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: P634502

Luminaire Tested: GWS-SA3B-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: | P634502 |
| | 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-SA3B-830-U-AFL-W-GRSBK |
| Description: | GALLEON WALL SLIM LUMINAIRE. (3) LIGHTSQUARES WITH 16 LEDS EACH AND AUTOMOTIVE FRONTLINE OPTICS W/ FACTORY INSTALLED GLARE SHIELD, BK |
| Light Source: | (48) 3000K CCT, 80 CRI LEDS |
| Ballast/Driver: | - |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 6223.1 lumens |
| Efficiency: | N/A |
| Efficacy: | 91.1 lumens/watt |
| Luminous Opening: | Rectangular (W 1.5' x L: 0.5' x H: 0') |
| IES Classification: | Type II - Short |
| BUG Rating: | B1 - U0 - G0 |

| | |
|---|---|
| Input Watts (W): | 68.3 |
| 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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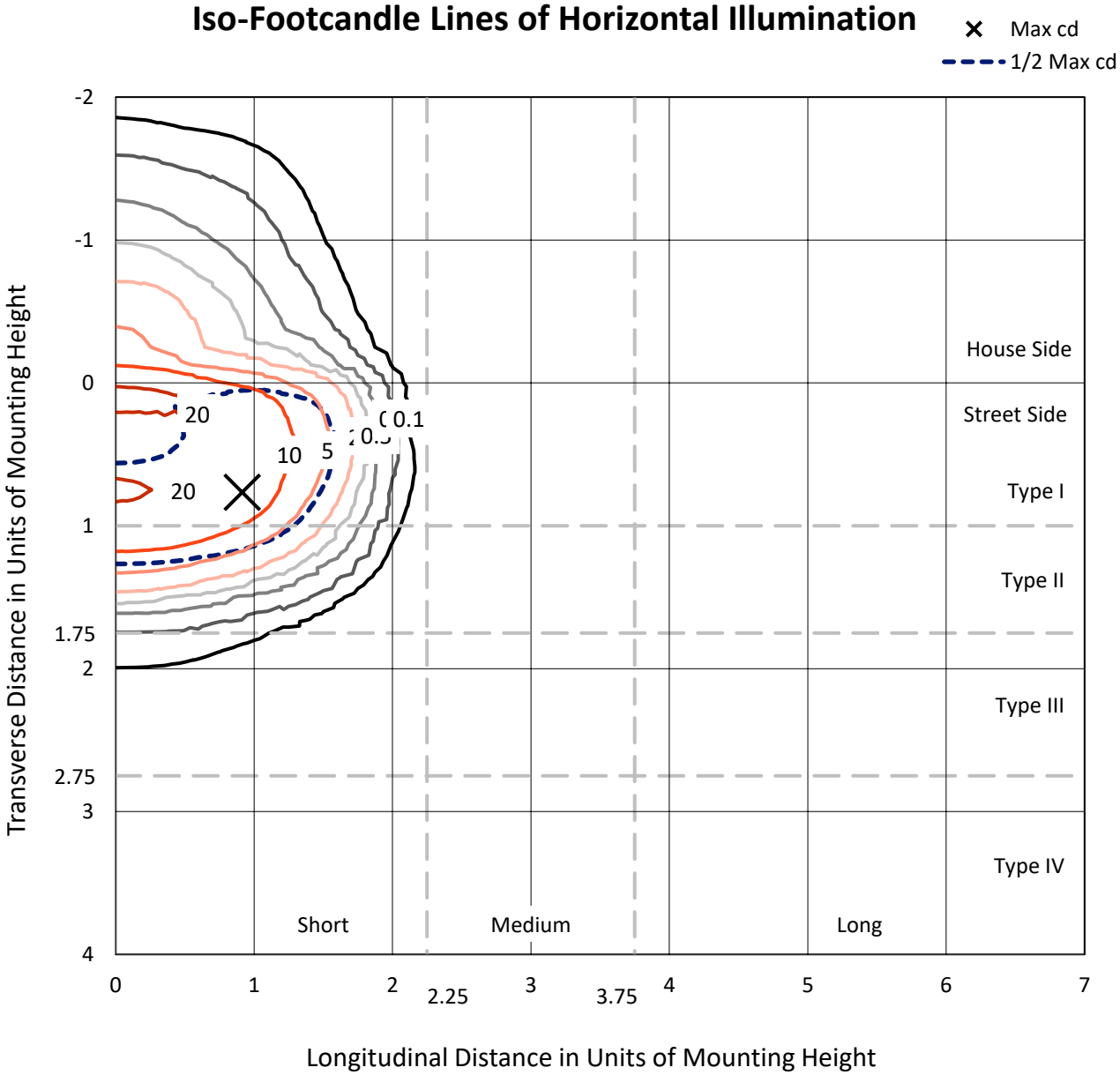
REPORT NUMBER: P634502
CATALOG NUMBER: GWS-SA3B-830-U-AFL-W-GRSBK

## Iso-Footcandle Lines of Horizontal Illumination




Based on 10 foot mounting height. Maximum calculated value = 24.2 fc
Type II - Short - N/A

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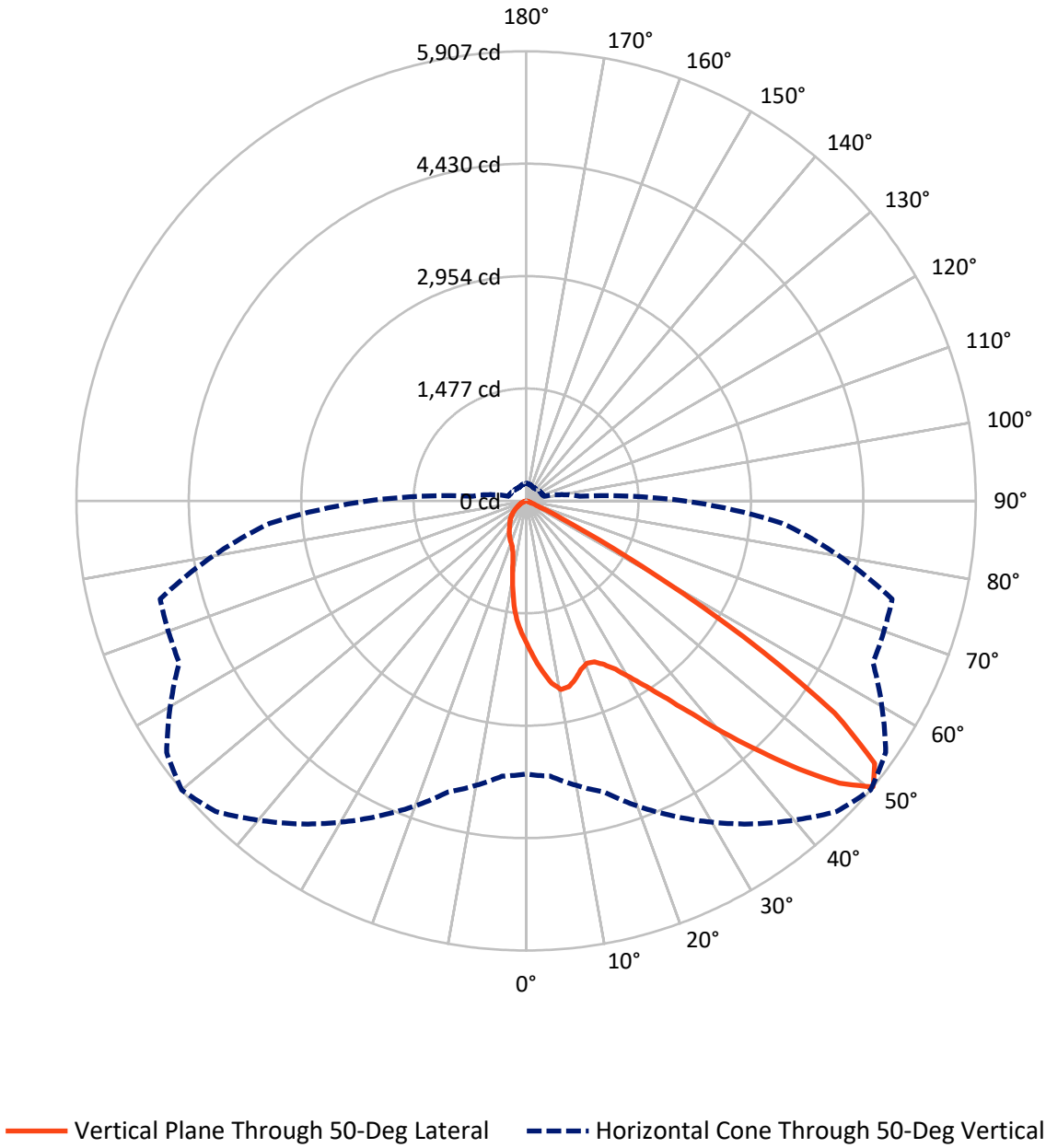
## Luminous Intensity Polar Plot



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REPORT NUMBER: P634502
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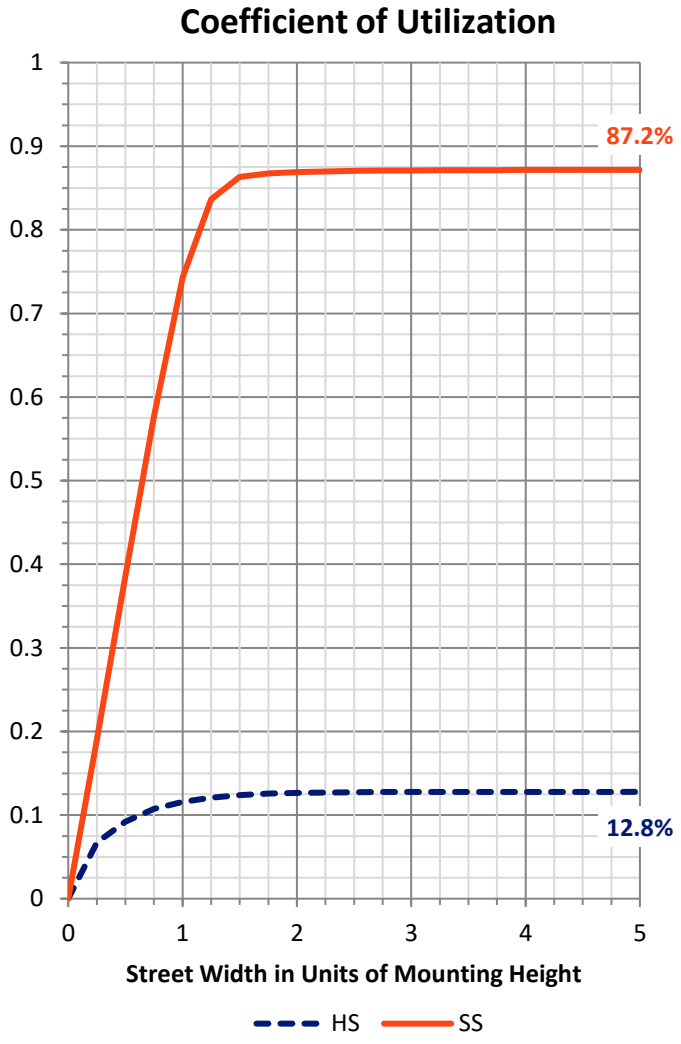
**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 799.6 | 0.0 | 799.6 |
| | % Fixture | 12.8 | 0.0 | 12.8 |
| **Street Side** | Lumens | 5423.5 | 0.0 | 5423.5 |
| | % Fixture | 87.2 | 0.0 | 87.2 |
| **Total** | Lumens | 6223.1 | 0.0 | 6223.1 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 174.9 | 2.8 |
| 10°-20° | 451.2 | 7.3 |
| 20°-30° | 744.7 | 12.0 |
| 30°-40° | 1228.9 | 19.7 |
| 40°-50° | 1944.5 | 31.2 |
| 50°-60° | 1472.2 | 23.7 |
| 60°-70° | 184.2 | 3.0 |
| 70°-80° | 20.8 | 0.3 |
| 80°-90° | 1.6 | 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° | 6223.1 | 100.0 |
| 0°-180° | 6223.1 | 100.0 |



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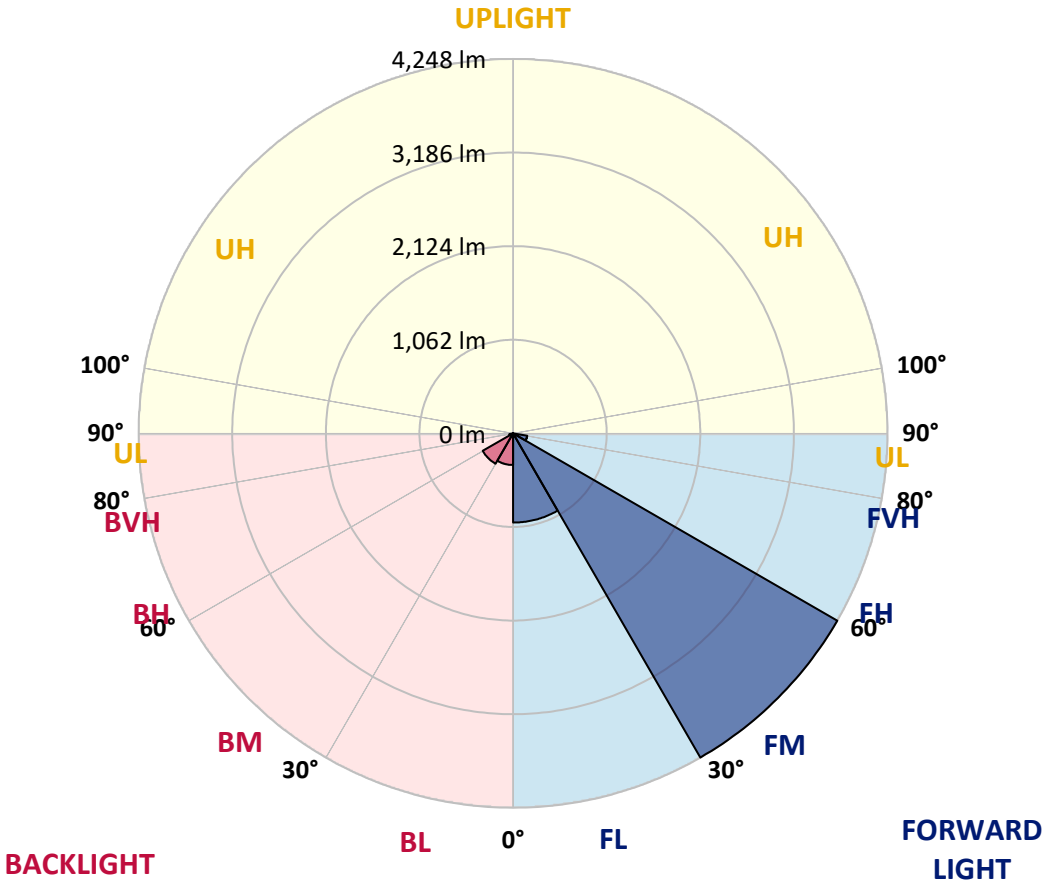
## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 1012.0 | 16.3 | | | |
| FM | (30°-60°) | 4247.9 | 68.3 | | | |
| FH | (60°-80°) | 162.9 | 2.6 | | | G0/660 |
| FVH | (80°-90°) | 0.8 | 0.0 | | | G0/10 |
| BL | (0°-30°) | 358.9 | 5.8 | B1/500 | | |
| BM | (30°-60°) | 397.6 | 6.4 | B1/1000 | | |
| BH | (60°-80°) | 42.2 | 0.7 | B0/110 | | G0/110 |
| 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: B1-U0-G0**
Type II Short



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REPORT NUMBER: P634502
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**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 45° | 50° | 55° | 65° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 1885.4 | 1885.4 | 1885.4 | 1885.4 | 1885.4 | 1885.4 | 1885.4 | 1885.4 | 1885.4 | 1885.4 | 1885.4 |
| 2.5° | 2148.3 | 2165.5 | 2160.8 | 2138.3 | 2114.0 | 2096.8 | 2070.2 | 2061.9 | 2001.4 | 1959.4 | 1915.0 |
| 5° | 2407.8 | 2413.1 | 2407.2 | 2379.9 | 2337.3 | 2296.4 | 2252.6 | 2227.1 | 2125.8 | 2034.6 | 1941.6 |
| 7.5° | 2470.0 | 2463.5 | 2474.7 | 2488.3 | 2482.4 | 2464.6 | 2418.4 | 2390.6 | 2269.8 | 2121.1 | 1980.1 |
| 10° | 2275.7 | 2260.9 | 2302.9 | 2373.4 | 2447.5 | 2531.0 | 2519.1 | 2521.5 | 2410.1 | 2230.1 | 2030.5 |
| 12.5° | 2018.0 | 2012.1 | 2043.5 | 2125.2 | 2270.4 | 2459.9 | 2505.5 | 2581.9 | 2538.7 | 2348.0 | 2087.9 |
| 15° | 1904.9 | 1907.9 | 1926.8 | 1978.3 | 2082.6 | 2318.3 | 2427.9 | 2565.9 | 2653.6 | 2462.3 | 2151.3 |
| 17.5° | 1922.1 | 1932.7 | 1932.1 | 1949.3 | 2012.7 | 2201.7 | 2329.6 | 2515.6 | 2742.4 | 2593.8 | 2224.2 |
| 20° | 2038.8 | 2049.4 | 2033.4 | 2020.4 | 2041.7 | 2172.0 | 2278.1 | 2464.6 | 2802.3 | 2726.4 | 2301.2 |
| 22.5° | 2213.5 | 2225.9 | 2188.0 | 2150.7 | 2137.1 | 2220.6 | 2297.6 | 2443.9 | 2847.9 | 2847.9 | 2369.9 |
| 25° | 2425.0 | 2442.1 | 2383.5 | 2317.2 | 2279.2 | 2323.1 | 2381.1 | 2490.7 | 2894.7 | 2956.9 | 2416.7 |
| 27.5° | 2661.3 | 2661.9 | 2611.5 | 2536.9 | 2465.8 | 2471.2 | 2506.1 | 2596.1 | 2946.2 | 3074.1 | 2453.4 |
| 30° | 2927.2 | 2929.0 | 2862.1 | 2772.6 | 2683.2 | 2658.9 | 2688.5 | 2756.7 | 3053.4 | 3221.6 | 2504.3 |
| 32.5° | 3270.8 | 3279.1 | 3183.1 | 3051.6 | 2935.5 | 2889.9 | 2907.1 | 2978.8 | 3224.0 | 3406.4 | 2580.7 |
| 35° | 3735.2 | 3744.0 | 3602.5 | 3428.9 | 3244.1 | 3175.4 | 3192.6 | 3264.9 | 3471.0 | 3668.8 | 2702.8 |
| 37.5° | 4193.6 | 4205.5 | 4062.1 | 3900.4 | 3646.9 | 3533.2 | 3551.0 | 3619.7 | 3841.8 | 4031.3 | 2898.2 |
| 40° | 4510.5 | 4526.5 | 4482.1 | 4373.1 | 4137.9 | 3988.7 | 4010.0 | 4034.9 | 4249.9 | 4464.9 | 3151.7 |
| 42.5° | 4677.5 | 4700.1 | 4719.0 | 4774.7 | 4650.9 | 4525.9 | 4489.8 | 4491.6 | 4665.1 | 4906.8 | 3415.3 |
| 45° | 4687.6 | 4709.5 | 4806.7 | 5021.7 | 5115.9 | 5089.8 | 5024.1 | 4979.6 | 4982.0 | 5201.2 | 3580.0 |
| 47.5° | 4361.8 | 4402.7 | 4584.6 | 5005.7 | 5359.9 | 5576.1 | 5542.9 | 5437.5 | 5115.3 | 5220.7 | 3562.2 |
| 50° | 3590.0 | 3630.3 | 3960.8 | 4566.8 | 5182.2 | 5770.4 | 5907.2 | 5765.6 | 5028.2 | 4977.3 | 3379.2 |
| 52.5° | 2607.4 | 2611.5 | 2826.0 | 3533.8 | 4461.9 | 5412.0 | 5734.2 | 5720.6 | 4895.5 | 4682.3 | 3129.2 |
| 55° | 1238.5 | 1223.7 | 1464.8 | 1994.3 | 3086.0 | 4377.2 | 4920.4 | 5074.4 | 4707.2 | 4469.0 | 2935.5 |
| 57.5° | 360.7 | 367.8 | 475.0 | 778.3 | 1543.6 | 2797.5 | 3369.7 | 3656.4 | 3863.7 | 3674.2 | 2276.9 |
| 60° | 161.7 | 162.3 | 180.7 | 236.9 | 514.1 | 1301.3 | 1742.0 | 2096.8 | 2310.0 | 2140.6 | 1129.6 |
| 62.5° | 117.3 | 117.9 | 125.0 | 133.9 | 174.7 | 440.7 | 653.3 | 870.7 | 886.7 | 580.5 | 286.1 |
| 65° | 97.7 | 97.7 | 98.9 | 98.9 | 104.8 | 157.6 | 198.4 | 255.9 | 215.6 | 159.9 | 111.9 |
| 67.5° | 78.8 | 79.4 | 80.6 | 80.6 | 78.8 | 78.8 | 85.3 | 93.6 | 100.1 | 123.8 | 103.1 |
| 70° | 61.6 | 61.0 | 61.0 | 61.6 | 59.8 | 50.9 | 55.1 | 62.8 | 68.7 | 96.5 | 89.4 |
| 72.5° | 48.0 | 48.6 | 48.0 | 45.6 | 41.5 | 30.2 | 32.6 | 40.9 | 43.8 | 60.4 | 60.4 |
| 75° | 36.1 | 36.7 | 34.4 | 26.1 | 17.2 | 9.5 | 12.4 | 20.1 | 25.5 | 29.6 | 21.9 |
| 77.5° | 4.7 | 4.7 | 3.6 | 3.6 | 3.0 | 3.6 | 3.6 | 4.7 | 7.1 | 7.1 | 5.3 |
| 80° | 0.6 | 0.6 | 0.6 | 1.2 | 1.8 | 2.4 | 2.4 | 2.4 | 2.4 | 3.0 | 3.0 |
| 82.5° | 0.6 | 0.6 | 0.6 | 0.6 | 1.8 | 1.8 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 |
| 85° | 0.0 | 0.0 | 0.0 | 0.6 | 1.2 | 1.8 | 1.8 | 2.4 | 2.4 | 2.4 | 2.4 |
| 87.5° | 0.0 | 0.0 | 0.0 | 0.6 | 1.2 | 1.8 | 1.8 | 1.8 | 2.4 | 2.4 | 2.4 |
| 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: P634502
CATALOG NUMBER: GWS-SA3B-830-U-AFL-W-GRSBK

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 1885.4 | 1885.4 | 1885.4 | 1885.4 | 1885.4 | 1885.4 | 1885.4 | 1885.4 | 1885.4 | 1885.4 | 1885.4 |
| 2.5° | 1888.3 | 1854.0 | 1812.5 | 1784.1 | 1743.8 | 1717.1 | 1679.2 | 1653.8 | 1631.8 | 1614.7 | 1624.1 |
| 5° | 1888.9 | 1834.4 | 1749.7 | 1677.4 | 1598.7 | 1526.4 | 1448.8 | 1387.8 | 1332.7 | 1307.8 | 1321.5 |
| 7.5° | 1900.8 | 1822.6 | 1692.8 | 1564.3 | 1413.3 | 1264.0 | 1124.2 | 1010.5 | 954.2 | 927.6 | 935.9 |
| 10° | 1923.9 | 1817.2 | 1629.5 | 1416.2 | 1171.0 | 967.3 | 831.6 | 754.6 | 723.2 | 706.6 | 709.6 |
| 12.5° | 1945.2 | 1813.7 | 1547.1 | 1221.4 | 924.0 | 750.5 | 680.0 | 669.3 | 675.8 | 676.4 | 675.8 |
| 15° | 1974.2 | 1807.2 | 1445.3 | 1021.2 | 739.2 | 648.6 | 650.4 | 665.8 | 681.2 | 685.9 | 684.7 |
| 17.5° | 2005.0 | 1797.1 | 1313.8 | 829.2 | 627.3 | 619.0 | 639.7 | 660.4 | 675.8 | 678.2 | 678.8 |
| 20° | 2037.0 | 1776.4 | 1163.9 | 677.0 | 575.1 | 596.5 | 619.6 | 635.0 | 646.2 | 649.8 | 651.0 |
| 22.5° | 2051.8 | 1732.5 | 990.9 | 568.0 | 540.2 | 568.6 | 585.8 | 605.9 | 609.5 | 596.5 | 598.8 |
| 25° | 2044.1 | 1658.5 | 822.1 | 494.6 | 505.2 | 533.7 | 559.1 | 549.1 | 534.3 | 524.8 | 527.8 |
| 27.5° | 2019.8 | 1560.2 | 656.9 | 440.7 | 467.9 | 504.1 | 507.0 | 495.8 | 493.4 | 485.7 | 488.1 |
| 30° | 1993.7 | 1447.0 | 528.3 | 397.4 | 430.0 | 467.9 | 459.0 | 463.2 | 463.8 | 454.9 | 457.9 |
| 32.5° | 1977.8 | 1328.6 | 420.5 | 368.4 | 405.7 | 412.8 | 430.6 | 438.9 | 439.5 | 418.8 | 422.3 |
| 35° | 1983.1 | 1211.9 | 356.0 | 344.7 | 383.2 | 381.5 | 406.3 | 411.1 | 376.7 | 348.3 | 351.2 |
| 37.5° | 2026.3 | 1104.1 | 319.3 | 326.4 | 344.1 | 357.8 | 376.7 | 345.3 | 337.6 | 324.6 | 326.4 |
| 40° | 2106.9 | 1012.3 | 297.3 | 315.1 | 317.5 | 339.4 | 310.4 | 314.5 | 315.1 | 306.8 | 308.6 |
| 42.5° | 2201.1 | 935.9 | 284.3 | 308.6 | 302.7 | 306.2 | 277.2 | 285.5 | 294.4 | 290.8 | 291.4 |
| 45° | 2248.4 | 861.2 | 273.1 | 286.1 | 287.9 | 254.1 | 247.6 | 256.5 | 267.7 | 269.5 | 270.1 |
| 47.5° | 2206.4 | 790.2 | 261.2 | 253.5 | 265.4 | 231.6 | 223.9 | 226.9 | 239.9 | 247.0 | 248.2 |
| 50° | *2077.9* | *708.4* | *243.4* | *224.5* | *218.0* | *207.9* | *200.8* | *201.4* | *216.2* | *228.6* | *231.0* |
| 52.5° | 1897.2 | 623.1 | 214.4 | 190.1 | 175.3 | 183.0 | 184.8 | 181.2 | 194.9 | 207.3 | 209.7 |
| 55° | 1721.9 | 516.5 | 170.0 | 154.6 | 141.0 | 157.6 | 162.3 | 157.6 | 161.7 | 170.0 | 170.6 |
| 57.5° | 1212.5 | 292.0 | 130.3 | 127.9 | 116.7 | 135.0 | 142.7 | 135.6 | 128.5 | 133.9 | 135.0 |
| 60° | 562.1 | 152.8 | 100.1 | 100.1 | 97.1 | 116.1 | 129.1 | 119.1 | 105.4 | 107.8 | 109.6 |
| 62.5° | 175.9 | 96.5 | 73.4 | 69.3 | 79.4 | 98.9 | 109.6 | 99.5 | 83.5 | 83.5 | 85.9 |
| 65° | 99.5 | 82.9 | 58.0 | 53.3 | 64.6 | 79.4 | 85.9 | 75.2 | 61.0 | 59.8 | 59.8 |
| 67.5° | 92.4 | 78.8 | 51.5 | 43.2 | 45.6 | 50.9 | 53.3 | 46.2 | 42.1 | 41.5 | 42.1 |
| 70° | 76.4 | 65.7 | 41.5 | 29.6 | 27.8 | 27.2 | 28.4 | 26.7 | 25.5 | 26.1 | 27.8 |
| 72.5° | 47.4 | 39.7 | 26.1 | 17.8 | 15.4 | 14.8 | 14.8 | 14.8 | 14.2 | 14.2 | 14.2 |
| 75° | 17.2 | 14.8 | 11.8 | 8.9 | 7.7 | 7.1 | 7.1 | 7.7 | 7.1 | 6.5 | 5.9 |
| 77.5° | 5.3 | 4.7 | 4.7 | 4.7 | 4.1 | 3.6 | 3.0 | 3.0 | 2.4 | 1.8 | 1.8 |
| 80° | 3.0 | 3.0 | 3.0 | 3.0 | 2.4 | 2.4 | 1.8 | 1.2 | 0.6 | 0.6 | 0.0 |
| 82.5° | 3.0 | 3.0 | 3.0 | 2.4 | 2.4 | 2.4 | 1.8 | 1.2 | 0.6 | 0.0 | 0.0 |
| 85° | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 1.8 | 1.2 | 0.6 | 0.0 | 0.0 |
| 87.5° | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 1.8 | 1.2 | 0.6 | 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 |

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

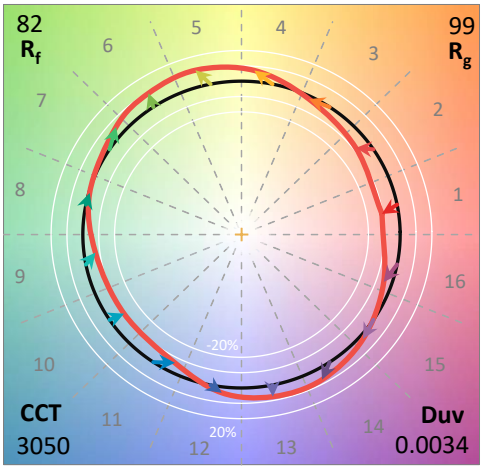
## Test Information

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

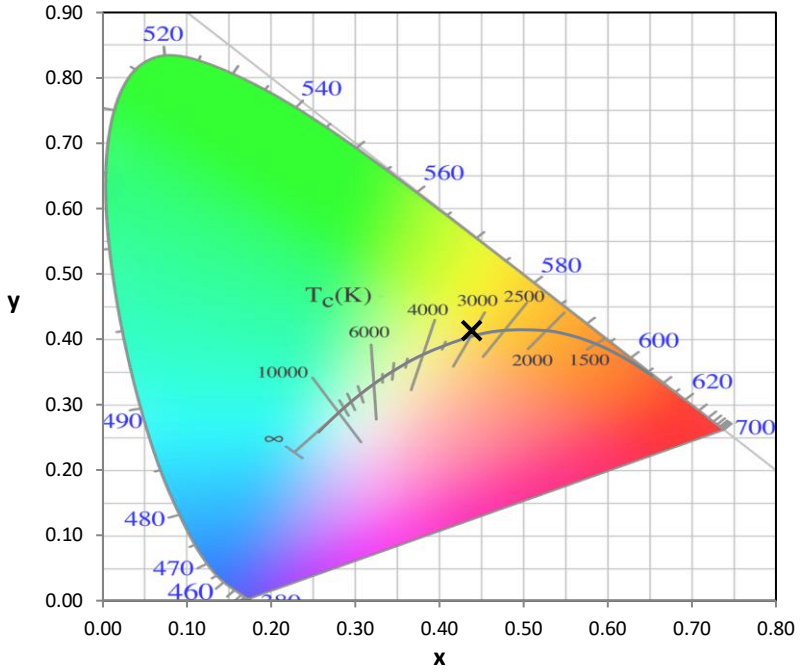
| | |
|---|---|
| Stabilization Time: | 20M |
| Operation Time: | 1H 20M |
| Sphere Temperature (°C): | 24.2 |

REPORT NUMBER: SP1-2408-195-9

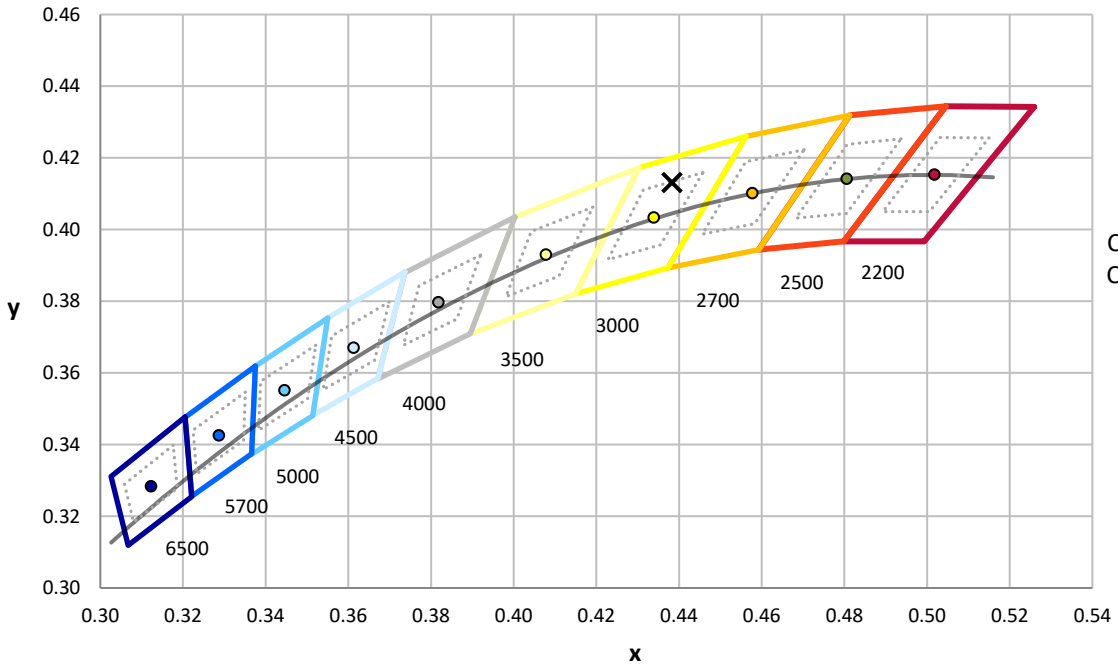
| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 6/18/2024 | 12/18/2024 |
| Power Meter | INXT2011004 | 2/8/2024 | 2/8/2025 |
| AC Power Source | IN0063 | 10/24/2023 | 10/24/2024 |
| DC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

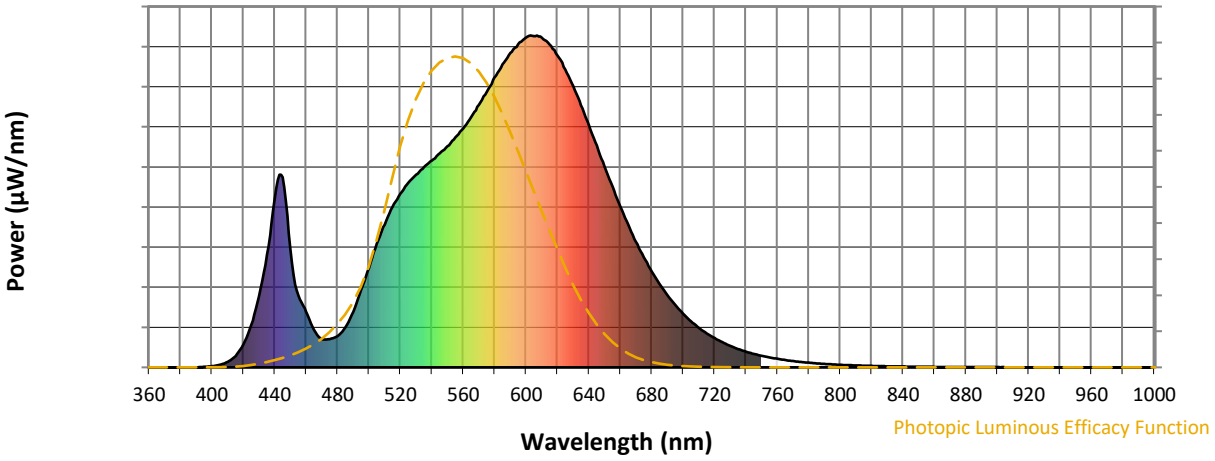



CCT = 3050K
CIE x = 0.4383
CIE y = 0.4131
Duv = 0.0034

Point lies inside the ANSI 3000K 4-step quadrangle

REPORT NUMBER: SP1-2408-195-9

## Photopic Flux vs. Wavelength

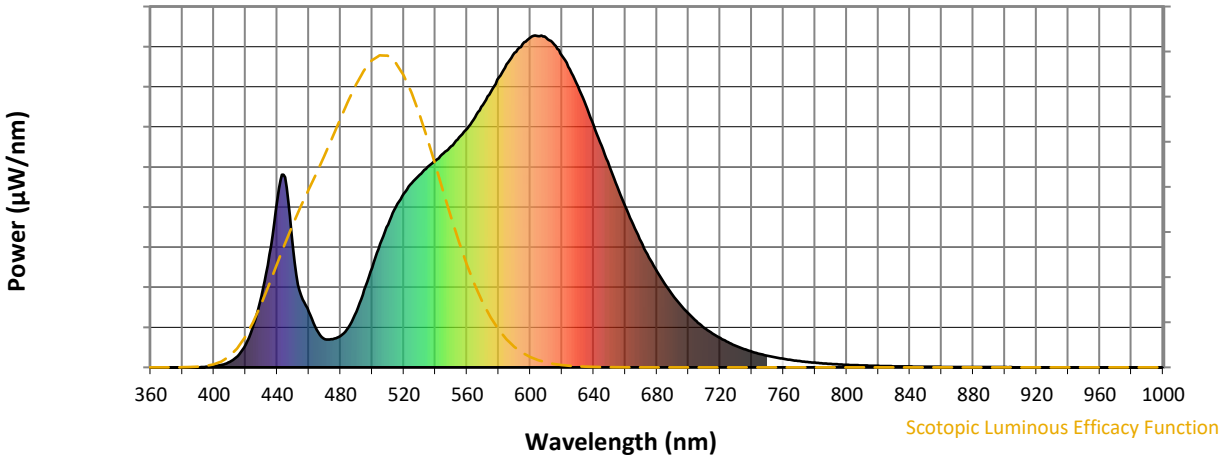



## Photopic Lumens: NR

| 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

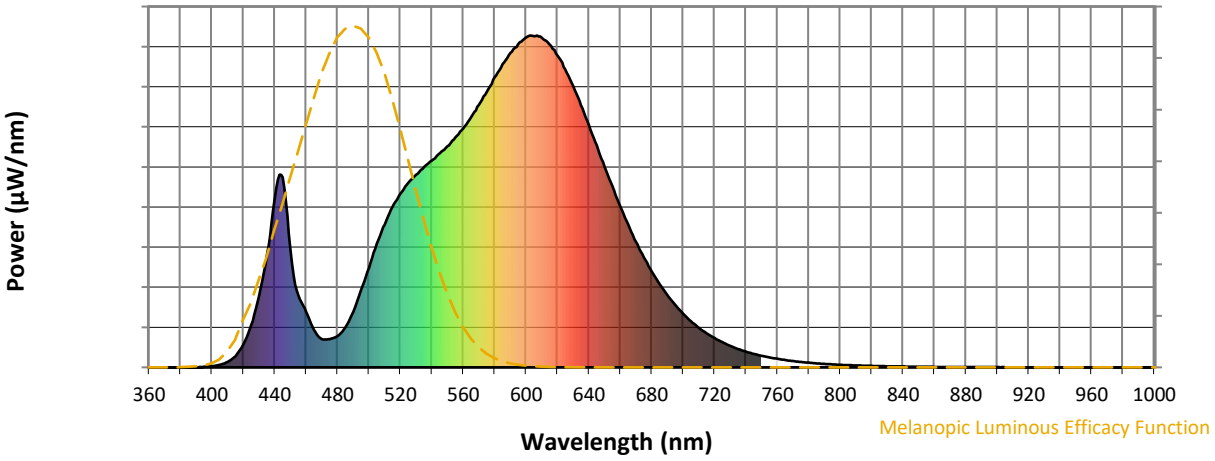



**Scotopic Lumens: NR** **S/P: 1.27**

| 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 | | | |

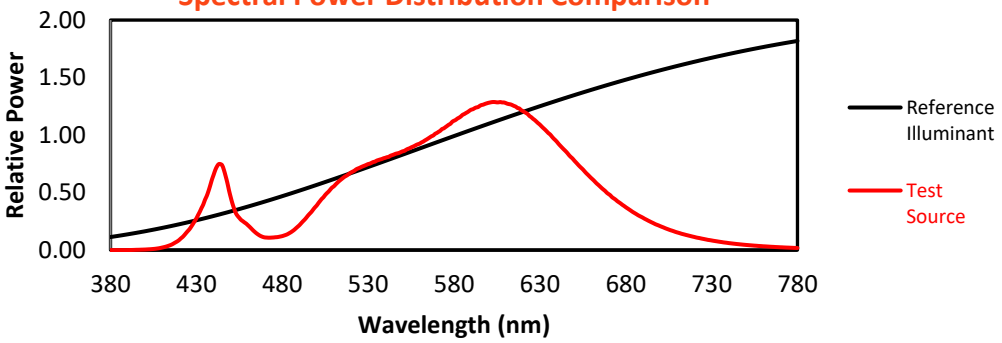
REPORT NUMBER: SP1-2408-195-9

# TM-30-18

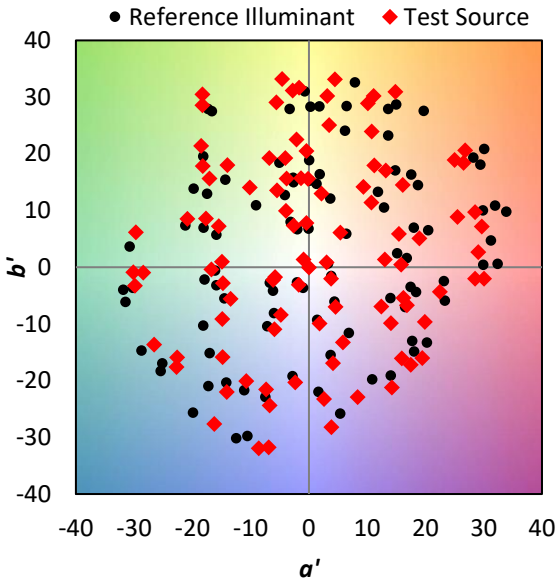
## Summary

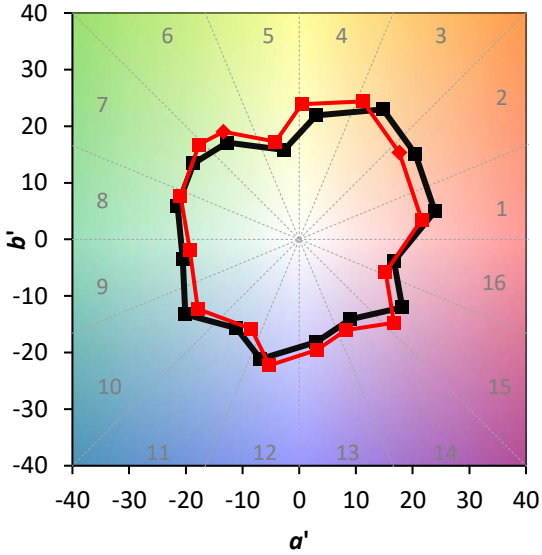
$R_f$ = 81.5
$R_g$ = 99.2
CIE $R_a$ = 81.0
$R_9$ = 7.1

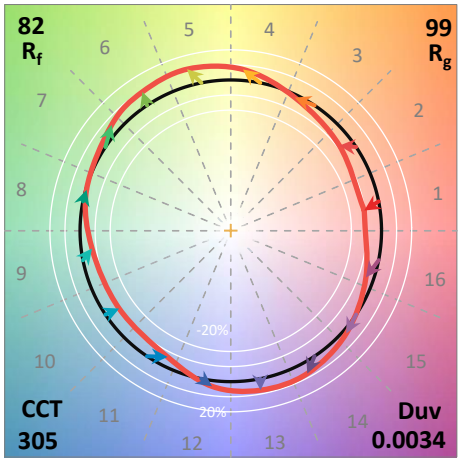
## Spectral Power Distribution Comparison

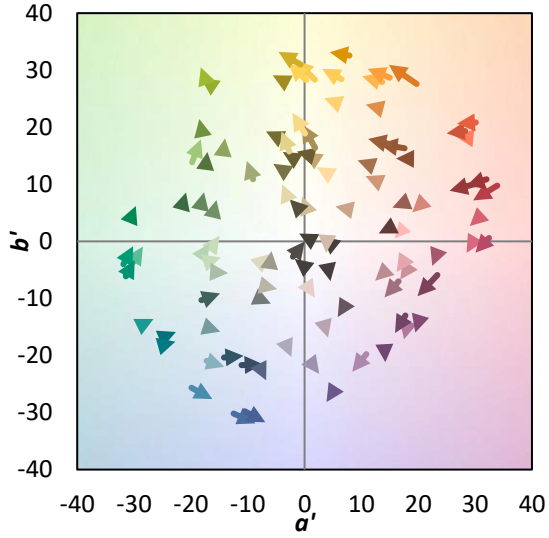



## Color Vector Graphics



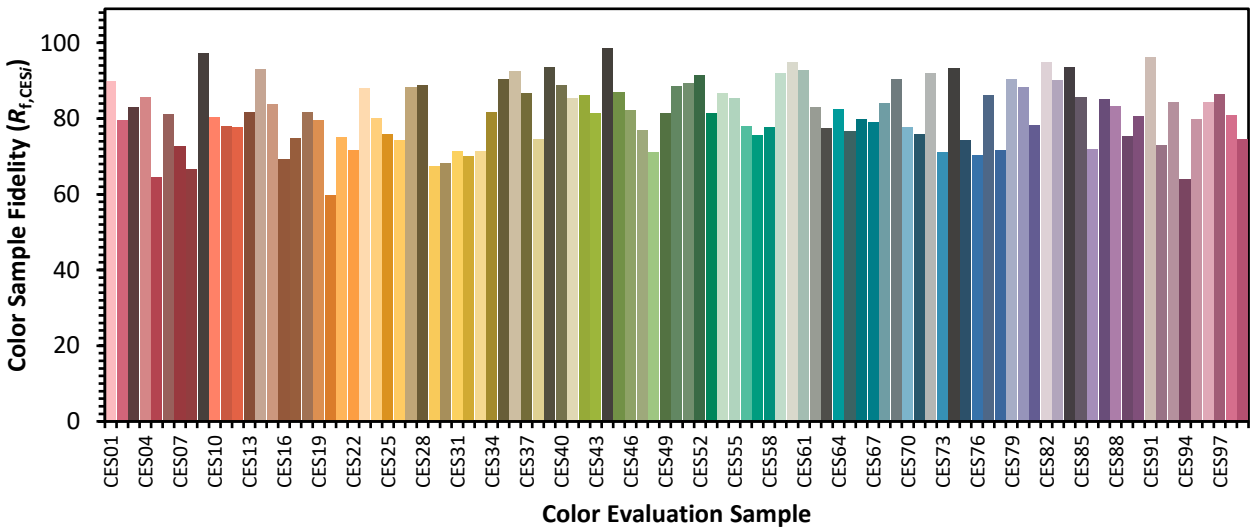



REPORT NUMBER: SP1-2408-195-9

# TM-30-18

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

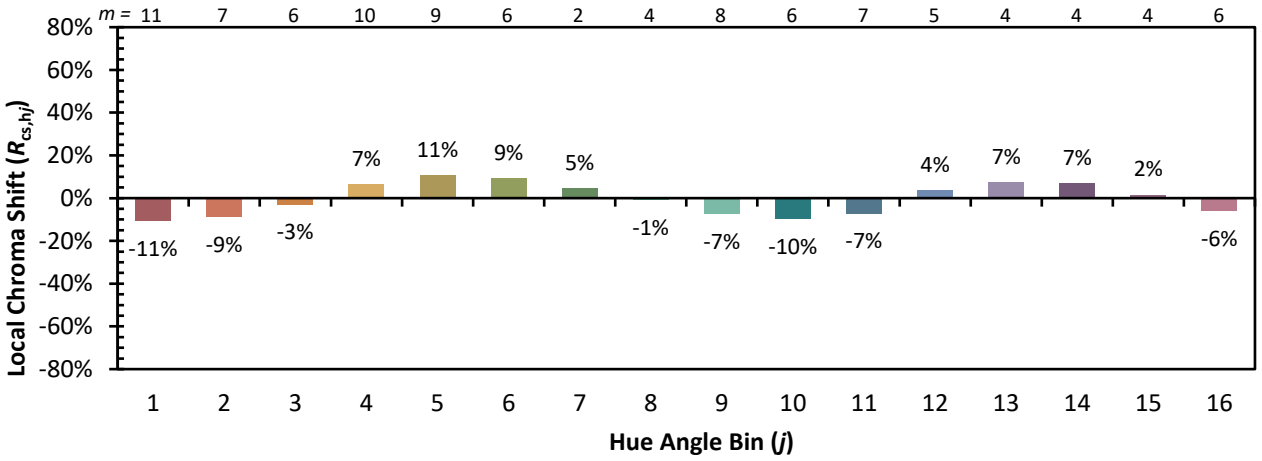
| | | | |
|---|---|---|---|
| CES01 = 86 | CES26 = 74 | CES51 = 89 | CES76 = 70 |
| CES02 = 63 | CES27 = 88 | CES52 = 92 | CES77 = 86 |
| CES03 = 31 | CES28 = 89 | CES53 = 81 | CES78 = 72 |
| CES04 = 70 | CES29 = 67 | CES54 = 87 | CES79 = 90 |
| CES05 = 50 | CES30 = 68 | CES55 = 85 | CES80 = 88 |
| CES06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

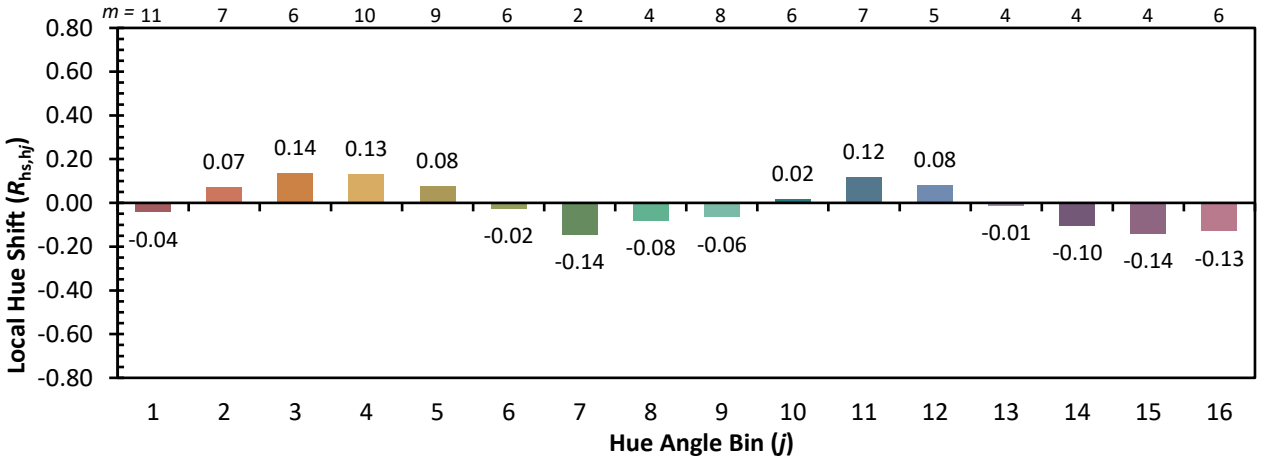


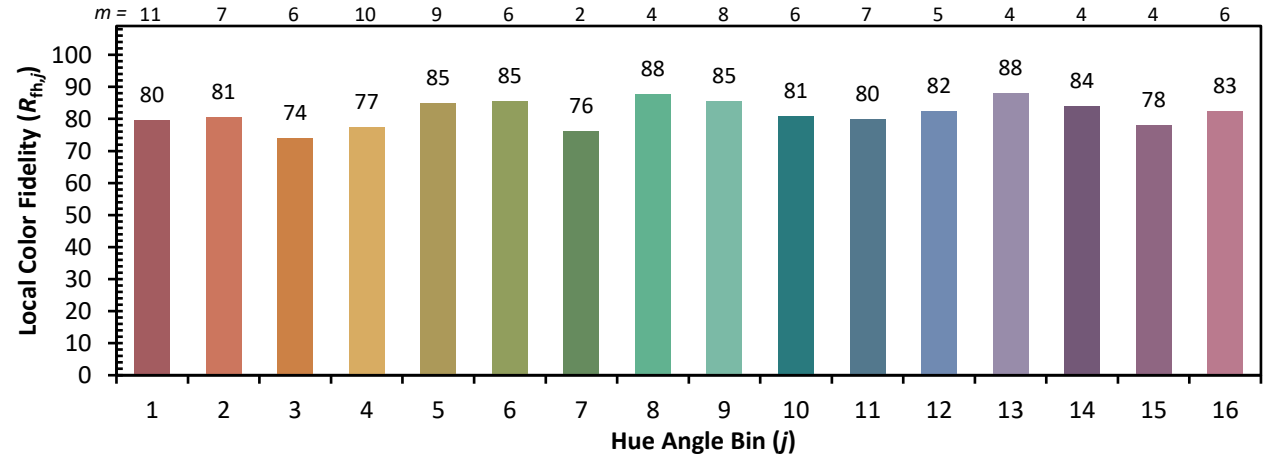
REPORT NUMBER: SP1-2408-195-9

# TM-30-18

## Color Rendition by Hue-Angle Bin



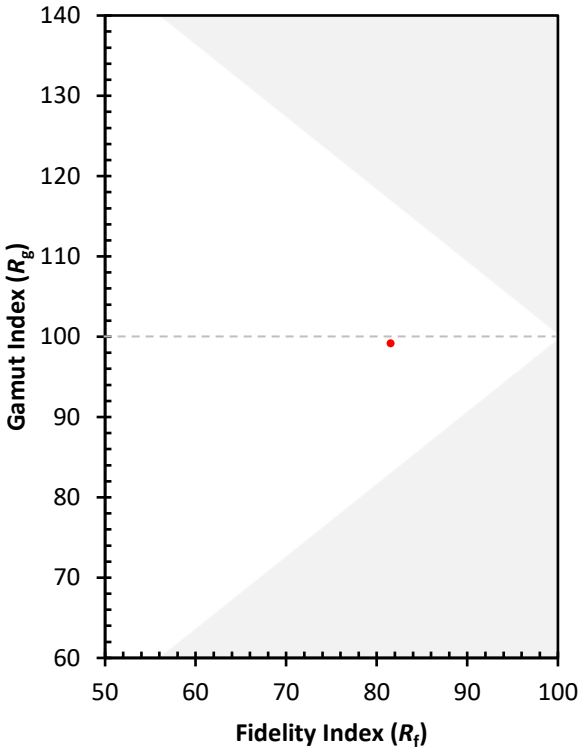



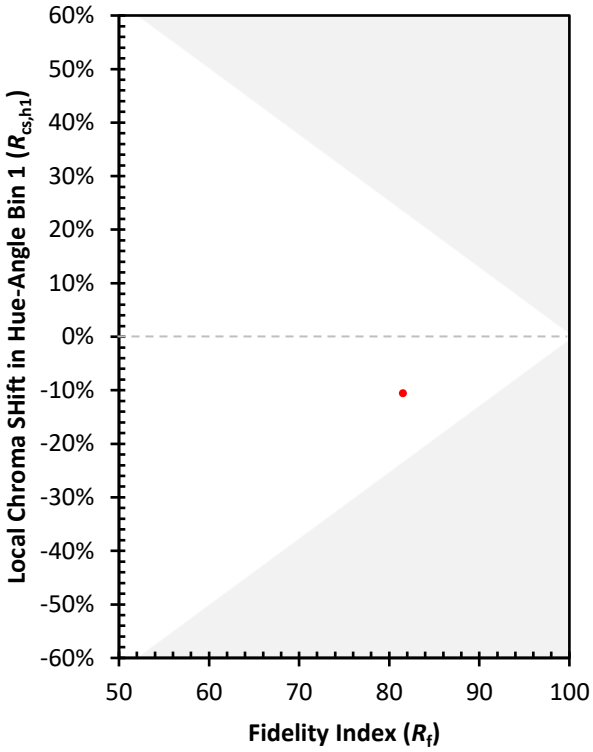



REPORT NUMBER: SP1-2408-195-9

## TM-30-18

### Measure Comparisons




(END OF REPORT)