Cooper Lighting Solutions Photometric Lab
1121 Highway 74 South
Peachtree City, GA 30269

Scaled data based on original data using

LM-79-08 Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Test Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

Brand: McGRAW-EDISON

Report Number: P437772

Luminaire Tested: **ISC-SA1E-830-U-T2**

Issue Date: 12/9/2020

Report Generated By 670245982

Cooper Lighting Solutions Photometric Lab
1121 Highway 74 South
Peachtree City, GA 30269

Scaled Data Report

**Test Information**

| | |
|---|---|
| Test Method: | LM-79-08 |
| Report Number: | P437772 |
| | TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G3-2011-074-1) |
| Test Lab: | INNOVATION CENTER |
| Issue Date: | 12/9/2020 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS (FORMERLY EATON) |
| Product Line: | McGRAW-EDISON |
| Catalog Number: | ISC-SA1E-830-U-T2 |
| Description: | IMPACT ELITE LED CYLINDER LUMINAIRE |
| | (1) 80 CRI, 3000K, 1050mA LIGHTSQUARE WITH 16 LEDS AND TYPE II OPTICS |
| Light Source: | - |
| Ballast/Driver: | ELECTRONIC DRIVER |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 5746 lumens |
| Efficiency: | N/A |
| Efficacy: | 98.7 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): | 58.2 |
| Input Voltage (V): | NR |
| Input Current (Ain): | NR |
| Voltage Rise (V): | NR |
| Power Factor: | NR |
| Total Harmonic Distortion (THDi): | NR |
| Frequency (hertz): | 60 |
| Stabilization Time: | NR |
| Operation Time: | NR |
| Ambient Temperature (°C): | NR |
| Test Distance: | 28.75 FT |

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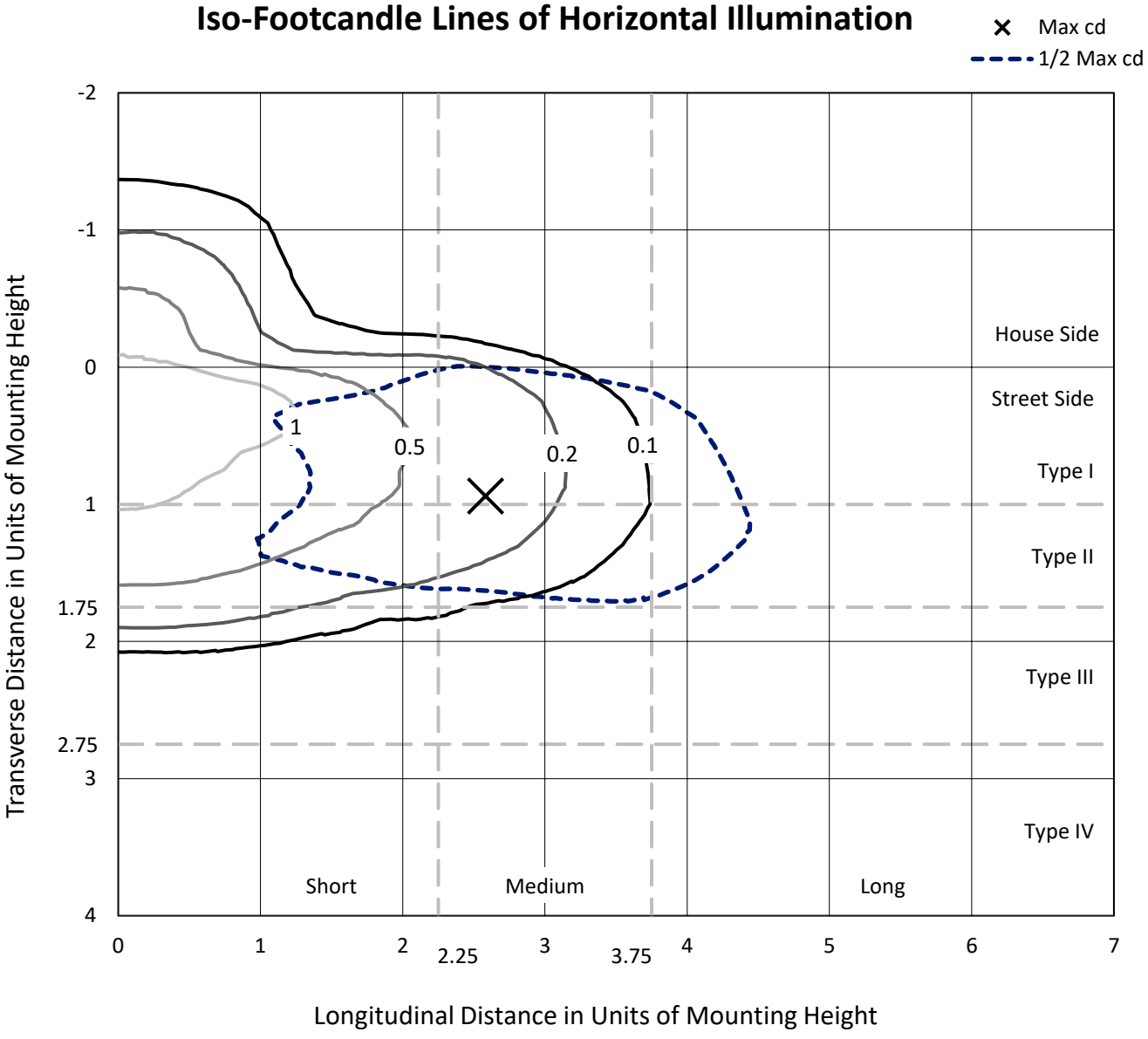
Scaled Data Report

REPORT NUMBER: P437772
CATALOG NUMBER: ISC-SA1E-830-U-T2

## Iso-Footcandle Lines of Horizontal Illumination




Based on 25 foot mounting height. Maximum calculated value = 1.6 fc
Type II - Medium - N/A

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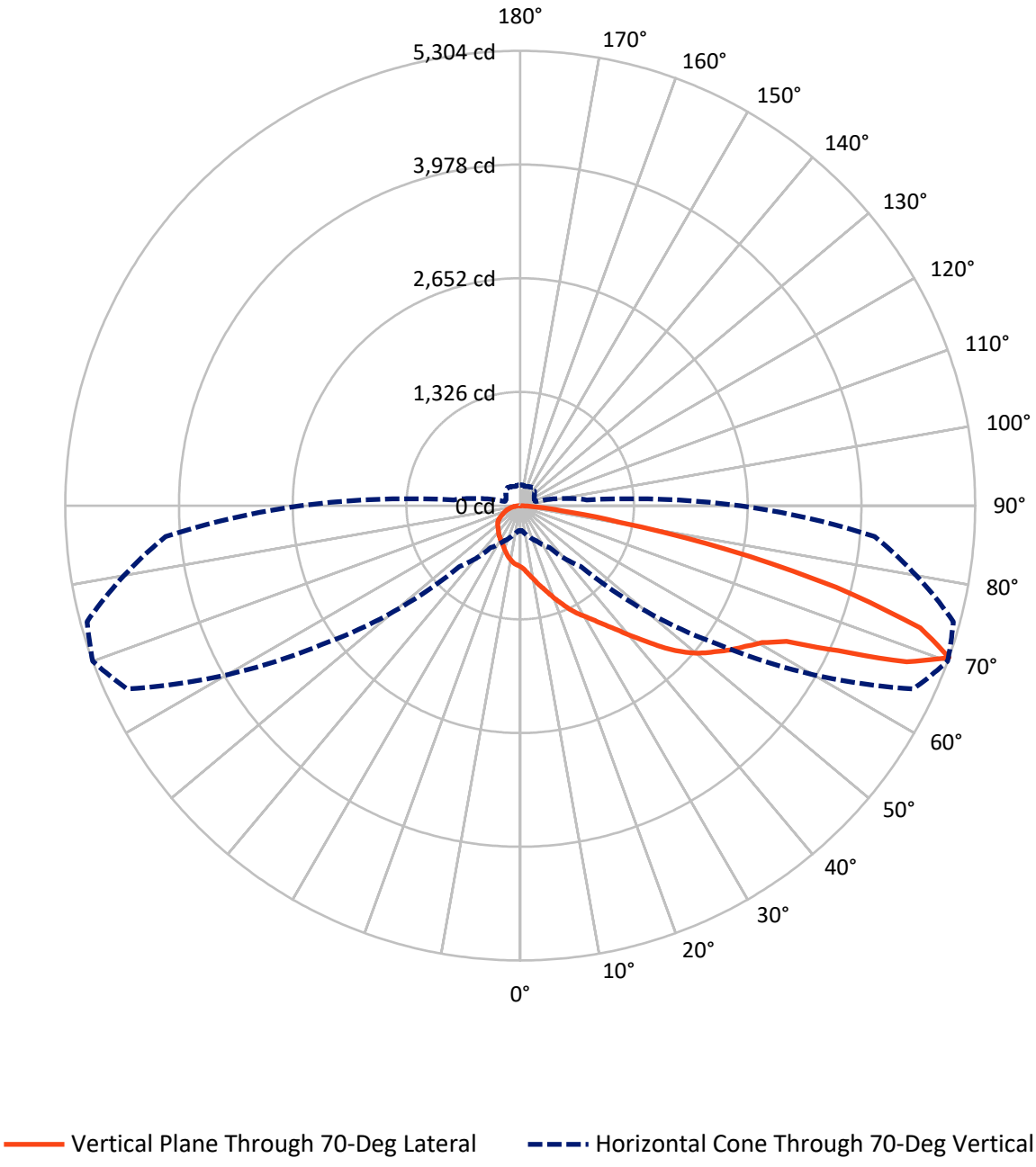
## Luminous Intensity Polar Plot



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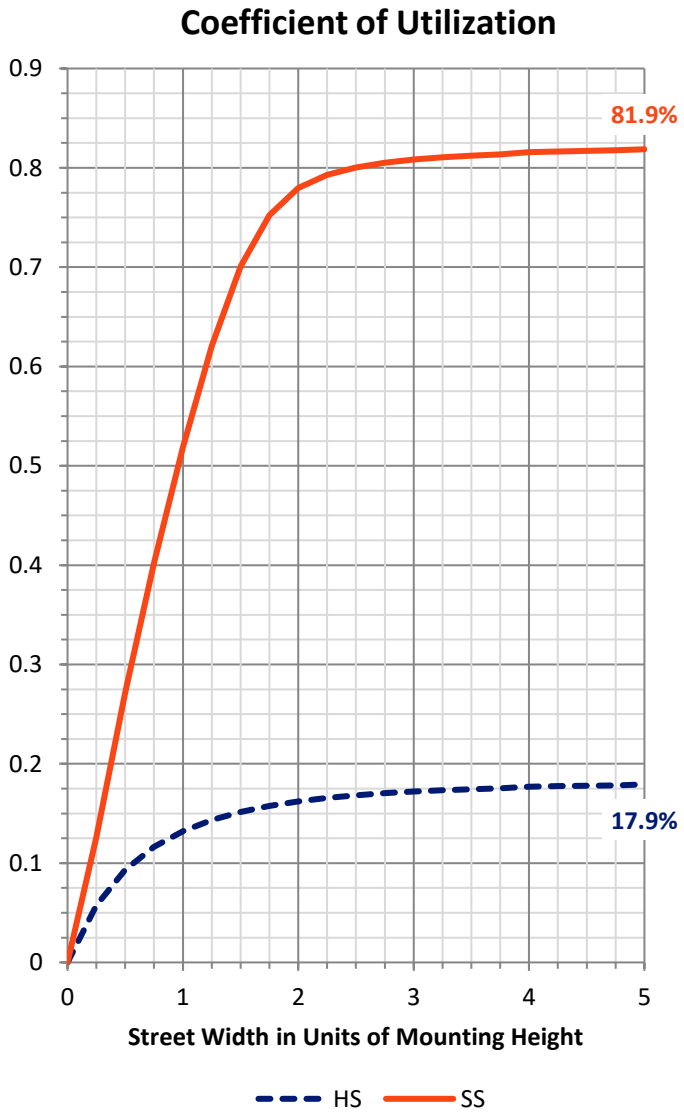
REPORT NUMBER: P437772
CATALOG NUMBER: ISC-SA1E-830-U-T2

**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 1039.3 | 0.0 | 1039.3 |
| | % Fixture | 18.1 | 0.0 | 18.1 |
| **Street Side** | Lumens | 4706.7 | 0.0 | 4706.7 |
| | % Fixture | 81.9 | 0.0 | 81.9 |
| **Total** | Lumens | 5746.0 | 0.0 | 5746.0 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 71.5 | 1.2 |
| 10°-20° | 229.8 | 4.0 |
| 20°-30° | 402.1 | 7.0 |
| 30°-40° | 598.2 | 10.4 |
| 40°-50° | 884.6 | 15.4 |
| 50°-60° | 1246.4 | 21.7 |
| 60°-70° | 1387.2 | 24.1 |
| 70°-80° | 839.1 | 14.6 |
| 80°-90° | 87.1 | 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° | 5746.0 | 100.0 |
| 0°-180° | 5746.0 | 100.0 |



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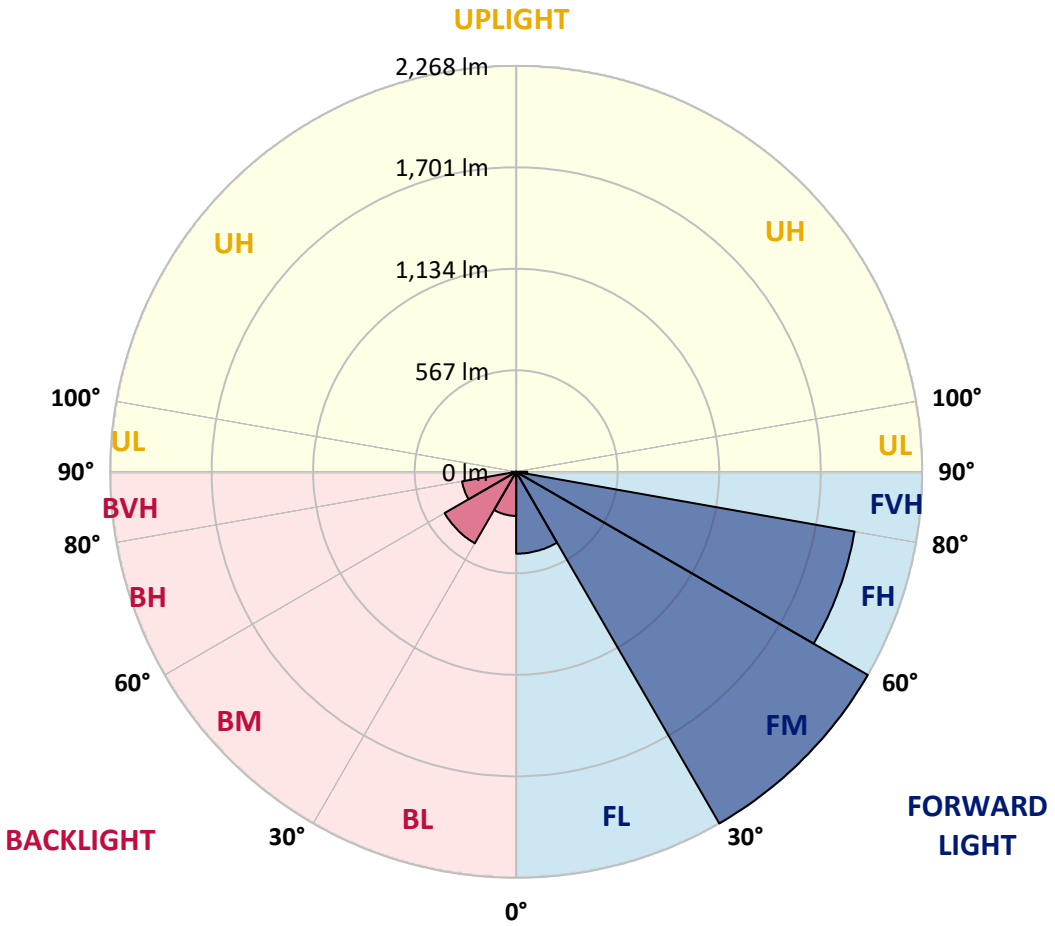
## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 457.2 | 8.0 | | | |
| FM | (30°-60°) | 2267.9 | 39.5 | | | |
| FH | (60°-80°) | 1919.5 | 33.4 | | | G2/5000 |
| FVH | (80°-90°) | 62.1 | 1.1 | | | G1/100 |
| BL | (0°-30°) | 246.2 | 4.3 | B1/500 | | |
| BM | (30°-60°) | 461.3 | 8.0 | B1/1000 | | |
| BH | (60°-80°) | 306.8 | 5.3 | B1/500 | | G1/500 |
| BVH | (80°-90°) | 25.0 | 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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**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 65° | 70° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 711.7 | 711.7 | 711.7 | 711.7 | 711.7 | 711.7 | 711.7 | 711.7 | *711.7* | 711.7 | 711.7 |
| 2.5° | 795.8 | 793.7 | 783.5 | 787.6 | 781.4 | 769.1 | 756.8 | 748.6 | *738.4* | 736.3 | 726.1 |
| 5° | 877.8 | 875.8 | 869.6 | 861.4 | 849.1 | 834.8 | 812.2 | 791.7 | *775.3* | 760.9 | 742.5 |
| 7.5° | 935.3 | 931.2 | 931.2 | 927.1 | 920.9 | 904.5 | 873.7 | 847.1 | *822.5* | 804.0 | 763.0 |
| 10° | 968.1 | 968.1 | 968.1 | 976.3 | 976.3 | 964.0 | 939.4 | 902.5 | *873.7* | 851.2 | 791.7 |
| 12.5° | 982.4 | 982.4 | 986.5 | 998.8 | 1017.3 | 1017.3 | 996.8 | 968.1 | *939.4* | 900.4 | 822.5 |
| 15° | 992.7 | 994.7 | 1000.9 | 1019.4 | 1046.0 | 1064.5 | 1064.5 | 1037.8 | *998.8* | 961.9 | 861.4 |
| 17.5° | 1003.0 | 1005.0 | 1017.3 | 1039.9 | 1070.6 | 1105.5 | 1126.0 | 1107.6 | *1072.7* | 1031.7 | 898.3 |
| 20° | 1005.0 | 1003.0 | 1023.5 | 1054.2 | 1099.3 | 1140.4 | 1191.6 | 1195.7 | *1158.8* | 1099.3 | 941.4 |
| 22.5° | 1025.5 | 1025.5 | 1033.7 | 1064.5 | 1113.7 | 1173.2 | 1251.1 | 1273.7 | *1240.9* | 1189.6 | 994.7 |
| 25° | 1066.5 | 1074.7 | 1080.9 | 1091.1 | 1128.1 | 1199.9 | 1302.4 | 1366.0 | *1335.2* | 1277.8 | 1050.1 |
| 27.5° | 1142.4 | 1142.4 | 1148.6 | 1146.5 | 1158.8 | 1222.4 | 1355.7 | 1454.2 | *1423.4* | 1347.5 | 1085.0 |
| 30° | 1216.3 | 1212.2 | 1218.3 | 1218.3 | 1214.2 | 1249.1 | 1394.7 | 1536.2 | *1503.4* | 1429.6 | 1126.0 |
| 32.5° | 1312.7 | 1314.7 | 1310.6 | 1292.1 | 1286.0 | 1298.3 | 1425.5 | 1614.2 | *1595.7* | 1509.6 | 1162.9 |
| 35° | 1443.9 | 1446.0 | 1423.4 | 1384.4 | 1363.9 | 1366.0 | 1466.5 | 1706.5 | *1708.5* | 1618.3 | 1208.1 |
| 37.5° | 1558.8 | 1569.0 | 1567.0 | 1495.2 | 1460.3 | 1452.1 | 1528.0 | 1800.8 | *1837.7* | 1743.4 | 1277.8 |
| 40° | 1665.4 | 1679.8 | 1675.7 | 1616.2 | 1571.1 | 1550.6 | 1624.4 | 1909.5 | *1995.6* | 1899.2 | 1361.9 |
| 42.5° | 1743.4 | 1751.6 | 1755.7 | 1714.7 | 1673.6 | 1683.9 | 1724.9 | 2032.6 | *2167.9* | 2071.5 | 1474.7 |
| 45° | 1827.5 | 1831.6 | 1837.7 | 1815.2 | 1786.4 | 1835.7 | 1850.0 | 2165.9 | *2368.9* | 2293.0 | 1608.0 |
| 47.5° | 1913.6 | 1930.0 | 1936.2 | 1911.6 | 1893.1 | 1973.1 | 1985.4 | 2295.1 | *2547.4* | 2510.5 | 1741.3 |
| 50° | 2053.1 | 2069.5 | 2063.3 | 2034.6 | 2018.2 | 2079.7 | 2106.4 | 2412.0 | *2705.3* | 2729.9 | 1870.5 |
| 52.5° | 2233.6 | 2243.8 | 2270.5 | 2221.3 | 2184.3 | 2161.8 | 2206.9 | 2541.2 | *2832.5* | 2922.7 | 2008.0 |
| 55° | 2268.4 | 2282.8 | 2379.2 | 2424.3 | 2455.1 | 2284.8 | 2313.6 | 2656.1 | *2969.9* | 3105.3 | 2161.8 |
| 57.5° | 2124.9 | 2133.1 | 2288.9 | 2426.4 | 2647.9 | 2588.4 | 2465.3 | 2803.8 | *3097.0* | 3293.9 | 2317.7 |
| 60° | 1768.0 | 1798.7 | 2001.8 | 2243.8 | 2594.5 | 2898.1 | 2859.1 | 2994.5 | *3240.6* | 3482.6 | 2543.3 |
| 62.5° | 1152.7 | 1181.4 | 1396.7 | 1807.0 | 2301.3 | 2902.2 | 3423.2 | 3384.2 | *3484.7* | 3712.4 | 2826.3 |
| 65° | 588.6 | 598.9 | 785.5 | 1095.2 | 1659.3 | 2594.5 | 3761.6 | 4188.2 | *4073.3* | 4171.8 | 3439.6 |
| 67.5° | 391.7 | 400.0 | 484.0 | 631.7 | 986.5 | 1796.7 | 3650.8 | 5000.4 | *4860.9* | 4914.3 | 4091.8 |
| 70° | *289.2* | *297.4* | *367.1* | *457.4* | *596.8* | *1007.1* | *2824.3* | *5057.8* | *5304.0* | *5228.1* | *4149.2* |
| 72.5° | 215.4 | 217.4 | 260.5 | 352.8 | 441.0 | 541.5 | 1669.5 | 4173.8 | *4875.3* | 5150.1 | 3855.9 |
| 75° | 164.1 | 164.1 | 186.6 | 260.5 | 344.6 | 348.7 | 931.2 | 3082.7 | *3802.6* | 4307.2 | 3216.0 |
| 77.5° | 123.1 | 127.2 | 137.4 | 180.5 | 256.4 | 250.2 | 438.9 | 2040.8 | *2473.5* | 2807.9 | 1979.2 |
| 80° | 88.2 | 90.2 | 96.4 | 110.8 | 170.2 | 162.0 | 221.5 | 984.5 | *1179.3* | 1255.2 | 808.1 |
| 82.5° | 55.4 | 55.4 | 67.7 | 67.7 | 96.4 | 100.5 | 100.5 | 397.9 | *475.8* | 533.3 | 270.7 |
| 85° | 10.3 | 10.3 | 20.5 | 26.7 | 30.8 | 34.9 | 30.8 | 100.5 | *137.4* | 162.0 | 92.3 |
| 87.5° | 0.0 | 0.0 | 0.0 | 2.1 | 2.1 | 4.1 | 4.1 | 4.1 | *4.1* | 4.1 | 4.1 |
| 90° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | *0.0* | 0.0 | 0.0 |

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Scaled Data Report

REPORT NUMBER: P437772
CATALOG NUMBER: ISC-SA1E-830-U-T2

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 711.7 | 711.7 | 711.7 | 711.7 | 711.7 | 711.7 | 711.7 | 711.7 | 711.7 | 711.7 | 711.7 |
| 2.5° | 717.9 | 713.8 | 703.5 | 691.2 | 683.0 | 674.8 | 668.6 | 664.5 | 662.5 | 662.5 | 660.4 |
| 5° | 728.1 | 715.8 | 695.3 | 674.8 | 656.3 | 642.0 | 631.7 | 625.6 | 621.5 | 623.5 | 619.4 |
| 7.5° | 744.5 | 722.0 | 685.0 | 652.2 | 627.6 | 609.2 | 601.0 | 596.8 | 598.9 | 601.0 | 601.0 |
| 10° | 756.8 | 726.1 | 666.6 | 621.5 | 598.9 | 588.6 | 586.6 | 590.7 | 596.8 | 598.9 | 596.8 |
| 12.5° | 771.2 | 728.1 | 646.1 | 594.8 | 580.4 | 574.3 | 584.5 | 594.8 | 605.1 | 613.3 | 609.2 |
| 15° | 793.7 | 728.1 | 621.5 | 572.2 | 562.0 | 568.1 | 586.6 | 601.0 | 619.4 | 627.6 | 629.7 |
| 17.5° | 810.2 | 722.0 | 590.7 | 547.6 | 545.6 | 562.0 | 588.6 | 613.3 | 631.7 | 646.1 | 646.1 |
| 20° | 826.6 | 711.7 | 559.9 | 525.1 | 533.3 | 555.8 | 586.6 | 615.3 | 637.9 | 652.2 | 656.3 |
| 22.5° | 847.1 | 697.3 | 529.2 | 504.6 | 518.9 | 547.6 | 580.4 | 605.1 | 625.6 | 637.9 | 639.9 |
| 25° | 861.4 | 672.7 | 498.4 | 488.1 | 510.7 | 537.4 | 562.0 | 578.4 | 588.6 | 596.8 | 596.8 |
| 27.5° | 869.6 | 644.0 | 473.8 | 475.8 | 500.5 | 523.0 | 535.3 | 535.3 | 539.4 | 539.4 | 537.4 |
| 30° | 859.4 | 613.3 | 455.3 | 463.5 | 486.1 | 502.5 | 506.6 | 498.4 | 486.1 | 473.8 | 469.7 |
| 32.5° | 855.3 | 572.2 | 436.9 | 451.2 | 467.6 | 475.8 | 473.8 | 461.5 | 438.9 | 420.5 | 420.5 |
| 35° | 847.1 | 533.3 | 420.5 | 436.9 | 447.1 | 449.2 | 445.1 | 426.6 | 406.1 | 389.7 | 387.6 |
| 37.5° | 840.9 | 502.5 | 406.1 | 420.5 | 426.6 | 428.7 | 420.5 | 404.1 | 391.7 | 379.4 | 377.4 |
| 40° | 859.4 | 475.8 | 391.7 | 402.0 | 406.1 | 406.1 | 397.9 | 385.6 | 391.7 | 389.7 | 389.7 |
| 42.5° | 894.2 | 465.6 | 377.4 | 383.5 | 387.6 | 391.7 | 385.6 | 375.3 | 389.7 | 377.4 | 381.5 |
| 45° | 945.5 | 465.6 | 367.1 | 369.2 | 373.3 | 383.5 | 381.5 | 367.1 | 369.2 | 340.5 | 334.3 |
| 47.5° | 1021.4 | 477.9 | 358.9 | 352.8 | 363.0 | 377.4 | 371.2 | 354.8 | 338.4 | 315.9 | 313.8 |
| 50° | 1107.6 | 502.5 | 350.7 | 336.4 | 352.8 | 369.2 | 363.0 | 342.5 | 324.1 | 311.8 | 309.7 |
| 52.5° | 1193.7 | 533.3 | 344.6 | 320.0 | 334.3 | 365.1 | 363.0 | 340.5 | 313.8 | 305.6 | 303.6 |
| 55° | 1300.4 | 562.0 | 334.3 | 301.5 | 320.0 | 361.0 | 361.0 | 328.2 | 307.7 | 305.6 | 303.6 |
| 57.5° | 1421.4 | 598.9 | 317.9 | 276.9 | 301.5 | 348.7 | 346.6 | 320.0 | 303.6 | 299.4 | 301.5 |
| 60° | 1577.2 | 644.0 | 293.3 | 254.3 | 285.1 | 330.2 | 334.3 | 311.8 | 295.3 | 293.3 | 293.3 |
| 62.5° | 1841.8 | 728.1 | 264.6 | 233.8 | 264.6 | 305.6 | 315.9 | 297.4 | 285.1 | 287.1 | 289.2 |
| 65° | 2350.5 | 886.0 | 231.8 | 215.4 | 244.1 | 278.9 | 299.4 | 283.0 | 270.7 | 278.9 | 278.9 |
| 67.5° | 2727.9 | 955.8 | 205.1 | 196.9 | 223.6 | 258.4 | 281.0 | 266.6 | 254.3 | 264.6 | 264.6 |
| 70° | *2563.8* | *777.3* | *184.6* | *180.5* | *201.0* | *235.9* | *256.4* | *244.1* | *231.8* | *242.0* | *240.0* |
| 72.5° | 2276.6 | 617.4 | 162.0 | 162.0 | 178.4 | 209.2 | 231.8 | 219.5 | 203.1 | 207.2 | 205.1 |
| 75° | 1993.6 | 572.2 | 141.5 | 141.5 | 155.9 | 180.5 | 198.9 | 192.8 | 176.4 | 174.3 | 170.2 |
| 77.5° | 1150.6 | 381.5 | 119.0 | 121.0 | 127.2 | 149.7 | 168.2 | 149.7 | 137.4 | 135.4 | 133.3 |
| 80° | 453.3 | 186.6 | 96.4 | 94.3 | 94.3 | 112.8 | 121.0 | 112.8 | 102.6 | 100.5 | 96.4 |
| 82.5° | 164.1 | 94.3 | 73.8 | 65.6 | 67.7 | 82.0 | 94.3 | 88.2 | 80.0 | 63.6 | 59.5 |
| 85° | 63.6 | 47.2 | 49.2 | 39.0 | 43.1 | 43.1 | 49.2 | 41.0 | 28.7 | 20.5 | 20.5 |
| 87.5° | 4.1 | 4.1 | 4.1 | 4.1 | 2.1 | 2.1 | 0.0 | 0.0 | 2.1 | 2.1 | 2.1 |
| 90° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

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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

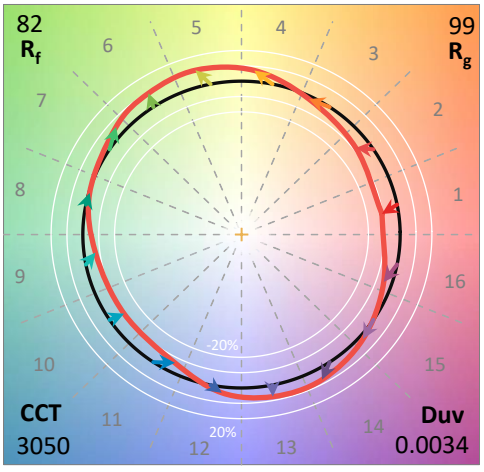
## Test Information

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

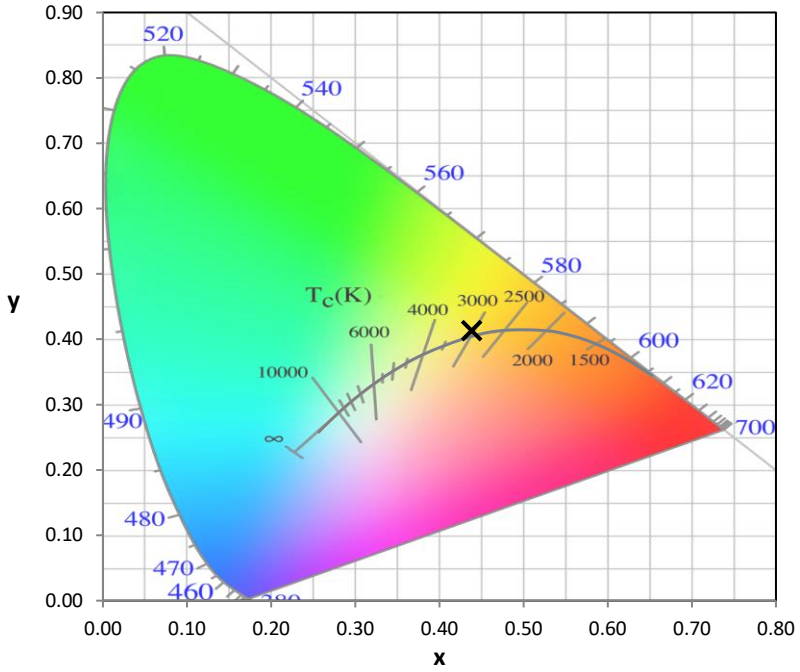
| | |
|---|---|
| Stabilization Time: | 20M |
| Operation Time: | 1H 20M |
| Sphere Temperature (°C): | 24.2 |

REPORT NUMBER: SP1-2408-195-9

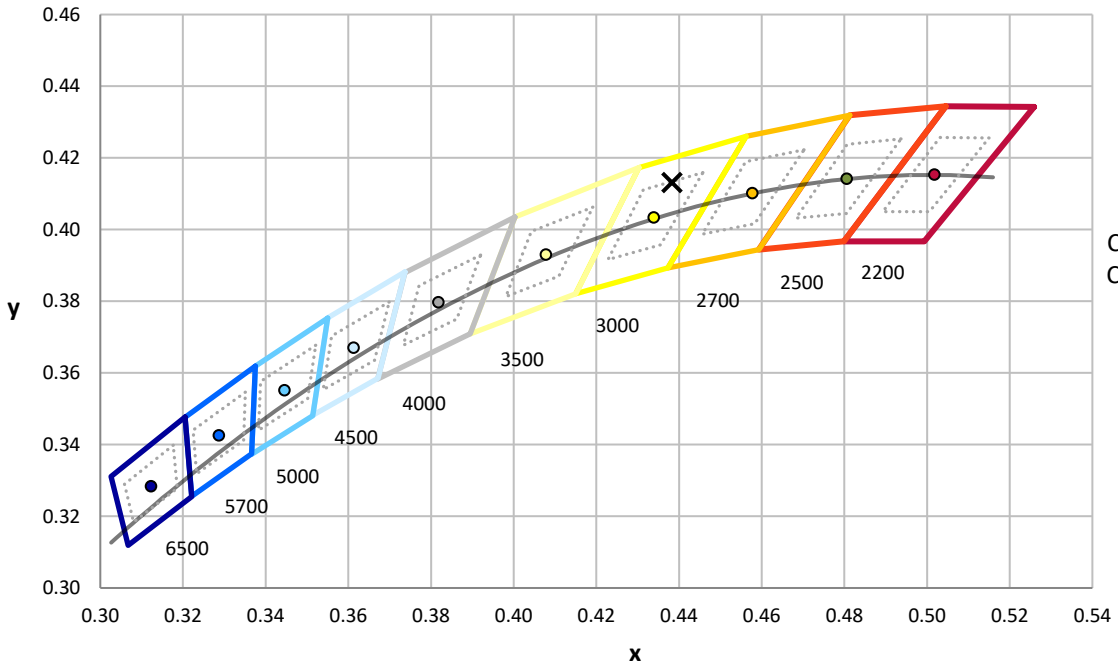
| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 6/18/2024 | 12/18/2024 |
| Power Meter | INXT2011004 | 2/8/2024 | 2/8/2025 |
| AC Power Source | IN0063 | 10/24/2023 | 10/24/2024 |
| DC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

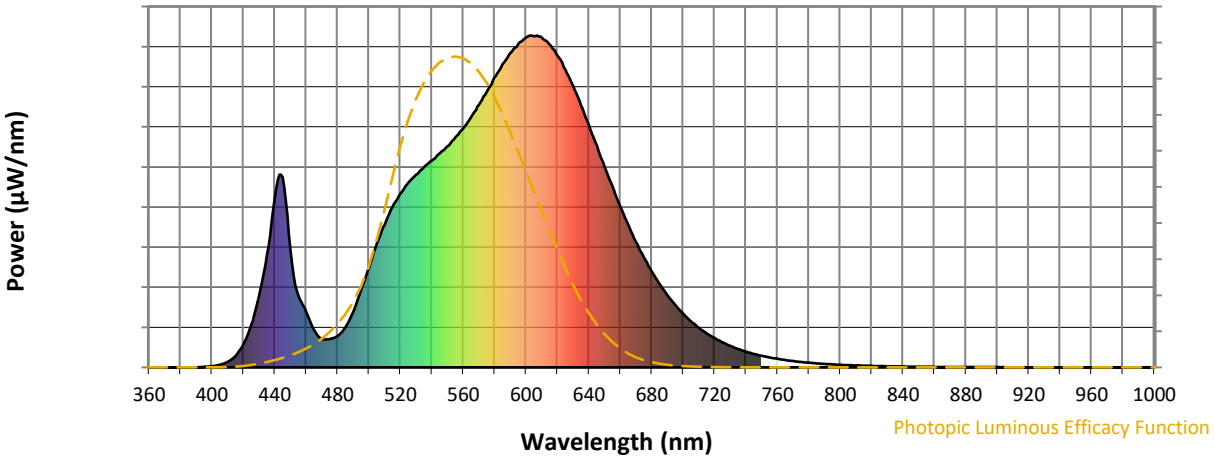



CCT = 3050K
CIE x = 0.4383
CIE y = 0.4131
Duv = 0.0034

Point lies inside the ANSI 3000K 4-step quadrangle

REPORT NUMBER: SP1-2408-195-9

## Photopic Flux vs. Wavelength

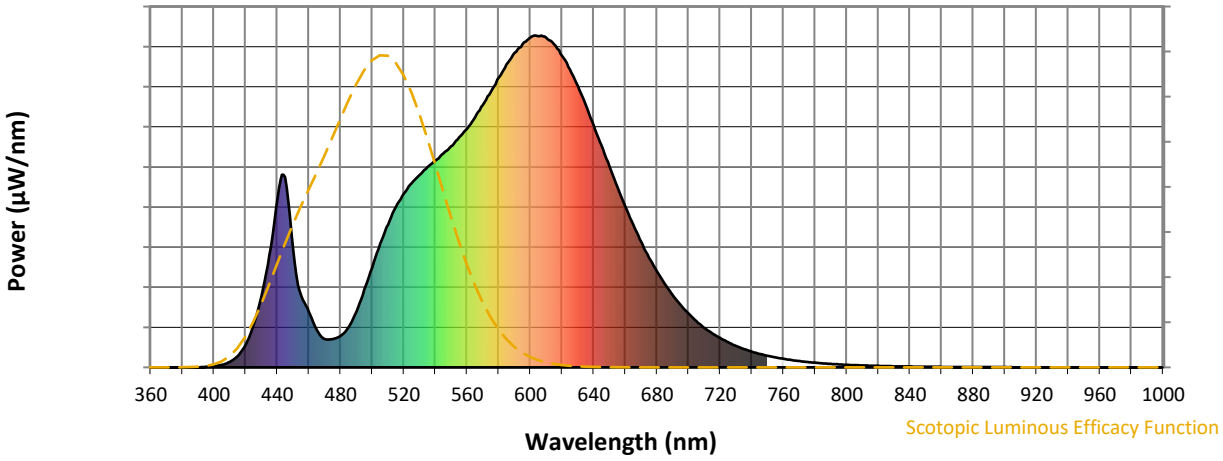



## Photopic Lumens: NR

| 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

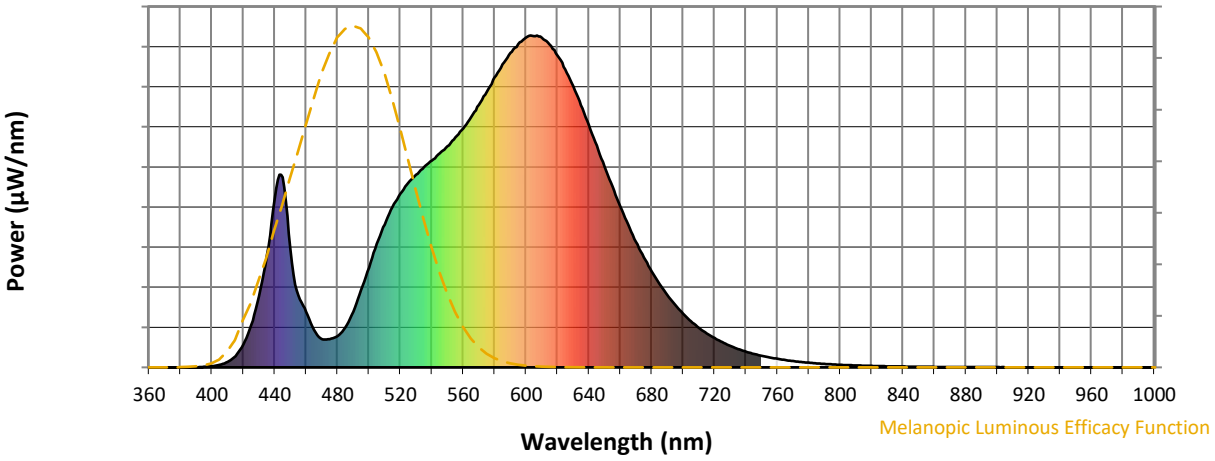



**Scotopic Lumens: NR** **S/P: 1.27**

| 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 | | | |

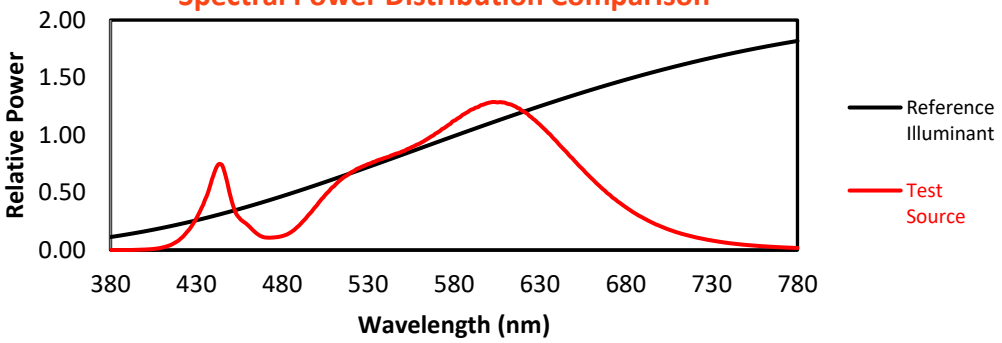
REPORT NUMBER: SP1-2408-195-9

# TM-30-18

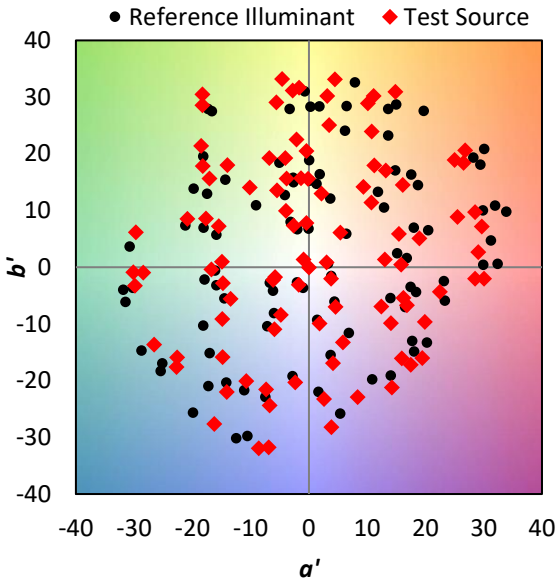
## Summary

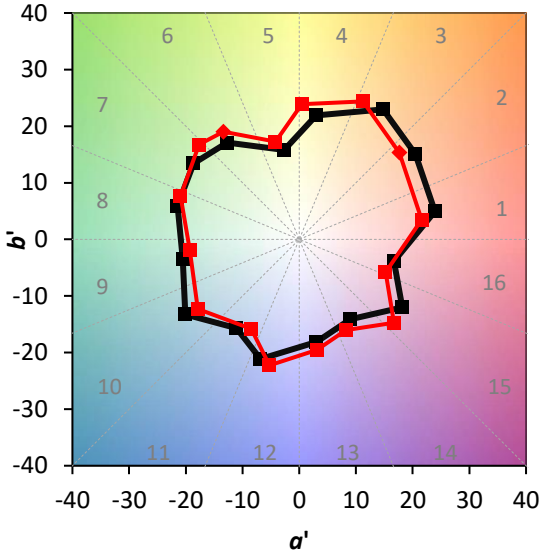
$R_f$ = 81.5
$R_g$ = 99.2
CIE $R_a$ = 81.0
$R_9$ = 7.1

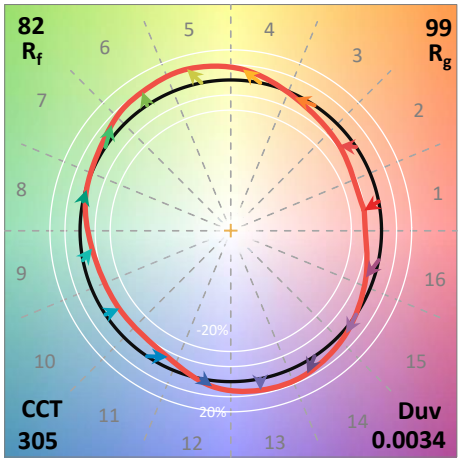
## Spectral Power Distribution Comparison

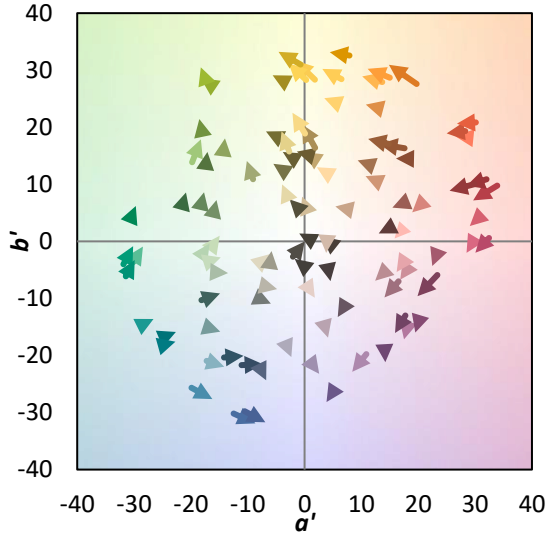



## Color Vector Graphics



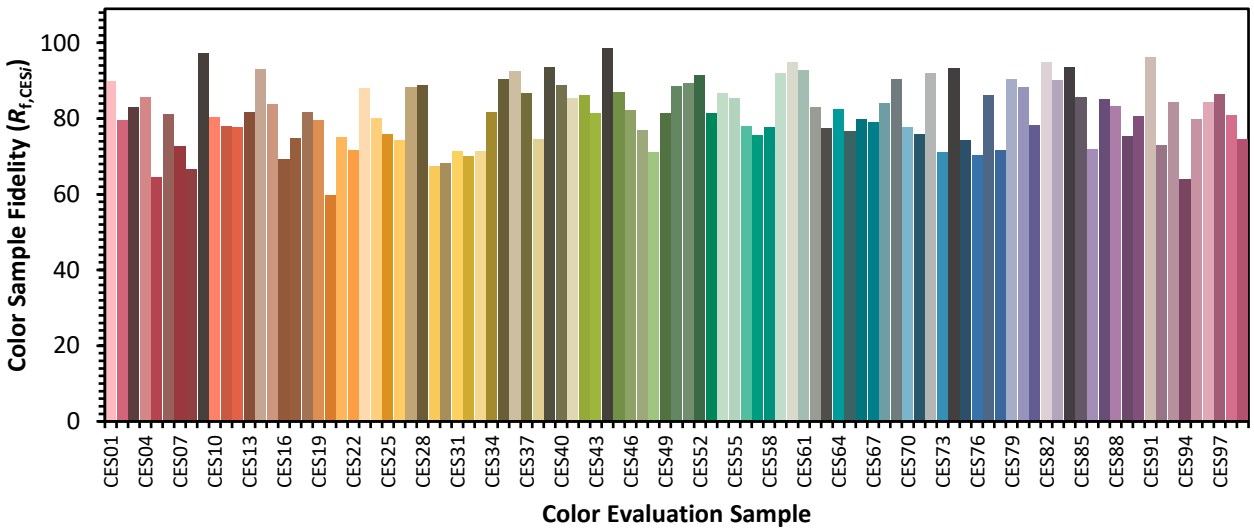



REPORT NUMBER: SP1-2408-195-9

# TM-30-18

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

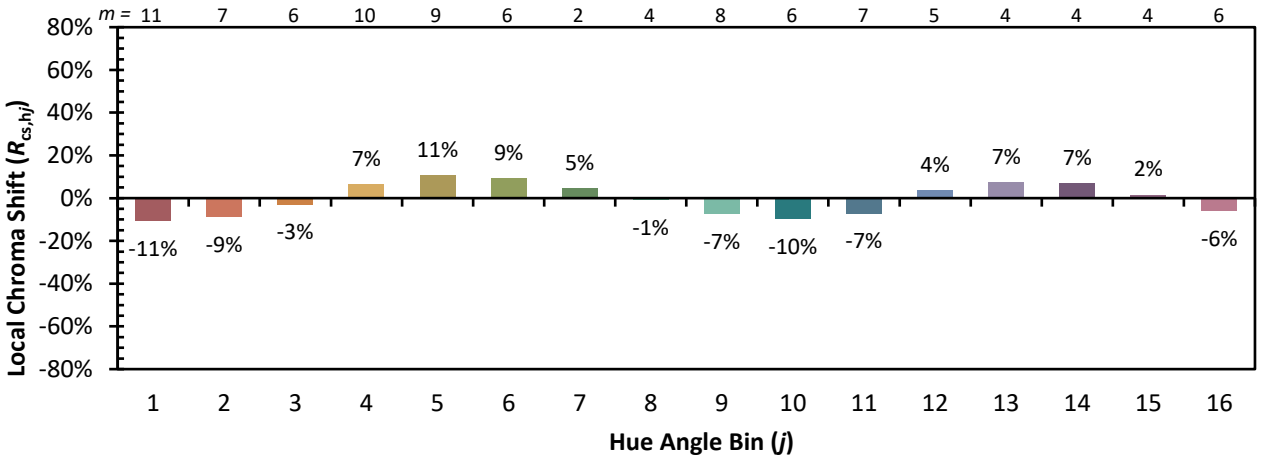
| | | | |
|---|---|---|---|
| CES01 = 86 | CES26 = 74 | CES51 = 89 | CES76 = 70 |
| CES02 = 63 | CES27 = 88 | CES52 = 92 | CES77 = 86 |
| CES03 = 31 | CES28 = 89 | CES53 = 81 | CES78 = 72 |
| CES04 = 70 | CES29 = 67 | CES54 = 87 | CES79 = 90 |
| CES05 = 50 | CES30 = 68 | CES55 = 85 | CES80 = 88 |
| CES06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

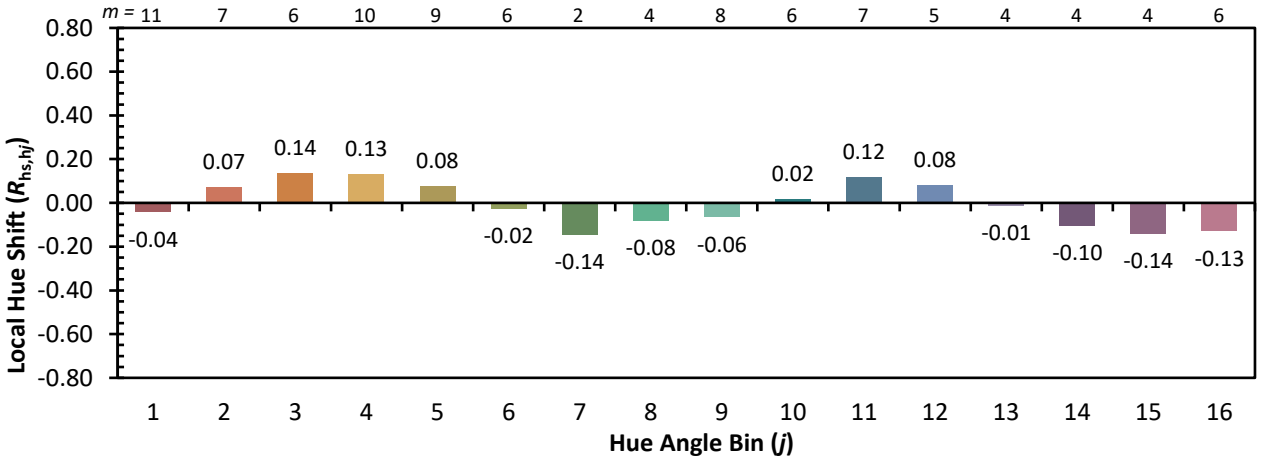


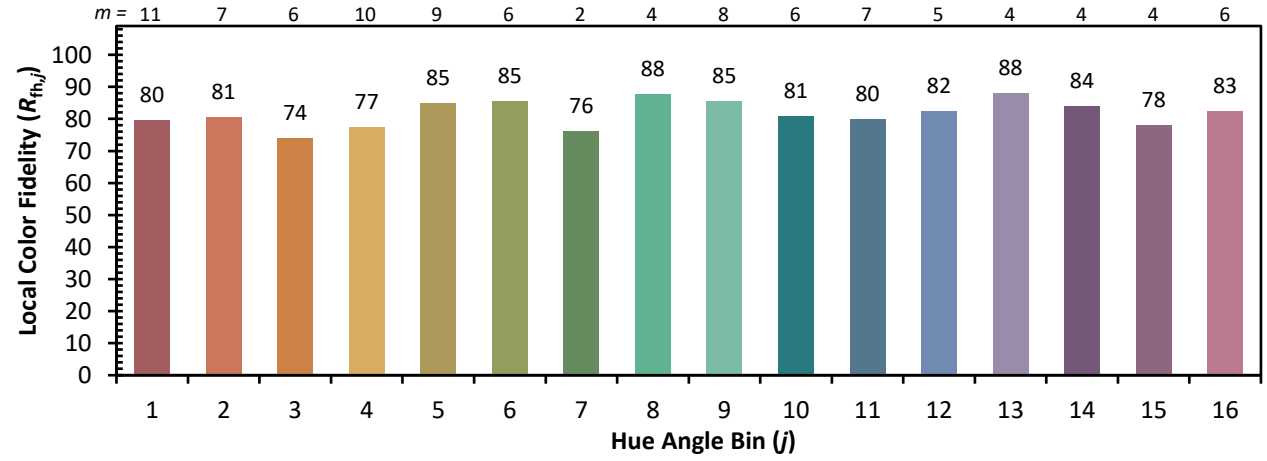
REPORT NUMBER: SP1-2408-195-9

# TM-30-18

## Color Rendition by Hue-Angle Bin



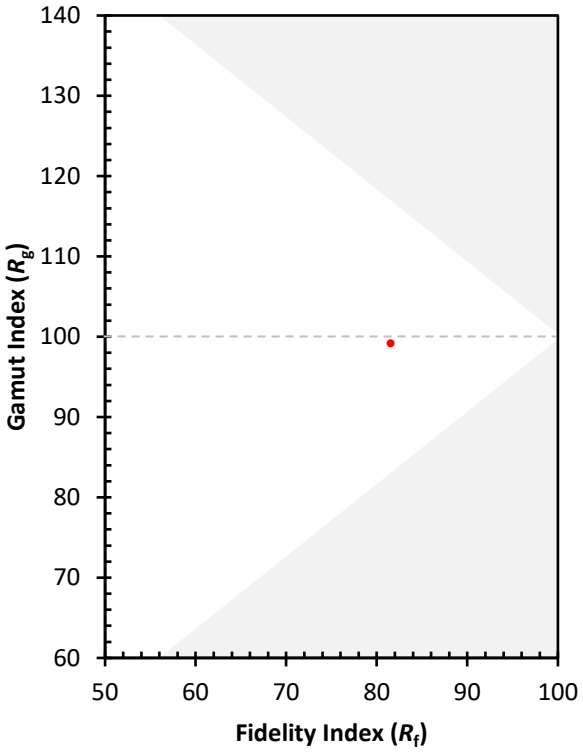



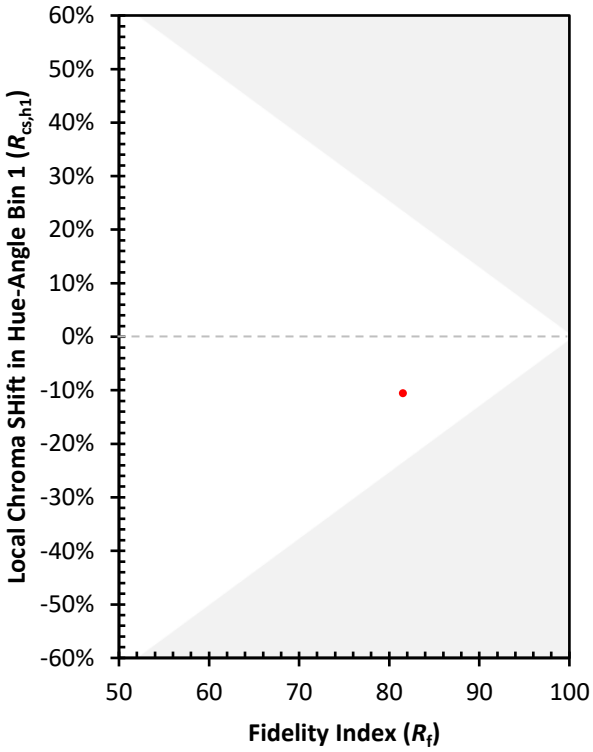



REPORT NUMBER: SP1-2408-195-9

## TM-30-18

### Measure Comparisons

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