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: P438632

Luminaire Tested: **IST-SA1D-830-U-T4W-HSS**

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: | P438632 |
| | TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G3-2011-074-13) |
| Test Lab: | INNOVATION CENTER |
| Issue Date: | 12/10/2020 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS (FORMERLY EATON) |
| Product Line: | McGRAW-EDISON |
| Catalog Number: | IST-SA1D-830-U-T4W-HSS |
| Description: | IMPACT ELITE LED TRAPEZOID LUMINAIRE |
| | (1) 80 CRI, 3000K, 800mA LIGHTSQUARE WITH 16 LEDS AND TYPE IV WIDE OPTICS WITH HOUSE SIDE SHIELD |
| Light Source: | - |
| Ballast/Driver: | ELECTRONIC DRIVER |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 3305 lumens |
| Efficiency: | N/A |
| Efficacy: | 73.1 lumens/watt |
| Luminous Opening: | Rectangular (W 0.5' x L: 0.5' x H: 0') |
| IES Classification: | Type III - Short |
| BUG Rating: | B0 - U0 - G1 |

| | |
|---|---|
| Input Watts (W): | 45.2 |
| 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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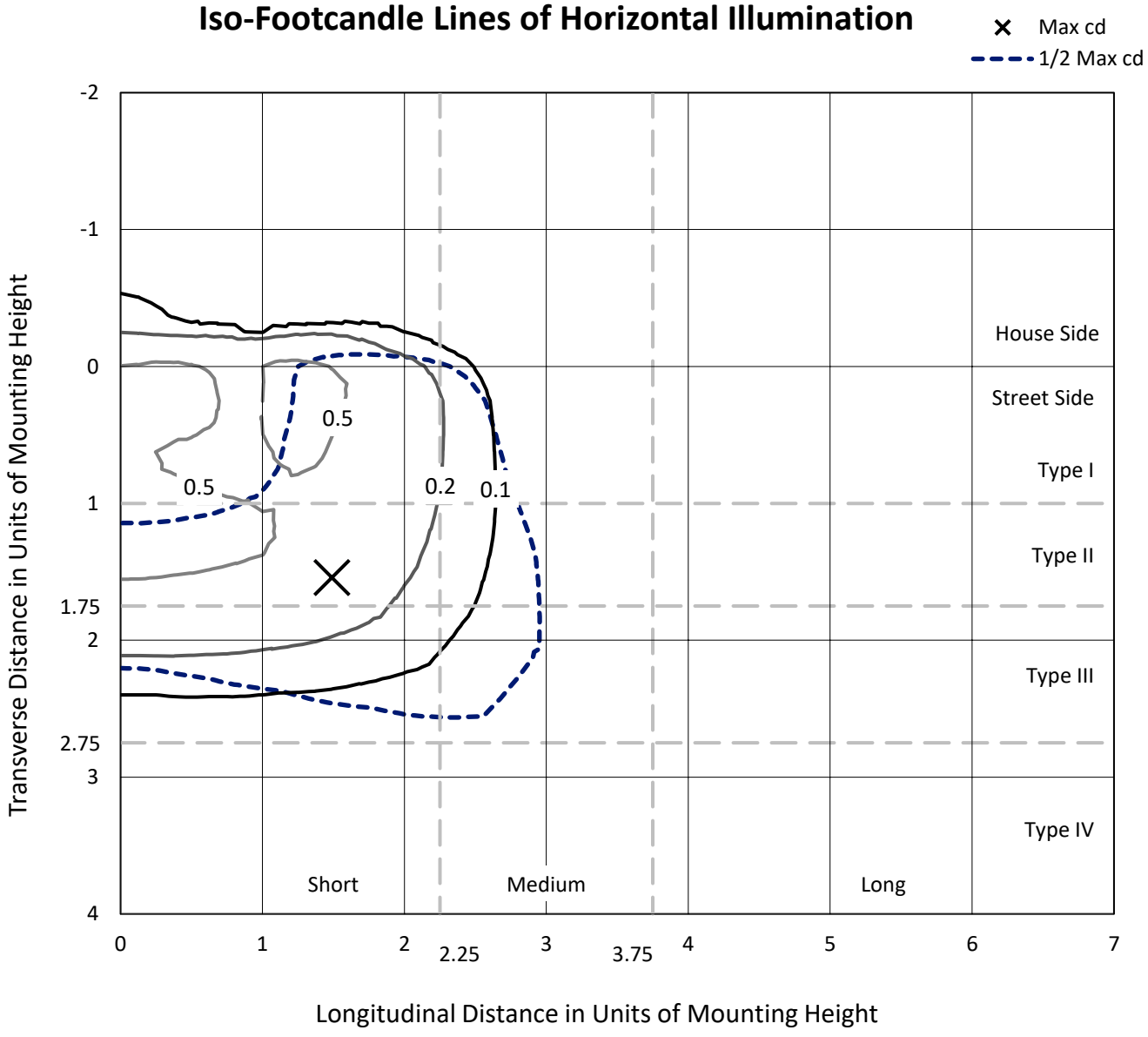
Scaled Data Report

REPORT NUMBER: P438632
CATALOG NUMBER: IST-SA1D-830-U-T4W-HSS

## Iso-Footcandle Lines of Horizontal Illumination




Based on 25 foot mounting height. Maximum calculated value = 0.7 fc
Type III - Short - N/A

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REPORT NUMBER: P438632
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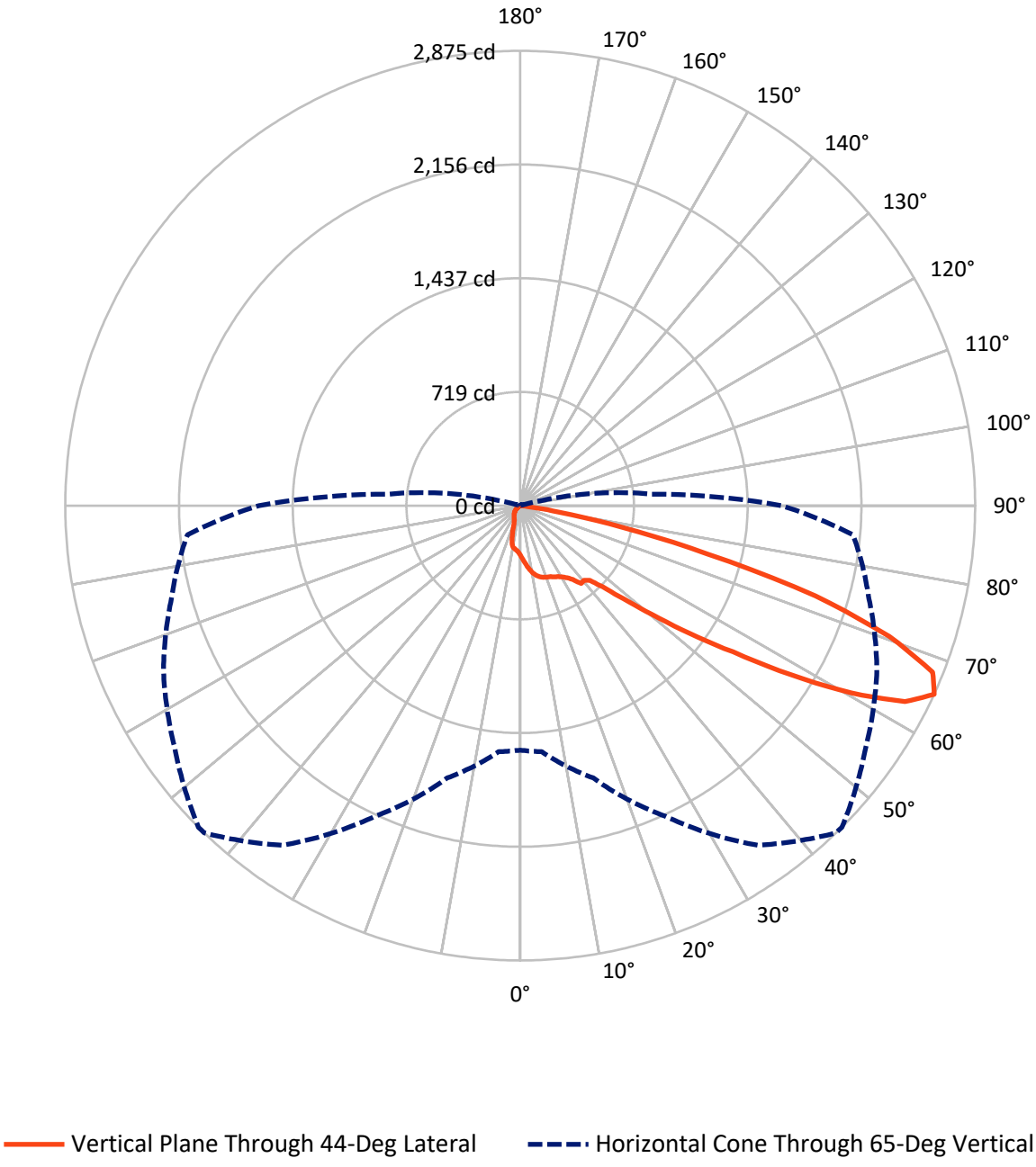
## Luminous Intensity Polar Plot



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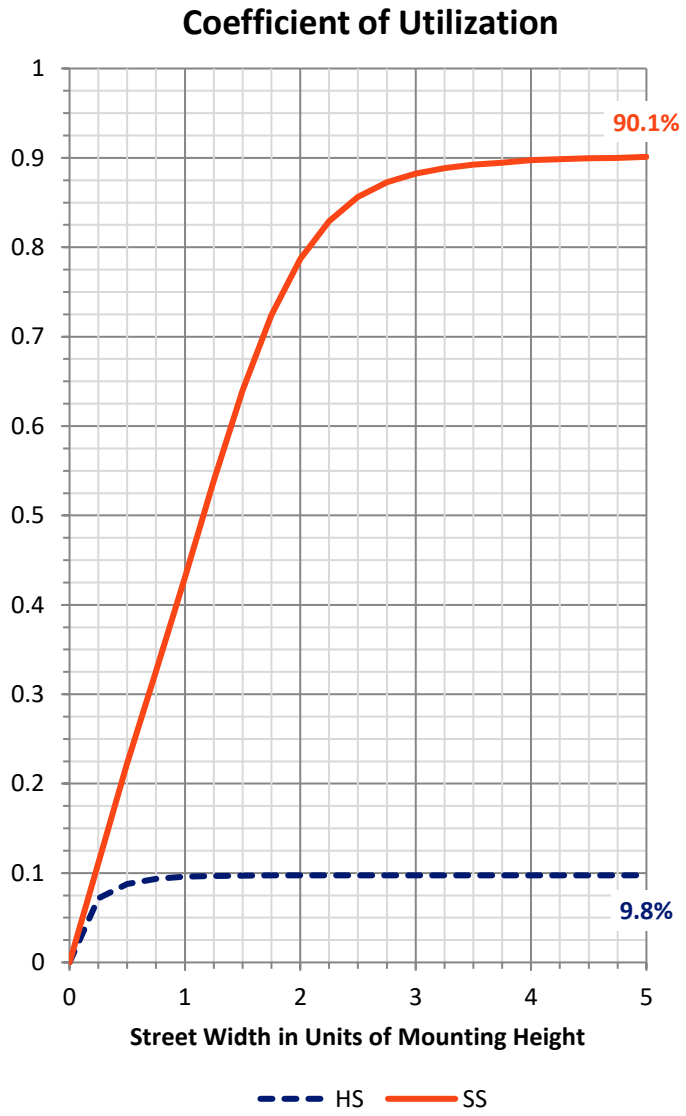
**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 325.1 | 0.0 | 325.1 |
| | % Fixture | 9.8 | 0.0 | 9.8 |
| **Street Side** | Lumens | 2979.9 | 0.0 | 2979.9 |
| | % Fixture | 90.2 | 0.0 | 90.2 |
| **Total** | Lumens | 3305.0 | 0.0 | 3305.0 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 31.9 | 1.0 |
| 10°-20° | 96.2 | 2.9 |
| 20°-30° | 154.0 | 4.7 |
| 30°-40° | 228.7 | 6.9 |
| 40°-50° | 417.0 | 12.6 |
| 50°-60° | 874.2 | 26.5 |
| 60°-70° | 1112.7 | 33.7 |
| 70°-80° | 373.5 | 11.3 |
| 80°-90° | 16.7 | 0.5 |
| 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° | 3305.0 | 100.0 |
| 0°-180° | 3305.0 | 100.0 |



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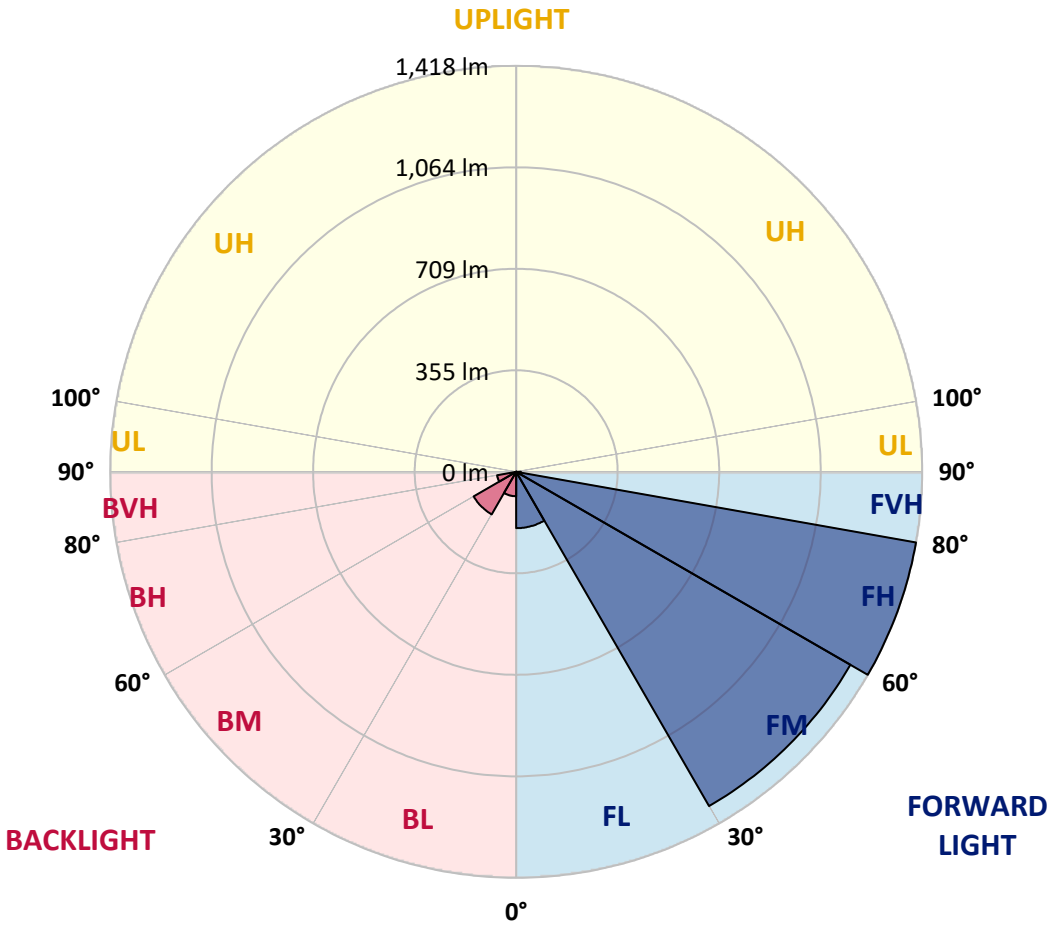
REPORT NUMBER: P438632
CATALOG NUMBER: IST-SA1D-830-U-T4W-HSS

## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 196.8 | 6.0 | | | |
| FM | (30°-60°) | 1348.4 | 40.8 | | | |
| FH | (60°-80°) | 1418.4 | 42.9 | | | G1/1800 |
| FVH | (80°-90°) | 16.3 | 0.5 | | | G1/100 |
| BL | (0°-30°) | 85.4 | 2.6 | B0/110 | | |
| BM | (30°-60°) | 171.5 | 5.2 | B0/220 | | |
| BH | (60°-80°) | 67.8 | 2.1 | B0/110 | | G0/110 |
| BVH | (80°-90°) | 0.5 | 0.0 | | | G0/10 |
| UL | (90°-100°) | 0.0 | 0.0 | | U0/0 | |
| UH | (100°-180°) | 0.0 | 0.0 | | U0/0 | |

**BUG Rating: B0-U0-G1**
Type III Short



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Scaled Data Report

REPORT NUMBER: P438632
CATALOG NUMBER: IST-SA1D-830-U-T4W-HSS

**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 44° | 45° | 55° | 65° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 314.8 | 314.8 | 314.8 | 314.8 | 314.8 | *314.8* | 314.8 | 314.8 | 314.8 | 314.8 | 314.8 |
| 2.5° | 354.8 | 356.4 | 350.0 | 351.6 | 348.4 | *342.0* | 340.4 | 335.6 | 329.2 | 324.4 | 319.6 |
| 5° | 401.1 | 399.5 | 396.3 | 389.9 | 381.9 | *372.3* | 369.2 | 359.6 | 348.4 | 335.6 | 326.0 |
| 7.5° | 439.5 | 439.5 | 434.7 | 428.3 | 415.5 | *402.7* | 399.5 | 386.7 | 370.7 | 353.2 | 335.6 |
| 10° | 473.0 | 471.4 | 466.6 | 458.6 | 442.7 | *431.5* | 426.7 | 410.7 | 391.5 | 372.3 | 351.6 |
| 12.5° | 498.6 | 498.6 | 492.2 | 481.0 | 463.4 | *452.2* | 449.1 | 434.7 | 415.5 | 393.1 | 364.4 |
| 15° | 513.0 | 511.4 | 506.6 | 492.2 | 479.4 | *466.6* | 465.0 | 452.2 | 436.3 | 412.3 | 381.9 |
| 17.5° | 513.0 | 514.6 | 506.6 | 498.6 | 487.4 | *476.2* | 474.6 | 465.0 | 449.1 | 428.3 | 396.3 |
| 20° | 506.6 | 506.6 | 500.2 | 493.8 | 487.4 | *482.6* | 481.0 | 474.6 | 461.8 | 444.3 | 412.3 |
| 22.5° | 498.6 | 497.0 | 495.4 | 490.6 | 489.0 | *487.4* | 489.0 | 485.8 | 477.8 | 458.6 | 428.3 |
| 25° | 497.0 | 495.4 | 492.2 | 489.0 | 490.6 | *498.6* | 498.6 | 500.2 | 492.2 | 476.2 | 447.5 |
| 27.5° | 503.4 | 503.4 | 498.6 | 493.8 | 497.0 | *508.2* | 508.2 | 513.0 | 508.2 | 497.0 | 468.2 |
| 30° | 530.6 | 524.2 | 516.2 | 506.6 | 509.8 | *522.6* | 524.2 | 533.8 | 533.8 | 525.8 | 501.8 |
| 32.5° | 567.3 | 560.9 | 540.1 | 527.4 | 527.4 | *543.3* | 543.3 | 559.3 | 573.7 | 557.7 | 521.0 |
| 35° | 596.1 | 592.9 | 568.9 | 552.9 | 557.7 | *572.1* | 576.9 | 602.5 | 615.3 | 575.3 | 530.6 |
| 37.5° | 692.0 | 687.2 | 640.8 | 581.7 | 584.9 | *624.8* | 628.0 | 639.2 | 628.0 | 583.3 | 549.7 |
| 40° | 819.8 | 823.0 | 775.1 | 677.6 | 602.5 | *620.0* | 620.0 | 639.2 | 645.6 | 618.4 | 596.1 |
| 42.5° | 1013.2 | 994.0 | 946.0 | 813.4 | 680.8 | *645.6* | 647.2 | 674.4 | 707.9 | 692.0 | 695.2 |
| 45° | 1181.0 | 1166.6 | 1115.4 | 987.6 | 807.0 | *730.3* | 723.9 | 759.1 | 824.6 | 839.0 | 875.7 |
| 47.5° | 1329.6 | 1315.2 | 1292.8 | 1173.0 | 995.6 | *878.9* | 855.0 | 890.1 | 1003.6 | 1078.7 | 1104.3 |
| 50° | 1508.6 | 1511.8 | 1460.6 | 1391.9 | 1201.7 | *1078.7* | 1072.3 | 1073.9 | 1252.9 | 1315.2 | 1352.0 |
| 52.5° | 1735.5 | 1730.7 | 1641.2 | 1604.4 | 1487.8 | *1340.8* | 1304.0 | 1326.4 | 1503.8 | 1548.5 | 1609.2 |
| 55° | 1896.9 | 1892.1 | 1849.0 | 1842.6 | 1804.2 | *1631.6* | 1622.0 | 1620.4 | 1780.2 | 1799.4 | 1871.3 |
| 57.5° | 1991.2 | 1999.2 | 2029.5 | 2111.0 | 2143.0 | *2018.3* | 1991.2 | 1938.4 | 2027.9 | 2023.1 | 2101.4 |
| 60° | 2007.2 | 2019.9 | 2106.2 | 2293.2 | 2472.2 | *2405.1* | 2368.3 | 2230.9 | 2254.9 | 2214.9 | 2262.8 |
| 62.5° | 1877.7 | 1914.5 | 2067.9 | 2331.6 | 2638.4 | *2727.9* | 2697.5 | 2485.0 | 2429.0 | 2345.9 | 2285.2 |
| 65° | *1545.3* | *1561.3* | *1781.8* | *2165.4* | *2620.8* | *2874.9* | *2874.9* | *2665.6* | *2486.6* | *2282.0* | *2111.0* |
| 67.5° | 1067.5 | 1075.5 | 1344.0 | 1746.7 | 2352.3 | *2811.0* | 2835.0 | 2662.4 | 2385.9 | 2031.1 | 1721.1 |
| 70° | 605.7 | 650.4 | 813.4 | 1220.9 | 1853.7 | *2475.4* | 2501.0 | 2422.7 | 1997.6 | 1505.4 | 1128.2 |
| 72.5° | 252.5 | 281.3 | 396.3 | 711.1 | 1260.9 | *1949.6* | 1994.4 | 1920.9 | 1492.6 | 918.9 | 533.8 |
| 75° | 78.3 | 81.5 | 131.0 | 310.0 | 688.8 | *1224.1* | 1299.2 | 1296.0 | 891.7 | 429.9 | 217.3 |
| 77.5° | 43.1 | 44.7 | 62.3 | 126.2 | 302.0 | *653.6* | 699.9 | 661.6 | 441.1 | 185.4 | 67.1 |
| 80° | 20.8 | 22.4 | 33.6 | 60.7 | 132.6 | *244.5* | 287.6 | 266.9 | 153.4 | 87.9 | 22.4 |
| 82.5° | 6.4 | 8.0 | 16.0 | 27.2 | 52.7 | *57.5* | 57.5 | 102.3 | 78.3 | 57.5 | 11.2 |
| 85° | 0.0 | 0.0 | 4.8 | 9.6 | 9.6 | *9.6* | 9.6 | 22.4 | 36.8 | 35.2 | 4.8 |
| 87.5° | 0.0 | 0.0 | 0.0 | 0.0 | 1.6 | *1.6* | 1.6 | 1.6 | 1.6 | 3.2 | 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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Scaled Data Report

REPORT NUMBER: P438632
CATALOG NUMBER: IST-SA1D-830-U-T4W-HSS

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 314.8 | 314.8 | 314.8 | 314.8 | 314.8 | 314.8 | 314.8 | 314.8 | 314.8 | 314.8 | 314.8 |
| 2.5° | 316.4 | 314.8 | 308.4 | 302.0 | 298.8 | 295.6 | 292.4 | 289.2 | 289.2 | 290.8 | 289.2 |
| 5° | 319.6 | 314.8 | 305.2 | 295.6 | 289.2 | 284.5 | 278.1 | 276.5 | 274.9 | 276.5 | 276.5 |
| 7.5° | 327.6 | 321.2 | 306.8 | 292.4 | 282.9 | 274.9 | 270.1 | 268.5 | 265.3 | 265.3 | 265.3 |
| 10° | 340.4 | 329.2 | 310.0 | 294.0 | 281.3 | 270.1 | 255.7 | 239.7 | 230.1 | 223.7 | 218.9 |
| 12.5° | 353.2 | 340.4 | 314.8 | 295.6 | 281.3 | 249.3 | 214.1 | 183.8 | 167.8 | 159.8 | 158.2 |
| 15° | 367.6 | 351.6 | 324.4 | 302.0 | 263.7 | 204.6 | 156.6 | 131.0 | 124.6 | 124.6 | 123.1 |
| 17.5° | 378.7 | 364.4 | 332.4 | 303.6 | 231.7 | 153.4 | 118.3 | 110.3 | 111.9 | 115.1 | 115.1 |
| 20° | 396.3 | 378.7 | 343.6 | 289.2 | 179.0 | 115.1 | 103.9 | 105.5 | 107.1 | 108.7 | 110.3 |
| 22.5° | 412.3 | 393.1 | 356.4 | 257.3 | 131.0 | 99.1 | 99.1 | 100.7 | 102.3 | 103.9 | 105.5 |
| 25° | 431.5 | 413.9 | 369.2 | 210.9 | 100.7 | 91.1 | 92.7 | 95.9 | 97.5 | 99.1 | 99.1 |
| 27.5° | 453.8 | 434.7 | 369.2 | 166.2 | 87.9 | 84.7 | 84.7 | 87.9 | 89.5 | 92.7 | 92.7 |
| 30° | 484.2 | 463.4 | 359.6 | 123.1 | 81.5 | 78.3 | 76.7 | 79.9 | 81.5 | 84.7 | 84.7 |
| 32.5° | 503.4 | 490.6 | 338.8 | 92.7 | 75.1 | 71.9 | 70.3 | 70.3 | 71.9 | 75.1 | 75.1 |
| 35° | 522.6 | 516.2 | 306.8 | 79.9 | 70.3 | 67.1 | 63.9 | 60.7 | 60.7 | 60.7 | 60.7 |
| 37.5° | 552.9 | 562.5 | 260.5 | 73.5 | 67.1 | 62.3 | 57.5 | 52.7 | 49.5 | 47.9 | 46.3 |
| 40° | 615.3 | 623.2 | 214.1 | 68.7 | 62.3 | 57.5 | 49.5 | 43.1 | 38.4 | 35.2 | 35.2 |
| 42.5° | 712.7 | 706.3 | 163.0 | 65.5 | 57.5 | 51.1 | 41.5 | 35.2 | 28.8 | 25.6 | 25.6 |
| 45° | 882.1 | 810.2 | 119.9 | 60.7 | 54.3 | 46.3 | 35.2 | 27.2 | 20.8 | 19.2 | 19.2 |
| 47.5° | 1089.9 | 930.1 | 91.1 | 57.5 | 49.5 | 40.0 | 27.2 | 20.8 | 16.0 | 14.4 | 14.4 |
| 50° | 1313.6 | 1053.1 | 75.1 | 52.7 | 44.7 | 33.6 | 22.4 | 14.4 | 11.2 | 11.2 | 11.2 |
| 52.5° | 1524.5 | 1136.2 | 62.3 | 47.9 | 38.4 | 27.2 | 16.0 | 11.2 | 9.6 | 9.6 | 9.6 |
| 55° | 1721.1 | 1187.4 | 51.1 | 41.5 | 32.0 | 20.8 | 12.8 | 9.6 | 8.0 | 6.4 | 6.4 |
| 57.5° | 1855.3 | 1179.4 | 41.5 | 33.6 | 24.0 | 14.4 | 9.6 | 8.0 | 6.4 | 4.8 | 4.8 |
| 60° | 1901.7 | 1109.1 | 32.0 | 27.2 | 17.6 | 11.2 | 8.0 | 6.4 | 4.8 | 3.2 | 3.2 |
| 62.5° | 1836.2 | 970.0 | 25.6 | 20.8 | 12.8 | 9.6 | 6.4 | 4.8 | 3.2 | 1.6 | 1.6 |
| 65° | *1652.4* | *834.2* | *19.2* | *14.4* | *9.6* | *6.4* | *4.8* | *3.2* | *1.6* | *0.0* | *0.0* |
| 67.5° | 1315.2 | 647.2 | 16.0 | 9.6 | 6.4 | 4.8 | 3.2 | 1.6 | 0.0 | 0.0 | 0.0 |
| 70° | 823.0 | 405.9 | 12.8 | 6.4 | 4.8 | 3.2 | 1.6 | 0.0 | 0.0 | 0.0 | 0.0 |
| 72.5° | 399.5 | 199.8 | 9.6 | 4.8 | 3.2 | 1.6 | 1.6 | 0.0 | 0.0 | 0.0 | 0.0 |
| 75° | 148.6 | 65.5 | 8.0 | 4.8 | 1.6 | 1.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 77.5° | 47.9 | 22.4 | 6.4 | 4.8 | 3.2 | 1.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 80° | 17.6 | 9.6 | 3.2 | 1.6 | 1.6 | 1.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 82.5° | 8.0 | 4.8 | 1.6 | 1.6 | 1.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 85° | 3.2 | 3.2 | 1.6 | 1.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 87.5° | 1.6 | 1.6 | 1.6 | 0.0 | 0.0 | 0.0 | 0.0 | 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 |

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

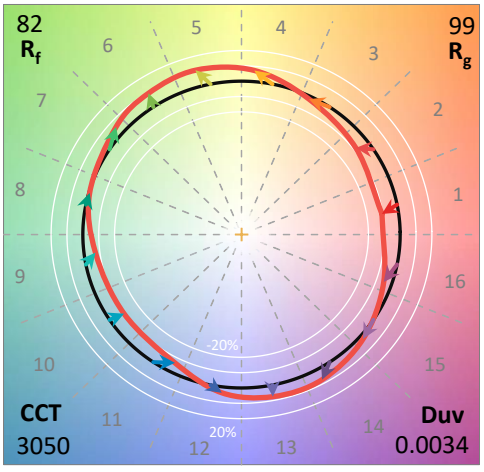
## Test Information

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

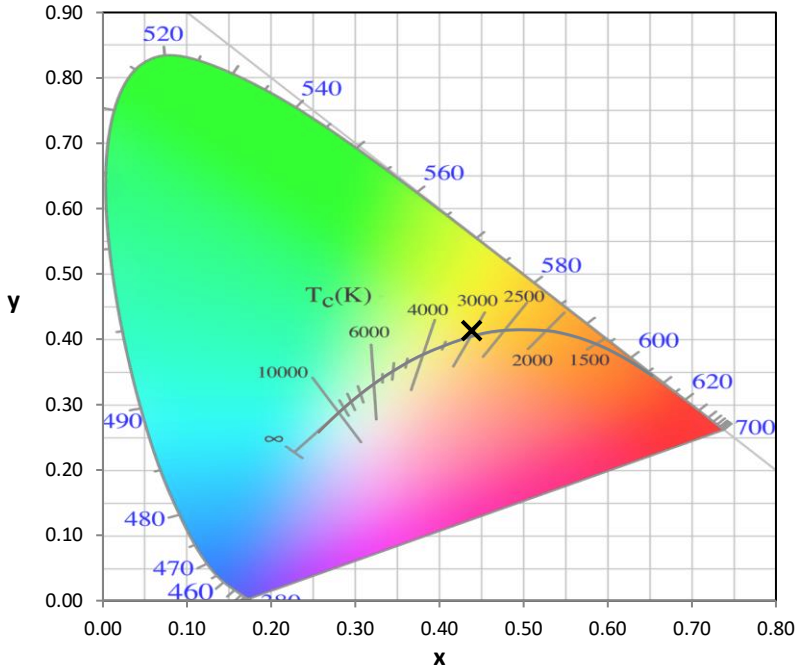
| | |
|---|---|
| Stabilization Time: | 20M |
| Operation Time: | 1H 20M |
| Sphere Temperature (°C): | 24.2 |

REPORT NUMBER: SP1-2408-195-9

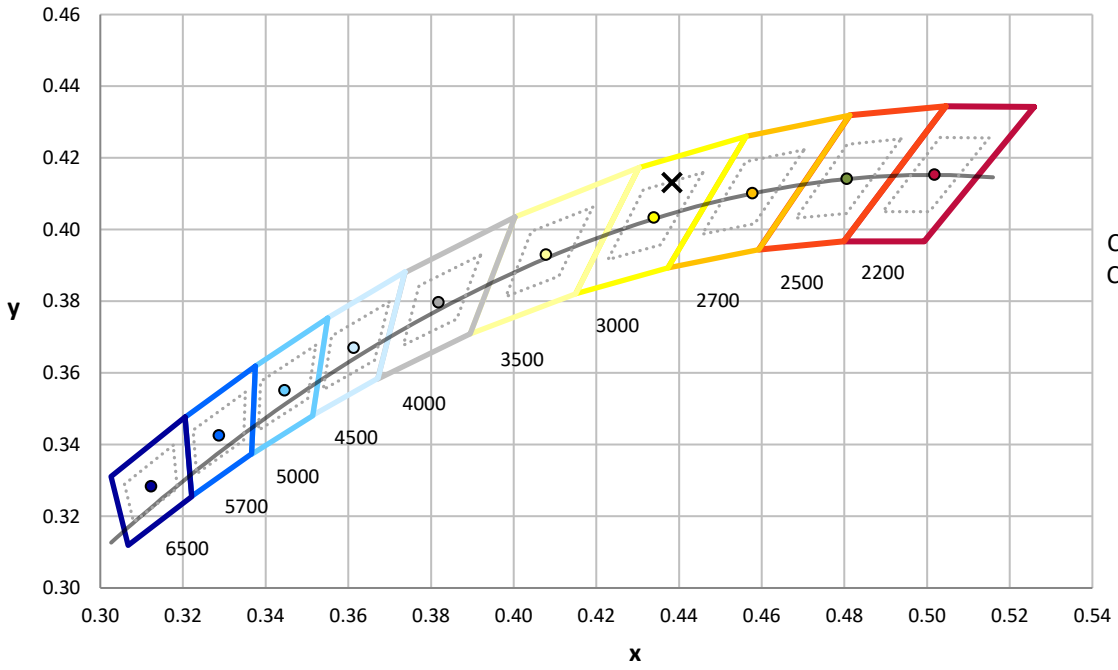
| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 6/18/2024 | 12/18/2024 |
| Power Meter | INXT2011004 | 2/8/2024 | 2/8/2025 |
| AC Power Source | IN0063 | 10/24/2023 | 10/24/2024 |
| DC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

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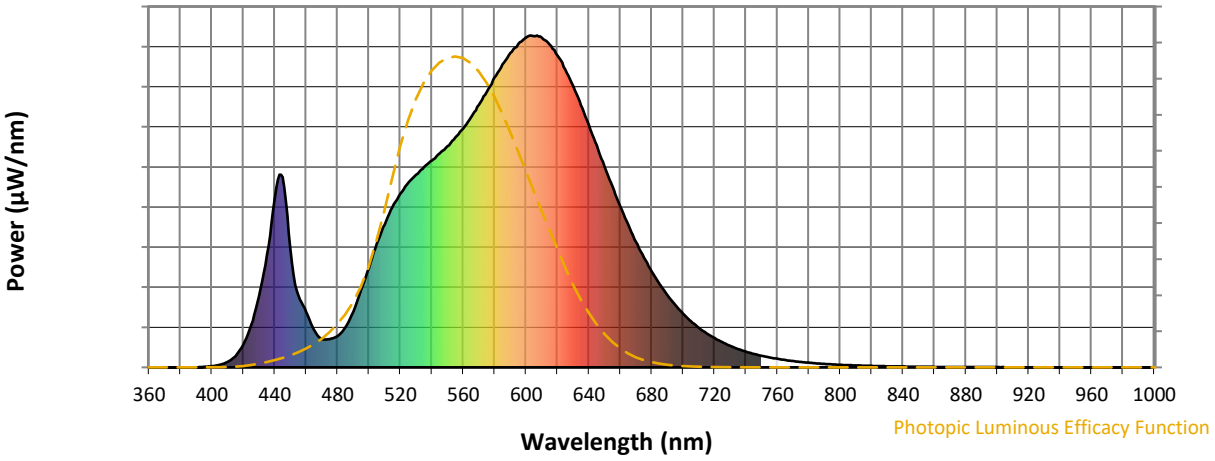
## Photopic Flux vs. Wavelength




## 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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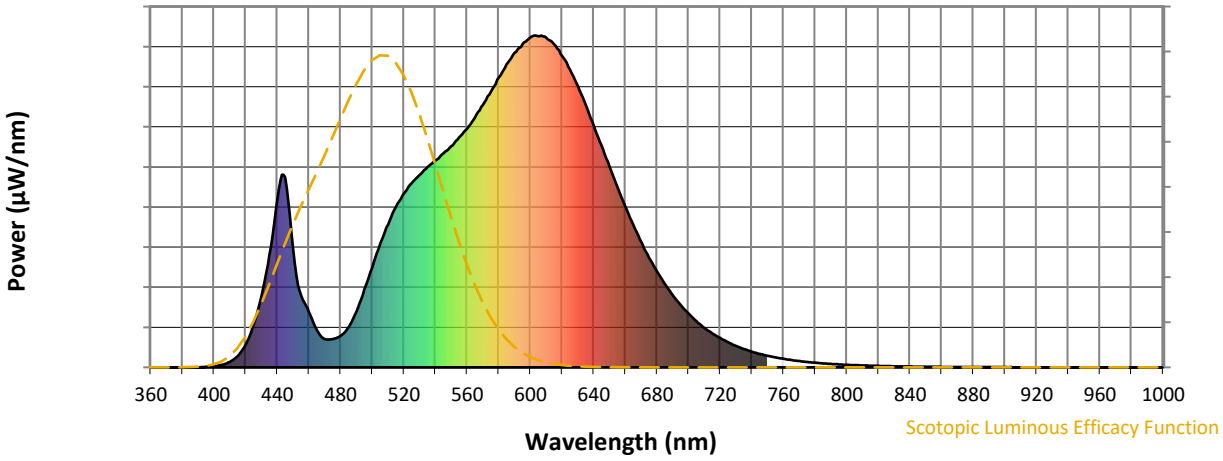
## Scotopic Flux vs. Wavelength




**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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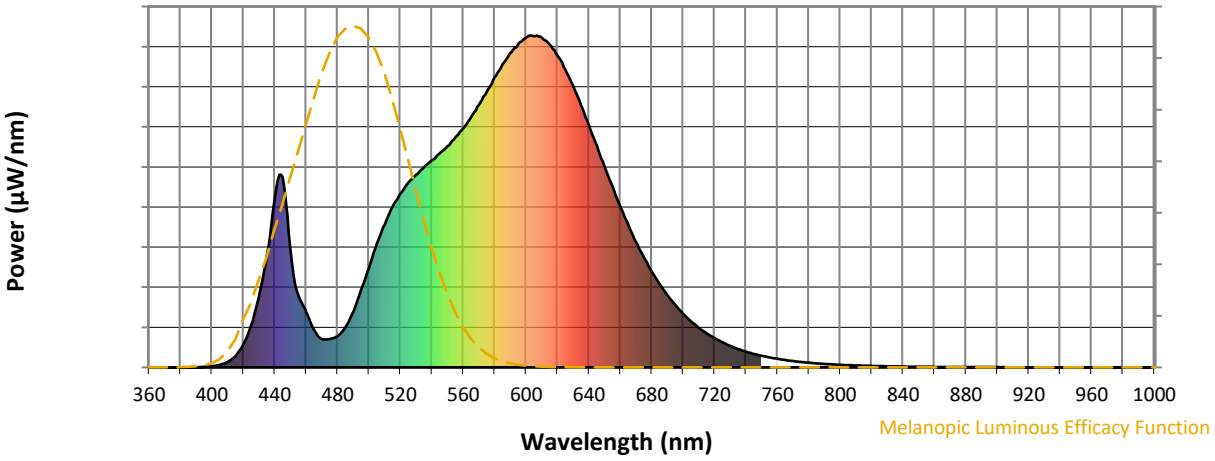
## Melanopic Flux vs. Wavelength




**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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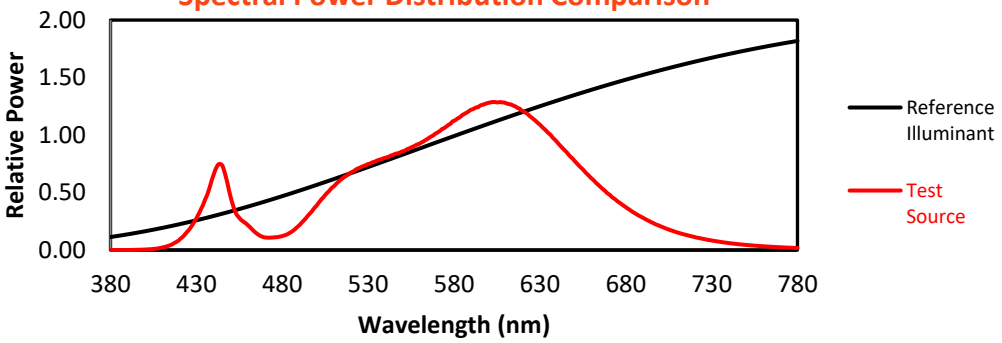
# TM-30-18

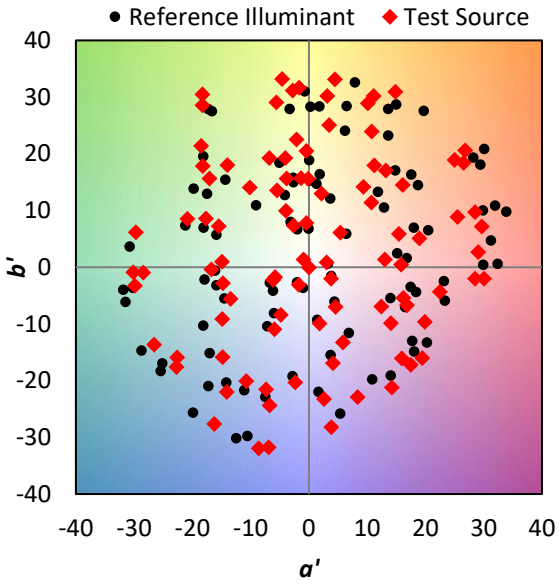
## Summary

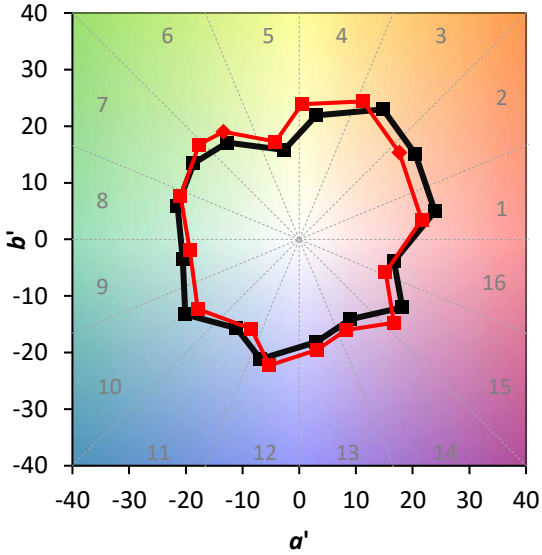
$R_f$ = 81.5
$R_g$ = 99.2
CIE $R_a$ = 81.0
$R_9$ = 7.1

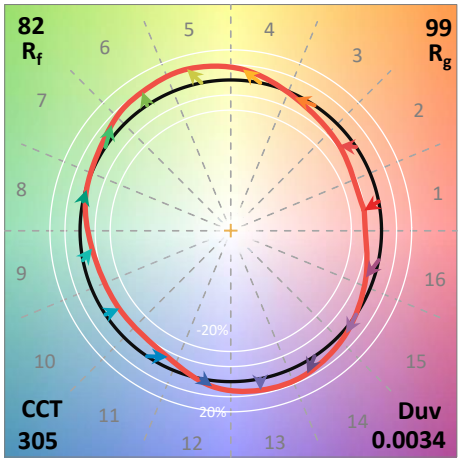
## Spectral Power Distribution Comparison

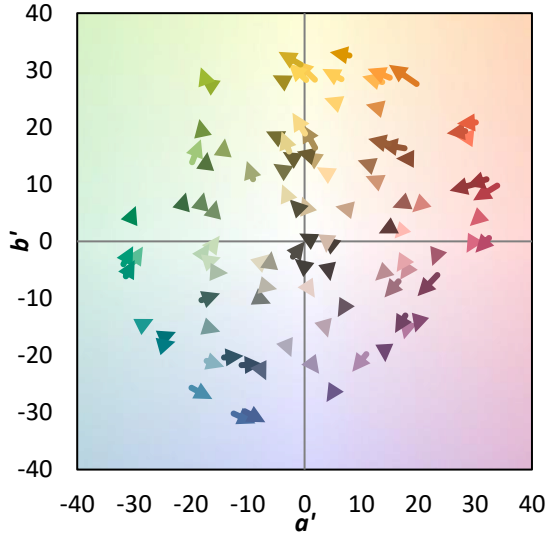



## Color Vector Graphics



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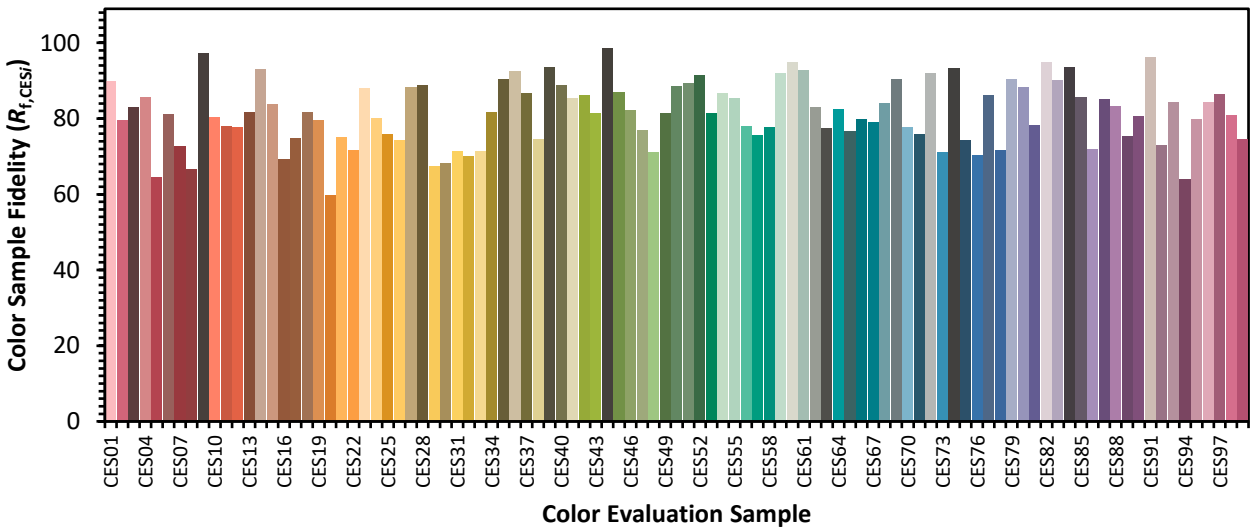
# TM-30-18

**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 | |



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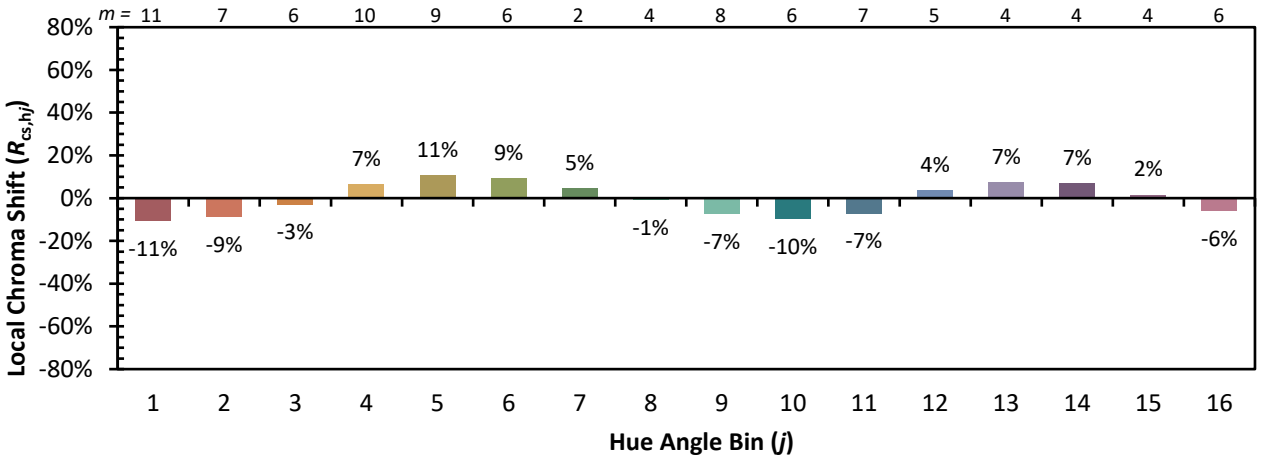
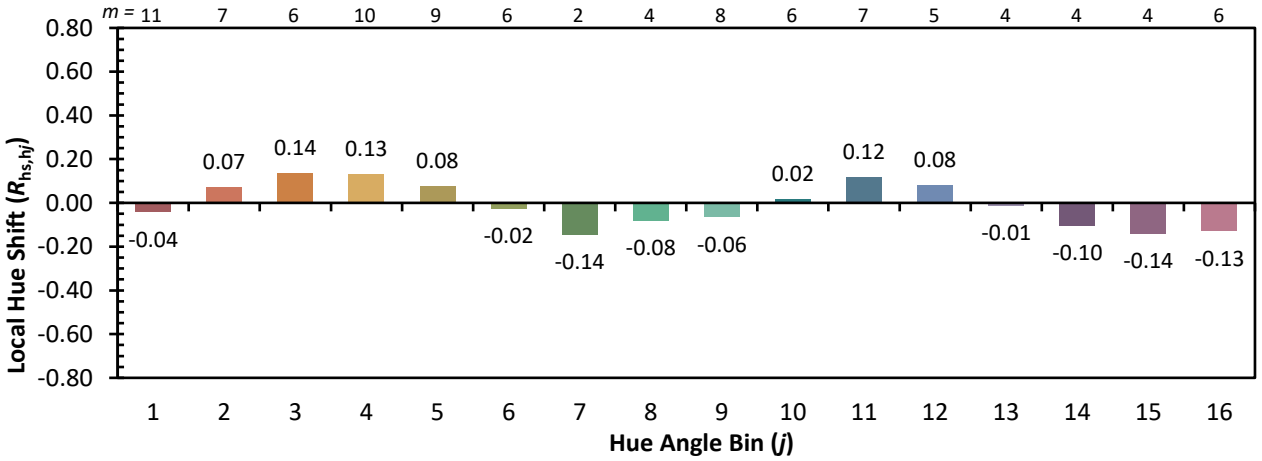
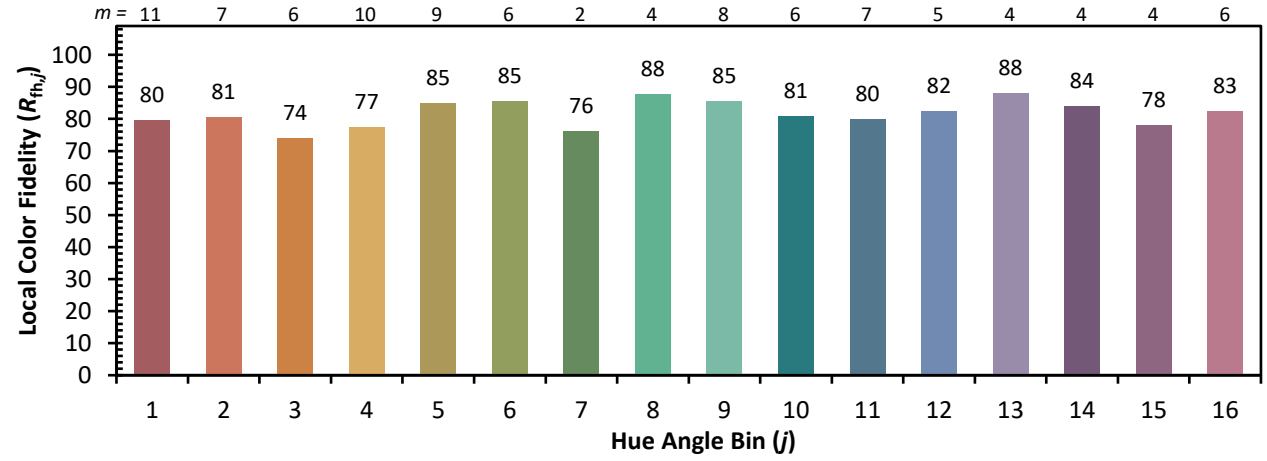
# TM-30-18

## Color Rendition by Hue-Angle Bin



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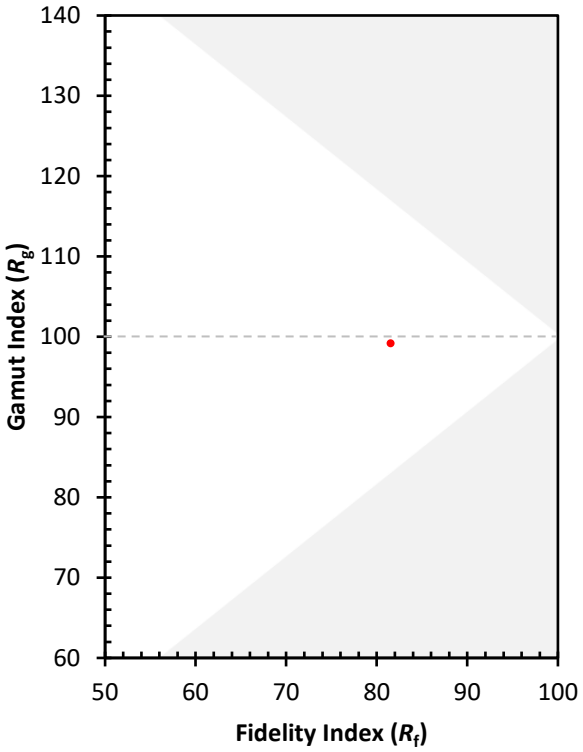
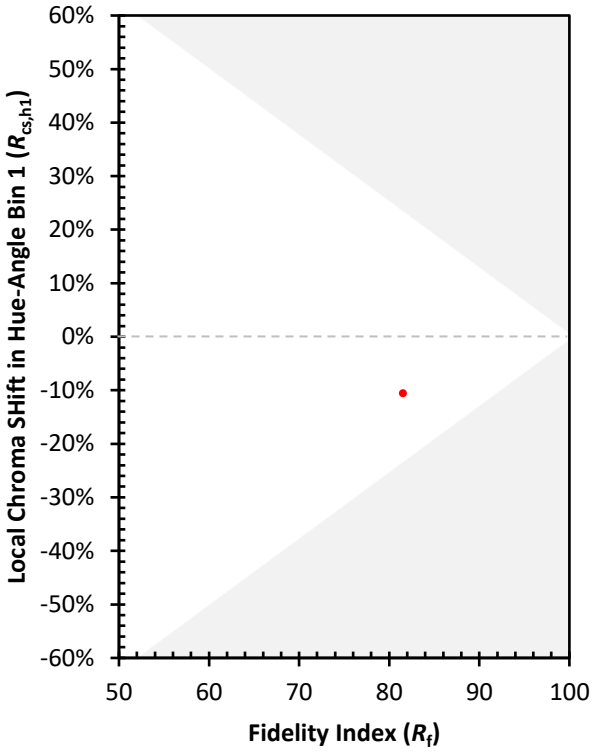
## TM-30-18

### Measure Comparisons




(END OF REPORT)