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: P438114

Luminaire Tested: **ISW-SA1A-830-U-T2**

Issue Date: 12/10/2020

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: | P438114 |
| | TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G3-2011-074-1) |
| Test Lab: | INNOVATION CENTER |
| Issue Date: | 12/10/2020 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS (FORMERLY EATON) |
| Product Line: | McGRAW-EDISON |
| Catalog Number: | ISW-SA1A-830-U-T2 |
| Description: | IMPACT ELITE LED WEDGE LUMINAIRE |
| | (1) 80 CRI, 3000K, 350mA LIGHTSQUARE WITH 16 LEDS AND TYPE II OPTICS |
| Light Source: | - |
| Ballast/Driver: | ELECTRONIC DRIVER |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 2203 lumens |
| Efficiency: | N/A |
| Efficacy: | 109.6 lumens/watt |
| Luminous Opening: | Rectangular (W 0.5' x L: 0.5' x H: 0') |
| IES Classification: | Type II - Medium |
| BUG Rating: | B1 - U0 - G1 |

| | |
|---|---|
| Input Watts (W): | 20.1 |
| 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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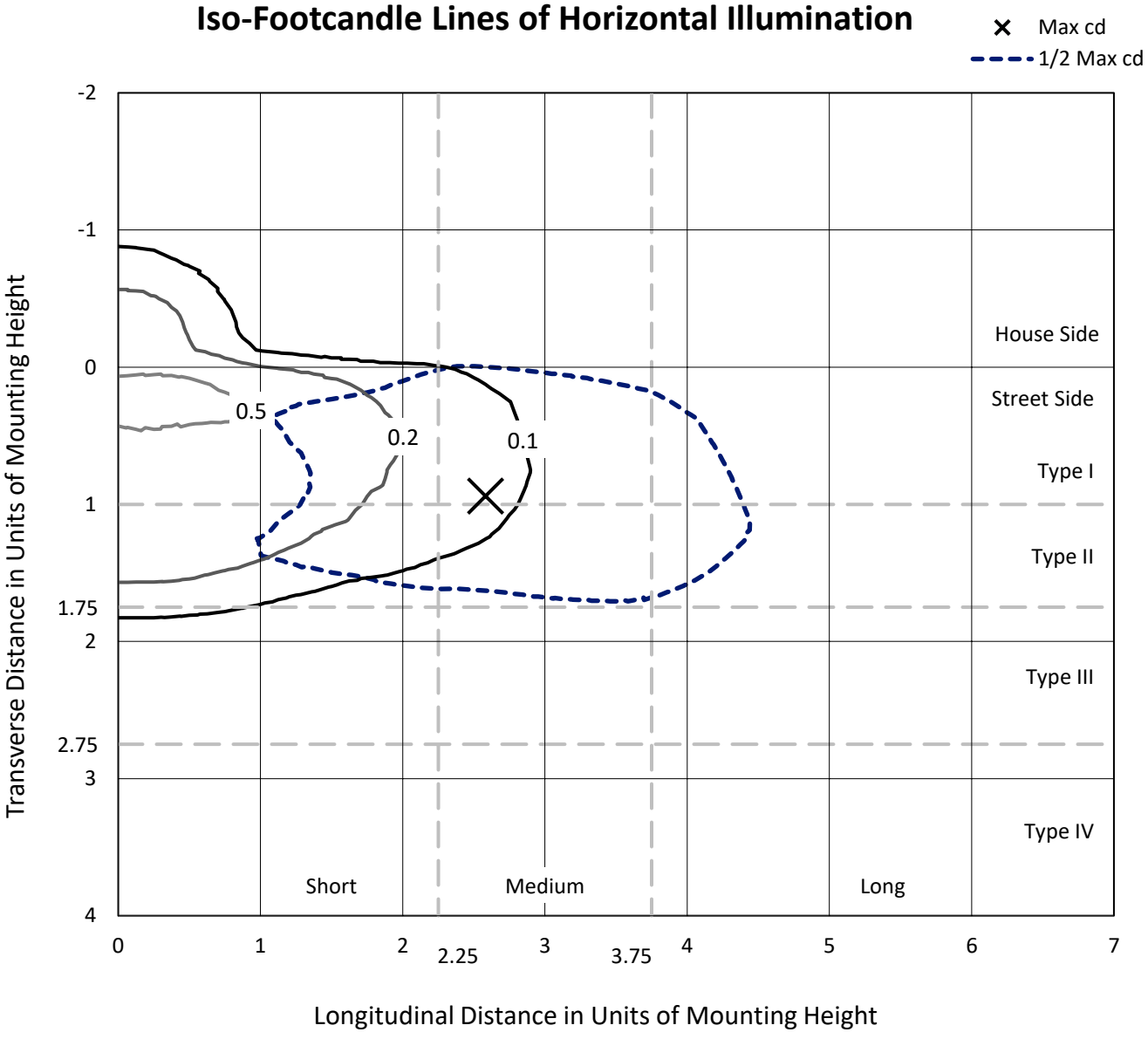
Scaled Data Report

REPORT NUMBER: P438114
CATALOG NUMBER: ISW-SA1A-830-U-T2

## Iso-Footcandle Lines of Horizontal Illumination




Based on 25 foot mounting height. Maximum calculated value = 0.6 fc
Type II - Medium - N/A

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REPORT NUMBER: P438114
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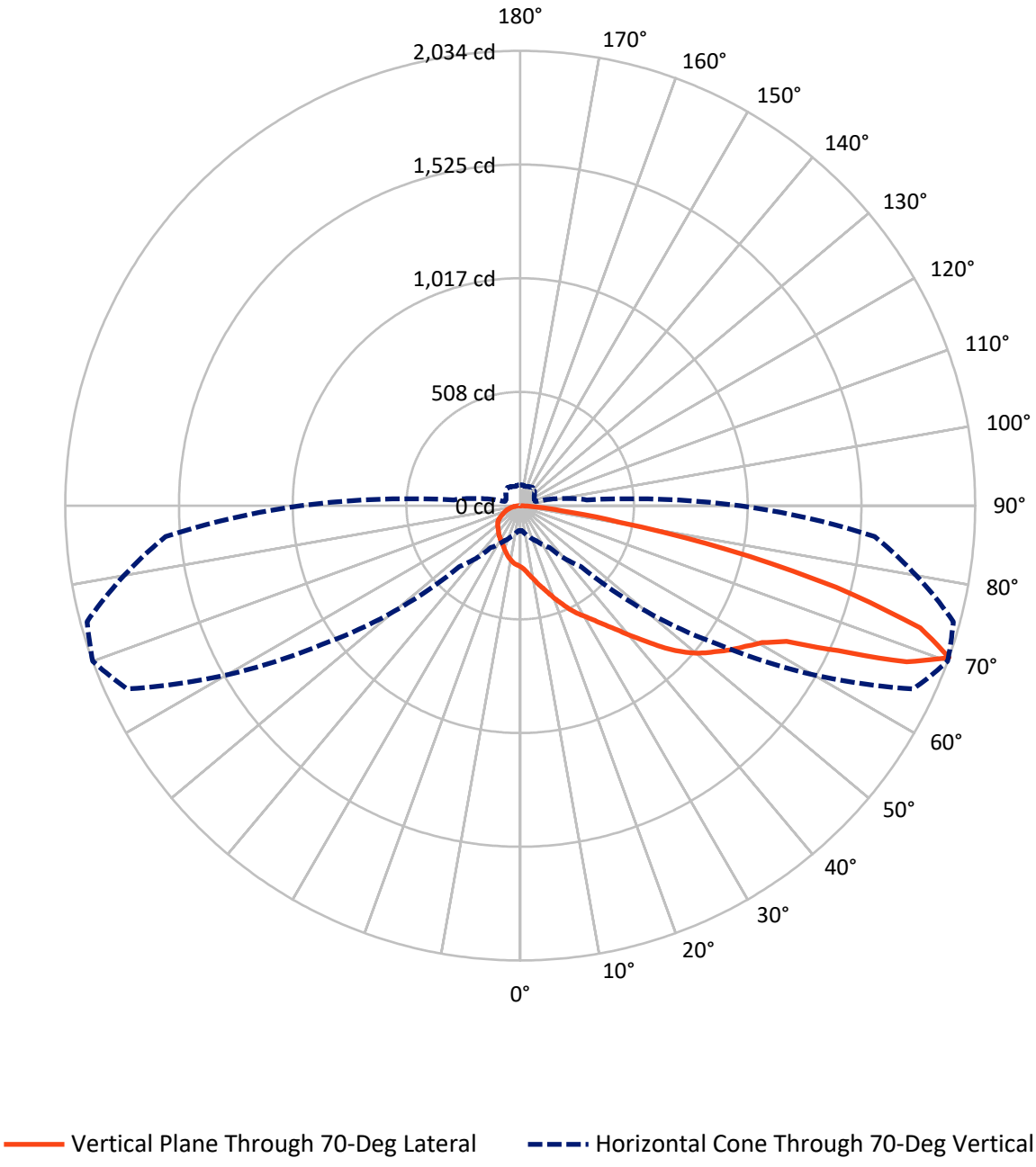
## Luminous Intensity Polar Plot



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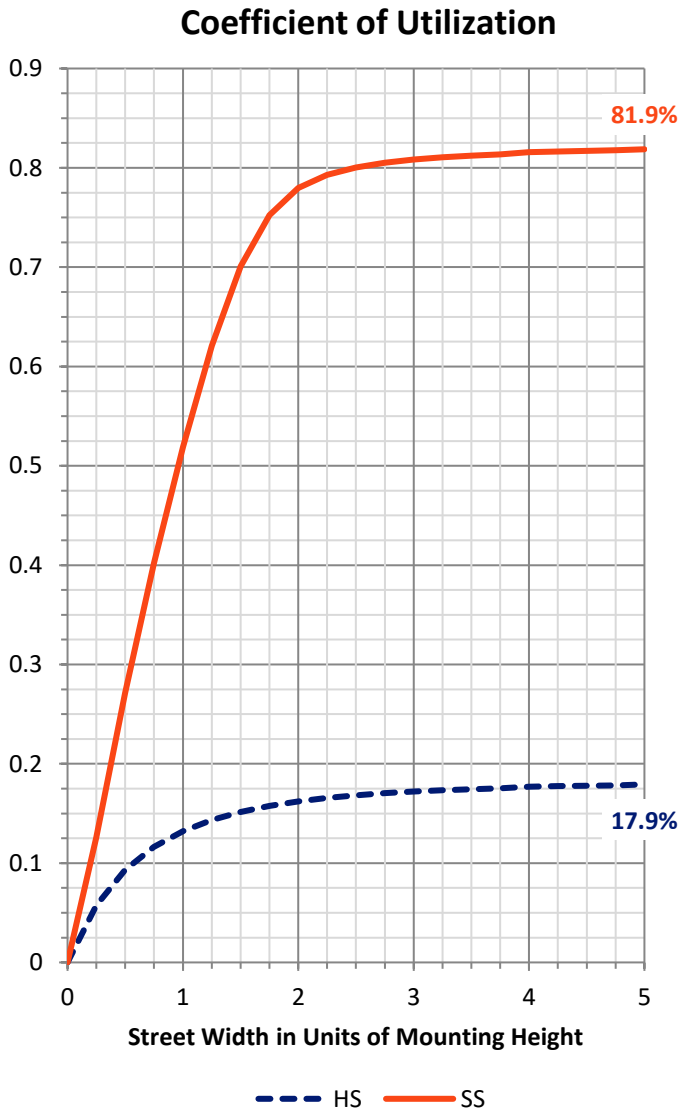
REPORT NUMBER: P438114
CATALOG NUMBER: ISW-SA1A-830-U-T2

**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 398.5 | 0.0 | 398.5 |
| | % Fixture | 18.1 | 0.0 | 18.1 |
| **Street Side** | Lumens | 1804.6 | 0.0 | 1804.6 |
| | % Fixture | 81.9 | 0.0 | 81.9 |
| **Total** | Lumens | 2203.0 | 0.0 | 2203.0 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 27.4 | 1.2 |
| 10°-20° | 88.1 | 4.0 |
| 20°-30° | 154.2 | 7.0 |
| 30°-40° | 229.3 | 10.4 |
| 40°-50° | 339.1 | 15.4 |
| 50°-60° | 477.9 | 21.7 |
| 60°-70° | 531.9 | 24.1 |
| 70°-80° | 321.7 | 14.6 |
| 80°-90° | 33.4 | 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° | 2203.0 | 100.0 |
| 0°-180° | 2203.0 | 100.0 |



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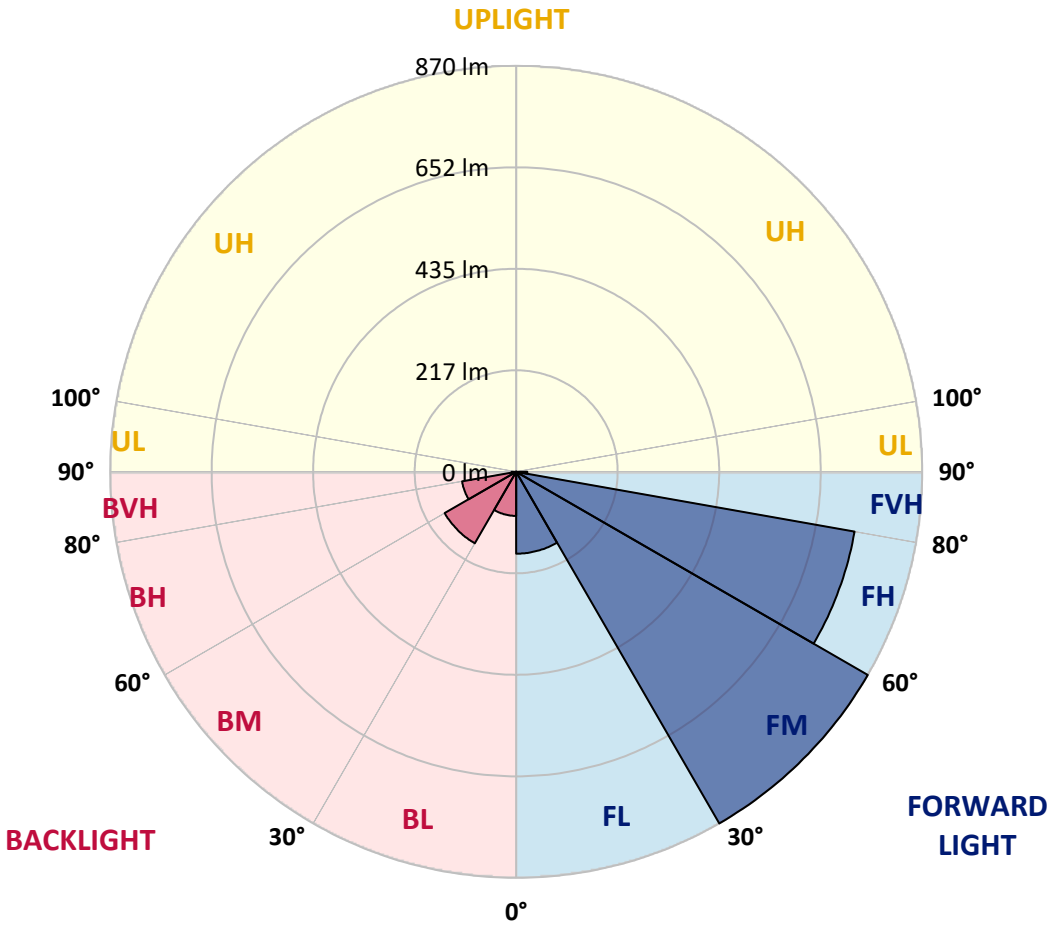
CATALOG NUMBER: ISW-SA1A-830-U-T2

## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 175.3 | 8.0 | | | |
| FM | (30°-60°) | 869.5 | 39.5 | | | |
| FH | (60°-80°) | 735.9 | 33.4 | | | G1/1800 |
| FVH | (80°-90°) | 23.8 | 1.1 | | | G1/100 |
| BL | (0°-30°) | 94.4 | 4.3 | B0/110 | | |
| BM | (30°-60°) | 176.8 | 8.0 | B0/220 | | |
| BH | (60°-80°) | 117.6 | 5.3 | B1/500 | | G1/500 |
| BVH | (80°-90°) | 9.6 | 0.4 | | | G0/10 |
| UL | (90°-100°) | 0.0 | 0.0 | | U0/0 | |
| UH | (100°-180°) | 0.0 | 0.0 | | U0/0 | |

**BUG Rating: B1-U0-G1**
Type II Medium



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Scaled Data Report

REPORT NUMBER: P438114
CATALOG NUMBER: ISW-SA1A-830-U-T2

**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 65° | 70° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 272.9 | 272.9 | 272.9 | 272.9 | 272.9 | 272.9 | 272.9 | 272.9 | *272.9* | 272.9 | 272.9 |
| 2.5° | 305.1 | 304.3 | 300.4 | 302.0 | 299.6 | 294.9 | 290.2 | 287.0 | *283.1* | 282.3 | 278.4 |
| 5° | 336.6 | 335.8 | 333.4 | 330.3 | 325.6 | 320.0 | 311.4 | 303.5 | *297.2* | 291.7 | 284.7 |
| 7.5° | 358.6 | 357.0 | 357.0 | 355.4 | 353.1 | 346.8 | 335.0 | 324.8 | *315.3* | 308.3 | 292.5 |
| 10° | 371.2 | 371.2 | 371.2 | 374.3 | 374.3 | 369.6 | 360.2 | 346.0 | *335.0* | 326.3 | 303.5 |
| 12.5° | 376.7 | 376.7 | 378.2 | 383.0 | 390.0 | 390.0 | 382.2 | 371.2 | *360.2* | 345.2 | 315.3 |
| 15° | 380.6 | 381.4 | 383.7 | 390.8 | 401.0 | 408.1 | 408.1 | 397.9 | *383.0* | 368.8 | 330.3 |
| 17.5° | 384.5 | 385.3 | 390.0 | 398.7 | 410.5 | 423.8 | 431.7 | 424.6 | *411.3* | 395.5 | 344.4 |
| 20° | 385.3 | 384.5 | 392.4 | 404.2 | 421.5 | 437.2 | 456.9 | 458.4 | *444.3* | 421.5 | 360.9 |
| 22.5° | 393.2 | 393.2 | 396.3 | 408.1 | 427.0 | 449.8 | 479.7 | 488.3 | *475.7* | 456.1 | 381.4 |
| 25° | 408.9 | 412.1 | 414.4 | 418.3 | 432.5 | 460.0 | 499.3 | 523.7 | *511.9* | 489.9 | 402.6 |
| 27.5° | 438.0 | 438.0 | 440.4 | 439.6 | 444.3 | 468.7 | 519.8 | 557.5 | *545.7* | 516.6 | 416.0 |
| 30° | 466.3 | 464.7 | 467.1 | 467.1 | 465.5 | 478.9 | 534.7 | 589.0 | *576.4* | 548.1 | 431.7 |
| 32.5° | 503.3 | 504.1 | 502.5 | 495.4 | 493.0 | 497.8 | 546.5 | 618.9 | *611.8* | 578.8 | 445.9 |
| 35° | 553.6 | 554.4 | 545.7 | 530.8 | 522.9 | 523.7 | 562.2 | 654.2 | *655.0* | 620.4 | 463.2 |
| 37.5° | 597.6 | 601.6 | 600.8 | 573.3 | 559.9 | 556.7 | 585.8 | 690.4 | *704.6* | 668.4 | 489.9 |
| 40° | 638.5 | 644.0 | 642.5 | 619.6 | 602.3 | 594.5 | 622.8 | 732.1 | *765.1* | 728.2 | 522.1 |
| 42.5° | 668.4 | 671.5 | 673.1 | 657.4 | 641.7 | 645.6 | 661.3 | 779.3 | *831.2* | 794.2 | 565.4 |
| 45° | 700.6 | 702.2 | 704.6 | 695.9 | 684.9 | 703.8 | 709.3 | 830.4 | *908.2* | 879.1 | 616.5 |
| 47.5° | 733.7 | 740.0 | 742.3 | 732.9 | 725.8 | 756.5 | 761.2 | 879.9 | *976.7* | 962.5 | 667.6 |
| 50° | 787.1 | 793.4 | 791.1 | 780.1 | 773.8 | 797.4 | 807.6 | 924.8 | *1037.2* | 1046.6 | 717.2 |
| 52.5° | 856.3 | 860.3 | 870.5 | 851.6 | 837.5 | 828.8 | 846.1 | 974.3 | *1086.0* | 1120.6 | 769.8 |
| 55° | 869.7 | 875.2 | 912.2 | 929.5 | 941.3 | 876.0 | 887.0 | 1018.3 | *1138.6* | 1190.5 | 828.8 |
| 57.5° | 814.7 | 817.8 | 877.6 | 930.3 | 1015.2 | 992.4 | 945.2 | 1075.0 | *1187.4* | 1262.9 | 888.6 |
| 60° | 677.8 | 689.6 | 767.5 | 860.3 | 994.7 | 1111.1 | 1096.2 | 1148.1 | *1242.4* | 1335.2 | 975.1 |
| 62.5° | 441.9 | 452.9 | 535.5 | 692.8 | 882.3 | 1112.7 | 1312.4 | 1297.5 | *1336.0* | 1423.3 | 1083.6 |
| 65° | 225.7 | 229.6 | 301.2 | 419.9 | 636.2 | 994.7 | 1442.2 | 1605.7 | *1561.7* | 1599.5 | 1318.7 |
| 67.5° | 150.2 | 153.3 | 185.6 | 242.2 | 378.2 | 688.8 | 1399.7 | 1917.1 | *1863.7* | 1884.1 | 1568.8 |
| 70° | *110.9* | *114.0* | *140.8* | *175.4* | *228.8* | *386.1* | *1082.8* | *1939.2* | 2033.5 | *2004.4* | *1590.8* |
| 72.5° | 82.6 | 83.4 | 99.9 | 135.3 | 169.1 | 207.6 | 640.1 | 1600.2 | *1869.2* | 1974.5 | 1478.4 |
| 75° | 62.9 | 62.9 | 71.6 | 99.9 | 132.1 | 133.7 | 357.0 | 1181.9 | *1457.9* | 1651.4 | 1233.0 |
| 77.5° | 47.2 | 48.8 | 52.7 | 69.2 | 98.3 | 95.9 | 168.3 | 782.4 | *948.3* | 1076.5 | 758.8 |
| 80° | 33.8 | 34.6 | 37.0 | 42.5 | 65.3 | 62.1 | 84.9 | 377.5 | *452.2* | 481.3 | 309.8 |
| 82.5° | 21.2 | 21.2 | 25.9 | 25.9 | 37.0 | 38.5 | 38.5 | 152.6 | *182.4* | 204.5 | 103.8 |
| 85° | 3.9 | 3.9 | 7.9 | 10.2 | 11.8 | 13.4 | 11.8 | 38.5 | *52.7* | 62.1 | 35.4 |
| 87.5° | 0.0 | 0.0 | 0.0 | 0.8 | 0.8 | 1.6 | 1.6 | 1.6 | *1.6* | 1.6 | 1.6 |
| 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

Scaled Data Report

REPORT NUMBER: P438114
CATALOG NUMBER: ISW-SA1A-830-U-T2

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 272.9 | 272.9 | 272.9 | 272.9 | 272.9 | 272.9 | 272.9 | 272.9 | 272.9 | 272.9 | 272.9 |
| 2.5° | 275.2 | 273.7 | 269.7 | 265.0 | 261.9 | 258.7 | 256.4 | 254.8 | 254.0 | 254.0 | 253.2 |
| 5° | 279.2 | 274.4 | 266.6 | 258.7 | 251.6 | 246.1 | 242.2 | 239.8 | 238.3 | 239.1 | 237.5 |
| 7.5° | 285.4 | 276.8 | 262.6 | 250.1 | 240.6 | 233.5 | 230.4 | 228.8 | 229.6 | 230.4 | 230.4 |
| 10° | 290.2 | 278.4 | 255.6 | 238.3 | 229.6 | 225.7 | 224.9 | 226.5 | 228.8 | 229.6 | 228.8 |
| 12.5° | 295.7 | 279.2 | 247.7 | 228.0 | 222.5 | 220.2 | 224.1 | 228.0 | 232.0 | 235.1 | 233.5 |
| 15° | 304.3 | 279.2 | 238.3 | 219.4 | 215.5 | 217.8 | 224.9 | 230.4 | 237.5 | 240.6 | 241.4 |
| 17.5° | 310.6 | 276.8 | 226.5 | 210.0 | 209.2 | 215.5 | 225.7 | 235.1 | 242.2 | 247.7 | 247.7 |
| 20° | 316.9 | 272.9 | 214.7 | 201.3 | 204.5 | 213.1 | 224.9 | 235.9 | 244.6 | 250.1 | 251.6 |
| 22.5° | 324.8 | 267.4 | 202.9 | 193.4 | 198.9 | 210.0 | 222.5 | 232.0 | 239.8 | 244.6 | 245.3 |
| 25° | 330.3 | 257.9 | 191.1 | 187.2 | 195.8 | 206.0 | 215.5 | 221.8 | 225.7 | 228.8 | 228.8 |
| 27.5° | 333.4 | 246.9 | 181.6 | 182.4 | 191.9 | 200.5 | 205.2 | 205.2 | 206.8 | 206.8 | 206.0 |
| 30° | 329.5 | 235.1 | 174.6 | 177.7 | 186.4 | 192.7 | 194.2 | 191.1 | 186.4 | 181.6 | 180.1 |
| 32.5° | 327.9 | 219.4 | 167.5 | 173.0 | 179.3 | 182.4 | 181.6 | 176.9 | 168.3 | 161.2 | 161.2 |
| 35° | 324.8 | 204.5 | 161.2 | 167.5 | 171.4 | 172.2 | 170.6 | 163.6 | 155.7 | 149.4 | 148.6 |
| 37.5° | 322.4 | 192.7 | 155.7 | 161.2 | 163.6 | 164.3 | 161.2 | 154.9 | 150.2 | 145.5 | 144.7 |
| 40° | 329.5 | 182.4 | 150.2 | 154.1 | 155.7 | 155.7 | 152.6 | 147.8 | 150.2 | 149.4 | 149.4 |
| 42.5° | 342.9 | 178.5 | 144.7 | 147.0 | 148.6 | 150.2 | 147.8 | 143.9 | 149.4 | 144.7 | 146.3 |
| 45° | 362.5 | 178.5 | 140.8 | 141.5 | 143.1 | 147.0 | 146.3 | 140.8 | 141.5 | 130.5 | 128.2 |
| 47.5° | 391.6 | 183.2 | 137.6 | 135.3 | 139.2 | 144.7 | 142.3 | 136.0 | 129.7 | 121.1 | 120.3 |
| 50° | 424.6 | 192.7 | 134.5 | 129.0 | 135.3 | 141.5 | 139.2 | 131.3 | 124.2 | 119.5 | 118.7 |
| 52.5° | 457.7 | 204.5 | 132.1 | 122.7 | 128.2 | 140.0 | 139.2 | 130.5 | 120.3 | 117.2 | 116.4 |
| 55° | 498.6 | 215.5 | 128.2 | 115.6 | 122.7 | 138.4 | 138.4 | 125.8 | 118.0 | 117.2 | 116.4 |
| 57.5° | 544.9 | 229.6 | 121.9 | 106.2 | 115.6 | 133.7 | 132.9 | 122.7 | 116.4 | 114.8 | 115.6 |
| 60° | 604.7 | 246.9 | 112.4 | 97.5 | 109.3 | 126.6 | 128.2 | 119.5 | 113.2 | 112.4 | 112.4 |
| 62.5° | 706.1 | 279.2 | 101.4 | 89.6 | 101.4 | 117.2 | 121.1 | 114.0 | 109.3 | 110.1 | 110.9 |
| 65° | 901.2 | 339.7 | 88.9 | 82.6 | 93.6 | 106.9 | 114.8 | 108.5 | 103.8 | 106.9 | 106.9 |
| 67.5° | 1045.9 | 366.4 | 78.6 | 75.5 | 85.7 | 99.1 | 107.7 | 102.2 | 97.5 | 101.4 | 101.4 |
| 70° | *982.9* | *298.0* | *70.8* | *69.2* | *77.1* | *90.4* | *98.3* | *93.6* | *88.9* | *92.8* | *92.0* |
| 72.5° | 872.9 | 236.7 | 62.1 | 62.1 | 68.4 | 80.2 | 88.9 | 84.1 | 77.8 | 79.4 | 78.6 |
| 75° | 764.3 | 219.4 | 54.3 | 54.3 | 59.8 | 69.2 | 76.3 | 73.9 | 67.6 | 66.8 | 65.3 |
| 77.5° | 441.1 | 146.3 | 45.6 | 46.4 | 48.8 | 57.4 | 64.5 | 57.4 | 52.7 | 51.9 | 51.1 |
| 80° | 173.8 | 71.6 | 37.0 | 36.2 | 36.2 | 43.2 | 46.4 | 43.2 | 39.3 | 38.5 | 37.0 |
| 82.5° | 62.9 | 36.2 | 28.3 | 25.2 | 25.9 | 31.5 | 36.2 | 33.8 | 30.7 | 24.4 | 22.8 |
| 85° | 24.4 | 18.1 | 18.9 | 14.9 | 16.5 | 16.5 | 18.9 | 15.7 | 11.0 | 7.9 | 7.9 |
| 87.5° | 1.6 | 1.6 | 1.6 | 1.6 | 0.8 | 0.8 | 0.0 | 0.0 | 0.8 | 0.8 | 0.8 |
| 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
1121 Highway 74 South
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

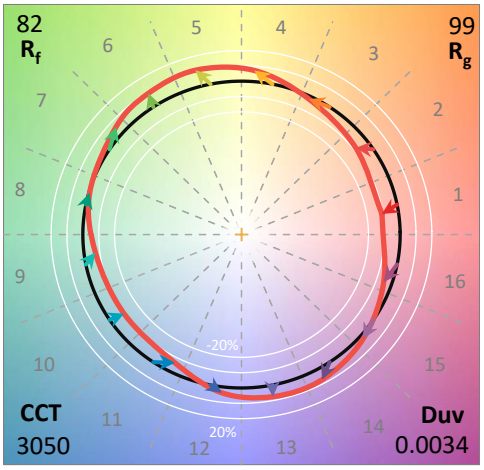
## Test Information

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

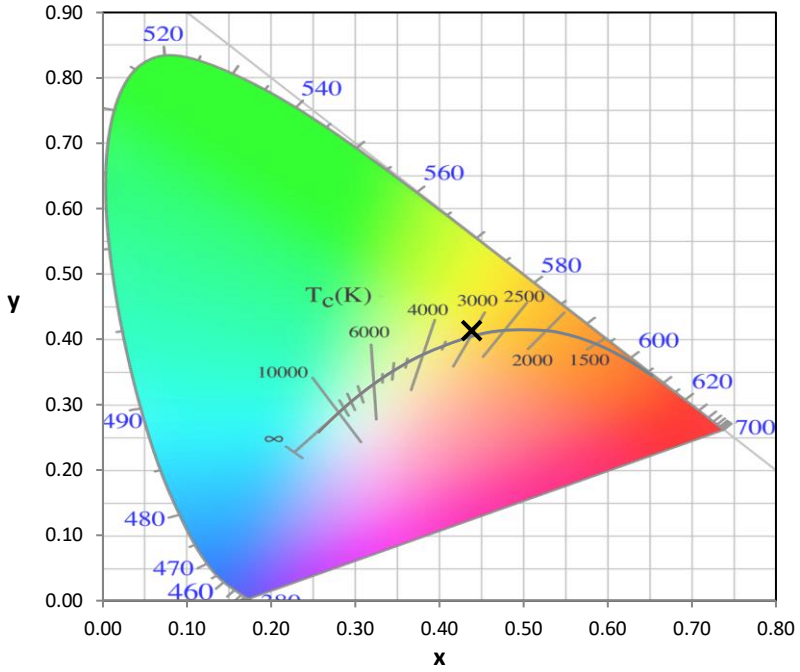
| | |
|---|---|
| Stabilization Time: | 20M |
| Operation Time: | 1H 20M |
| Sphere Temperature (°C): | 24.2 |

REPORT NUMBER: SP1-2408-195-9

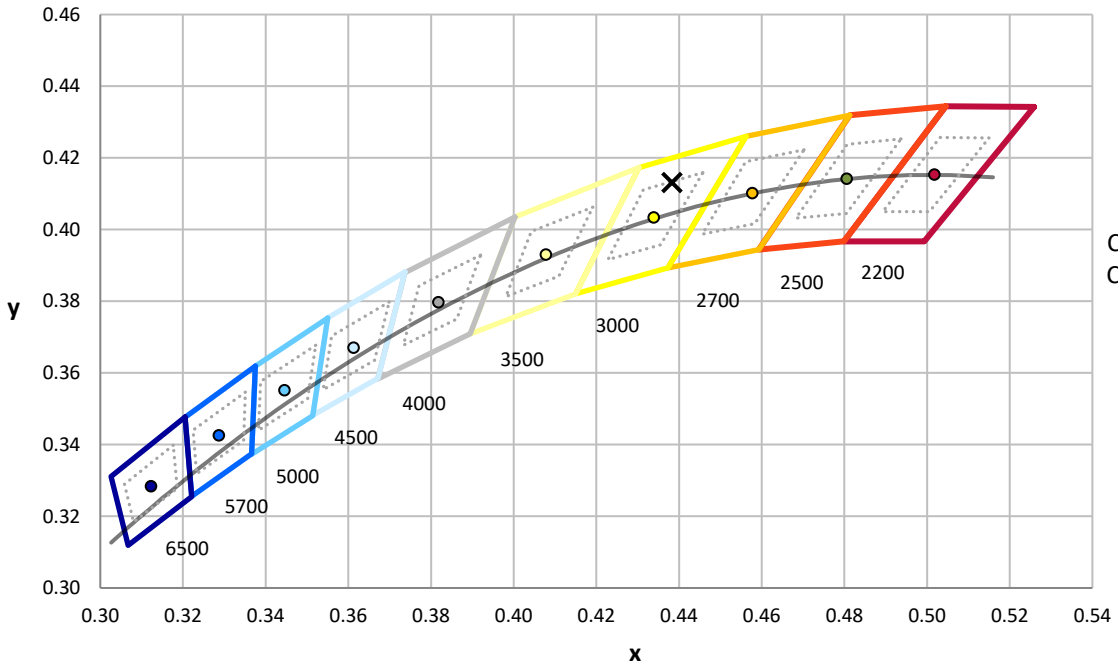
| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 6/18/2024 | 12/18/2024 |
| Power Meter | INXT2011004 | 2/8/2024 | 2/8/2025 |
| AC Power Source | IN0063 | 10/24/2023 | 10/24/2024 |
| DC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

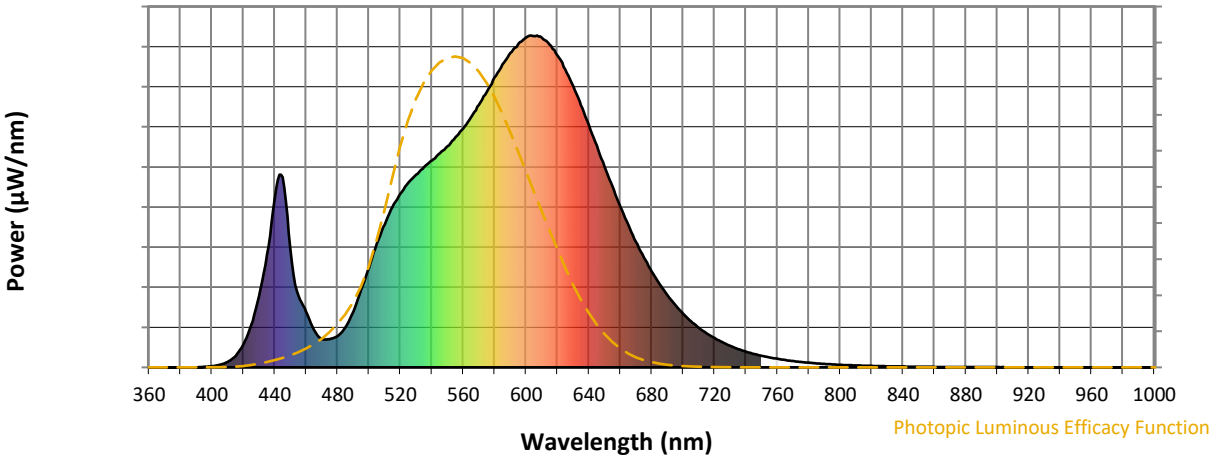



CCT = 3050K
CIE x = 0.4383
CIE y = 0.4131
Duv = 0.0034

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 | | | |

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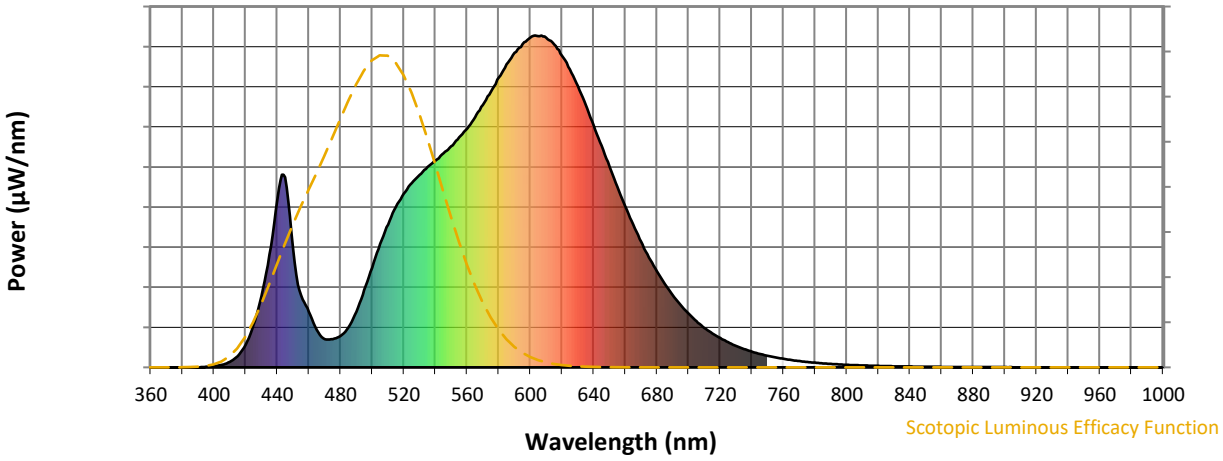
## Scotopic Flux vs. Wavelength




**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 | | | |

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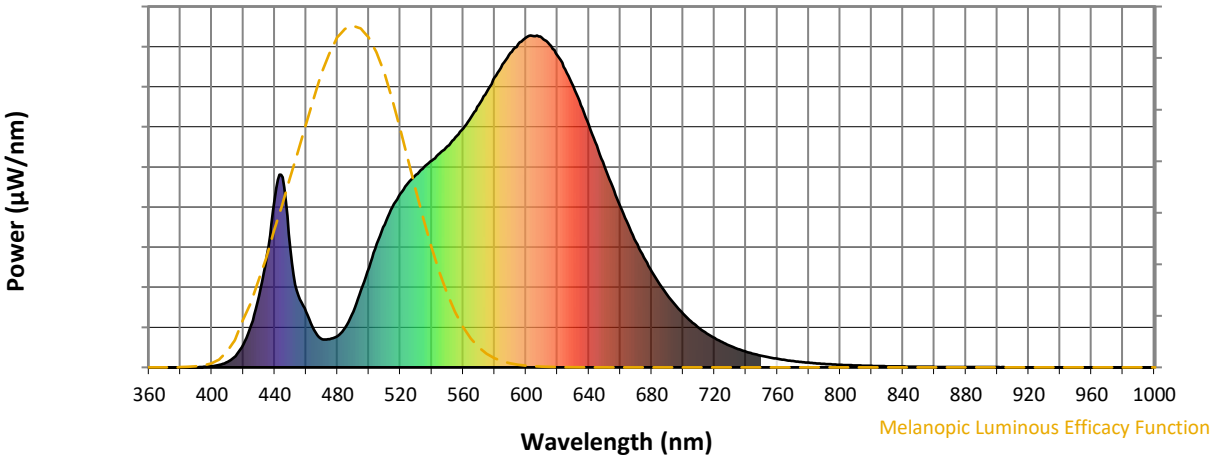
## Melanopic Flux vs. Wavelength




**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 | | | |

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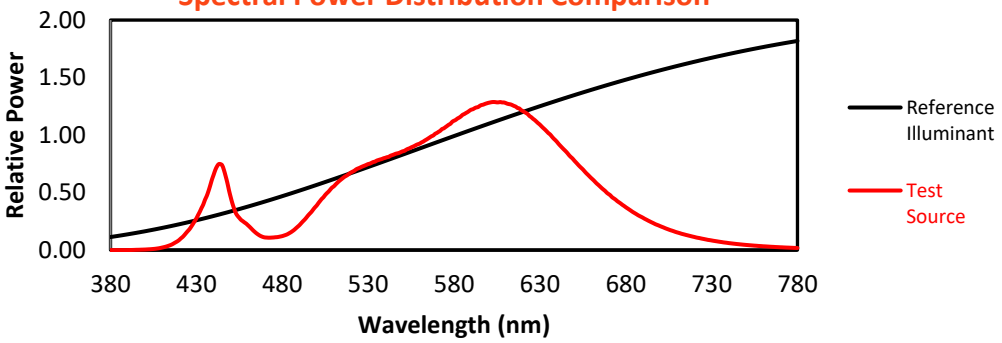
# TM-30-18

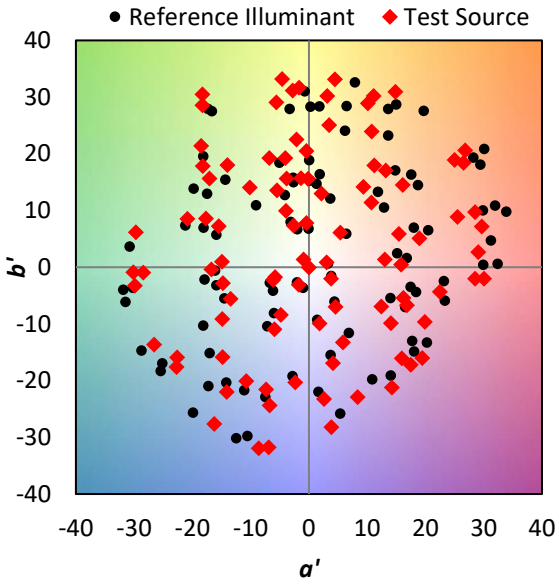
## Summary

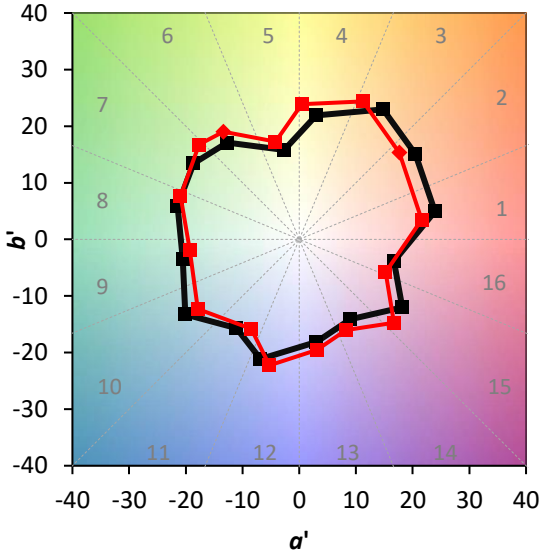
$R_f$ = 81.5
$R_g$ = 99.2
CIE $R_a$ = 81.0
$R_9$ = 7.1

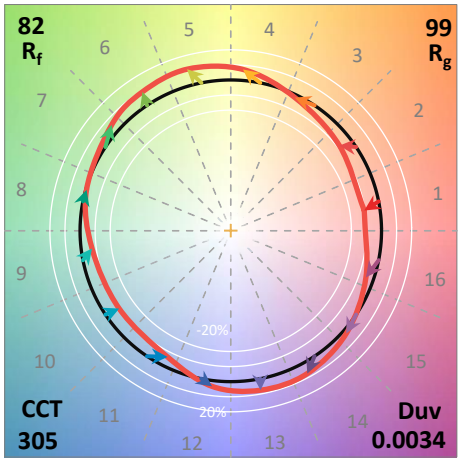
## Spectral Power Distribution Comparison

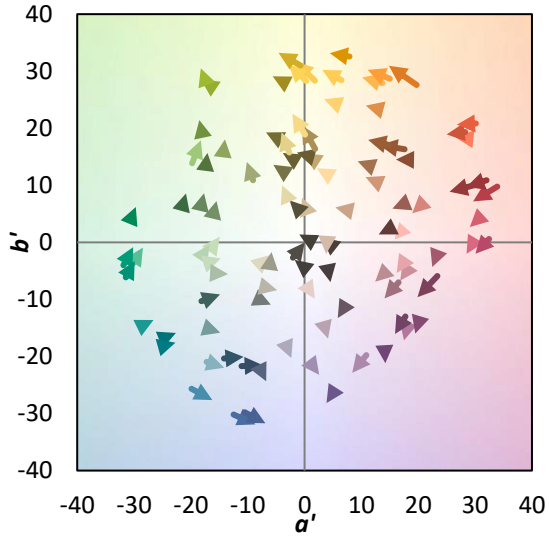



## Color Vector Graphics



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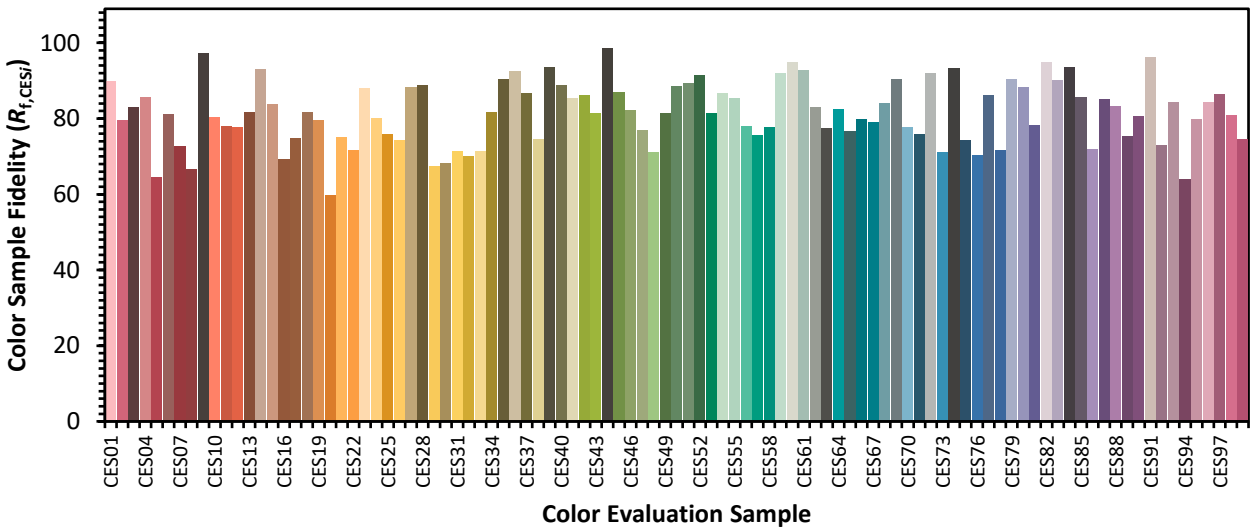
## Individual Sample Fidelity Index ($R_{f,i}$)

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



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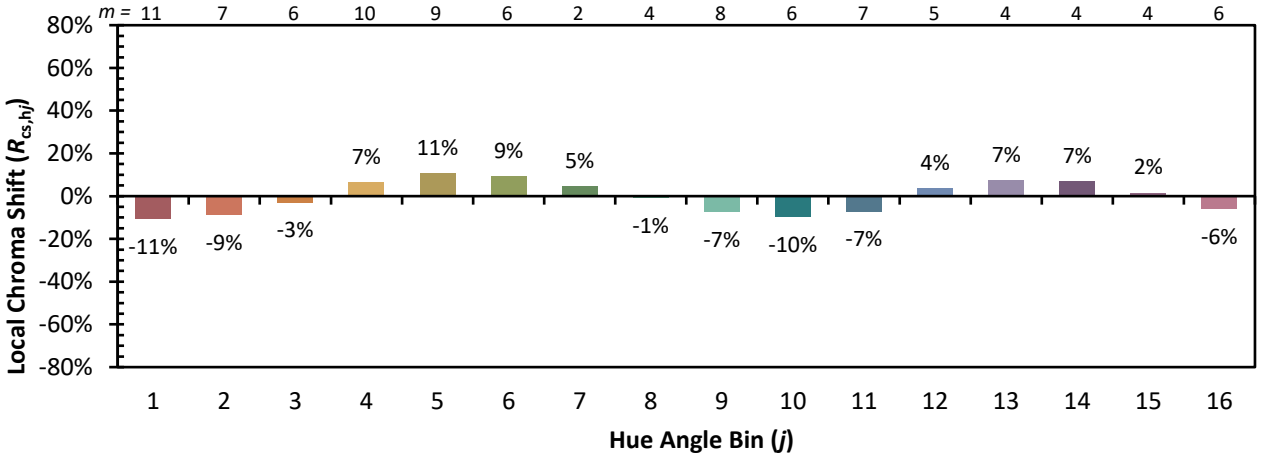
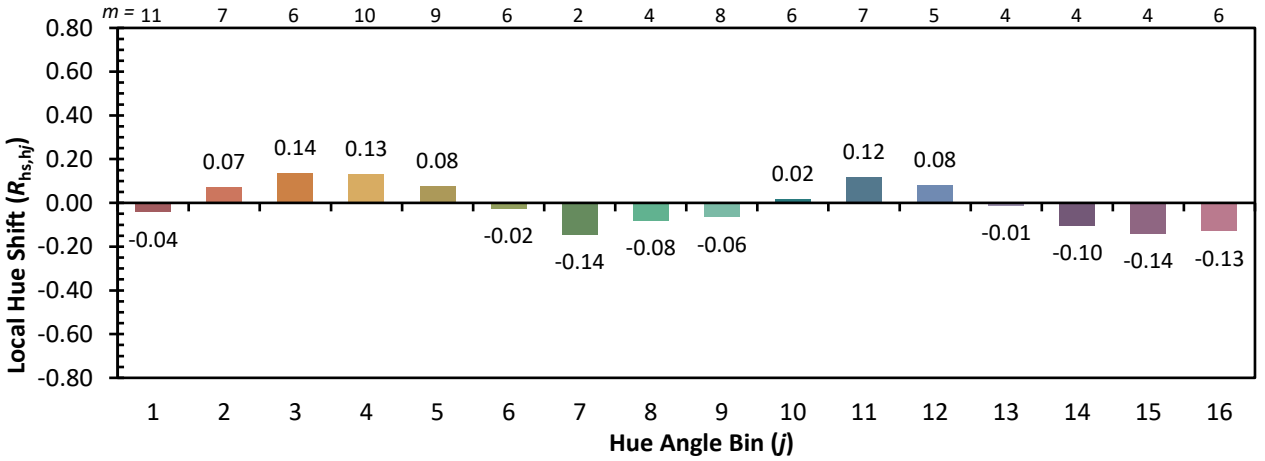
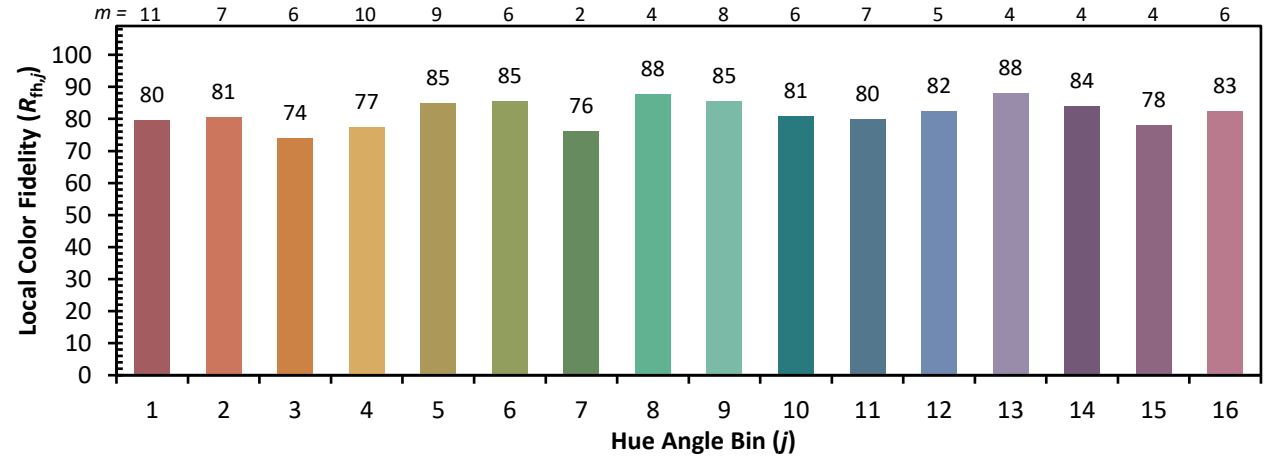
# TM-30-18

## Color Rendition by Hue-Angle Bin



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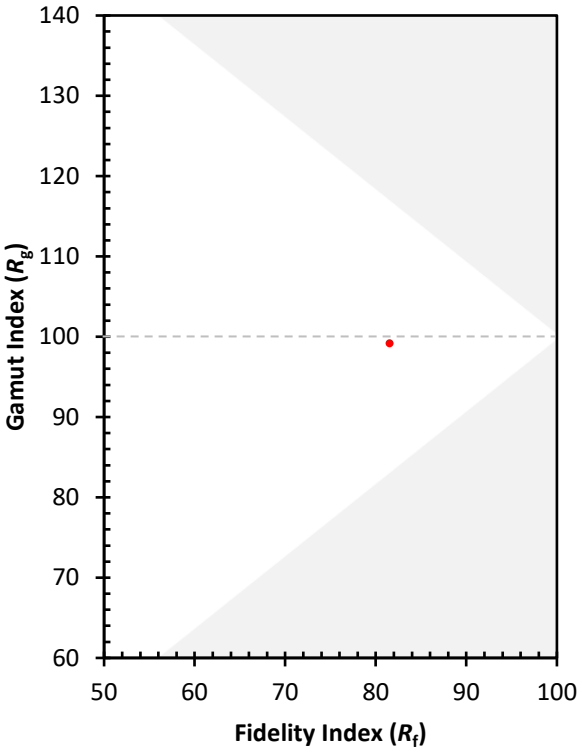
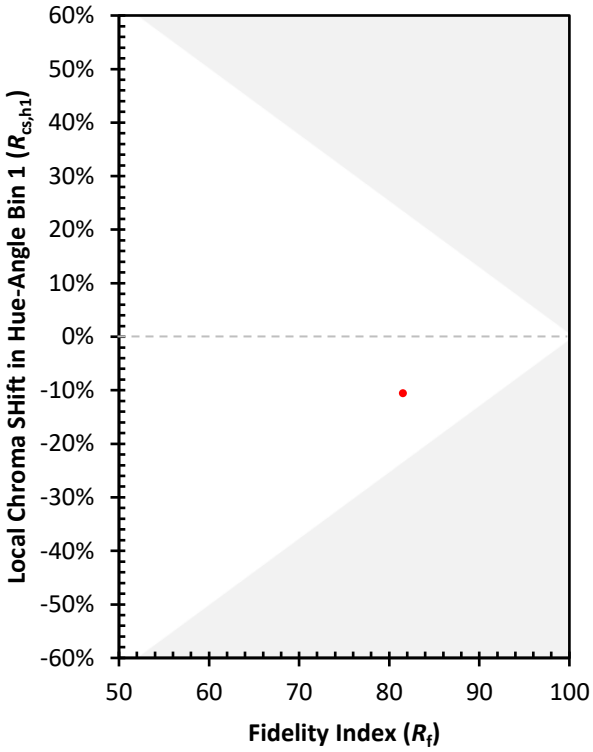
# TM-30-18

## Measure Comparisons

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