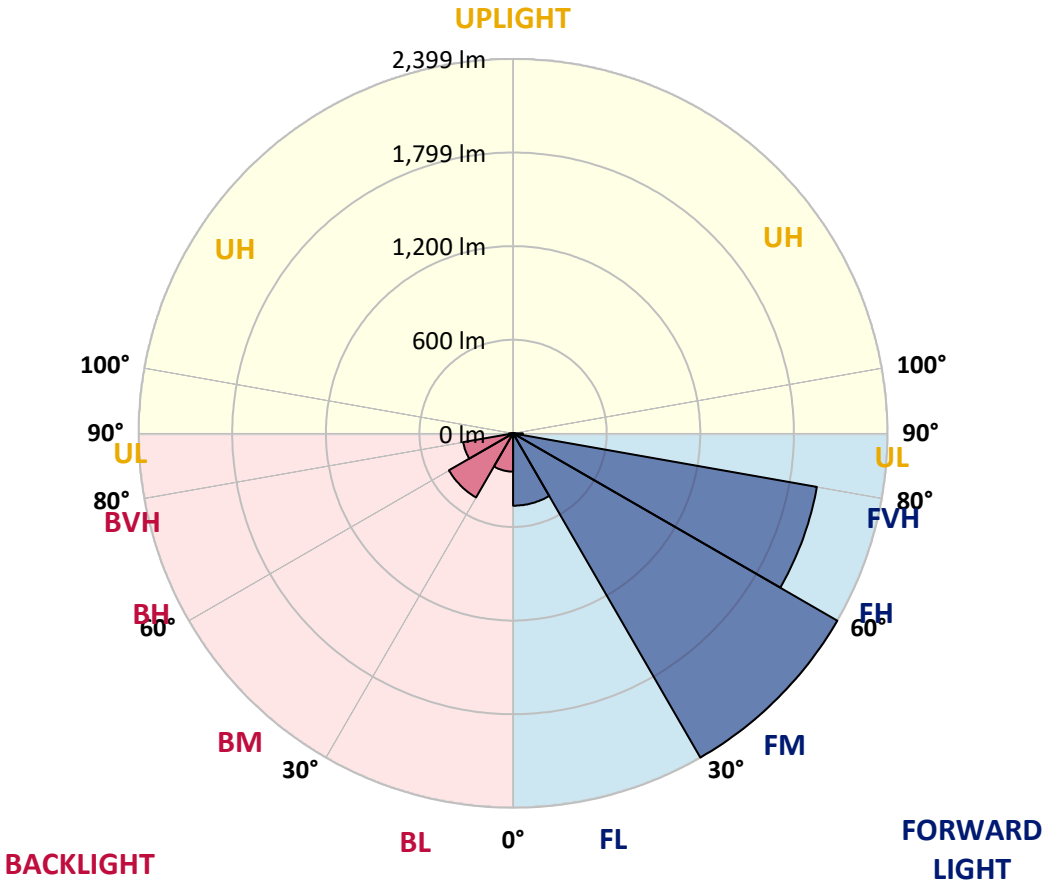
## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 463.6 | 7.8 | | | |
| FM | (30°-60°) | 2399.1 | 40.2 | | | |
| FH | (60°-80°) | 1976.6 | 33.1 | | | G2/5000 |
| FVH | (80°-90°) | 62.8 | 1.1 | | | G1/100 |
| BL | (0°-30°) | 245.4 | 4.1 | B1/500 | | |
| BM | (30°-60°) | 474.5 | 7.9 | B1/1000 | | |
| BH | (60°-80°) | 324.4 | 5.4 | B1/500 | | G1/500 |
| BVH | (80°-90°) | 26.0 | 0.4 | | | G1/100 |
| UL | (90°-100°) | 0.0 | 0.0 | | U0/0 | |
| UH | (100°-180°) | 0.0 | 0.0 | | U0/0 | |

**BUG Rating: B1-U0-G2**
Type II Medium



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REPORT NUMBER: P631066
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**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 65° | 70° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 696.5 | 696.5 | 696.5 | 696.5 | 696.5 | 696.5 | 696.5 | 696.5 | *696.5* | 696.5 | 696.5 |
| 2.5° | 771.6 | 770.3 | 771.1 | 770.3 | 765.5 | 753.9 | 744.4 | 732.3 | *724.1* | 719.4 | 708.1 |
| 5° | 862.2 | 860.9 | 857.9 | 853.6 | 844.9 | 829.0 | 805.2 | 778.9 | *762.9* | 750.9 | 727.1 |
| 7.5° | 927.4 | 927.4 | 926.9 | 921.8 | 915.7 | 898.9 | 870.8 | 836.3 | *813.0* | 792.3 | 753.5 |
| 10° | 960.6 | 962.7 | 965.8 | 973.1 | 971.8 | 962.7 | 936.4 | 899.3 | *870.0* | 845.8 | 788.0 |
| 12.5° | 978.7 | 980.0 | 985.2 | 1000.3 | 1015.8 | 1018.0 | 1002.5 | 963.6 | *931.7* | 899.3 | 826.4 |
| 15° | 1002.0 | 1002.5 | 1009.4 | 1027.5 | 1050.4 | 1073.2 | 1069.3 | 1030.5 | *997.7* | 961.9 | 869.1 |
| 17.5° | 1020.1 | 1023.2 | 1035.7 | 1056.8 | 1085.3 | 1116.8 | 1135.8 | 1111.6 | *1071.1* | 1030.1 | 915.7 |
| 20° | 1026.6 | 1028.8 | 1045.2 | 1077.5 | 1116.4 | 1160.8 | 1203.1 | 1196.6 | *1155.6* | 1107.3 | 968.4 |
| 22.5° | 1049.9 | 1049.9 | 1062.0 | 1089.2 | 1134.9 | 1199.7 | 1268.3 | 1285.1 | *1248.9* | 1192.3 | 1024.9 |
| 25° | 1101.3 | 1099.5 | 1105.2 | 1116.4 | 1150.9 | 1230.7 | 1332.6 | 1383.1 | *1342.5* | 1279.1 | 1081.4 |
| 27.5° | 1171.6 | 1170.7 | 1170.3 | 1172.0 | 1183.7 | 1257.9 | 1386.9 | 1474.5 | *1434.0* | 1362.3 | 1131.9 |
| 30° | 1248.0 | 1245.4 | 1251.0 | 1245.8 | 1243.2 | 1290.3 | 1433.1 | 1556.5 | *1525.0* | 1444.8 | 1173.8 |
| 32.5° | 1352.0 | 1347.2 | 1346.0 | 1329.1 | 1318.8 | 1340.8 | 1470.2 | 1649.7 | *1624.7* | 1533.7 | 1220.8 |
| 35° | 1489.2 | 1484.9 | 1462.9 | 1436.1 | 1405.5 | 1415.9 | 1516.4 | 1740.8 | *1742.5* | 1645.0 | 1282.5 |
| 37.5° | 1627.7 | 1628.6 | 1611.3 | 1548.3 | 1516.8 | 1510.8 | 1586.7 | 1851.7 | *1888.8* | 1777.9 | 1362.3 |
| 40° | 1743.0 | 1748.1 | 1748.1 | 1681.7 | 1634.6 | 1629.0 | 1685.6 | 1983.3 | *2057.1* | 1941.0 | 1463.3 |
| 42.5° | 1830.6 | 1835.3 | 1850.4 | 1802.5 | 1752.9 | 1772.3 | 1805.5 | 2115.4 | *2247.9* | 2142.6 | 1591.1 |
| 45° | 1926.8 | 1930.7 | 1938.9 | 1911.3 | 1882.3 | 1934.1 | 1941.5 | 2273.3 | *2466.2* | 2368.7 | 1739.5 |
| 47.5° | 2054.5 | 2051.1 | 2051.9 | 2031.7 | 2009.2 | 2092.9 | 2091.2 | 2406.2 | *2677.2* | 2616.4 | 1900.5 |
| 50° | 2213.3 | 2219.8 | 2213.8 | 2173.6 | 2147.3 | 2223.7 | 2233.6 | 2553.4 | *2862.8* | 2861.5 | 2062.7 |
| 52.5° | 2366.1 | 2368.7 | 2400.6 | 2402.3 | 2348.4 | 2332.4 | 2358.3 | 2701.8 | *3019.4* | 3085.9 | 2218.5 |
| 55° | 2373.9 | 2383.8 | 2479.6 | 2548.6 | 2635.8 | 2507.6 | 2484.3 | 2843.4 | *3170.9* | 3305.5 | 2380.3 |
| 57.5° | 2208.6 | 2224.6 | 2387.2 | 2536.1 | 2778.6 | 2808.4 | 2700.1 | 3026.3 | *3322.4* | 3521.7 | 2567.6 |
| 60° | 1855.6 | 1888.8 | 2109.8 | 2337.6 | 2714.3 | 3024.6 | 3141.6 | 3274.9 | *3521.3* | 3742.7 | 2795.0 |
| 62.5° | 1185.0 | 1197.9 | 1507.8 | 1889.3 | 2424.8 | 3003.5 | 3622.3 | 3712.9 | *3824.2* | 4030.5 | 3145.4 |
| 65° | 593.4 | 634.8 | 816.5 | 1127.6 | 1748.6 | 2646.6 | 3865.2 | 4515.1 | *4378.8* | 4523.3 | 3713.3 |
| 67.5° | 402.6 | 416.0 | 507.9 | 677.5 | 1025.3 | 1875.0 | 3714.6 | 5190.9 | *5150.8* | 5174.5 | 4318.8 |
| 70° | *296.9* | *305.5* | *378.0* | *479.9* | *620.1* | *1064.6* | *2957.3* | *5140.0* | *5414.0* | *5405.4* | *4255.3* |
| 72.5° | 216.6 | 220.9 | 275.7 | 366.4 | 459.6 | 550.6 | 1806.0 | 4152.2 | *4726.1* | 4975.1 | 3721.5 |
| 75° | 157.5 | 162.7 | 191.6 | 274.0 | 357.3 | 343.5 | 891.5 | 2999.2 | *3604.2* | 4083.2 | 3031.9 |
| 77.5° | 117.4 | 123.8 | 137.2 | 171.8 | 250.3 | 246.0 | 385.4 | 1947.5 | *2331.1* | 2666.9 | 1841.8 |
| 80° | 84.6 | 85.9 | 93.6 | 110.0 | 158.8 | 144.1 | 183.4 | 1015.4 | *1164.3* | 1275.6 | 722.0 |
| 82.5° | 51.4 | 52.6 | 62.6 | 67.8 | 98.4 | 90.6 | 95.4 | 328.8 | *471.2* | 500.1 | 269.7 |
| 85° | 15.1 | 16.0 | 28.5 | 31.1 | 41.0 | 38.8 | 38.4 | 133.8 | *159.7* | 204.1 | 106.2 |
| 87.5° | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 | 2.6 | 4.7 | 23.7 | *35.8* | 49.6 | 25.9 |
| 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: P631066
CATALOG NUMBER: GWS-SA1E-830-U-T2-W

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 696.5 | 696.5 | 696.5 | 696.5 | 696.5 | 696.5 | 696.5 | 696.5 | 696.5 | 696.5 | 696.5 |
| 2.5° | 703.8 | 693.9 | 688.7 | 679.7 | 673.2 | 666.7 | 660.2 | 654.2 | 651.6 | 647.7 | 648.6 |
| 5° | 716.3 | 700.8 | 685.3 | 667.6 | 652.5 | 640.0 | 628.7 | 618.8 | 614.5 | 610.6 | 612.3 |
| 7.5° | 735.3 | 712.0 | 682.3 | 649.9 | 626.2 | 608.9 | 597.2 | 590.3 | 588.2 | 585.2 | 585.2 |
| 10° | 759.5 | 724.5 | 672.3 | 626.2 | 597.7 | 583.9 | 578.7 | 578.3 | 580.4 | 580.8 | 580.0 |
| 12.5° | 786.3 | 736.6 | 657.7 | 598.1 | 573.9 | 569.6 | 573.5 | 580.8 | 588.2 | 592.1 | 591.2 |
| 15° | 813.9 | 744.4 | 632.6 | 571.3 | 556.7 | 562.3 | 574.8 | 589.5 | 603.7 | 611.1 | 610.6 |
| 17.5° | 839.8 | 746.1 | 600.3 | 545.5 | 541.6 | 555.8 | 577.4 | 600.3 | 619.7 | 630.0 | 630.5 |
| 20° | 868.7 | 743.1 | 567.0 | 522.2 | 526.5 | 549.8 | 578.3 | 605.9 | 628.7 | 639.1 | 641.7 |
| 22.5° | 895.0 | 732.7 | 534.7 | 500.1 | 513.5 | 542.4 | 571.3 | 597.2 | 617.5 | 627.4 | 630.9 |
| 25° | 918.7 | 712.9 | 499.3 | 481.6 | 503.6 | 532.1 | 554.1 | 572.2 | 586.5 | 592.5 | 597.2 |
| 27.5° | 931.7 | 683.1 | 472.5 | 466.9 | 494.1 | 517.4 | 529.5 | 535.1 | 539.8 | 538.1 | 541.6 |
| 30° | 934.3 | 646.0 | 449.2 | 455.3 | 479.9 | 497.1 | 499.7 | 494.1 | 485.9 | 472.5 | 475.5 |
| 32.5° | 931.7 | 603.3 | 429.8 | 442.8 | 463.9 | 474.3 | 470.8 | 456.1 | 436.3 | 415.6 | 416.9 |
| 35° | 932.5 | 560.1 | 413.8 | 428.9 | 445.3 | 451.0 | 442.3 | 422.0 | 400.9 | 381.9 | 381.0 |
| 37.5° | 942.0 | 523.9 | 400.5 | 415.6 | 427.2 | 428.1 | 418.6 | 397.4 | 386.7 | 372.4 | 370.7 |
| 40° | 968.4 | 497.1 | 388.4 | 402.2 | 409.5 | 409.1 | 398.3 | 383.2 | 390.5 | 385.8 | 384.5 |
| 42.5° | 1011.5 | 480.7 | 378.5 | 387.9 | 393.1 | 394.0 | 385.4 | 375.9 | 391.8 | 385.8 | 383.6 |
| 45° | 1081.0 | 479.9 | 371.5 | 373.7 | 381.9 | 387.9 | 381.9 | 371.1 | 377.2 | 347.8 | 342.2 |
| 47.5° | 1163.4 | 494.5 | 366.4 | 361.2 | 375.4 | 386.2 | 376.7 | 359.5 | 347.0 | 320.2 | 316.3 |
| 50° | 1262.7 | 524.3 | 361.6 | 347.8 | 365.9 | 379.7 | 370.3 | 346.5 | 327.5 | 313.3 | 311.1 |
| 52.5° | 1380.5 | 563.6 | 355.6 | 332.7 | 351.7 | 376.3 | 370.3 | 345.2 | 320.2 | 307.3 | 305.1 |
| 55° | 1503.9 | 608.9 | 348.7 | 314.6 | 335.7 | 377.2 | 373.3 | 336.2 | 314.6 | 307.7 | 306.0 |
| 57.5° | 1657.1 | 663.3 | 336.2 | 293.4 | 321.5 | 369.4 | 361.2 | 331.0 | 310.7 | 305.1 | 303.4 |
| 60° | 1856.0 | 744.0 | 312.4 | 271.9 | 305.1 | 355.6 | 350.4 | 322.4 | 300.3 | 295.6 | 294.3 |
| 62.5° | 2171.0 | 880.8 | 283.5 | 251.2 | 285.7 | 326.7 | 334.4 | 306.0 | 287.4 | 287.0 | 286.5 |
| 65° | 2684.6 | 1045.2 | 249.4 | 232.6 | 265.4 | 302.9 | 313.3 | 289.1 | 274.0 | 278.8 | 278.3 |
| 67.5° | 3044.5 | 1059.4 | 221.4 | 213.2 | 241.7 | 277.0 | 292.1 | 271.9 | 255.5 | 264.5 | 264.1 |
| 70° | *2788.6* | *826.4* | *197.2* | *192.9* | *216.2* | *249.0* | *269.3* | *250.3* | *233.9* | *242.5* | *240.8* |
| 72.5° | 2351.9 | 633.5 | 174.3 | 171.8 | 190.3 | 219.7 | 239.9 | 228.7 | 211.5 | 211.5 | 207.6 |
| 75° | 1890.1 | 522.6 | 150.2 | 148.9 | 161.4 | 189.9 | 212.7 | 193.8 | 177.8 | 176.9 | 174.3 |
| 77.5° | 1084.0 | 342.6 | 126.0 | 125.1 | 129.0 | 158.8 | 165.3 | 161.4 | 149.3 | 143.7 | 142.0 |
| 80° | 432.0 | 178.2 | 99.3 | 93.6 | 97.5 | 116.5 | 130.3 | 123.8 | 113.5 | 106.6 | 102.7 |
| 82.5° | 167.4 | 89.3 | 69.9 | 61.3 | 66.9 | 84.1 | 94.5 | 92.3 | 85.4 | 69.9 | 65.6 |
| 85° | 68.2 | 43.6 | 41.9 | 35.4 | 38.8 | 45.3 | 54.4 | 47.0 | 38.8 | 27.6 | 26.3 |
| 87.5° | 18.1 | 16.0 | 15.5 | 9.5 | 7.3 | 2.2 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 |
| 90° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

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Peachtree City, GA 30269

# LM-79-2019: Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Report Prepared for

Cooper Lighting Solutions

MCGRAW EDISON

Report Number: SP1-2408-195-9

Test Date: 08/07/2024

Luminaire Tested: GALN-SB1A-830-U-5WQ

Data in this report applies to families of products including GALN-SB1A-830-U-5WQ.

Report Generated By FNC07603 / LDUCLS01DT446
Version: v7.04

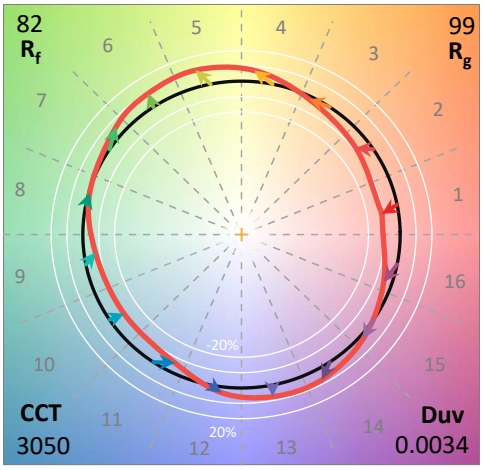
## Test Information

| | |
|---|---|
| Test Method: | LM-79-2019 |
| Report Number: | SP1-2408-195-9 |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Photometer: | SP1 - 76IN SPHERE |
| Measurement Geometry: | 4π |
| Issue Date: | 08/07/2024 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS |
| Product Line: | MCGRAW EDISON |
| Catalog Number: | **GALN-SB1A-830-U-5WQ** |
| Description: | GALLEON AREA AND ROADWAY LUMINAIRE. (1) 80 CRI, 3000K, 350MA HIGH DENSITY LIGHTSQUARE WITH 26 LEDS AND TYPE V WIDE OPTICS |

## Spectral Parameters

| | | | | | |
|---|---|---|---|---|---|
| CCT (K): | 3050 | CRI (Ra): | 81.0 | | |
| CIE u': | 0.2476 | R1: | 79.6 | R9: | 7.1 |
| CIE v': | 0.5251 | R2: | 85.6 | R10: | 67.0 |
| Duv: | 0.0034 | R3: | 92.0 | R11: | 82.7 |
| CIE x: | 0.4383 | R4: | 82.6 | R12: | 63.2 |
| CIE y: | 0.4131 | R5: | 78.9 | R13: | 80.3 |
| CIE z: | 0.1487 | R6: | 81.7 | R14: | 95.0 |
| Peak Wavelength (nm): | 603 | R7: | 85.2 | R15: | 71.7 |
| Dominant Wavelength (nm): | 581 | R8: | 62.0 | | |
| Purity: | 55.55201 | | | | |

| | |
|---|---|
| Rf: | 81.5 |
| Rg: | 99.2 |




## Test Conditions

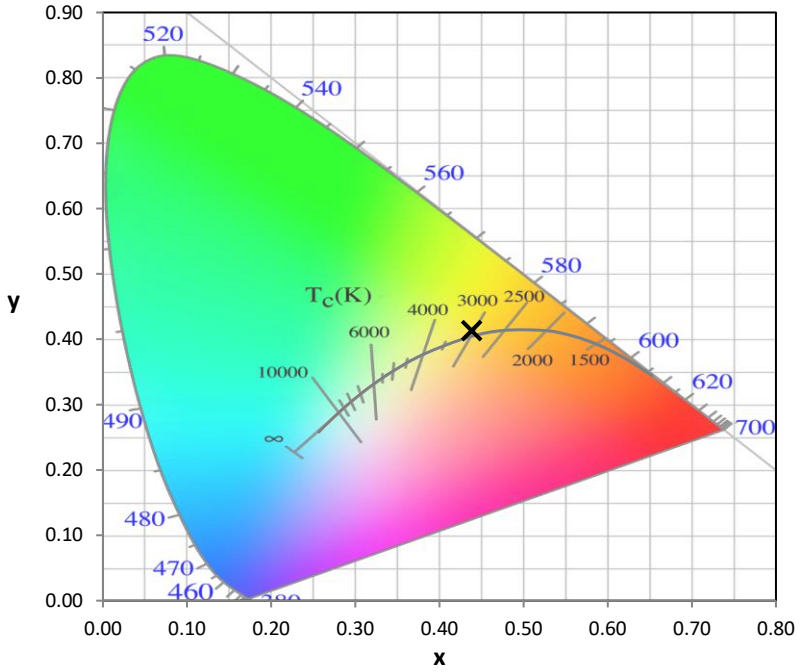
| | |
|---|---|
| Stabilization Time: | 20M |
| Operation Time: | 1H 20M |
| Sphere Temperature (°C): | 24.2 |

REPORT NUMBER: SP1-2408-195-9

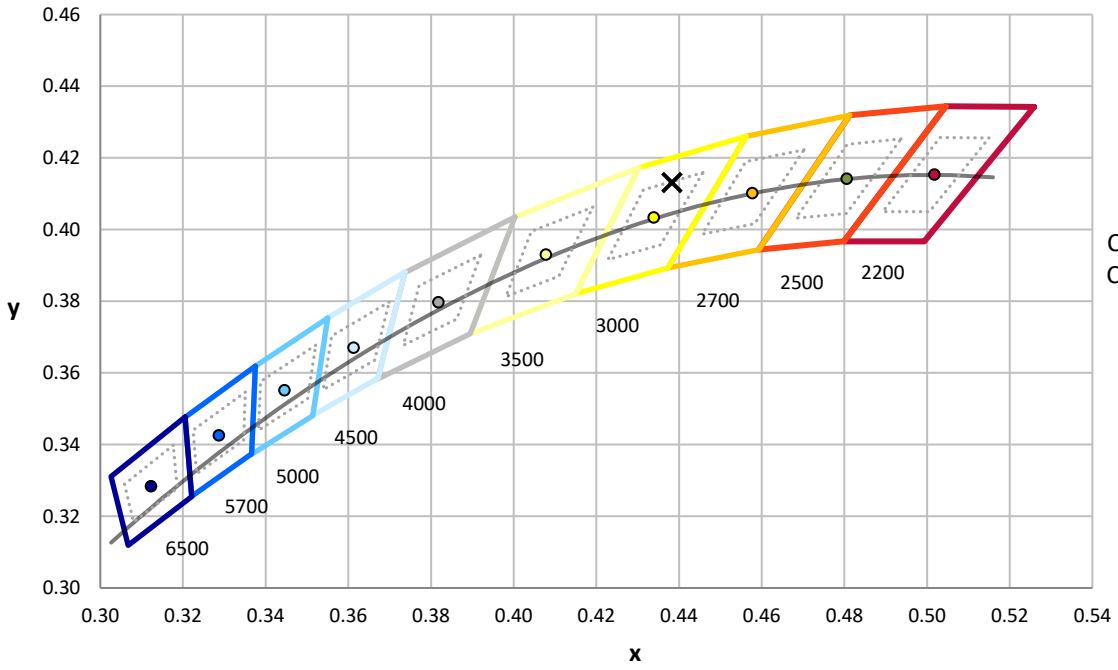
| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 6/18/2024 | 12/18/2024 |
| Power Meter | INXT2011004 | 2/8/2024 | 2/8/2025 |
| AC Power Source | IN0063 | 10/24/2023 | 10/24/2024 |
| DC Power Source | IN0208 | 10/24/2023 | 10/24/2024 |
| Sphere Thermometer | IN0085 | 10/24/2023 | 10/24/2024 |
| Room Thermometer | IN0046 | 10/24/2023 | 10/24/2024 |

REPORT NUMBER: SP1-2408-195-9

## CIE 1931 Chromaticity Diagram




## CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles

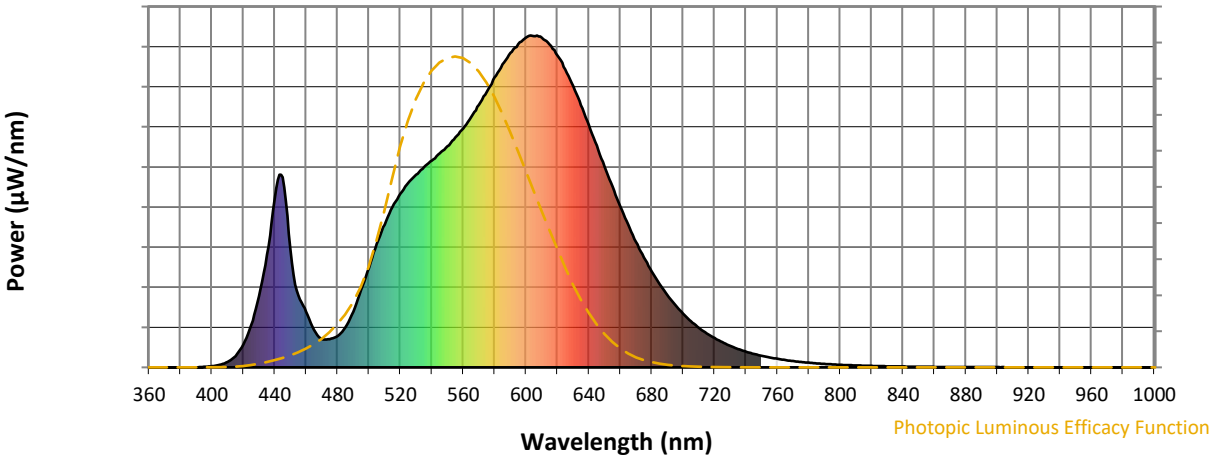



CCT = 3050K
CIE x = 0.4383
CIE y = 0.4131
Duv = 0.0034

Point lies inside the ANSI 3000K 4-step quadrangle

REPORT NUMBER: SP1-2408-195-9

## Photopic Flux vs. Wavelength

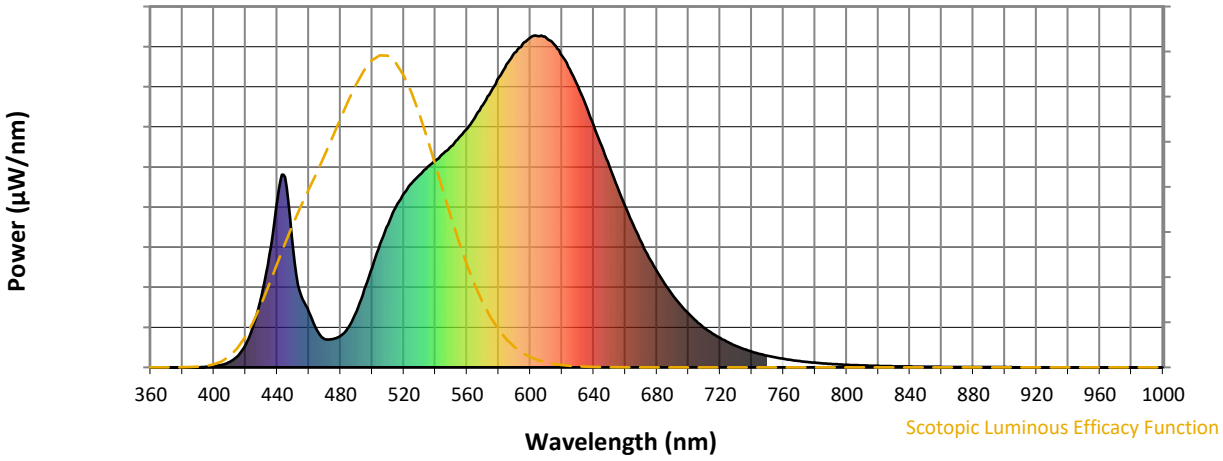



## Photopic Lumens: NR

| 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

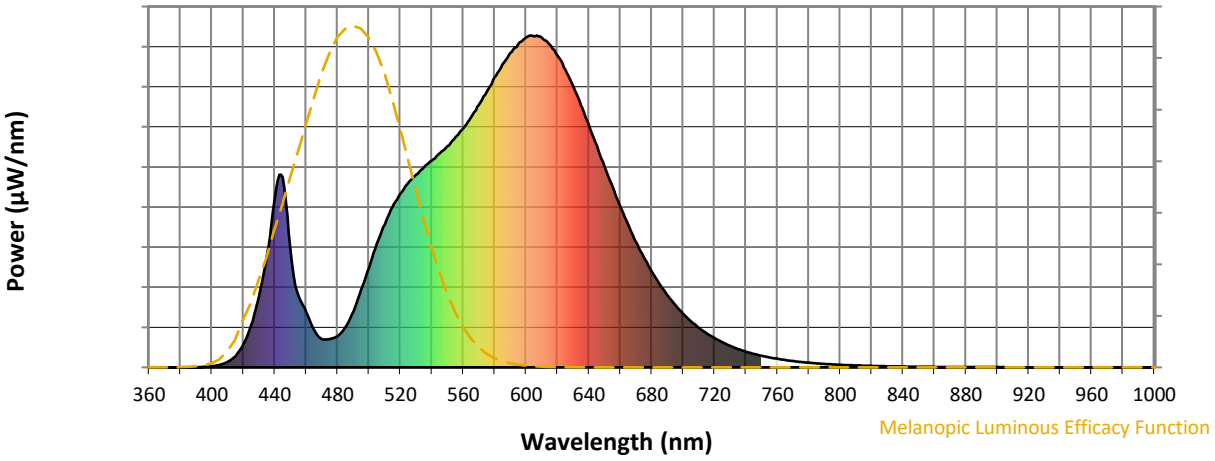



**Scotopic Lumens: NR** **S/P: 1.27**

| 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 | | | |

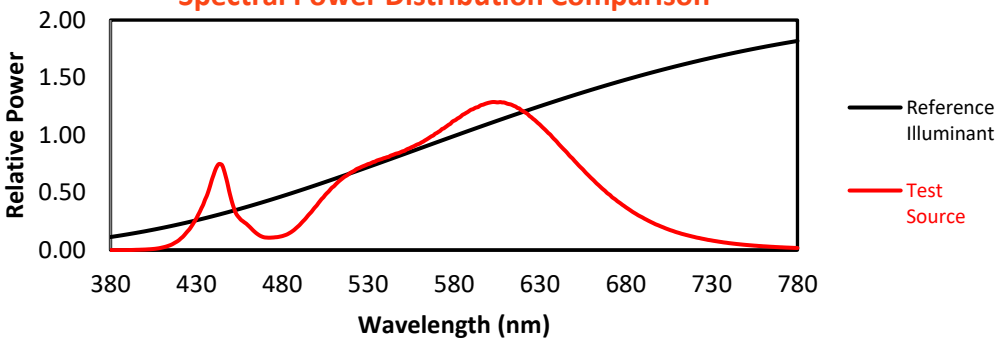
REPORT NUMBER: SP1-2408-195-9

# TM-30-18

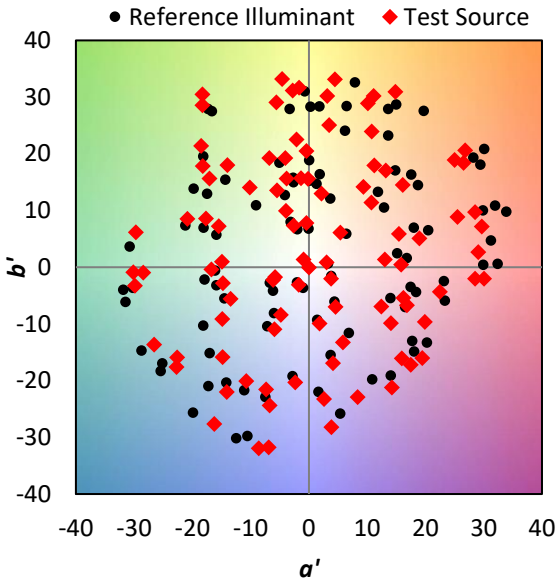
## Summary

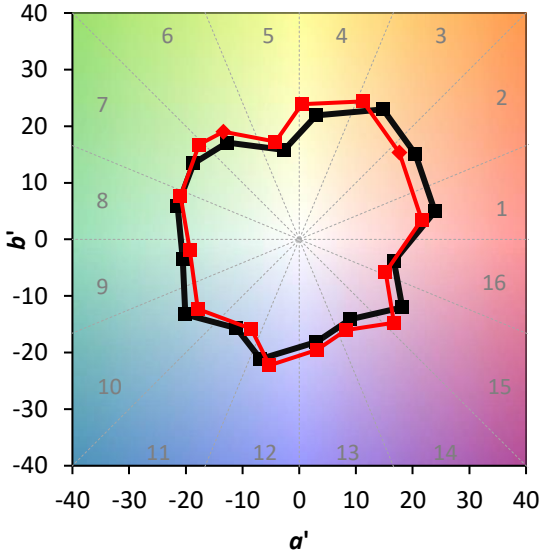
$R_f$ = 81.5
$R_g$ = 99.2
CIE $R_a$ = 81.0
$R_9$ = 7.1

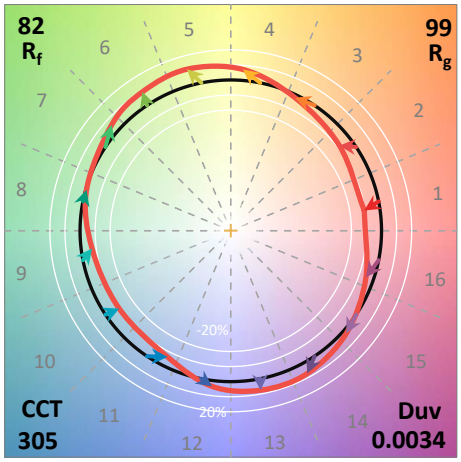
## Spectral Power Distribution Comparison

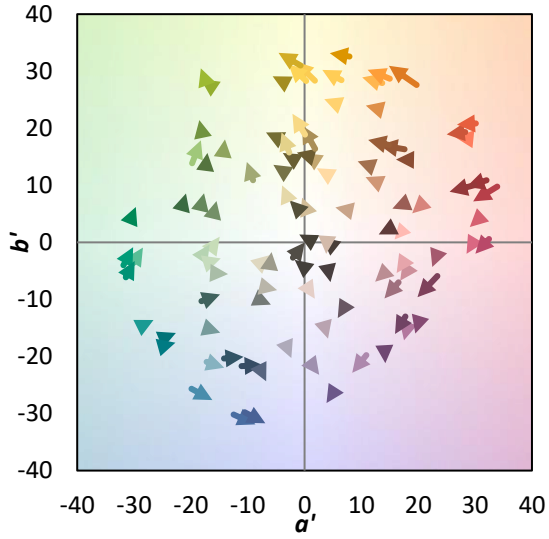



## Color Vector Graphics



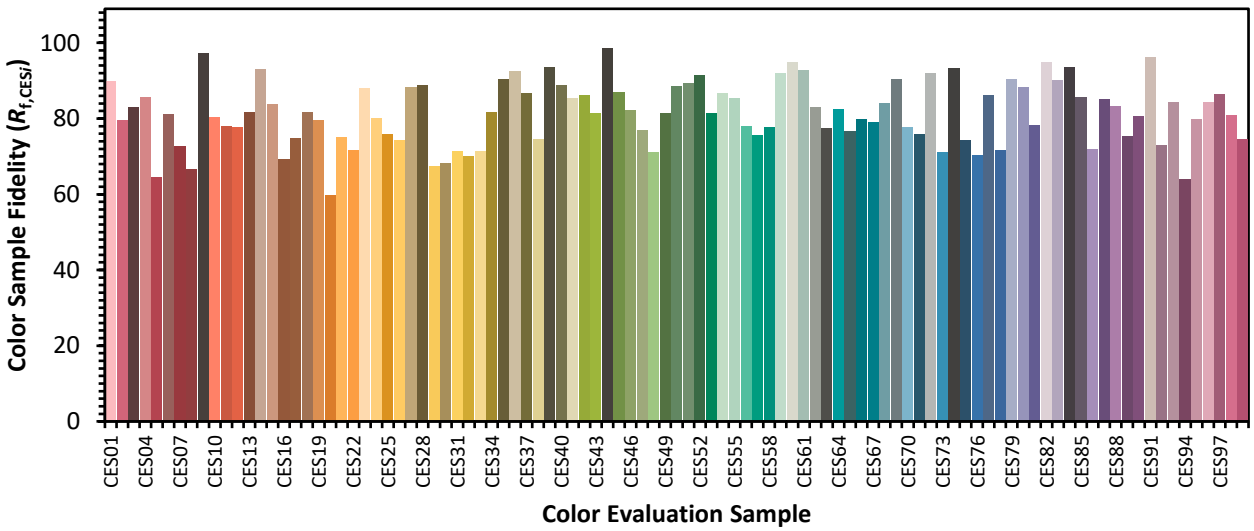



REPORT NUMBER: SP1-2408-195-9

# TM-30-18

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

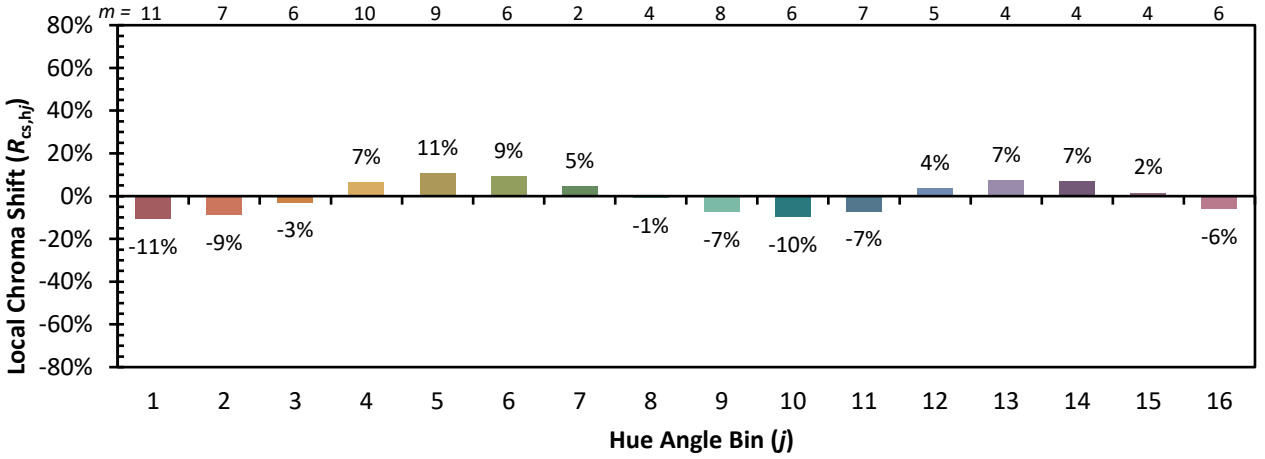
| | | | |
|---|---|---|---|
| CES01 = 86 | CES26 = 74 | CES51 = 89 | CES76 = 70 |
| CES02 = 63 | CES27 = 88 | CES52 = 92 | CES77 = 86 |
| CES03 = 31 | CES28 = 89 | CES53 = 81 | CES78 = 72 |
| CES04 = 70 | CES29 = 67 | CES54 = 87 | CES79 = 90 |
| CES05 = 50 | CES30 = 68 | CES55 = 85 | CES80 = 88 |
| CES06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

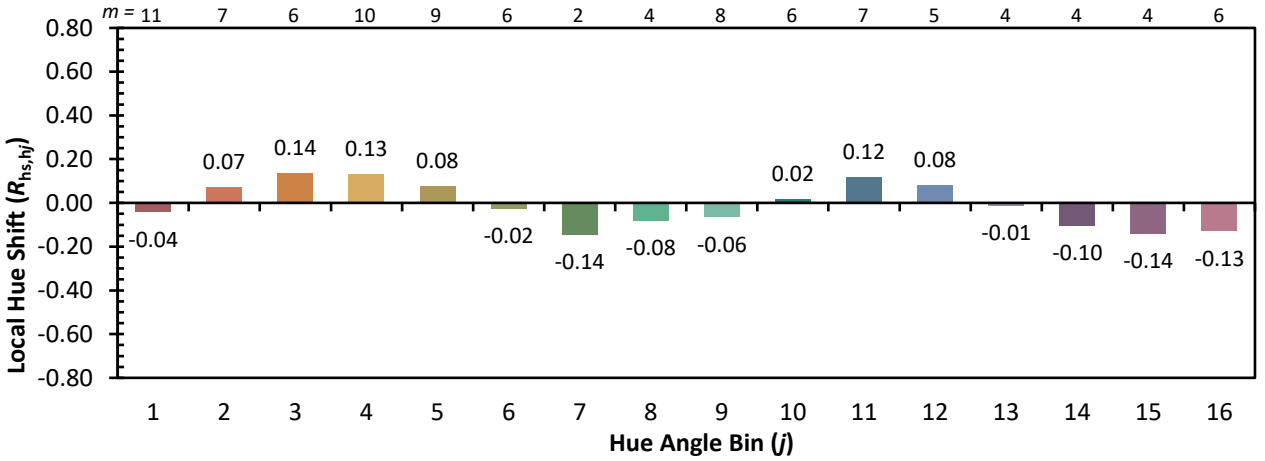


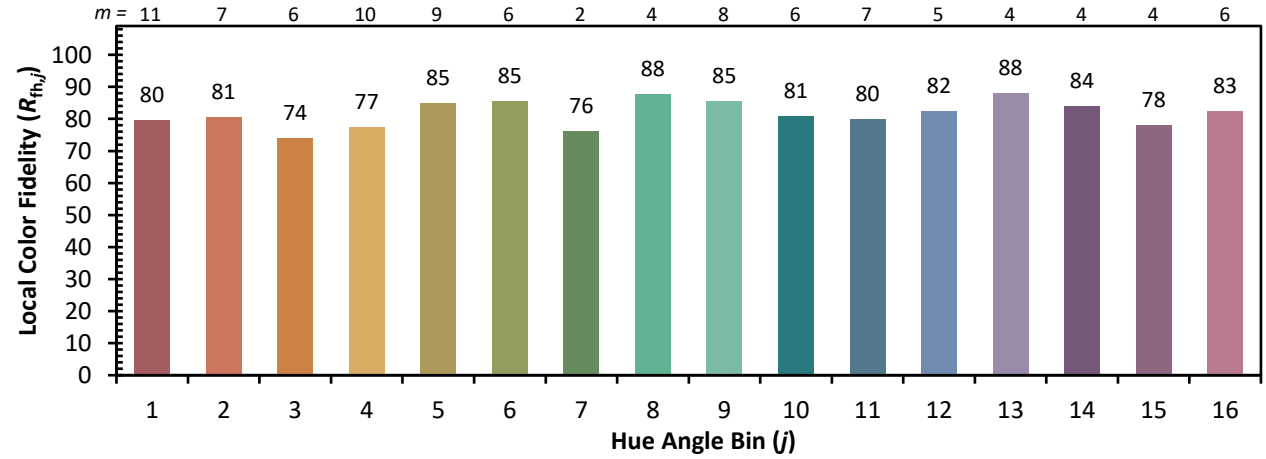
REPORT NUMBER: SP1-2408-195-9

# TM-30-18

## Color Rendition by Hue-Angle Bin



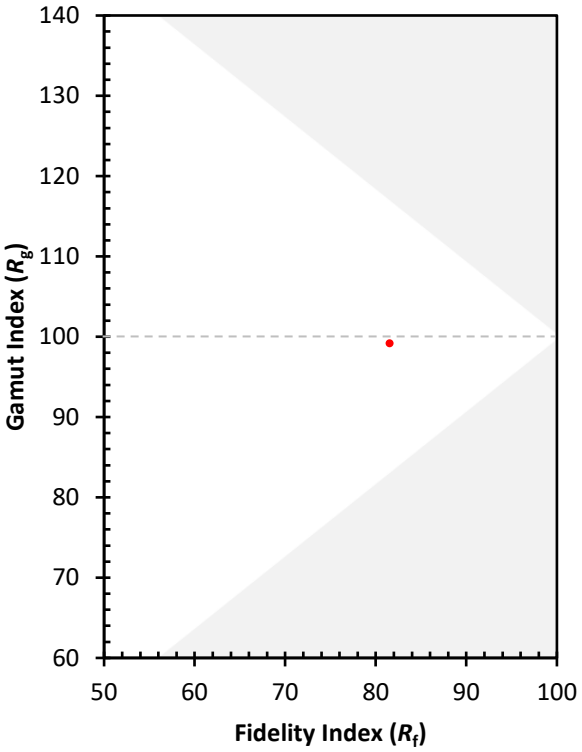



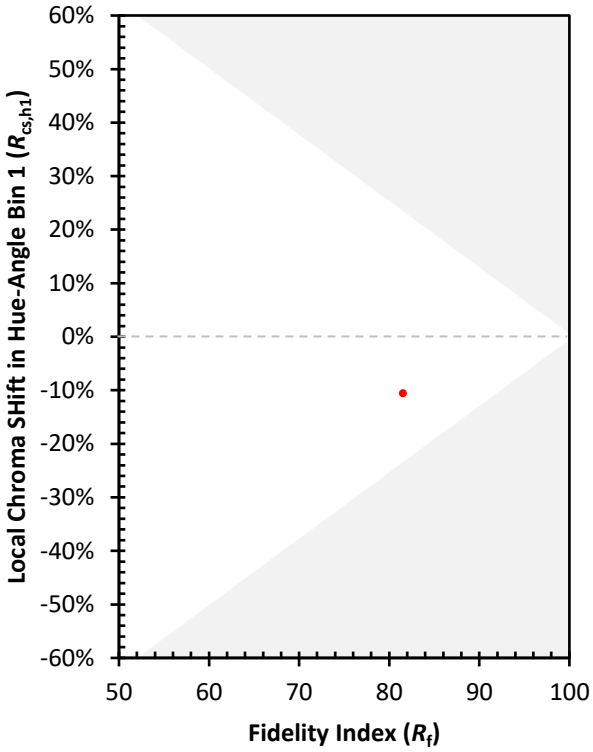



REPORT NUMBER: SP1-2408-195-9

# TM-30-18

## Measure Comparisons

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