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: P637486

Luminaire Tested: GWS-SA4C-830-U-SL3-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: | P637486 |
| | TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-31) |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Issue Date: | 1/10/2023 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS |
| Product Line: | McGRAW-EDISON |
| Catalog Number: | GWS-SA4C-830-U-SL3-W |
| Description: | GALLEON WALL SLIM LUMINAIRE. (4) LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III SPILL LIGHT ELIMINATOR OPTICS |
| Light Source: | (64) 3000K CCT, 80 CRI LEDS |
| Ballast/Driver: | - |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 15109.2 lumens |
| Efficiency: | N/A |
| Efficacy: | 117.6 lumens/watt |
| Luminous Opening: | Rectangular (W 1' x L: 1' x H: 0') |
| IES Classification: | Type III - Medium |
| BUG Rating: | B2 - U0 - G3 |

| | |
|---|---|
| Input Watts (W): | 128.5 |
| 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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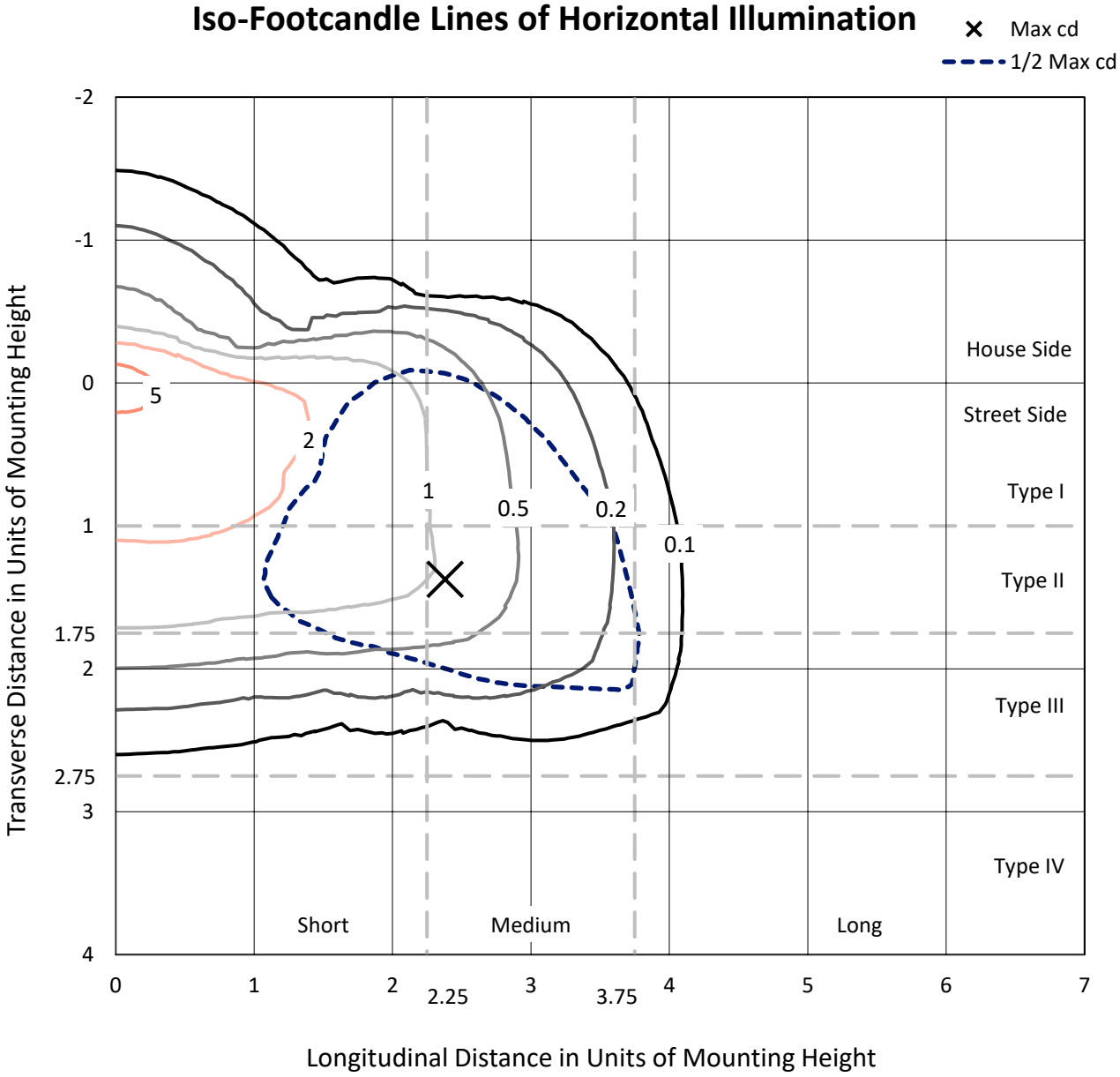
Scaled Data Report

REPORT NUMBER: P637486
CATALOG NUMBER: GWS-SA4C-830-U-SL3-W

## Iso-Footcandle Lines of Horizontal Illumination




Based on 25 foot mounting height. Maximum calculated value = 6.7 fc
Type III - Medium - N/A

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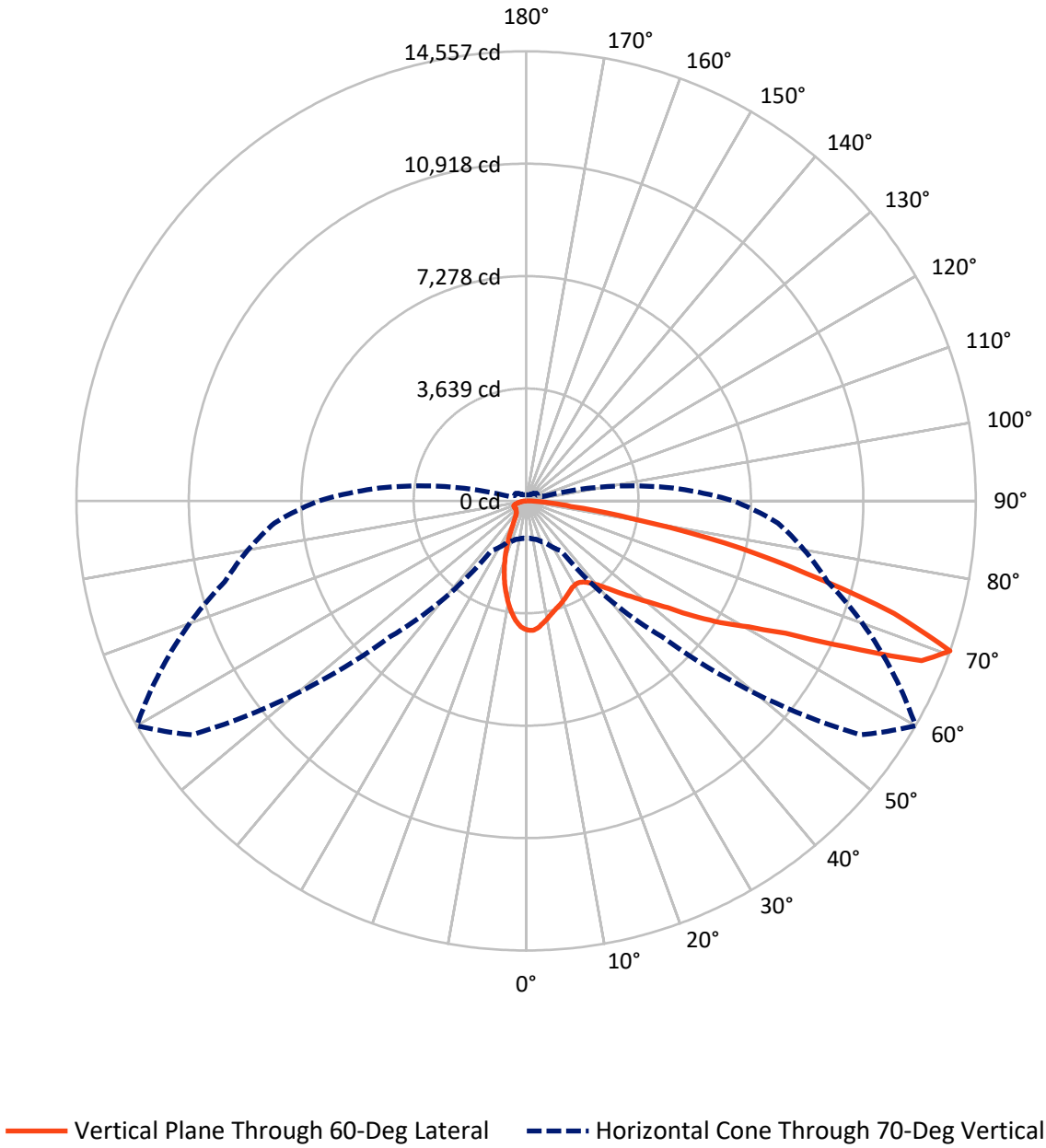
## Luminous Intensity Polar Plot



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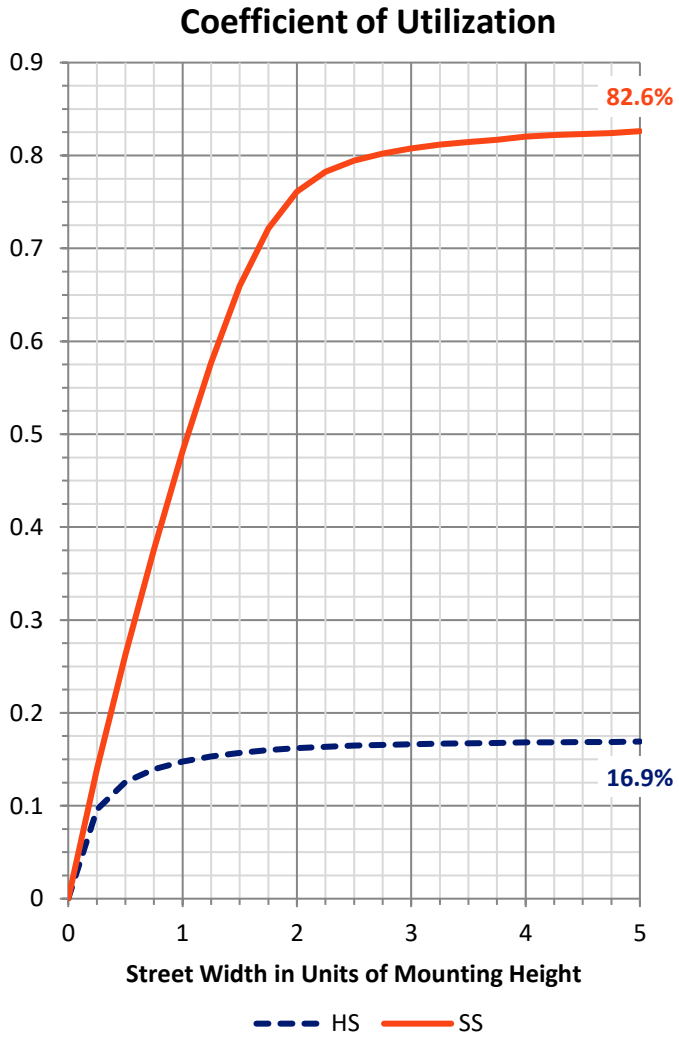
REPORT NUMBER: P637486
CATALOG NUMBER: GWS-SA4C-830-U-SL3-W

**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 2584.0 | 0.0 | 2584.0 |
| | % Fixture | 17.1 | 0.0 | 17.1 |
| **Street Side** | Lumens | 12525.2 | 0.0 | 12525.2 |
| | % Fixture | 82.9 | 0.0 | 82.9 |
| **Total** | Lumens | 15109.2 | 0.0 | 15109.2 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 360.4 | 2.4 |
| 10°-20° | 807.4 | 5.3 |
| 20°-30° | 1034.0 | 6.8 |
| 30°-40° | 1358.9 | 9.0 |
| 40°-50° | 1971.5 | 13.0 |
| 50°-60° | 3076.0 | 20.4 |
| 60°-70° | 4027.1 | 26.7 |
| 70°-80° | 2226.9 | 14.7 |
| 80°-90° | 247.1 | 1.6 |
| 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° | 15109.2 | 100.0 |
| 0°-180° | 15109.2 | 100.0 |



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REPORT NUMBER: P637486
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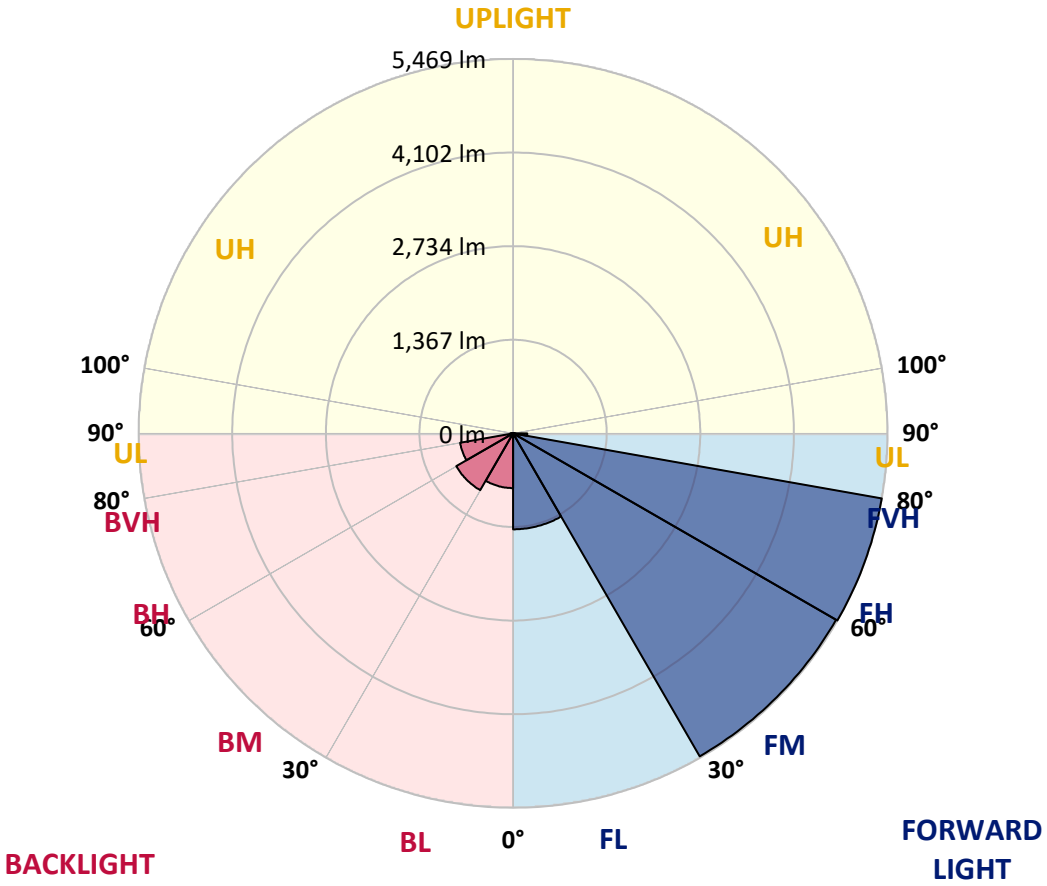
## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 1402.2 | 9.3 | | | |
| FM | (30°-60°) | 5448.3 | 36.1 | | | |
| FH | (60°-80°) | 5468.7 | 36.2 | | | G3/7500 |
| FVH | (80°-90°) | 205.9 | 1.4 | | | G2/225 |
| BL | (0°-30°) | 799.5 | 5.3 | B2/1000 | | |
| BM | (30°-60°) | 958.1 | 6.3 | B1/1000 | | |
| BH | (60°-80°) | 785.3 | 5.2 | B2/1000 | | G2/1000 |
| BVH | (80°-90°) | 41.2 | 0.3 | | | G1/100 |
| UL | (90°-100°) | 0.0 | 0.0 | | U0/0 | |
| UH | (100°-180°) | 0.0 | 0.0 | | U0/0 | |

**BUG Rating: B2-U0-G3**
Type III Medium



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**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 60° | 65° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 4180.9 | 4180.9 | 4180.9 | 4180.9 | 4180.9 | 4180.9 | 4180.9 | *4180.9* | 4180.9 | 4180.9 | 4180.9 |
| 2.5° | 4122.3 | 4126.7 | 4138.9 | 4156.6 | 4174.3 | 4183.1 | 4205.2 | *4198.6* | 4194.2 | 4185.3 | 4174.3 |
| 5° | 3939.9 | 3948.8 | 3959.8 | 3994.1 | 4032.8 | 4063.7 | 4113.5 | *4119.0* | 4121.2 | 4125.6 | 4107.9 |
| 7.5° | 3707.8 | 3710.0 | 3736.5 | 3781.8 | 3832.7 | 3885.7 | 3968.7 | *3991.9* | 4011.8 | 4033.9 | 4019.5 |
| 10° | 3451.3 | 3456.8 | 3476.7 | 3541.9 | 3629.3 | 3707.8 | 3819.4 | *3858.1* | 3900.1 | 3948.8 | 3928.9 |
| 12.5° | 3241.3 | 3242.4 | 3274.4 | 3344.1 | 3439.1 | 3545.3 | 3684.6 | *3731.0* | 3786.3 | 3862.5 | 3844.8 |
| 15° | 3074.3 | 3074.3 | 3104.2 | 3163.9 | 3273.3 | 3398.2 | 3564.1 | *3623.8* | 3698.9 | 3801.7 | 3770.8 |
| 17.5° | 2941.7 | 2942.8 | 2961.6 | 3024.6 | 3121.9 | 3260.0 | 3456.8 | *3537.5* | 3620.4 | 3756.4 | 3710.0 |
| 20° | 2872.0 | 2866.5 | 2869.8 | 2908.5 | 2991.4 | 3125.2 | 3349.6 | *3443.6* | 3555.2 | 3725.5 | 3654.7 |
| 22.5° | 2868.7 | 2858.8 | 2844.4 | 2847.7 | 2896.3 | 3006.9 | 3234.6 | *3348.5* | 3488.9 | 3700.0 | 3598.3 |
| 25° | 2925.1 | 2914.0 | 2888.6 | 2859.9 | 2855.4 | 2921.8 | 3126.3 | *3255.6* | 3420.3 | 3689.0 | 3544.2 |
| 27.5° | 3020.2 | 3012.4 | 2979.3 | 2936.1 | 2890.8 | 2888.6 | 3044.5 | *3179.3* | 3370.6 | 3700.0 | 3505.5 |
| 30° | 3146.2 | 3132.9 | 3111.9 | 3056.6 | 2988.1 | 2917.4 | 3012.4 | *3138.4* | 3337.4 | 3735.4 | 3488.9 |
| 32.5° | 3288.8 | 3281.1 | 3261.2 | 3205.9 | 3132.9 | 3020.2 | 3037.8 | *3147.3* | 3337.4 | 3797.3 | 3492.2 |
| 35° | 3440.2 | 3439.1 | 3439.1 | 3402.7 | 3322.0 | 3181.6 | 3138.4 | *3222.5* | 3388.3 | 3896.8 | 3527.6 |
| 37.5° | 3587.3 | 3586.2 | 3621.5 | 3634.8 | 3543.1 | 3391.6 | 3309.8 | *3372.8* | 3499.9 | 4043.8 | 3614.9 |
| 40° | 3706.7 | 3711.1 | 3788.5 | 3854.8 | 3803.9 | 3663.5 | 3548.6 | *3580.6* | 3681.2 | 4252.8 | 3767.5 |
| 42.5° | 3827.2 | 3839.3 | 3955.4 | 4072.6 | 4092.5 | 3970.9 | 3854.8 | *3873.6* | 3941.0 | 4529.1 | 3995.2 |
| 45° | 3958.7 | 3964.2 | 4126.7 | 4290.4 | 4386.5 | 4314.7 | 4219.6 | *4245.0* | 4260.5 | 4870.7 | 4334.6 |
| 47.5° | 4085.8 | 4100.2 | 4310.3 | 4534.7 | 4717.1 | 4710.4 | 4657.4 | *4649.6* | 4652.9 | 5286.4 | 4735.9 |
| 50° | 4259.4 | 4280.4 | 4526.9 | 4797.8 | 5065.3 | 5188.0 | 5203.5 | *5144.9* | 5120.6 | 5748.5 | 5235.5 |
| 52.5° | 4588.8 | 4588.8 | 4809.9 | 5076.3 | 5435.6 | 5739.6 | 5843.5 | *5747.4* | 5670.0 | 6237.1 | 5766.2 |
| 55° | 5001.2 | 5018.9 | 5194.6 | 5410.2 | 5865.7 | 6320.0 | 6671.5 | *6565.4* | 6346.5 | 6768.8 | 6322.2 |
| 57.5° | 5184.7 | 5206.8 | 5485.4 | 5820.3 | 6428.3 | 6980.0 | 7467.5 | *7429.9* | 7110.4 | 7321.6 | 6899.3 |
| 60° | 4853.0 | 4899.5 | 5283.1 | 5844.7 | 6938.0 | 8044.6 | 8388.4 | *8278.9* | 7822.3 | 7901.9 | 7525.0 |
| 62.5° | 4048.3 | 4099.1 | 4524.7 | 5308.5 | 6867.2 | 9195.4 | 9839.8 | *9436.3* | 8711.2 | 8634.9 | 8358.5 |
| 65° | 2415.5 | 2413.3 | 2925.1 | 3964.2 | 5995.0 | 9514.8 | 12137.0 | *11384.2* | 10084.2 | 9640.9 | 9216.4 |
| 67.5° | 1535.5 | 1532.2 | 1639.4 | 2100.4 | 3989.7 | 8732.2 | 13613.9 | *13809.6* | 11949.1 | 10380.4 | 9287.1 |
| 70° | *1211.6* | *1210.5* | *1287.9* | *1497.9* | *1973.3* | *6213.9* | *13202.7* | *14556.9* | *13075.6* | *10098.5* | *8177.2* |
| 72.5° | 883.3 | 885.5 | 1004.9 | 1254.7 | 1522.2 | 3119.7 | 10691.1 | *12455.4* | 12026.5 | 8914.6 | 6638.4 |
| 75° | 634.5 | 637.9 | 709.7 | 960.7 | 1404.0 | 1705.7 | 7109.3 | *9365.6* | 9150.0 | 7145.8 | 4566.7 |
| 77.5° | 403.5 | 407.9 | 470.9 | 673.2 | 1134.2 | 1377.4 | 4310.3 | *6611.9* | 6087.9 | 4026.1 | 1623.9 |
| 80° | 246.5 | 260.9 | 314.0 | 501.9 | 906.5 | 1033.6 | 2154.6 | *3483.4* | 3048.9 | 1104.4 | 546.1 |
| 82.5° | 127.1 | 138.2 | 189.0 | 310.6 | 624.6 | 907.6 | 1219.3 | *1463.7* | 944.1 | 462.1 | 290.7 |
| 85° | 39.8 | 46.4 | 66.3 | 126.0 | 297.4 | 562.7 | 807.0 | *727.4* | 433.3 | 217.8 | 134.9 |
| 87.5° | 9.9 | 9.9 | 11.1 | 11.1 | 12.2 | 25.4 | 155.9 | *164.7* | 115.0 | 68.5 | 55.3 |
| 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: P637486
CATALOG NUMBER: GWS-SA4C-830-U-SL3-W

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 4180.9 | 4180.9 | 4180.9 | 4180.9 | 4180.9 | 4180.9 | 4180.9 | 4180.9 | 4180.9 | 4180.9 | 4180.9 |
| 2.5° | 4152.2 | 4125.6 | 4114.6 | 4113.5 | 4085.8 | 4046.0 | 4019.5 | 4000.7 | 3989.7 | 3987.5 | 3987.5 |
| 5° | 4078.1 | 4043.8 | 3998.5 | 3964.2 | 3890.2 | 3815.0 | 3752.0 | 3716.6 | 3675.7 | 3670.2 | 3669.1 |
| 7.5° | 3979.7 | 3930.0 | 3843.7 | 3747.6 | 3618.2 | 3493.3 | 3387.2 | 3315.3 | 3243.5 | 3230.2 | 3225.8 |
| 10° | 3873.6 | 3806.2 | 3659.1 | 3490.0 | 3296.5 | 3109.7 | 2947.2 | 2820.1 | 2736.1 | 2676.4 | 2665.3 |
| 12.5° | 3768.6 | 3679.0 | 3463.5 | 3211.4 | 2946.1 | 2690.7 | 2446.4 | 2238.6 | 2088.2 | 2000.9 | 1985.4 |
| 15° | 3670.2 | 3545.3 | 3250.1 | 2928.4 | 2583.5 | 2234.2 | 1888.2 | 1618.4 | 1407.3 | 1332.1 | 1314.4 |
| 17.5° | 3580.6 | 3424.8 | 3043.4 | 2635.5 | 2205.4 | 1748.9 | 1355.3 | 1115.4 | 991.6 | 954.0 | 945.2 |
| 20° | 3491.1 | 3301.0 | 2833.3 | 2327.0 | 1804.1 | 1292.3 | 990.5 | 877.7 | 831.3 | 816.9 | 812.5 |
| 22.5° | 3394.9 | 3165.0 | 2604.5 | 2023.0 | 1398.4 | 967.3 | 810.3 | 760.6 | 746.2 | 747.3 | 746.2 |
| 25° | 3298.7 | 3026.8 | 2364.6 | 1692.5 | 1041.4 | 784.9 | 707.5 | 688.7 | 692.0 | 702.0 | 704.2 |
| 27.5° | 3219.1 | 2904.1 | 2129.1 | 1329.9 | 813.6 | 675.4 | 639.0 | 637.9 | 650.0 | 663.3 | 665.5 |
| 30° | 3161.7 | 2794.6 | 1897.0 | 1022.6 | 669.9 | 600.3 | 585.9 | 592.5 | 606.9 | 616.9 | 620.2 |
| 32.5° | 3120.8 | 2700.7 | 1649.4 | 803.7 | 587.0 | 547.2 | 540.6 | 547.2 | 556.1 | 566.0 | 568.2 |
| 35° | 3106.4 | 2632.1 | 1406.2 | 655.5 | 530.6 | 508.5 | 504.1 | 507.4 | 511.8 | 517.4 | 519.6 |
| 37.5° | 3138.4 | 2597.9 | 1151.9 | 570.4 | 496.4 | 483.1 | 476.5 | 474.2 | 475.4 | 477.6 | 478.7 |
| 40° | 3233.5 | 2613.3 | 944.1 | 520.7 | 474.2 | 462.1 | 451.0 | 446.6 | 445.5 | 447.7 | 446.6 |
| 42.5° | 3397.1 | 2678.6 | 793.7 | 491.9 | 456.6 | 438.9 | 426.7 | 422.3 | 422.3 | 427.8 | 427.8 |
| 45° | 3637.0 | 2806.8 | 685.4 | 470.9 | 441.1 | 419.0 | 405.7 | 403.5 | 407.9 | 416.8 | 417.9 |
| 47.5° | 3988.6 | 2994.7 | 620.2 | 455.5 | 426.7 | 401.3 | 388.0 | 386.9 | 395.8 | 410.1 | 411.2 |
| 50° | 4405.3 | 3265.6 | 584.8 | 444.4 | 416.8 | 386.9 | 373.7 | 374.8 | 384.7 | 400.2 | 403.5 |
| 52.5° | 4907.2 | 3634.8 | 587.0 | 440.0 | 411.2 | 378.1 | 364.8 | 362.6 | 372.5 | 388.0 | 391.3 |
| 55° | 5425.7 | 4083.6 | 630.1 | 441.1 | 403.5 | 373.7 | 356.0 | 348.2 | 357.1 | 368.1 | 369.2 |
| 57.5° | 5996.1 | 4589.9 | 737.4 | 438.9 | 393.5 | 369.2 | 348.2 | 330.5 | 336.1 | 342.7 | 346.0 |
| 60° | 6639.5 | 5185.8 | 968.4 | 443.3 | 389.1 | 359.3 | 332.7 | 309.5 | 308.4 | 312.8 | 314.0 |
| 62.5° | 7499.6 | 5996.1 | 1228.2 | 451.0 | 399.1 | 347.1 | 309.5 | 285.2 | 280.8 | 283.0 | 284.1 |
| 65° | 8157.3 | 6383.0 | 1146.4 | 444.4 | 420.1 | 338.3 | 287.4 | 262.0 | 253.2 | 250.9 | 250.9 |
| 67.5° | 7889.8 | 5871.2 | 798.2 | 426.7 | 430.0 | 339.4 | 269.7 | 237.7 | 226.6 | 221.1 | 220.0 |
| 70° | *6713.6* | *4769.0* | *554.9* | *409.0* | *419.0* | *337.2* | *250.9* | *217.8* | *203.4* | *195.7* | *194.6* |
| 72.5° | 5304.1 | 3641.4 | 448.8 | 373.7 | 380.3 | 304.0 | 223.3 | 195.7 | 183.5 | 173.6 | 173.6 |
| 75° | 3413.7 | 2222.0 | 374.8 | 332.7 | 310.6 | 236.6 | 193.5 | 174.7 | 162.5 | 152.6 | 152.6 |
| 77.5° | 1148.6 | 824.7 | 290.7 | 281.9 | 232.2 | 178.0 | 162.5 | 150.3 | 140.4 | 131.6 | 130.4 |
| 80° | 466.5 | 391.3 | 213.4 | 213.4 | 162.5 | 136.0 | 127.1 | 121.6 | 115.0 | 103.9 | 103.9 |
| 82.5° | 270.8 | 237.7 | 149.2 | 129.3 | 108.3 | 94.0 | 88.4 | 82.9 | 82.9 | 75.2 | 75.2 |
| 85° | 130.4 | 131.6 | 89.5 | 79.6 | 61.9 | 54.2 | 52.0 | 48.6 | 47.5 | 43.1 | 42.0 |
| 87.5° | 70.8 | 71.9 | 45.3 | 35.4 | 24.3 | 21.0 | 17.7 | 16.6 | 15.5 | 14.4 | 14.4 |
| 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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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

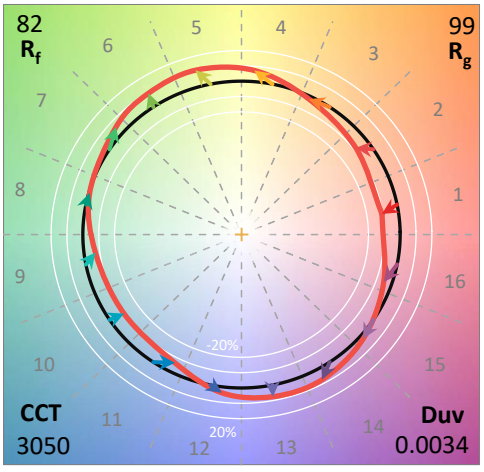
## Test Information

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

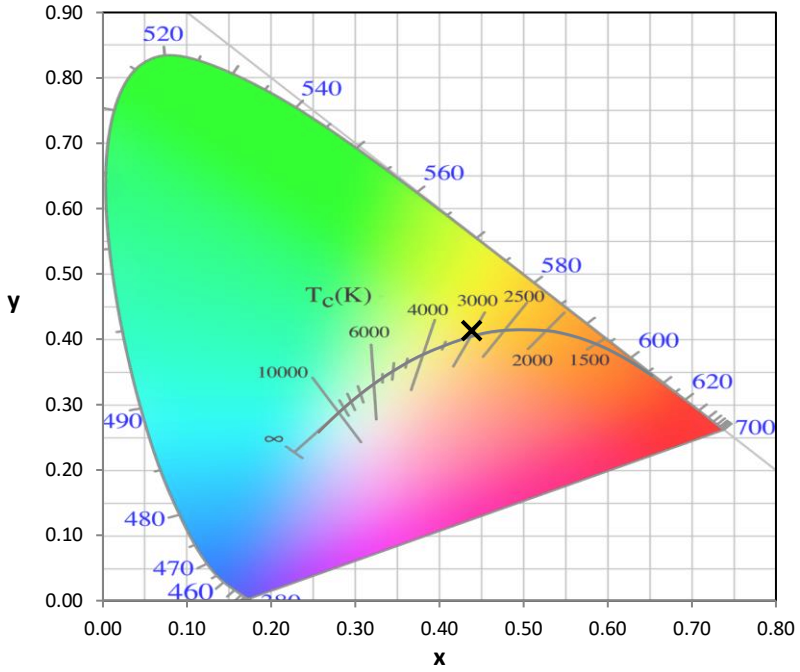
| | |
|---|---|
| Stabilization Time: | 20M |
| Operation Time: | 1H 20M |
| Sphere Temperature (°C): | 24.2 |

REPORT NUMBER: SP1-2408-195-9

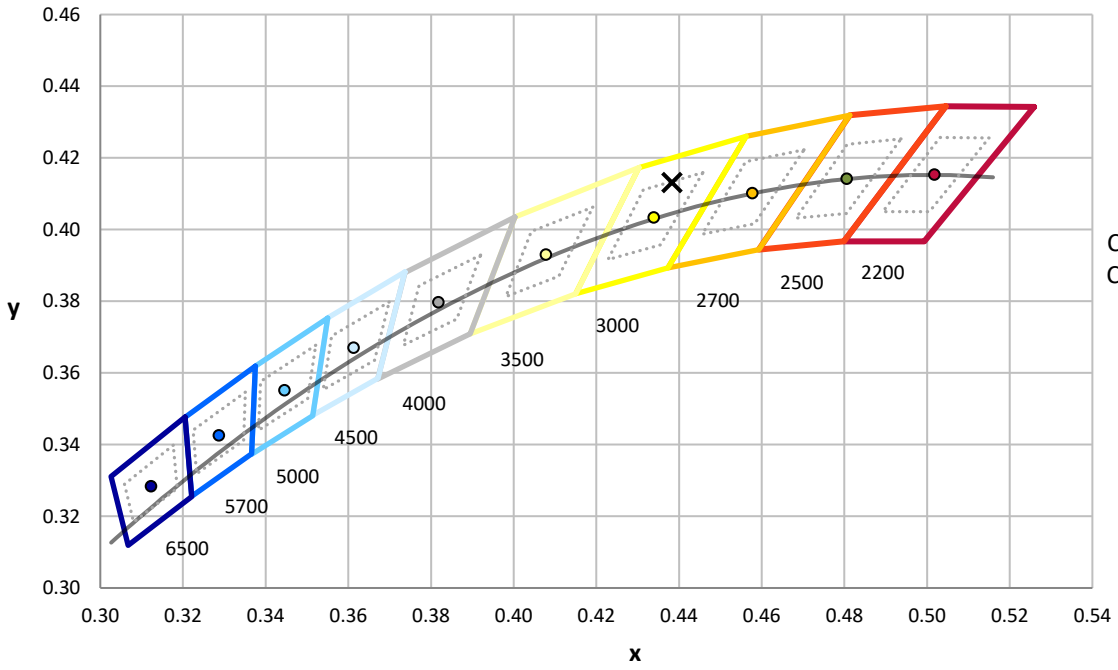
| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 6/18/2024 | 12/18/2024 |
| Power Meter | INXT2011004 | 2/8/2024 | 2/8/2025 |
| AC Power Source | IN0063 | 10/24/2023 | 10/24/2024 |
| DC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

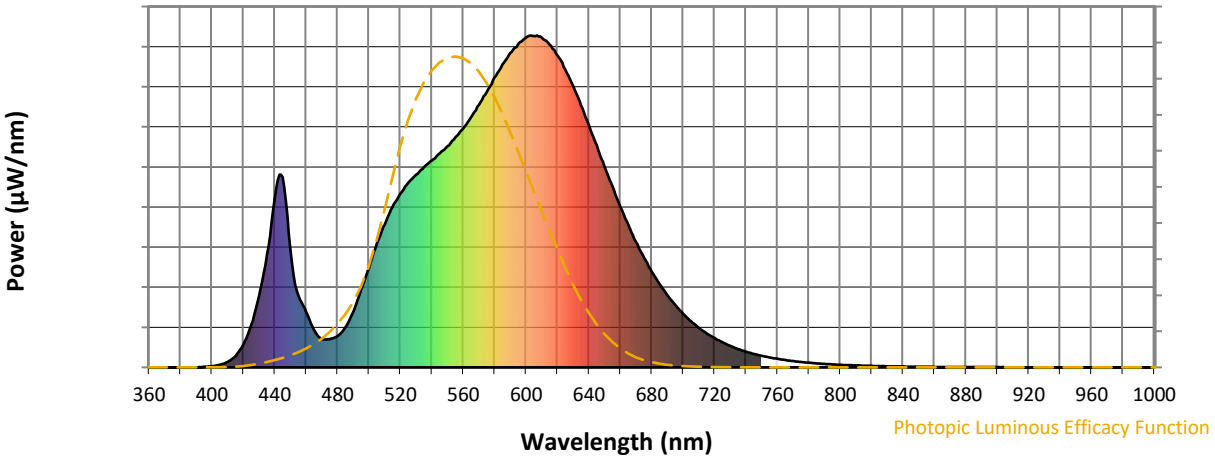



CCT = 3050K
CIE x = 0.4383
CIE y = 0.4131
Duv = 0.0034

Point lies inside the ANSI 3000K 4-step quadrangle

REPORT NUMBER: SP1-2408-195-9

## Photopic Flux vs. Wavelength

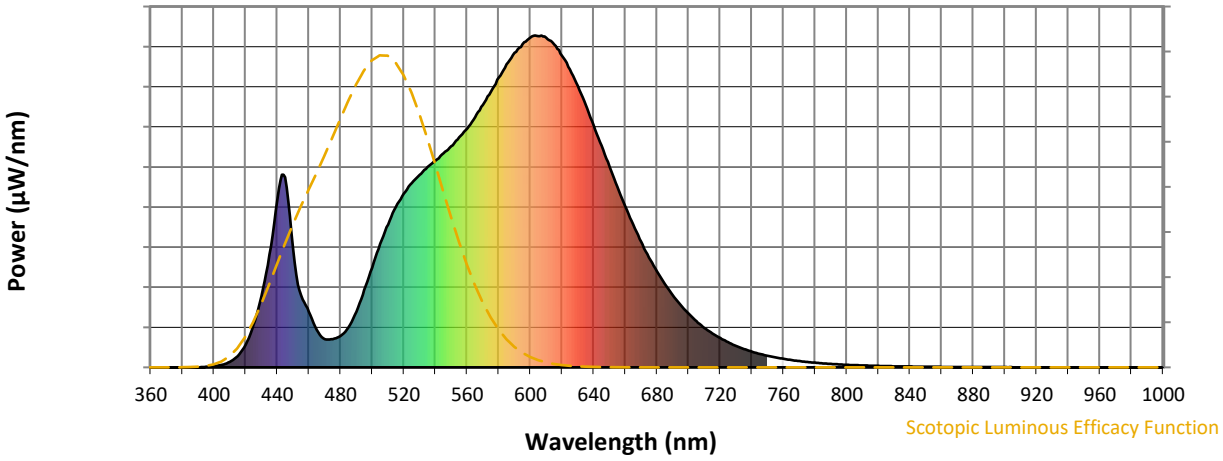



## Photopic Lumens: NR

| 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

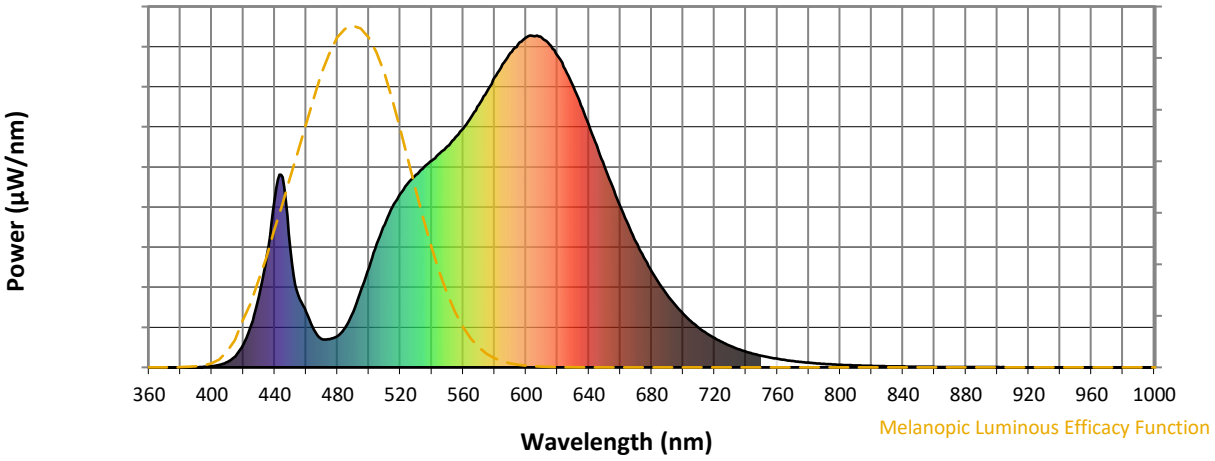



**Scotopic Lumens: NR** **S/P: 1.27**

| 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 | | | |

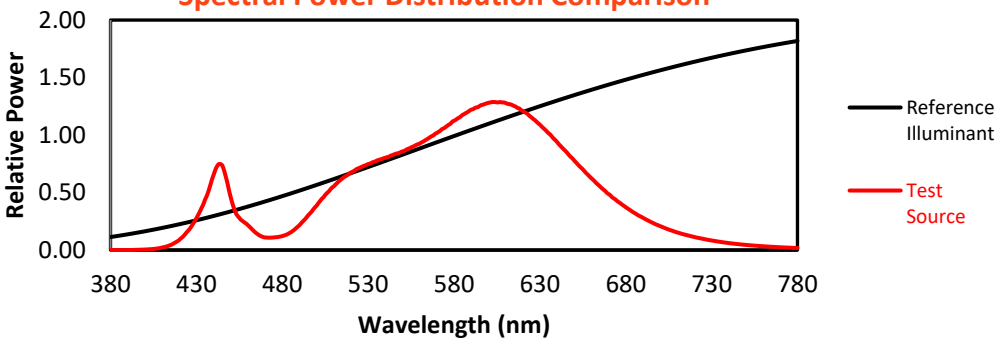
REPORT NUMBER: SP1-2408-195-9

# TM-30-18

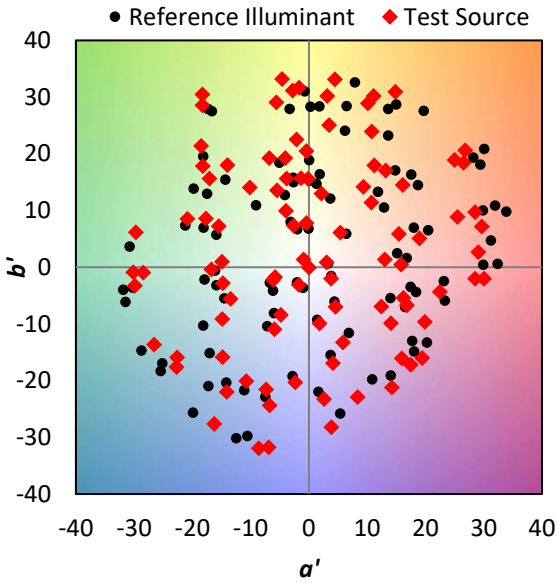
## Summary

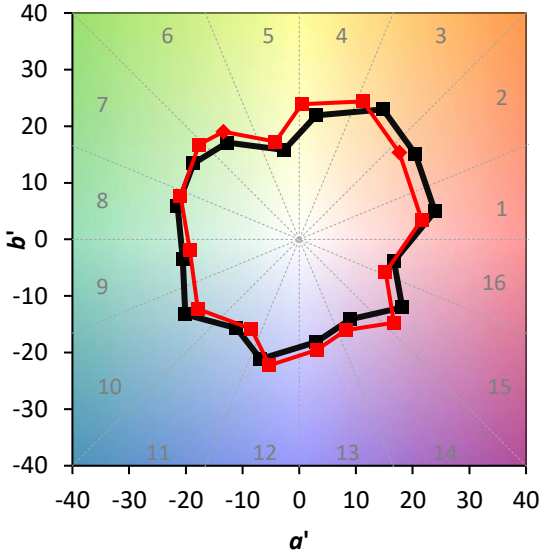
$R_f$ = 81.5
$R_g$ = 99.2
CIE $R_a$ = 81.0
$R_9$ = 7.1

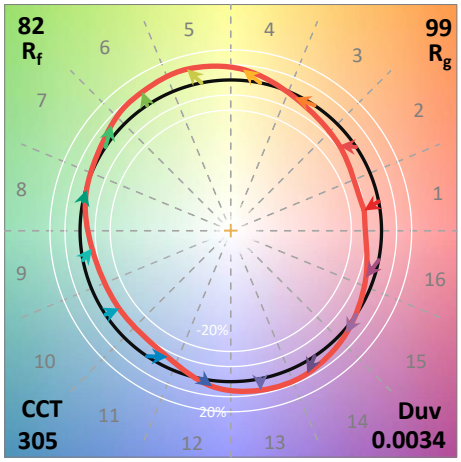
## Spectral Power Distribution Comparison

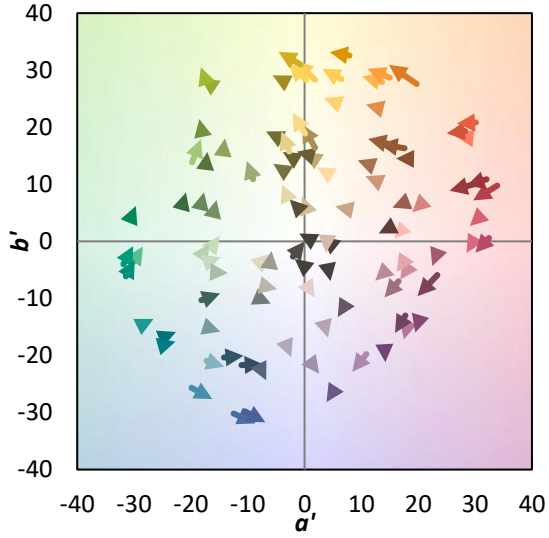



## Color Vector Graphics



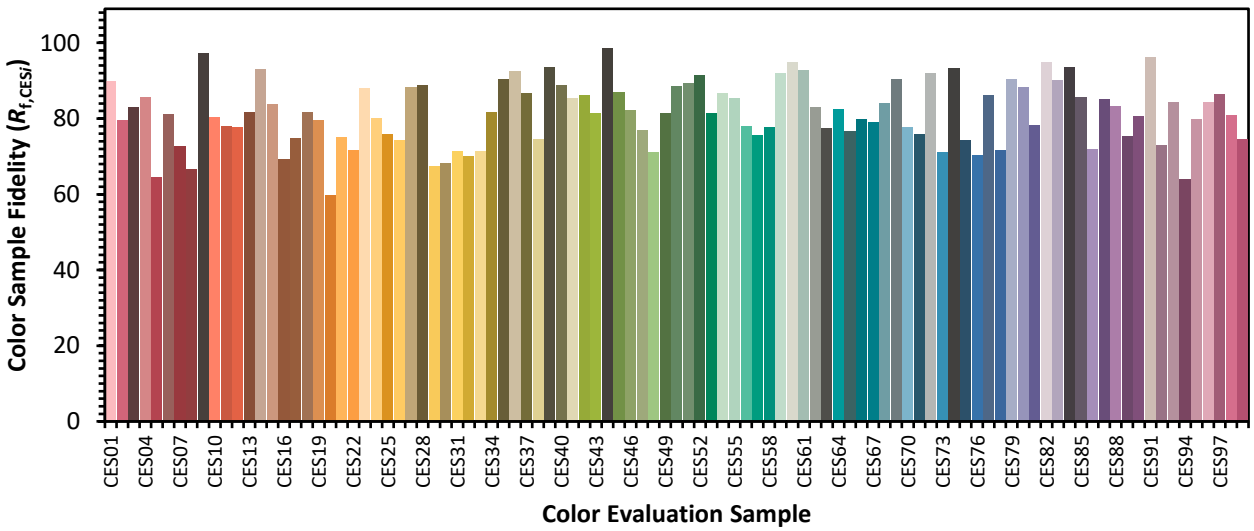



REPORT NUMBER: SP1-2408-195-9

# TM-30-18

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

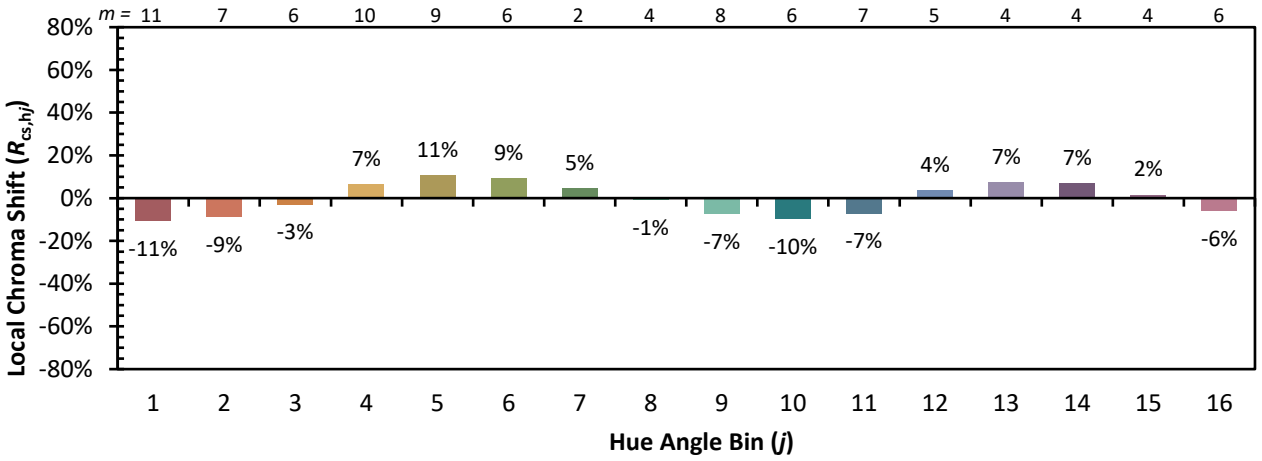
| | | | |
|---|---|---|---|
| CES01 = 86 | CES26 = 74 | CES51 = 89 | CES76 = 70 |
| CES02 = 63 | CES27 = 88 | CES52 = 92 | CES77 = 86 |
| CES03 = 31 | CES28 = 89 | CES53 = 81 | CES78 = 72 |
| CES04 = 70 | CES29 = 67 | CES54 = 87 | CES79 = 90 |
| CES05 = 50 | CES30 = 68 | CES55 = 85 | CES80 = 88 |
| CES06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

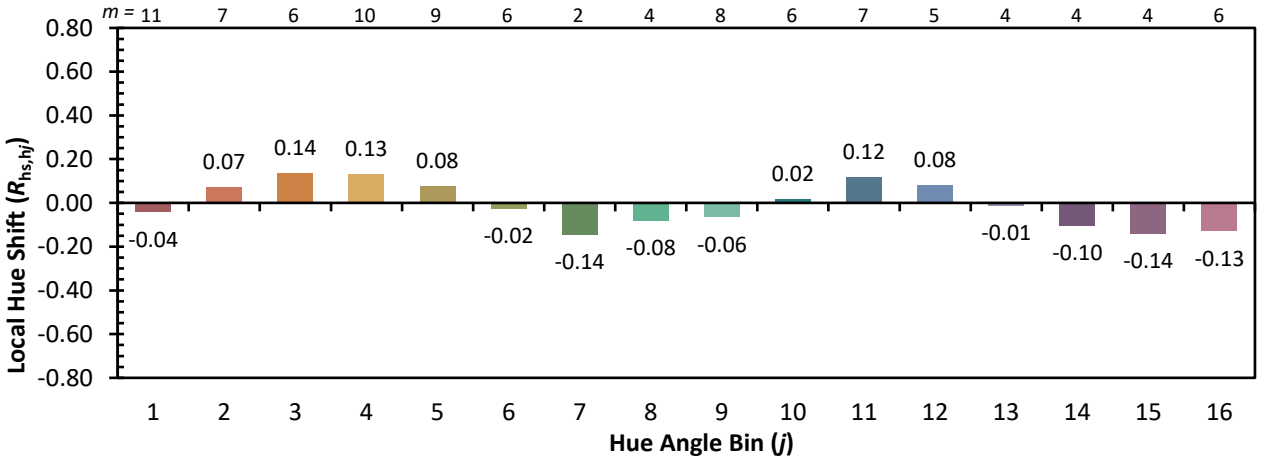


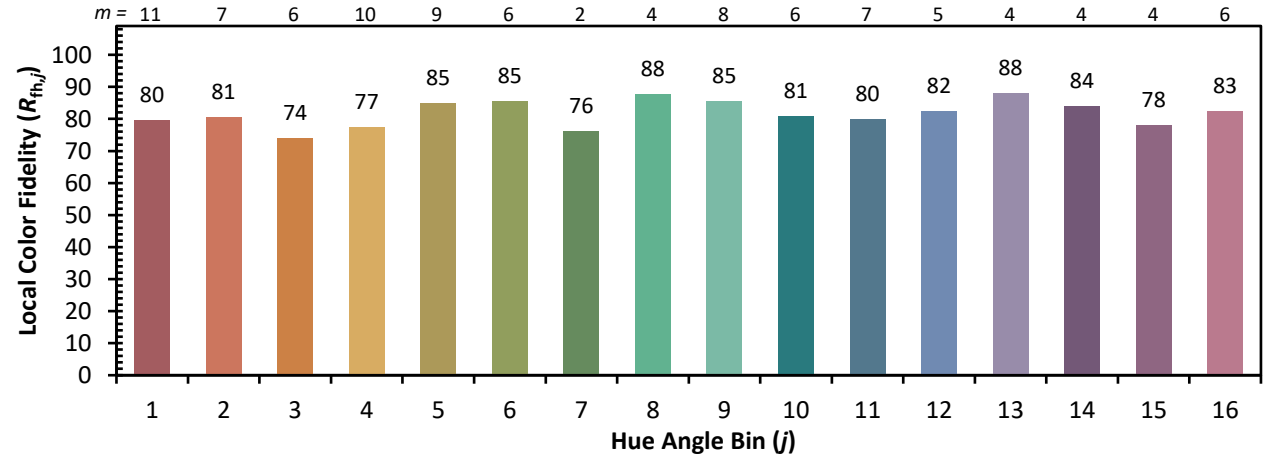
REPORT NUMBER: SP1-2408-195-9

# TM-30-18

## Color Rendition by Hue-Angle Bin



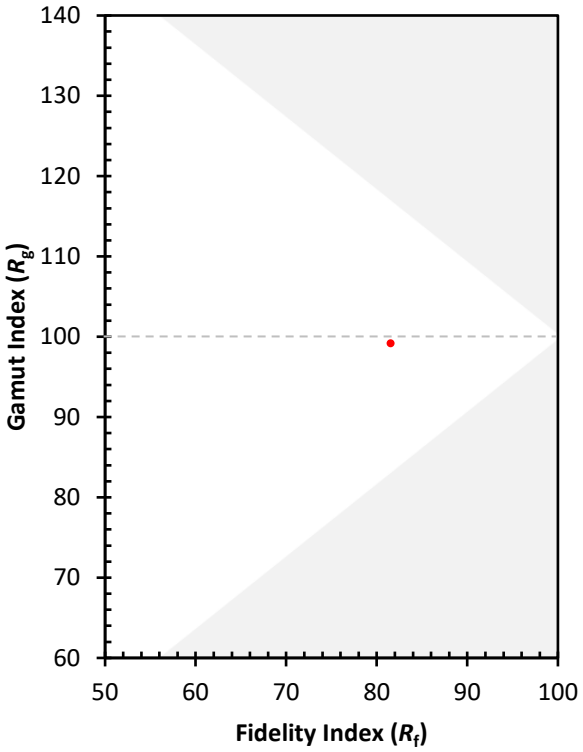



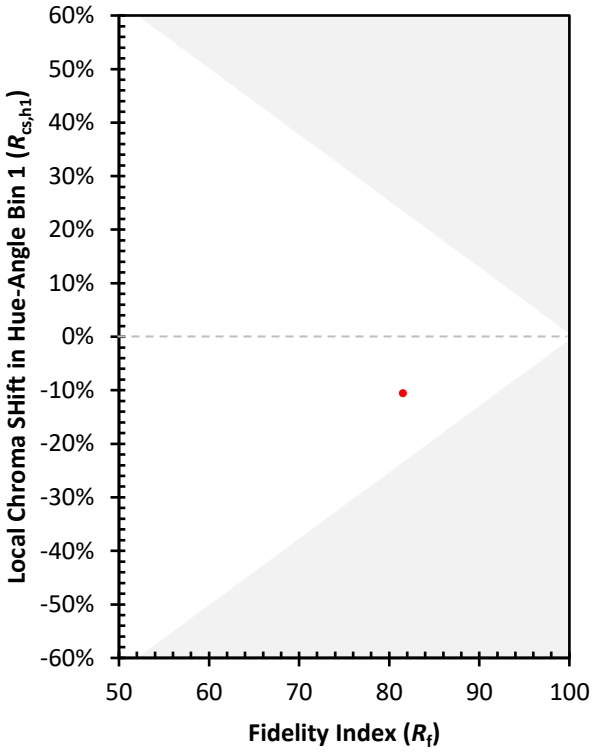



REPORT NUMBER: SP1-2408-195-9

## TM-30-18

### Measure Comparisons




(END OF REPORT)