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: P638991

Luminaire Tested: GWS-SA4F-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: | P638991 |
| | 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-SA4F-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: | 16690.6 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): | 225.3 |
| 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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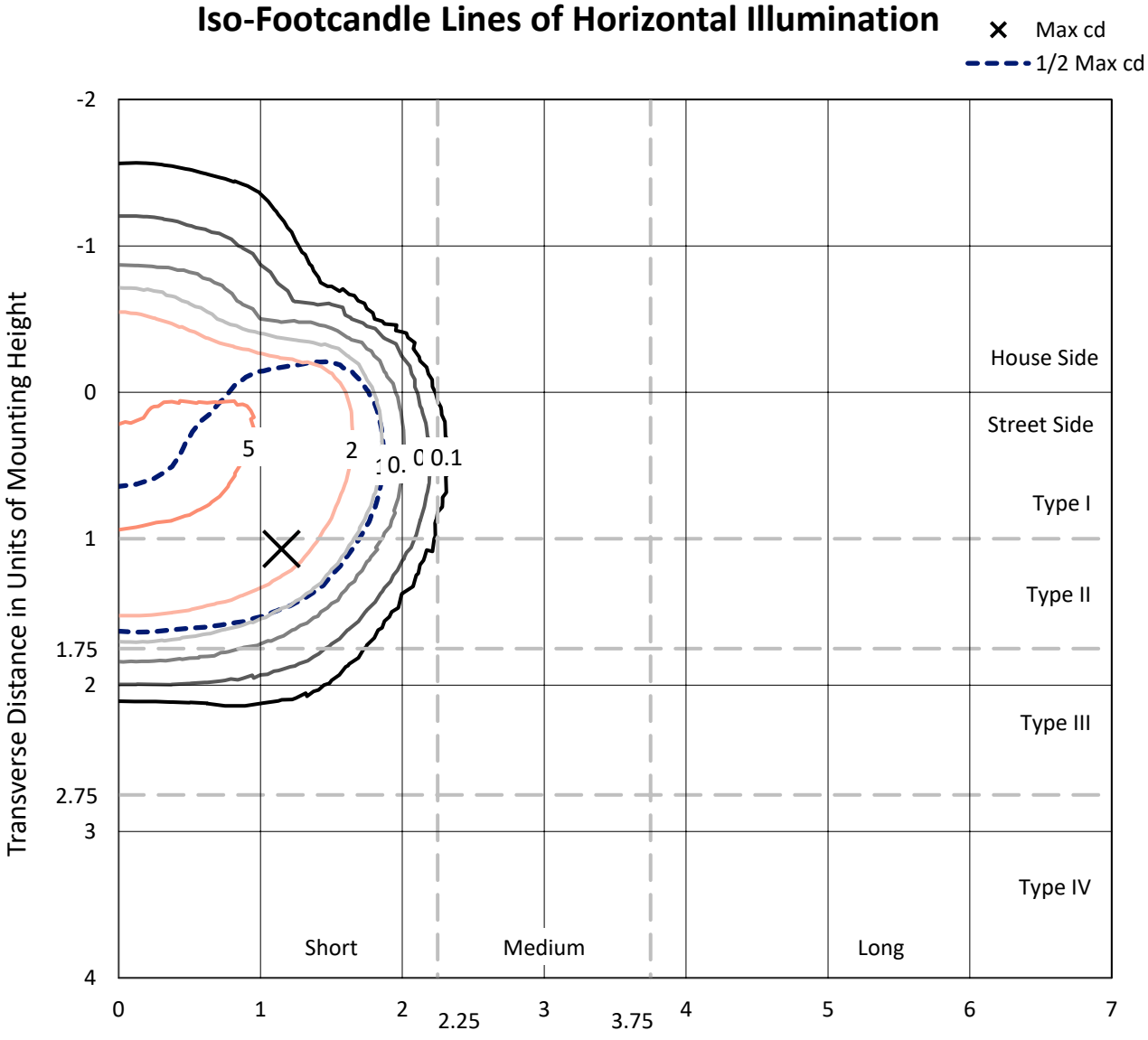
Scaled Data Report

REPORT NUMBER: P638991
CATALOG NUMBER: GWS-SA4F-830-U-T3-W-GRSBK

## Iso-Footcandle Lines of Horizontal Illumination




Based on 25 foot mounting height. Maximum calculated value = 6.3 fc
Type II - Short - N/A

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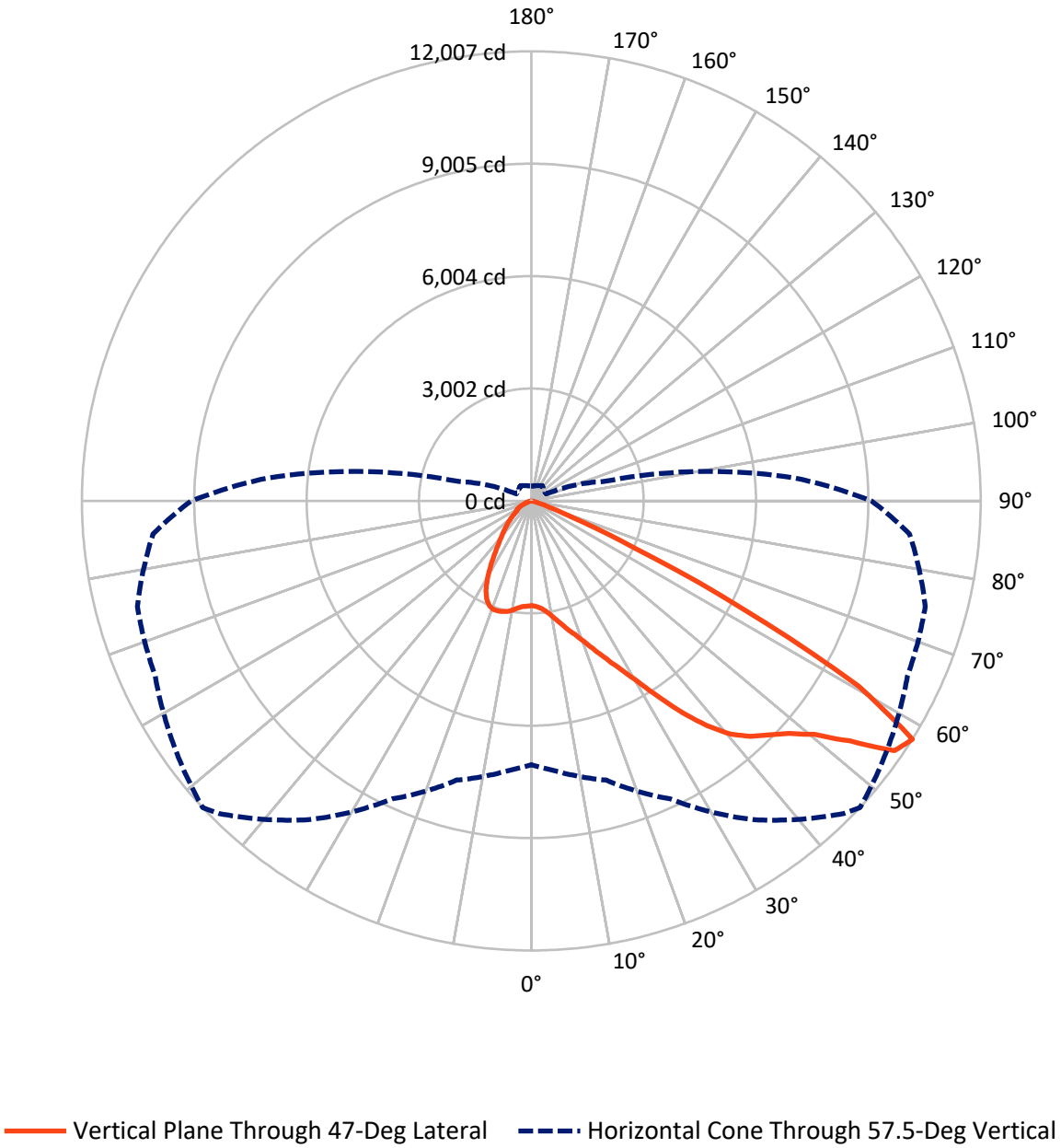
## Luminous Intensity Polar Plot



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REPORT NUMBER: P638991
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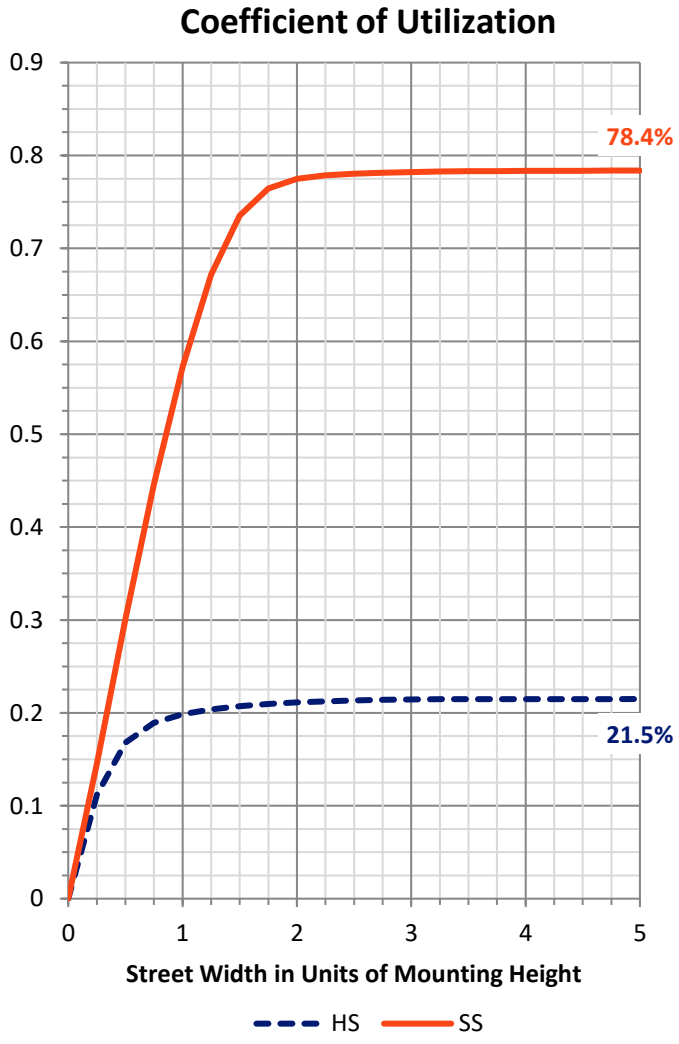
**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 3621.0 | 0.0 | 3621.0 |
| | % Fixture | 21.7 | 0.0 | 21.7 |
| **Street Side** | Lumens | 13069.6 | 0.0 | 13069.6 |
| | % Fixture | 78.3 | 0.0 | 78.3 |
| **Total** | Lumens | 16690.6 | 0.0 | 16690.6 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 278.0 | 1.7 |
| 10°-20° | 937.9 | 5.6 |
| 20°-30° | 1741.5 | 10.4 |
| 30°-40° | 2787.9 | 16.7 |
| 40°-50° | 4075.2 | 24.4 |
| 50°-60° | 5029.6 | 30.1 |
| 60°-70° | 1680.6 | 10.1 |
| 70°-80° | 156.6 | 0.9 |
| 80°-90° | 3.2 | 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° | 16690.6 | 100.0 |
| 0°-180° | 16690.6 | 100.0 |



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REPORT NUMBER: P638991
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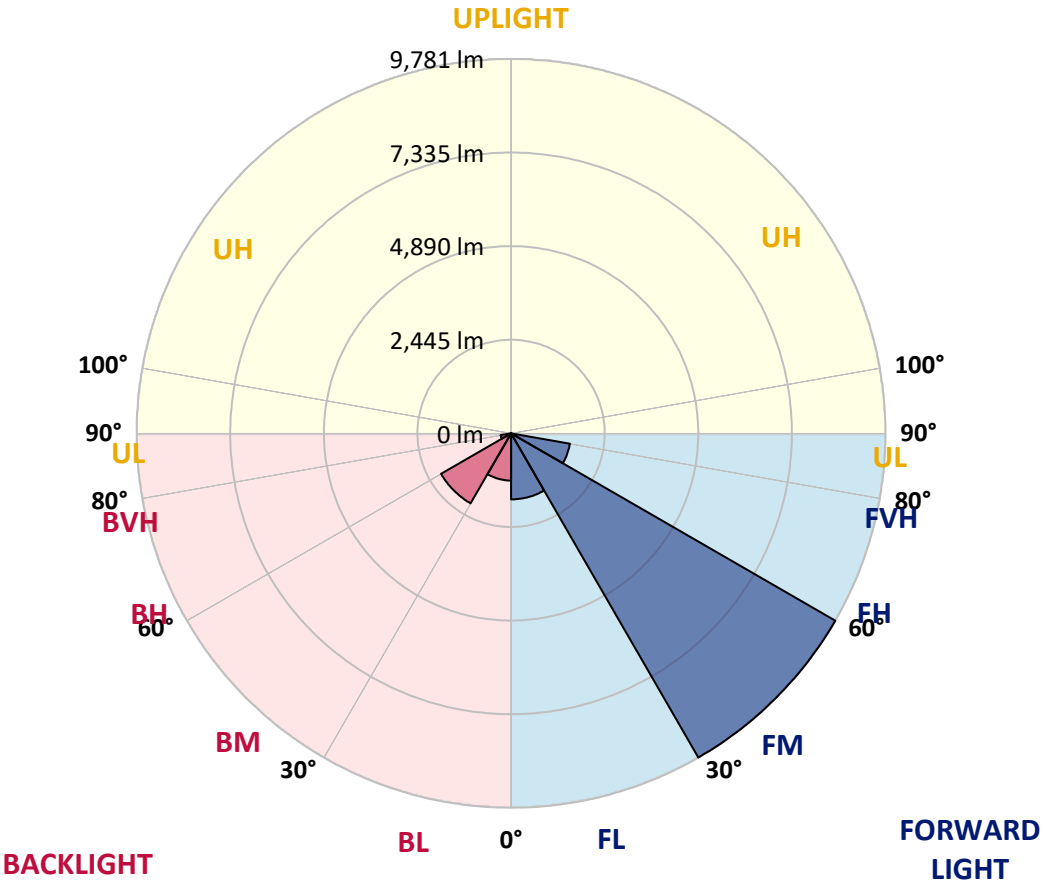
## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 1724.9 | 10.3 | | | |
| FM | (30°-60°) | 9780.6 | 58.6 | | | |
| FH | (60°-80°) | 1561.9 | 9.4 | | | G1/1800 |
| FVH | (80°-90°) | 2.2 | 0.0 | | | G0/10 |
| BL | (0°-30°) | 1232.5 | 7.4 | B3/2500 | | |
| BM | (30°-60°) | 2112.2 | 12.7 | B2/2500 | | |
| BH | (60°-80°) | 275.3 | 1.6 | B1/500 | | G1/500 |
| BVH | (80°-90°) | 1.0 | 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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CATALOG NUMBER: GWS-SA4F-830-U-T3-W-GRSBK

**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 45° | 47° | 55° | 65° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 2794.0 | 2794.0 | 2794.0 | 2794.0 | 2794.0 | 2794.0 | *2794.0* | 2794.0 | 2794.0 | 2794.0 | 2794.0 |
| 2.5° | 2823.1 | 2821.2 | 2819.2 | 2830.8 | 2827.0 | 2825.0 | *2828.9* | 2828.9 | 2828.9 | 2817.3 | 2794.0 |
| 5° | 2890.9 | 2890.9 | 2889.0 | 2900.6 | 2890.9 | 2885.1 | *2887.0* | 2887.0 | 2879.3 | 2858.0 | 2828.9 |
| 7.5° | 2997.5 | 2993.6 | 2989.7 | 3001.3 | 2991.7 | 2989.7 | *2993.6* | 2982.0 | 2968.4 | 2933.5 | 2892.8 |
| 10° | 3150.5 | 3150.5 | 3144.7 | 3156.4 | 3148.6 | 3144.7 | *3144.7* | 3137.0 | 3111.8 | 3057.5 | 2997.5 |
| 12.5° | 3361.7 | 3352.1 | 3338.5 | 3328.8 | 3324.9 | 3323.0 | *3324.9* | 3313.3 | 3286.2 | 3216.4 | 3133.1 |
| 15° | 3592.3 | 3584.6 | 3563.3 | 3547.8 | 3526.4 | 3522.6 | *3534.2* | 3524.5 | 3497.4 | 3402.4 | 3284.2 |
| 17.5° | 3883.0 | 3892.6 | 3838.4 | 3805.5 | 3743.5 | 3739.6 | *3743.5* | 3759.0 | 3739.6 | 3617.5 | 3445.1 |
| 20° | 4131.0 | 4138.7 | 4098.0 | 4074.8 | 4018.6 | 3993.4 | *4001.2* | 4026.3 | 4005.0 | 3861.6 | 3621.4 |
| 22.5° | 4396.4 | 4406.1 | 4363.5 | 4315.0 | 4289.9 | 4289.9 | *4318.9* | 4353.8 | 4324.7 | 4136.8 | 3822.9 |
| 25° | 4714.2 | 4721.9 | 4687.1 | 4623.1 | 4578.6 | 4634.7 | *4677.4* | 4770.4 | 4721.9 | 4466.2 | 4061.2 |
| 27.5° | 5078.5 | 5080.4 | 5030.0 | 4964.1 | 4940.9 | 5045.5 | *5088.1* | 5231.5 | 5212.2 | 4836.3 | 4313.1 |
| 30° | 5467.9 | 5469.9 | 5458.2 | 5413.7 | 5392.4 | 5529.9 | *5588.0* | 5795.4 | 5781.8 | 5295.5 | 4656.1 |
| 32.5° | 5872.9 | 5872.9 | 5894.2 | 5890.3 | 5915.5 | 6140.3 | *6233.3* | 6469.7 | 6456.1 | 5857.4 | 5082.3 |
| 35° | 6279.8 | 6281.7 | 6318.5 | 6411.5 | 6516.2 | 6814.6 | *6936.6* | 7223.4 | 7192.4 | 6529.7 | 5626.8 |
| 37.5° | 6742.9 | 6723.5 | 6773.9 | 6913.4 | 7145.9 | 7490.8 | *7607.0* | 7880.2 | 7845.4 | 7217.6 | 6337.9 |
| 40° | 7300.9 | 7266.0 | 7266.0 | 7428.8 | 7692.3 | 8089.5 | *8188.3* | 8323.9 | 8205.8 | 7773.7 | 7035.4 |
| 42.5° | 7917.0 | 7884.1 | 7841.5 | 7984.9 | 8205.8 | 8515.8 | *8597.1* | 8560.3 | 8463.5 | 8298.8 | 7829.9 |
| 45° | 8541.0 | 8490.6 | 8519.6 | 8606.8 | 8734.7 | 8882.0 | *8913.0* | 8742.5 | 8697.9 | 8744.4 | 8486.7 |
| 47.5° | 9015.7 | 8980.8 | 9052.5 | 9174.6 | 9279.2 | 9300.5 | *9279.2* | 9042.8 | 9038.9 | 9203.6 | 8942.0 |
| 50° | 9174.6 | 9178.4 | 9376.1 | 9643.5 | 9812.0 | 9829.5 | *9800.4* | 9529.1 | 9492.3 | 9540.8 | 9188.1 |
| 52.5° | 9190.1 | 9205.6 | 9494.3 | 10003.8 | 10463.1 | 10672.3 | *10649.1* | 10356.5 | 9996.1 | 9943.8 | 9560.1 |
| 55° | 8816.1 | 8907.2 | 9310.2 | 10054.2 | 11030.8 | 11699.3 | *11776.8* | 11216.8 | 10682.0 | 10637.4 | 10360.4 |
| 57.5° | *7047.1* | *7233.1* | *7719.4* | *8779.3* | *10397.2* | *11805.8* | *12007.3* | *11604.3* | *11087.0* | *10897.1* | *10145.3* |
| 60° | 4212.4 | 4442.9 | 4909.9 | 6210.0 | 7913.2 | 9703.5 | *10050.3* | 10106.5 | 9868.2 | 9319.9 | 7783.4 |
| 62.5° | 1807.8 | 1788.4 | 2363.9 | 3359.8 | 4706.4 | 6167.4 | *6324.3* | 6568.5 | 6775.8 | 6202.3 | 4723.9 |
| 65° | 620.0 | 674.3 | 937.8 | 1515.2 | 2356.1 | 2863.8 | *3003.3* | 3222.2 | 3516.8 | 2902.5 | 1730.3 |
| 67.5° | 383.6 | 406.9 | 540.6 | 895.2 | 1271.1 | 1251.7 | *1189.7* | 1154.8 | 1123.8 | 769.2 | 474.7 |
| 70° | 279.0 | 298.4 | 379.8 | 616.2 | 854.5 | 600.7 | *521.2* | 422.4 | 468.9 | 432.1 | 337.1 |
| 72.5° | 187.9 | 203.4 | 261.6 | 374.0 | 437.9 | 292.6 | *271.3* | 308.1 | 372.0 | 354.6 | 275.1 |
| 75° | 112.4 | 122.1 | 149.2 | 182.1 | 178.3 | 151.1 | *153.1* | 217.0 | 284.8 | 265.5 | 195.7 |
| 77.5° | 77.5 | 81.4 | 98.8 | 118.2 | 87.2 | 46.5 | *42.6* | 60.1 | 96.9 | 96.9 | 65.9 |
| 80° | 19.4 | 25.2 | 25.2 | 15.5 | 13.6 | 11.6 | *11.6* | 17.4 | 27.1 | 19.4 | 9.7 |
| 82.5° | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | *1.9* | 3.9 | 3.9 | 3.9 | 3.9 |
| 85° | 0.0 | 0.0 | 1.9 | 1.9 | 1.9 | 1.9 | *1.9* | 1.9 | 3.9 | 3.9 | 3.9 |
| 87.5° | 0.0 | 0.0 | 1.9 | 1.9 | 1.9 | 1.9 | *1.9* | 1.9 | 1.9 | 3.9 | 3.9 |
| 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: P638991
CATALOG NUMBER: GWS-SA4F-830-U-T3-W-GRSBK

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 2794.0 | 2794.0 | 2794.0 | 2794.0 | 2794.0 | 2794.0 | 2794.0 | 2794.0 | 2794.0 | 2794.0 | 2794.0 |
| 2.5° | 2807.6 | 2784.3 | 2799.8 | 2796.0 | 2807.6 | 2811.5 | 2794.0 | 2790.1 | 2792.1 | 2768.8 | 2761.1 |
| 5° | 2834.7 | 2807.6 | 2815.3 | 2807.6 | 2821.2 | 2832.8 | 2827.0 | 2834.7 | 2844.4 | 2827.0 | 2819.2 |
| 7.5° | 2892.8 | 2865.7 | 2863.8 | 2852.2 | 2871.5 | 2879.3 | 2877.3 | 2898.7 | 2918.0 | 2906.4 | 2894.8 |
| 10° | 2993.6 | 2956.8 | 2952.9 | 2943.2 | 2949.0 | 2954.8 | 2933.5 | 2937.4 | 2954.8 | 2941.3 | 2935.5 |
| 12.5° | 3117.6 | 3073.0 | 3063.4 | 3040.1 | 3040.1 | 3011.0 | 2964.5 | 2954.8 | 2968.4 | 2958.7 | 2949.0 |
| 15° | 3251.3 | 3191.2 | 3175.7 | 3135.0 | 3096.3 | 3042.0 | 2993.6 | 2982.0 | 2991.7 | 2980.0 | 2972.3 |
| 17.5° | 3400.5 | 3332.7 | 3282.3 | 3210.6 | 3125.4 | 3061.4 | 3007.2 | 2982.0 | 2966.5 | 2943.2 | 2941.3 |
| 20° | 3547.8 | 3458.6 | 3373.4 | 3259.0 | 3146.7 | 3049.8 | 2960.7 | 2894.8 | 2838.6 | 2803.7 | 2790.1 |
| 22.5° | 3718.3 | 3586.5 | 3448.9 | 3288.1 | 3127.3 | 2980.0 | 2823.1 | 2710.7 | 2613.8 | 2580.9 | 2565.4 |
| 25° | 3900.4 | 3729.9 | 3524.5 | 3315.2 | 3061.4 | 2825.0 | 2611.9 | 2445.3 | 2317.4 | 2274.7 | 2257.3 |
| 27.5° | 4101.9 | 3867.5 | 3602.0 | 3309.4 | 2925.8 | 2604.1 | 2321.2 | 2113.9 | 1988.0 | 1949.2 | 1962.8 |
| 30° | 4357.7 | 4045.7 | 3698.9 | 3249.4 | 2722.3 | 2294.1 | 1962.8 | 1788.4 | 1693.5 | 1656.7 | 1658.6 |
| 32.5° | 4698.7 | 4301.5 | 3840.3 | 3121.5 | 2460.8 | 1941.5 | 1650.8 | 1523.0 | 1459.0 | 1410.6 | 1406.7 |
| 35° | 5187.0 | 4690.9 | 3972.1 | 2916.1 | 2143.0 | 1627.6 | 1416.4 | 1315.6 | 1226.5 | 1170.3 | 1180.0 |
| 37.5° | 5772.1 | 5181.2 | 4043.8 | 2639.0 | 1786.5 | 1383.4 | 1240.1 | 1137.4 | 1036.6 | 953.3 | 963.0 |
| 40° | 6465.8 | 5822.5 | 4038.0 | 2274.7 | 1461.0 | 1216.8 | 1092.8 | 972.7 | 846.7 | 771.2 | 778.9 |
| 42.5° | 7238.9 | 6429.0 | 3912.0 | 1889.2 | 1211.0 | 1081.2 | 951.4 | 800.2 | 678.2 | 631.7 | 633.6 |
| 45° | 7909.3 | 6921.1 | 3691.1 | 1490.0 | 1019.2 | 949.4 | 804.1 | 649.1 | 594.8 | 561.9 | 560.0 |
| 47.5° | 8405.3 | 7281.5 | 3375.3 | 1172.3 | 864.2 | 829.3 | 660.7 | 581.3 | 538.7 | 511.5 | 507.7 |
| 50° | 8682.4 | 7407.5 | 3026.5 | 918.4 | 730.5 | 703.4 | 591.0 | 527.0 | 498.0 | 480.5 | 476.7 |
| 52.5° | 9054.4 | 7558.6 | 2776.6 | 724.7 | 612.3 | 575.5 | 544.5 | 490.2 | 470.8 | 457.3 | 451.5 |
| 55° | 9643.5 | 7851.2 | 2559.6 | 575.5 | 509.6 | 501.8 | 513.5 | 468.9 | 457.3 | 436.0 | 428.2 |
| 57.5° | *9089.3* | *7052.9* | *1988.0* | *445.6* | *430.1* | *459.2* | *496.0* | *447.6* | *418.5* | *399.1* | *391.4* |
| 60° | 6396.0 | 4689.0 | 999.8 | 358.5 | 383.6 | 430.1 | 467.0 | 405.0 | 375.9 | 379.8 | 375.9 |
| 62.5° | 3526.4 | 2346.4 | 449.5 | 300.3 | 333.3 | 379.8 | 399.1 | 350.7 | 331.3 | 364.3 | 370.1 |
| 65° | 1152.9 | 798.3 | 259.6 | 232.5 | 263.5 | 310.0 | 344.9 | 333.3 | 329.4 | 368.1 | 379.8 |
| 67.5° | 354.6 | 263.5 | 176.3 | 166.6 | 182.1 | 228.6 | 290.6 | 360.4 | 387.5 | 399.1 | 405.0 |
| 70° | 265.5 | 207.3 | 151.1 | 141.4 | 149.2 | 174.4 | 246.1 | 300.3 | 282.9 | 284.8 | 281.0 |
| 72.5° | 213.1 | 164.7 | 129.8 | 124.0 | 124.0 | 120.1 | 129.8 | 162.8 | 184.1 | 193.8 | 193.8 |
| 75° | 149.2 | 116.3 | 98.8 | 91.1 | 71.7 | 58.1 | 52.3 | 52.3 | 46.5 | 44.6 | 42.6 |
| 77.5° | 50.4 | 42.6 | 38.8 | 31.0 | 21.3 | 17.4 | 15.5 | 13.6 | 9.7 | 5.8 | 3.9 |
| 80° | 7.8 | 5.8 | 3.9 | 3.9 | 3.9 | 1.9 | 1.9 | 1.9 | 0.0 | 0.0 | 0.0 |
| 82.5° | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 1.9 | 1.9 | 0.0 | 0.0 | 0.0 | 0.0 |
| 85° | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 1.9 | 1.9 | 0.0 | 0.0 | 0.0 | 0.0 |
| 87.5° | 3.9 | 3.9 | 3.9 | 3.9 | 1.9 | 1.9 | 1.9 | 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

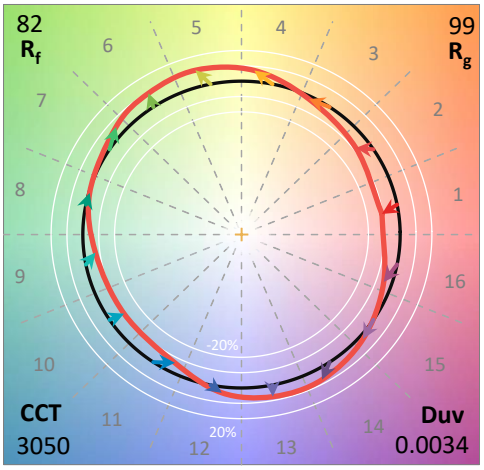
## Test Information

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

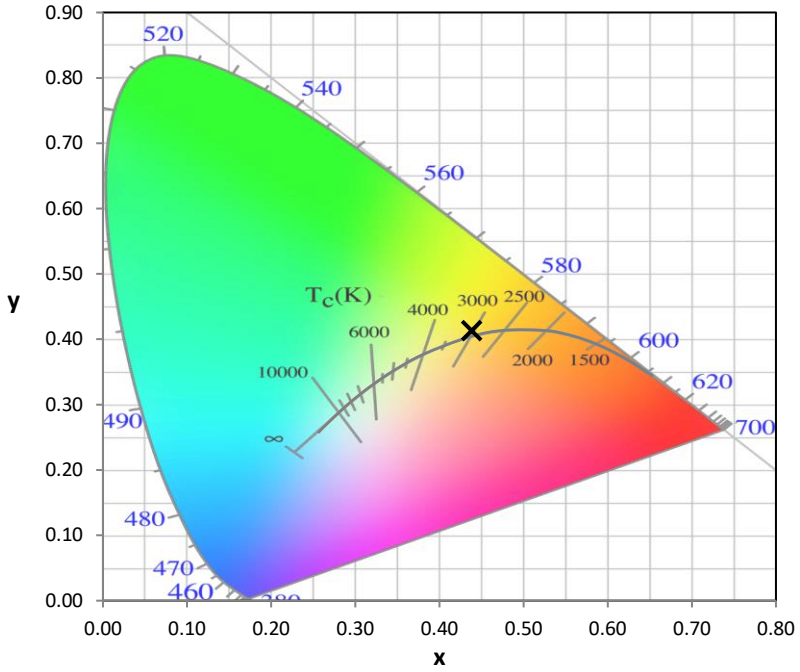
| | |
|---|---|
| Stabilization Time: | 20M |
| Operation Time: | 1H 20M |
| Sphere Temperature (°C): | 24.2 |

REPORT NUMBER: SP1-2408-195-9

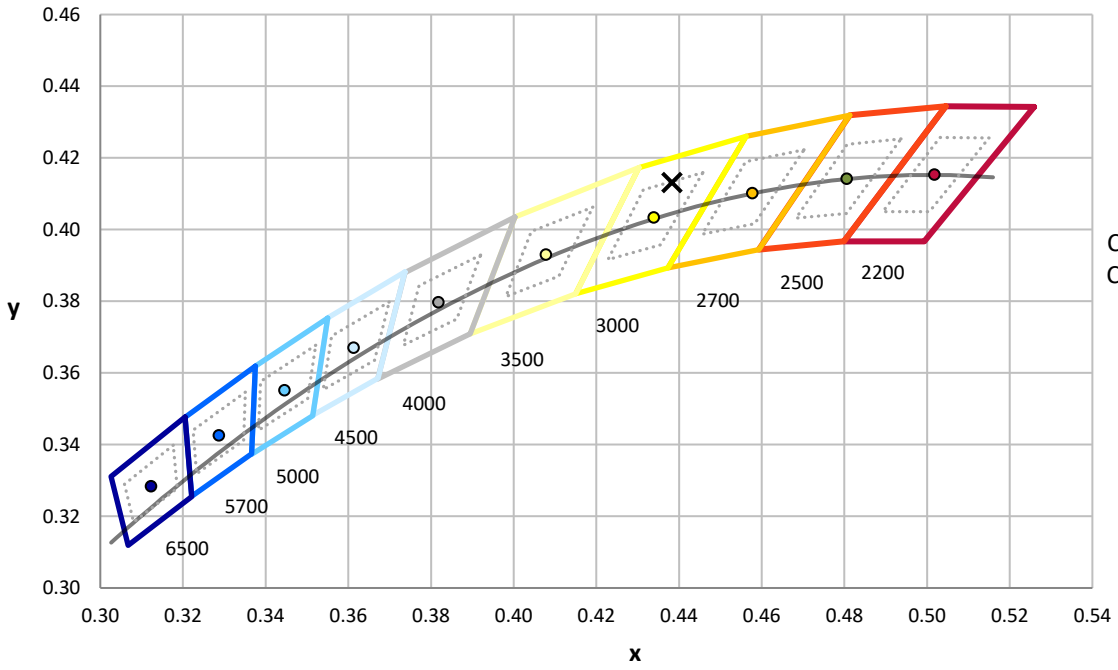
| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 6/18/2024 | 12/18/2024 |
| Power Meter | INXT2011004 | 2/8/2024 | 2/8/2025 |
| AC Power Source | IN0063 | 10/24/2023 | 10/24/2024 |
| DC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

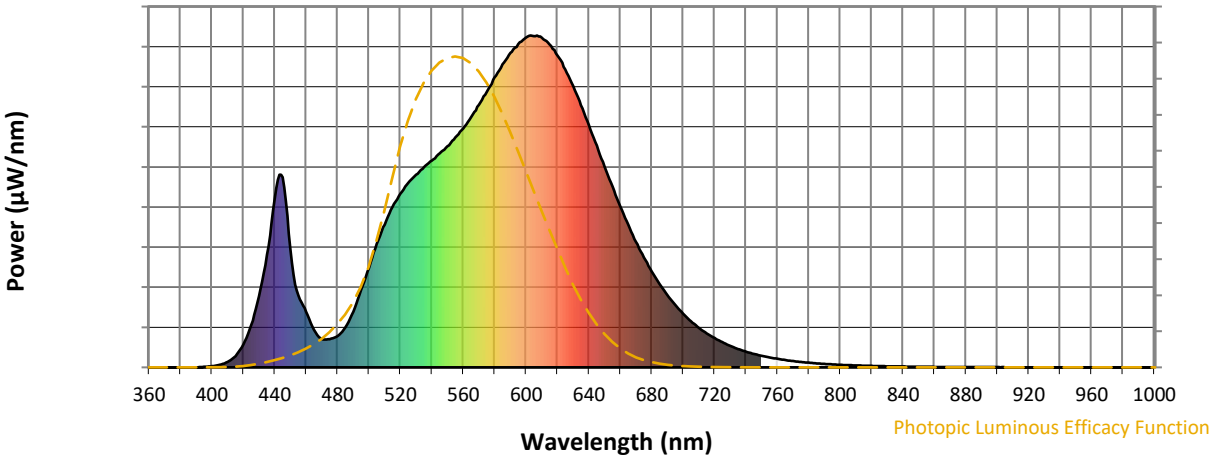



CCT = 3050K
CIE x = 0.4383
CIE y = 0.4131
Duv = 0.0034

Point lies inside the ANSI 3000K 4-step quadrangle

REPORT NUMBER: SP1-2408-195-9

## Photopic Flux vs. Wavelength

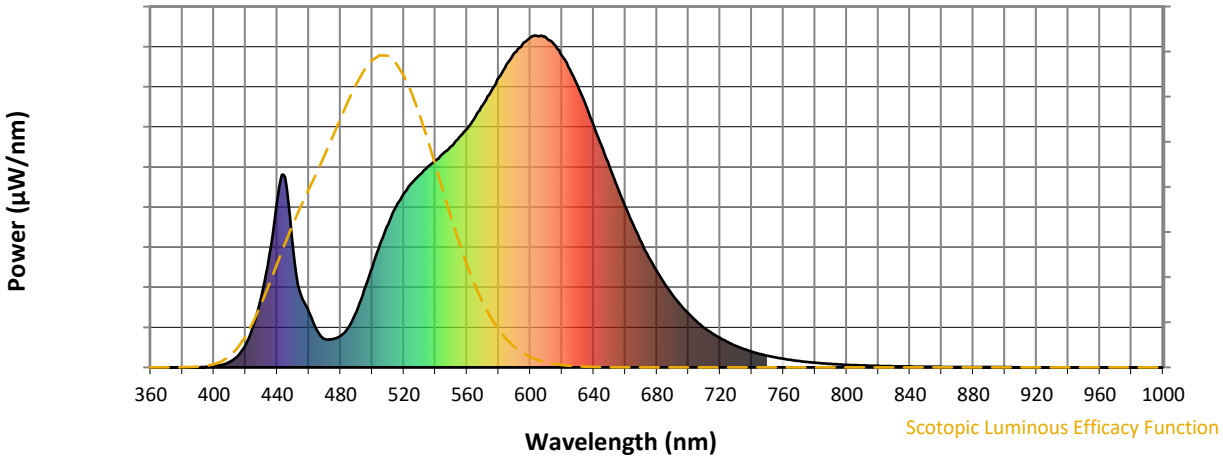



## Photopic Lumens: NR

| 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

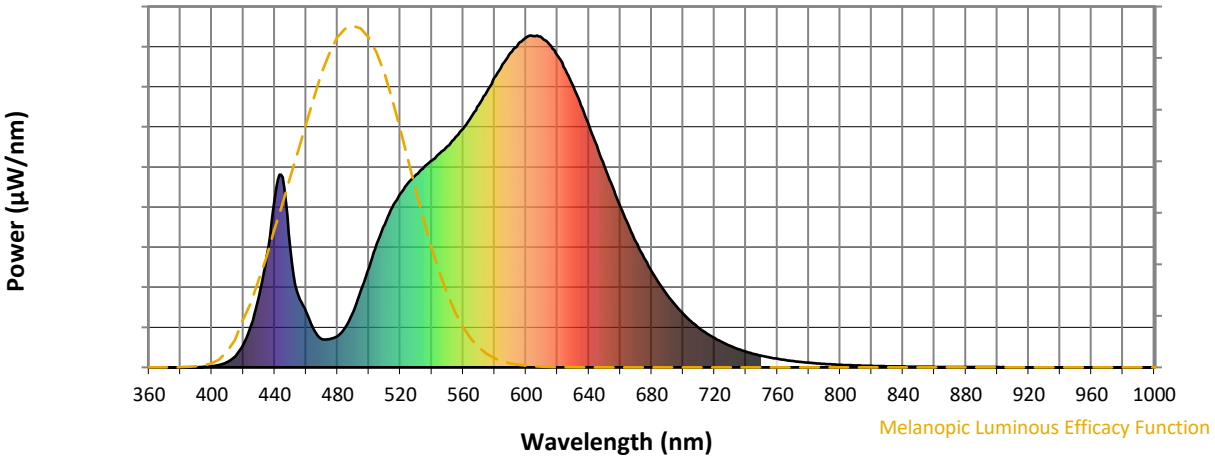



**Scotopic Lumens: NR** **S/P: 1.27**

| 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 | | | |

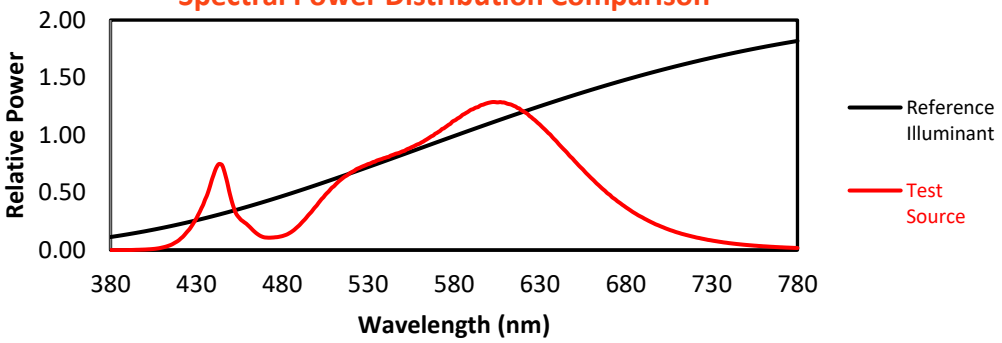
REPORT NUMBER: SP1-2408-195-9

# TM-30-18

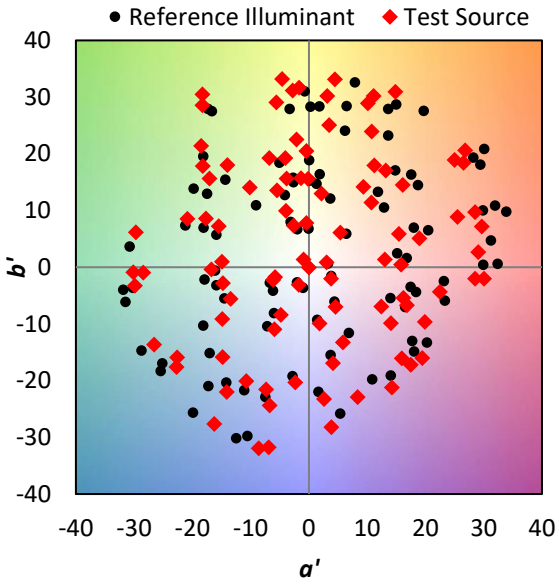
## Summary

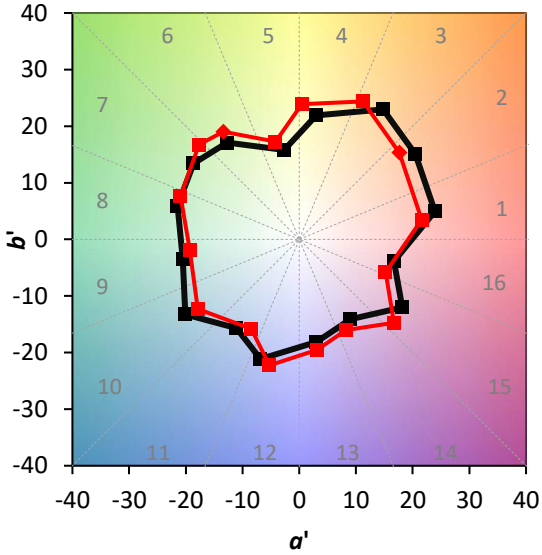
$R_f$ = 81.5
$R_g$ = 99.2
CIE $R_a$ = 81.0
$R_9$ = 7.1

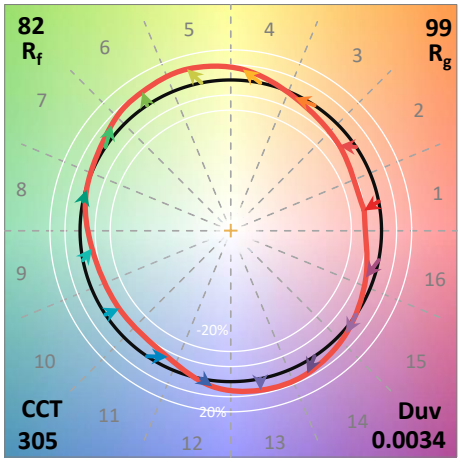
## Spectral Power Distribution Comparison

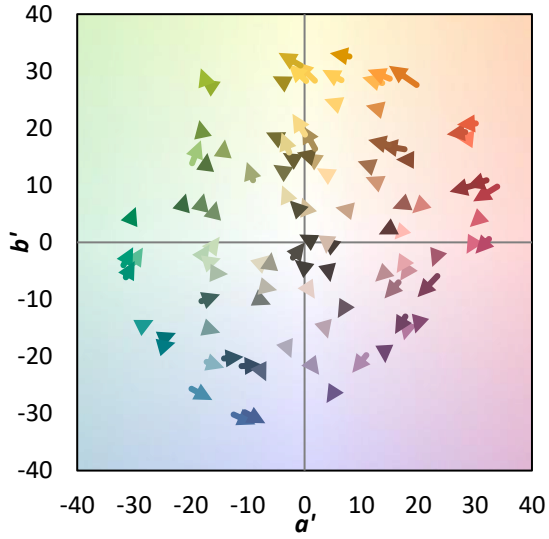



## Color Vector Graphics



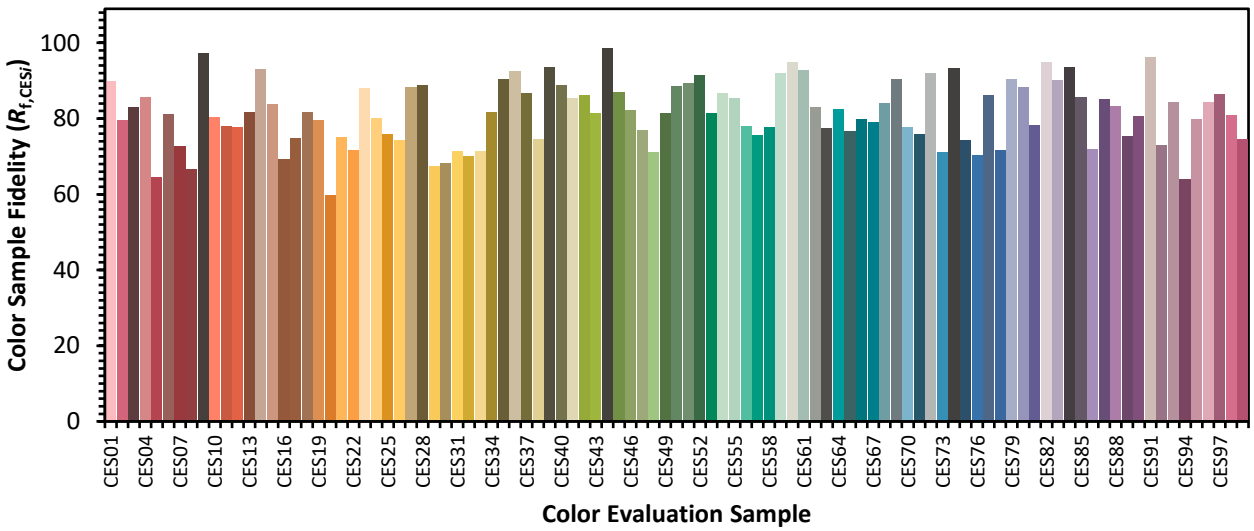



REPORT NUMBER: SP1-2408-195-9

# TM-30-18

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

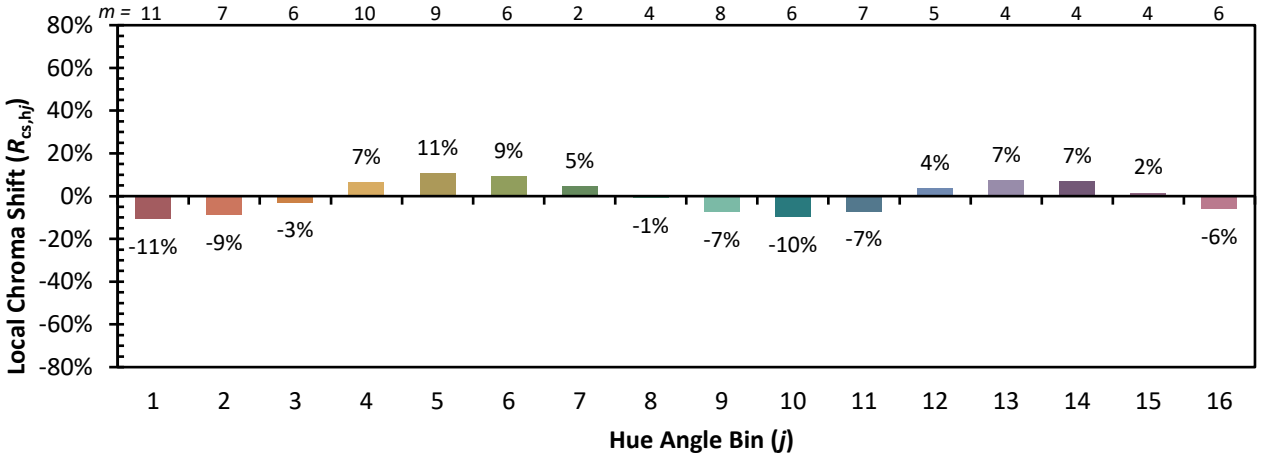
| | | | |
|---|---|---|---|
| CES01 = 86 | CES26 = 74 | CES51 = 89 | CES76 = 70 |
| CES02 = 63 | CES27 = 88 | CES52 = 92 | CES77 = 86 |
| CES03 = 31 | CES28 = 89 | CES53 = 81 | CES78 = 72 |
| CES04 = 70 | CES29 = 67 | CES54 = 87 | CES79 = 90 |
| CES05 = 50 | CES30 = 68 | CES55 = 85 | CES80 = 88 |
| CES06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

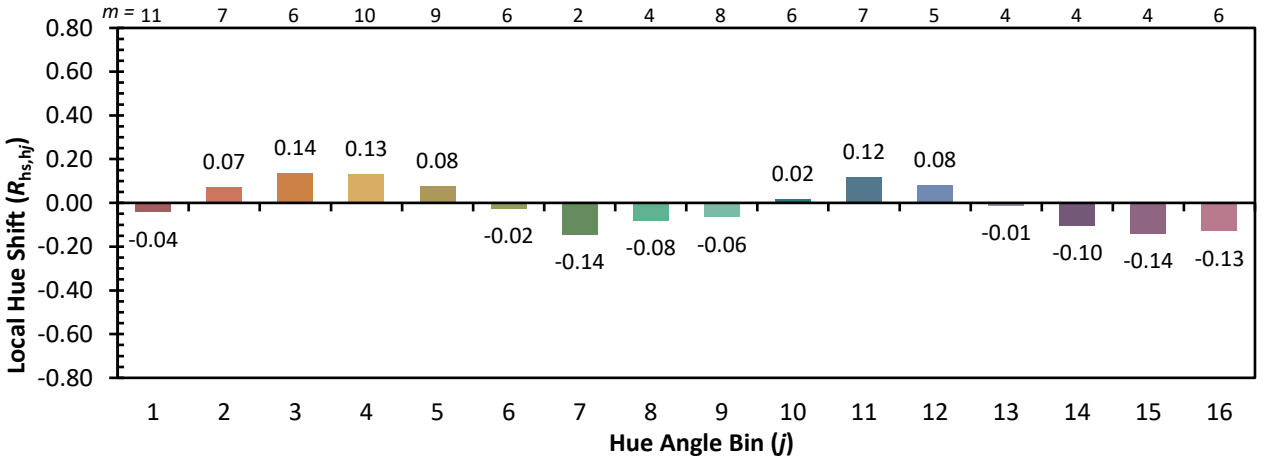


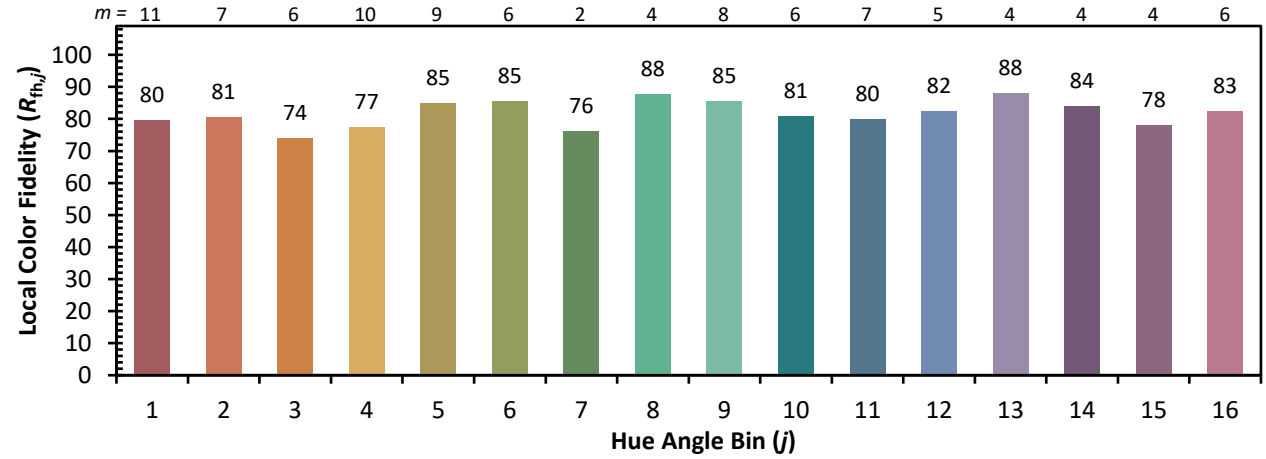
REPORT NUMBER: SP1-2408-195-9

# TM-30-18

## Color Rendition by Hue-Angle Bin



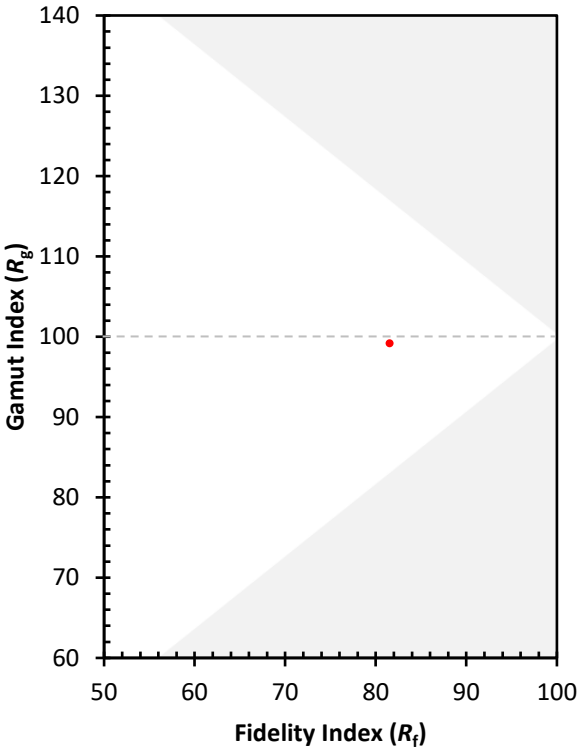



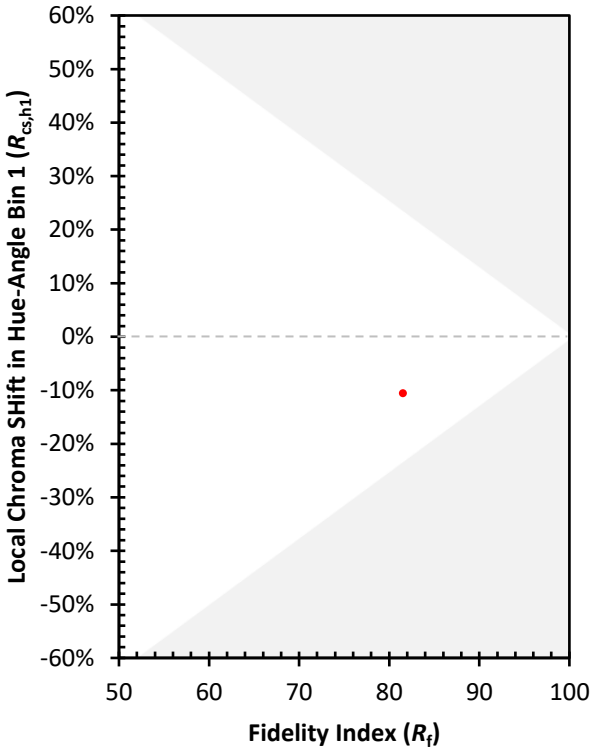



REPORT NUMBER: SP1-2408-195-9

# TM-30-18

## Measure Comparisons




(END OF REPORT)