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: STREETWORKS

Report Number: P870282

Luminaire Tested: **MEM2-HSN-SA-100-840-U-T2R-HSS**

Issue Date: 09/05/2024

Report Generated By 670245763

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: | P870282 |
| Test Lab: | INNOVATION CENTER(G3) |
| Issue Date: | 09/05/2024 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS (FORMERLY EATON) |
| Product Line: | STREETWORKS |
| Catalog Number: | MEM2-HSN-SA-100-840-U-T2R-HSS |
| Description: | EPIC MODERN SHORT HOUSING DISCRETE LED ARRAYS 100W 80CRI 4000K FIXTURE w/ TYPE II ROADWAY DISTRIBUTION OPTIC AND HOUSE SIDE SHIELD |
| Light Source: | (20) 4000K CCT, 80 CRI LEDS |
| Ballast/Driver: | ELECTRONIC DRIVER |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 9329.4 lumens |
| Efficiency: | N/A |
| Efficacy: | 92.4 lumens/watt |
| Luminous Opening: | Rectangular (W 0.67' x L: 0.33' x H: 0') |
| IES Classification: | Type II - Short |
| BUG Rating: | B1 - U0 - G2 |

| | |
|---|---|
| Input Watts (W): | 101 |
| Input Voltage (V): | 120 |
| Input Current (Ain): | NR |
| Voltage Rise (V): | NR |
| Power Factor: | 0.99 |
| Total Harmonic Distortion (THDi): | 9.45% |
| Frequency (hertz): | 60 |
| Stabilization Time: | NR |
| Operation Time: | NR |
| Ambient Temperature (°C): | NR |
| Test Distance: | 24 FT |

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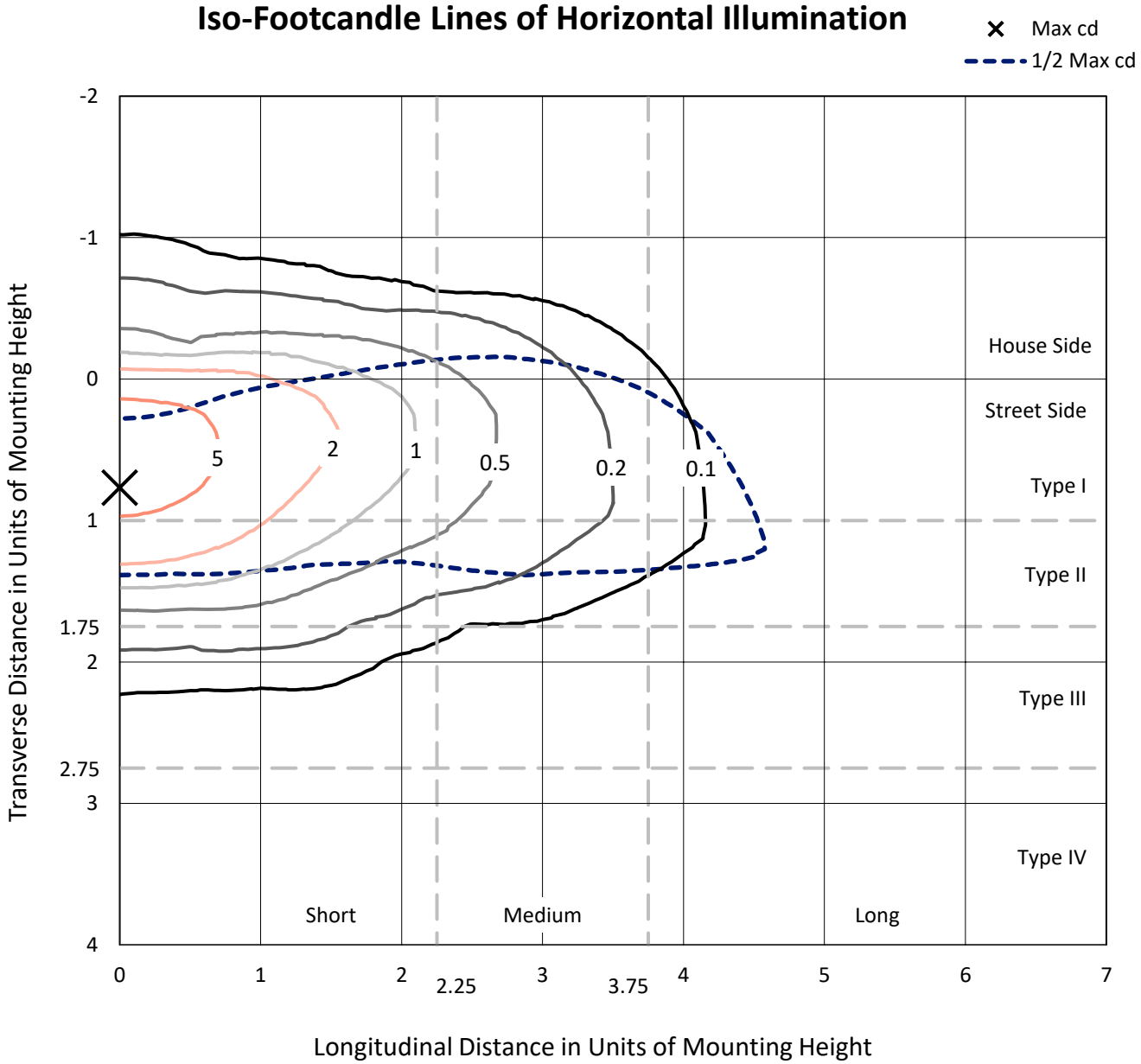
Scaled Data Report

REPORT NUMBER: P870282
CATALOG NUMBER: MEM2-HSN-SA-100-840-U-T2R-HSS

## Iso-Footcandle Lines of Horizontal Illumination




Based on 20 foot mounting height. Maximum calculated value = 8 fc
Type II - Short - N/A

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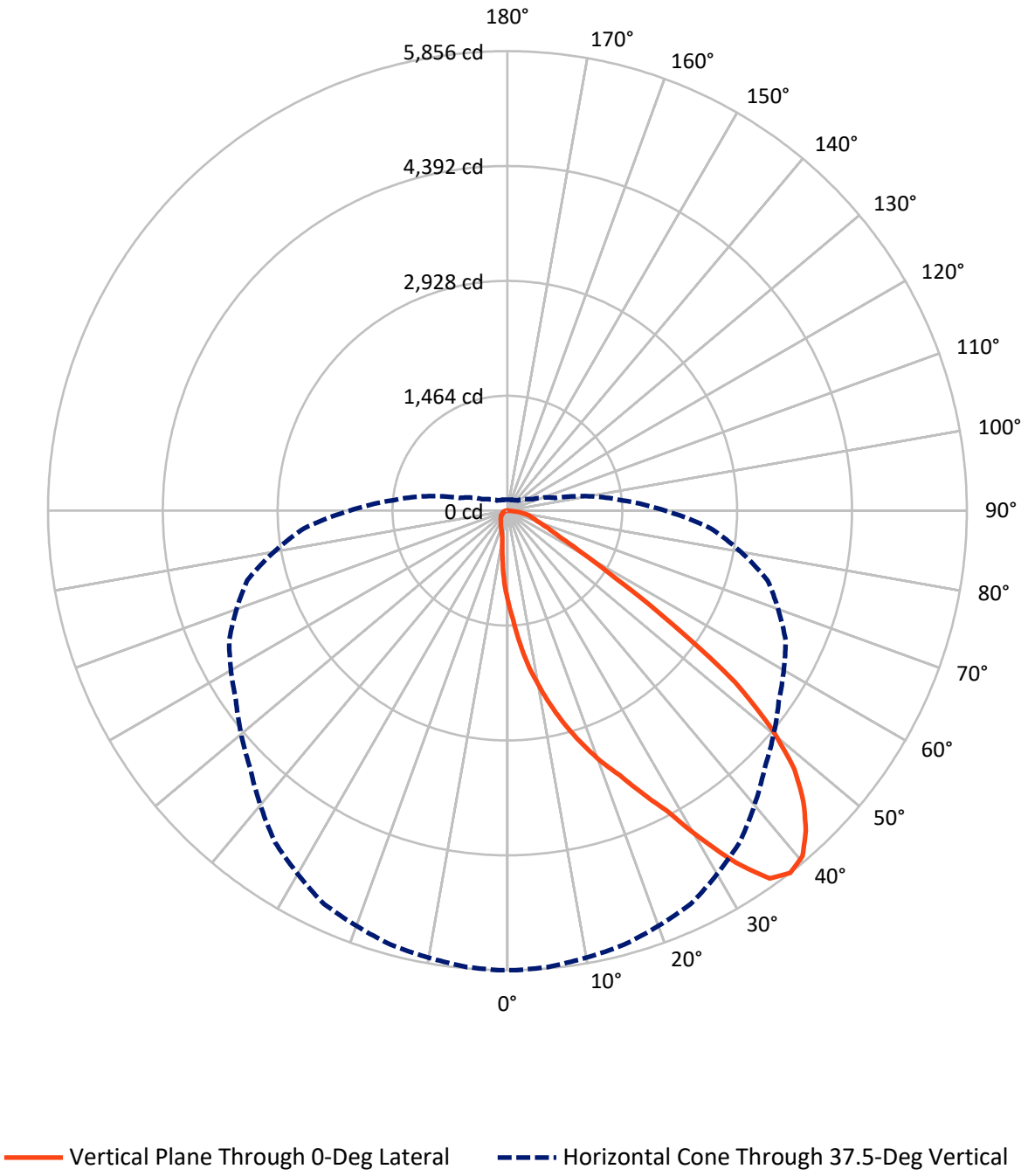
## Luminous Intensity Polar Plot



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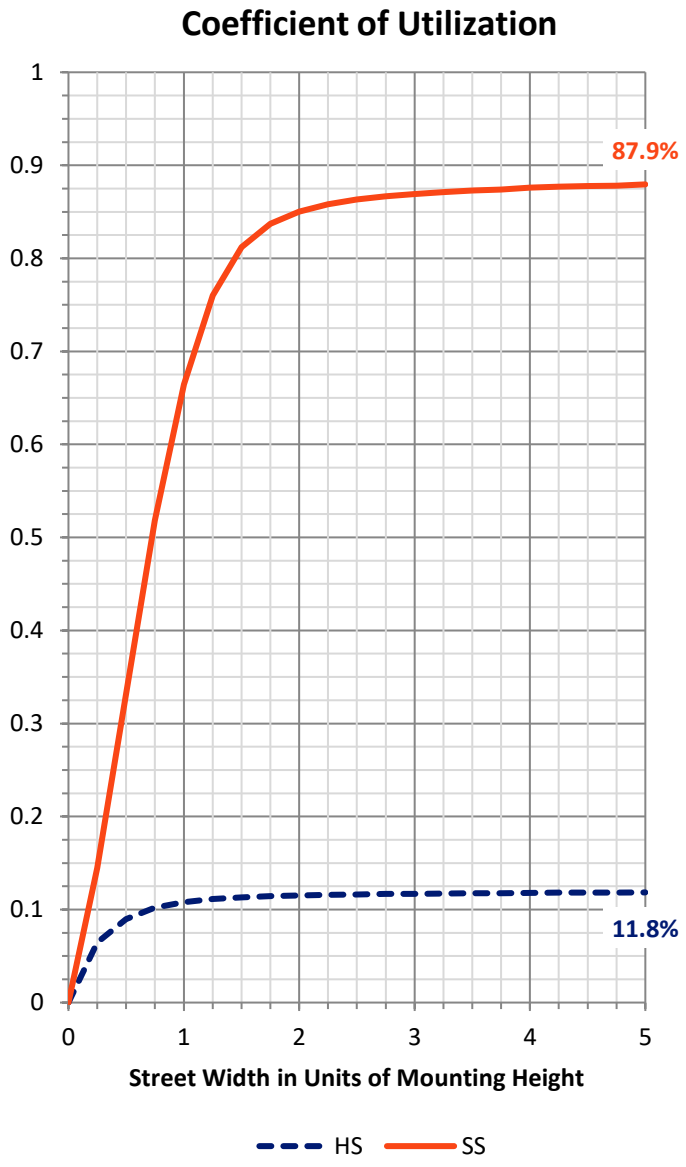
REPORT NUMBER: P870282
CATALOG NUMBER: MEM2-HSN-SA-100-840-U-T2R-HSS

**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 1112.7 | 0.0 | 1112.7 |
| | % Fixture | 11.9 | 0.0 | 11.9 |
| **Street Side** | Lumens | 8216.7 | 0.0 | 8216.7 |
| | % Fixture | 88.1 | 0.0 | 88.1 |
| **Total** | Lumens | 9329.4 | 0.0 | 9329.4 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 116.0 | 1.2 |
| 10°-20° | 405.4 | 4.3 |
| 20°-30° | 836.5 | 9.0 |
| 30°-40° | 1471.8 | 15.8 |
| 40°-50° | 1998.4 | 21.4 |
| 50°-60° | 1979.9 | 21.2 |
| 60°-70° | 1524.3 | 16.3 |
| 70°-80° | 884.7 | 9.5 |
| 80°-90° | 112.5 | 1.2 |
| 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° | 9329.4 | 100.0 |
| 0°-180° | 9329.4 | 100.0 |



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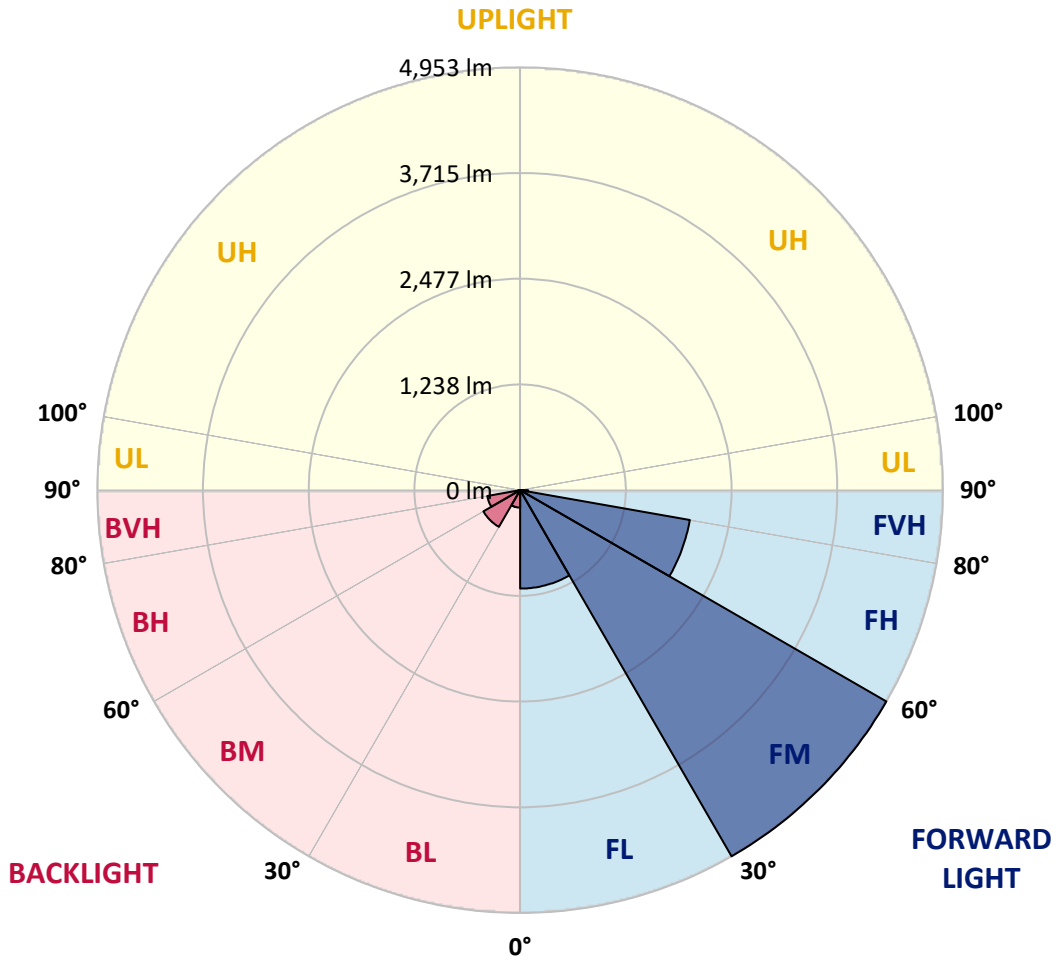
REPORT NUMBER: P870282
CATALOG NUMBER: MEM2-HSN-SA-100-840-U-T2R-HSS

## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 1153.3 | 12.4 | | | |
| FM | (30°-60°) | 4953.1 | 53.1 | | | |
| FH | (60°-80°) | 2018.5 | 21.6 | | | G2/5000 |
| FVH | (80°-90°) | 91.8 | 1.0 | | | G1/100 |
| BL | (0°-30°) | 204.6 | 2.2 | B1/500 | | |
| BM | (30°-60°) | 497.0 | 5.3 | B1/1000 | | |
| BH | (60°-80°) | 390.4 | 4.2 | B1/500 | | G1/500 |
| BVH | (80°-90°) | 20.7 | 0.2 | | | 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 Short



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REPORT NUMBER: P870282
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**CANDELA DISTRIBUTION (FULL):**

| | 0° | 1° | 5° | 15° | 25° | 35° | 45° | 55° | 65° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 1156.0 | 1156.0 | 1156.0 | 1156.0 | 1156.0 | 1156.0 | 1156.0 | 1156.0 | 1156.0 | 1156.0 | 1156.0 |
| 2.5° | 1393.0 | 1413.8 | 1398.2 | 1385.2 | 1366.9 | 1348.7 | 1322.7 | 1294.0 | 1257.6 | 1213.3 | 1174.3 |
| 5° | 1708.0 | 1718.4 | 1713.2 | 1705.4 | 1648.1 | 1593.5 | 1538.8 | 1471.1 | 1377.4 | 1294.0 | 1205.5 |
| 7.5° | 2023.1 | 2017.9 | 2004.8 | 1981.4 | 1929.3 | 1866.9 | 1767.9 | 1656.0 | 1523.2 | 1377.4 | 1239.4 |
| 10° | 2299.1 | 2306.9 | 2296.5 | 2260.0 | 2194.9 | 2109.0 | 1989.2 | 1861.6 | 1682.0 | 1478.9 | 1286.2 |
| 12.5° | 2588.1 | 2593.3 | 2593.3 | 2515.2 | 2470.9 | 2338.1 | 2210.5 | 2038.7 | 1838.2 | 1603.9 | 1340.9 |
| 15° | 2871.9 | 2861.5 | 2861.5 | 2809.4 | 2731.3 | 2582.9 | 2439.7 | 2231.4 | 2004.8 | 1721.0 | 1403.4 |
| 17.5° | 3142.7 | 3147.9 | 3124.4 | 3067.2 | 2991.6 | 2848.4 | 2671.4 | 2442.3 | 2168.9 | 1861.6 | 1468.5 |
| 20° | 3410.8 | 3395.2 | 3384.8 | 3327.5 | 3246.8 | 3077.6 | 2908.3 | 2648.0 | 2361.6 | 2020.5 | 1559.6 |
| 22.5° | 3660.8 | 3668.6 | 3642.6 | 3551.4 | 3475.9 | 3322.3 | 3129.6 | 2890.1 | 2564.6 | 2179.3 | 1658.6 |
| 25° | 3983.7 | 3957.6 | 3981.1 | 3871.7 | 3754.5 | 3572.3 | 3353.6 | 3116.6 | 2786.0 | 2374.6 | 1780.9 |
| 27.5° | 4327.3 | 4343.0 | 4329.9 | 4210.2 | 4051.4 | 3806.6 | 3577.5 | 3324.9 | 3009.9 | 2559.4 | 1918.9 |
| 30° | 4840.3 | 4832.5 | 4835.1 | 4655.4 | 4392.4 | 4100.8 | 3819.6 | 3543.6 | 3233.8 | 2786.0 | 2080.4 |
| 32.5° | 5348.0 | 5376.6 | 5306.3 | 5147.5 | 4845.5 | 4405.5 | 4061.8 | 3754.5 | 3449.9 | 2981.2 | 2244.4 |
| 35° | 5756.8 | 5749.0 | 5720.3 | 5543.3 | 5243.8 | 4816.8 | 4337.8 | 3988.9 | 3679.0 | 3220.8 | 2426.6 |
| 37.5° | 5855.7 | 5855.7 | 5837.5 | 5728.1 | 5530.3 | 5160.5 | 4637.2 | 4223.2 | 3913.4 | 3434.3 | 2603.7 |
| 40° | 5790.6 | 5777.6 | 5767.2 | 5694.3 | 5587.5 | 5368.8 | 4952.2 | 4465.3 | 4163.3 | 3710.3 | 2799.0 |
| 42.5° | 5577.1 | 5579.7 | 5566.7 | 5525.0 | 5467.8 | 5384.4 | 5147.5 | 4723.1 | 4408.1 | 3970.6 | 2991.6 |
| 45° | 5290.7 | 5295.9 | 5280.3 | 5275.1 | 5246.4 | 5246.4 | 5191.8 | 4926.2 | 4639.8 | 4236.2 | 3202.5 |
| 47.5° | 4923.6 | 4921.0 | 4913.2 | 4900.2 | 4957.4 | 5019.9 | 5069.4 | 5040.8 | 4845.5 | 4522.6 | 3392.6 |
| 50° | 4363.8 | 4358.6 | 4382.0 | 4447.1 | 4587.7 | 4725.7 | 4871.5 | 5006.9 | 4993.9 | 4788.2 | 3621.7 |
| 52.5° | 3637.4 | 3603.5 | 3629.6 | 3830.0 | 4119.0 | 4426.3 | 4632.0 | 4845.5 | 5069.4 | 5069.4 | 3848.3 |
| 55° | 2543.8 | 2572.5 | 2588.1 | 2882.3 | 3452.5 | 3981.1 | 4343.0 | 4619.0 | 5040.8 | 5293.3 | 4098.2 |
| 57.5° | 1619.5 | 1629.9 | 1676.8 | 1994.4 | 2663.6 | 3324.9 | 3965.4 | 4418.5 | 4934.0 | 5480.8 | 4348.2 |
| 60° | 1090.9 | 1054.5 | 1090.9 | 1273.2 | 1916.3 | 2608.9 | 3410.8 | 4165.9 | 4780.4 | 5616.2 | 4624.2 |
| 62.5° | 770.7 | 768.1 | 778.5 | 885.3 | 1366.9 | 1960.6 | 2715.7 | 3824.8 | 4658.0 | 5624.0 | 4829.9 |
| 65° | 622.3 | 604.1 | 611.9 | 671.8 | 916.5 | 1437.2 | 1991.8 | 3207.8 | 4548.7 | 5486.0 | 4931.4 |
| 67.5° | 499.9 | 492.1 | 497.3 | 536.4 | 687.4 | 1080.5 | 1403.4 | 2439.7 | 4316.9 | 5251.7 | 4874.1 |
| 70° | 408.8 | 411.4 | 414.0 | 453.0 | 546.8 | 817.6 | 1002.4 | 1674.2 | 3822.2 | 4986.1 | 4616.4 |
| 72.5° | 354.1 | 354.1 | 356.7 | 382.7 | 458.3 | 648.3 | 757.7 | 1088.3 | 3093.2 | 4699.7 | 4142.5 |
| 75° | 312.4 | 312.4 | 312.4 | 335.9 | 390.6 | 520.7 | 588.4 | 744.7 | 2221.0 | 4168.5 | 3426.5 |
| 77.5° | 270.8 | 273.4 | 273.4 | 294.2 | 335.9 | 406.2 | 453.0 | 515.5 | 1416.4 | 3220.8 | 2593.3 |
| 80° | 208.3 | 208.3 | 210.9 | 234.3 | 286.4 | 317.7 | 333.3 | 364.5 | 744.7 | 2023.1 | 1645.5 |
| 82.5° | 145.8 | 148.4 | 148.4 | 151.0 | 192.7 | 195.3 | 179.7 | 182.3 | 270.8 | 671.8 | 624.9 |
| 85° | 15.6 | 18.2 | 20.8 | 20.8 | 33.8 | 41.7 | 44.3 | 41.7 | 44.3 | 78.1 | 78.1 |
| 87.5° | 0.0 | 0.0 | 0.0 | 0.0 | 2.6 | 5.2 | 5.2 | 7.8 | 7.8 | 7.8 | 7.8 |
| 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: P870282
CATALOG NUMBER: MEM2-HSN-SA-100-840-U-T2R-HSS

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 1156.0 | 1156.0 | 1156.0 | 1156.0 | 1156.0 | 1156.0 | 1156.0 | 1156.0 | 1156.0 | 1156.0 | 1156.0 |
| 2.5° | 1153.4 | 1135.2 | 1096.2 | 1062.3 | 1031.1 | 1005.0 | 986.8 | 963.4 | 945.1 | 945.1 | 955.6 |
| 5° | 1161.2 | 1119.6 | 1038.9 | 963.4 | 903.5 | 846.2 | 794.1 | 760.3 | 734.2 | 718.6 | 718.6 |
| 7.5° | 1171.7 | 1109.2 | 986.8 | 872.2 | 778.5 | 687.4 | 606.7 | 567.6 | 528.6 | 515.5 | 518.1 |
| 10° | 1192.5 | 1104.0 | 939.9 | 791.5 | 650.9 | 536.4 | 458.3 | 416.6 | 395.8 | 385.3 | 385.3 |
| 12.5° | 1215.9 | 1104.0 | 890.5 | 700.4 | 536.4 | 419.2 | 372.3 | 341.1 | 330.7 | 325.5 | 320.3 |
| 15° | 1247.2 | 1109.2 | 848.8 | 604.1 | 437.4 | 354.1 | 320.3 | 302.0 | 291.6 | 286.4 | 286.4 |
| 17.5° | 1283.6 | 1114.4 | 804.5 | 525.9 | 372.3 | 312.4 | 286.4 | 273.4 | 263.0 | 257.8 | 257.8 |
| 20° | 1330.5 | 1127.4 | 760.3 | 455.6 | 325.5 | 286.4 | 263.0 | 250.0 | 239.5 | 236.9 | 234.3 |
| 22.5° | 1387.8 | 1148.2 | 716.0 | 398.4 | 294.2 | 260.4 | 239.5 | 229.1 | 221.3 | 216.1 | 216.1 |
| 25° | 1455.5 | 1174.3 | 682.2 | 356.7 | 270.8 | 242.1 | 223.9 | 210.9 | 203.1 | 200.5 | 200.5 |
| 27.5° | 1549.2 | 1218.5 | 648.3 | 325.5 | 252.6 | 223.9 | 205.7 | 195.3 | 187.5 | 184.9 | 182.3 |
| 30° | 1637.7 | 1273.2 | 632.7 | 317.7 | 239.5 | 208.3 | 195.3 | 182.3 | 174.4 | 171.8 | 169.2 |
| 32.5° | 1752.3 | 1335.7 | 622.3 | 317.7 | 234.3 | 197.9 | 182.3 | 171.8 | 164.0 | 161.4 | 158.8 |
| 35° | 1874.7 | 1408.6 | 622.3 | 328.1 | 236.9 | 190.1 | 171.8 | 161.4 | 153.6 | 148.4 | 148.4 |
| 37.5° | *2007.4* | *1481.5* | *627.5* | *343.7* | *244.7* | *184.9* | *161.4* | *151.0* | *143.2* | *140.6* | *140.6* |
| 40° | 2148.0 | 1580.4 | 637.9 | 356.7 | 252.6 | 182.3 | 151.0 | 143.2 | 135.4 | 130.2 | 130.2 |
| 42.5° | 2278.2 | 1658.6 | 656.1 | 372.3 | 257.8 | 179.7 | 143.2 | 135.4 | 127.6 | 125.0 | 125.0 |
| 45° | 2429.2 | 1744.5 | 671.8 | 382.7 | 257.8 | 171.8 | 135.4 | 127.6 | 122.4 | 119.8 | 117.2 |
| 47.5° | 2549.0 | 1814.8 | 679.6 | 388.0 | 252.6 | 164.0 | 127.6 | 122.4 | 117.2 | 112.0 | 114.6 |
| 50° | 2694.8 | 1890.3 | 692.6 | 390.6 | 242.1 | 153.6 | 122.4 | 114.6 | 109.4 | 106.8 | 106.8 |
| 52.5° | 2835.4 | 1965.8 | 703.0 | 385.3 | 229.1 | 140.6 | 114.6 | 109.4 | 104.1 | 98.9 | 98.9 |
| 55° | 3002.1 | 2049.1 | 718.6 | 377.5 | 208.3 | 127.6 | 106.8 | 101.5 | 93.7 | 91.1 | 88.5 |
| 57.5° | 3192.1 | 2158.5 | 731.6 | 361.9 | 182.3 | 114.6 | 101.5 | 93.7 | 83.3 | 78.1 | 78.1 |
| 60° | 3366.6 | 2283.4 | 742.1 | 322.9 | 158.8 | 106.8 | 93.7 | 85.9 | 75.5 | 72.9 | 72.9 |
| 62.5° | 3554.0 | 2413.6 | 742.1 | 255.2 | 135.4 | 96.3 | 88.5 | 80.7 | 70.3 | 67.7 | 67.7 |
| 65° | 3684.2 | 2530.8 | 718.6 | 190.1 | 114.6 | 91.1 | 85.9 | 75.5 | 65.1 | 62.5 | 62.5 |
| 67.5° | 3720.7 | 2603.7 | 653.5 | 135.4 | 98.9 | 85.9 | 80.7 | 70.3 | 62.5 | 57.3 | 57.3 |
| 70° | 3603.5 | 2546.4 | 533.8 | 104.1 | 85.9 | 78.1 | 72.9 | 65.1 | 57.3 | 54.7 | 54.7 |
| 72.5° | 3267.6 | 2327.7 | 398.4 | 88.5 | 75.5 | 72.9 | 67.7 | 59.9 | 54.7 | 52.1 | 52.1 |
| 75° | 2736.5 | 1934.5 | 281.2 | 78.1 | 70.3 | 65.1 | 59.9 | 54.7 | 49.5 | 49.5 | 49.5 |
| 77.5° | 2072.5 | 1398.2 | 174.4 | 70.3 | 59.9 | 59.9 | 54.7 | 49.5 | 46.9 | 44.3 | 44.3 |
| 80° | 1338.3 | 882.7 | 98.9 | 49.5 | 41.7 | 44.3 | 39.1 | 33.8 | 33.8 | 31.2 | 31.2 |
| 82.5° | 567.6 | 348.9 | 52.1 | 28.6 | 20.8 | 18.2 | 13.0 | 13.0 | 10.4 | 10.4 | 10.4 |
| 85° | 57.3 | 20.8 | 10.4 | 7.8 | 7.8 | 5.2 | 5.2 | 5.2 | 5.2 | 2.6 | 2.6 |
| 87.5° | 7.8 | 7.8 | 7.8 | 5.2 | 5.2 | 5.2 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 |
| 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

Streetworks

Report Number: SP1-2407-157-8

Test Date: 09/05/2024

Luminaire Tested: MEM2-HTN-SA-30-840-U-5WQ

Data in this report applies to families of products including MEM2-HTN-SA-30-840-U-5WQ

Report Generated By FNC07603 / LDUCLS01DT446
Version: v7.04

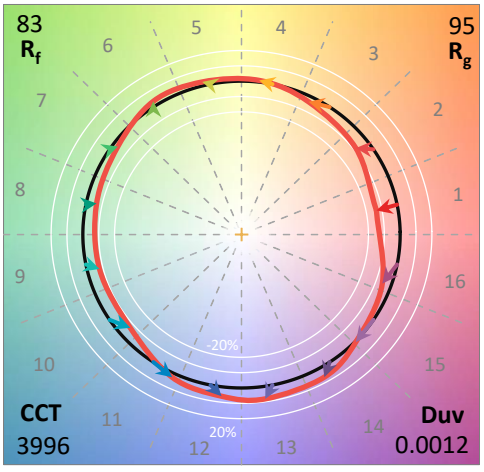
## Test Information

| | |
|---|---|
| Test Method: | LM-79-2019 |
| Report Number: | SP1-2407-157-8 |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Photometer: | SP1 - 76IN SPHERE |
| Measurement Geometry: | 4π |
| Issue Date: | 09/05/2024 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS |
| Product Line: | Streetworks |
| Catalog Number: | **MEM2-HTN-SA-30-840-U-5WQ** |
| Description: | Epic Modern Light Square 30W 5WQ Optic |

## Spectral Parameters

| | |
|---|---|
| CCT (K): | 3996 |
| CIE u': | 0.2245 |
| CIE v': | 0.5031 |
| Duv: | 0.0012 |
| CIE x: | 0.3815 |
| CIE y: | 0.3799 |
| CIE z: | 0.2386 |
| Peak Wavelength (nm): | 449 |
| Dominant Wavelength (nm): | 578 |
| Purity: | 28.49233 |
| Rf: | 82.6 |
| Rg: | 95.1 |

| | |
|---|---|
| CRI (Ra): | 80.6 |
| R1: | 78.1 |
| R2: | 87.1 |
| R3: | 94.5 |
| R4: | 79.7 |
| R5: | 78.7 |
| R6: | 82.7 |
| R7: | 84.3 |
| R8: | 59.5 |
| R9: | -5.8 |
| R10: | 70.3 |
| R11: | 78.7 |
| R12: | 60.5 |
| R13: | 80.2 |
| R14: | 97.2 |
| R15: | 70.6 |




## Test Conditions

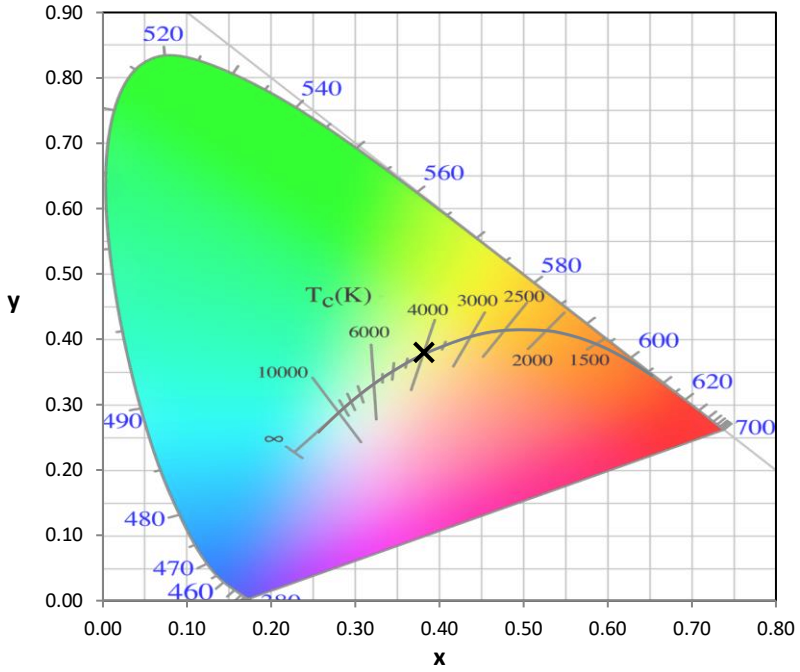
| | |
|---|---|
| Stabilization Time: | 29M |
| Operation Time: | 1H 29M |
| Sphere Temperature (°C): | 24.3 |

REPORT NUMBER: SP1-2407-157-8

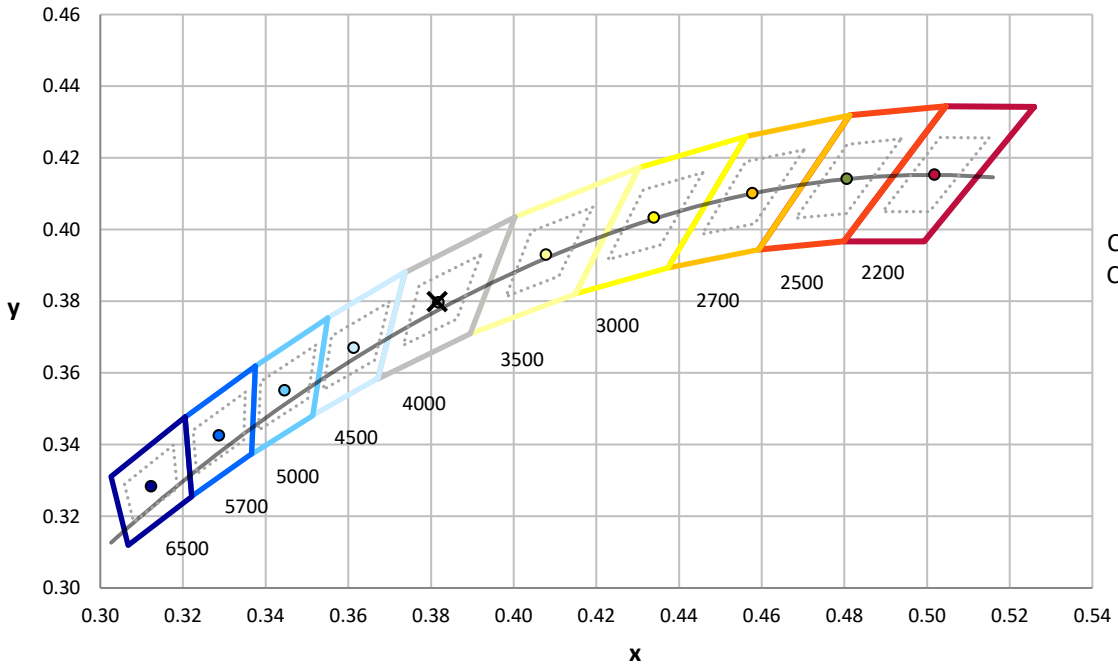
| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 6/18/2024 | 12/18/2024 |
| Power Meter | INXT2011004 | 2/8/2024 | 2/8/2025 |
| AC Power Source | IN0063 | 10/24/2023 | 10/24/2024 |
| DC 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: SP1-2407-157-8

## CIE 1931 Chromaticity Diagram




## CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles




CCT = 3996K
CIE x = 0.3815
CIE y = 0.3799
Duv = 0.0012

Point lies inside the ANSI 4000K 4-step quadrangle

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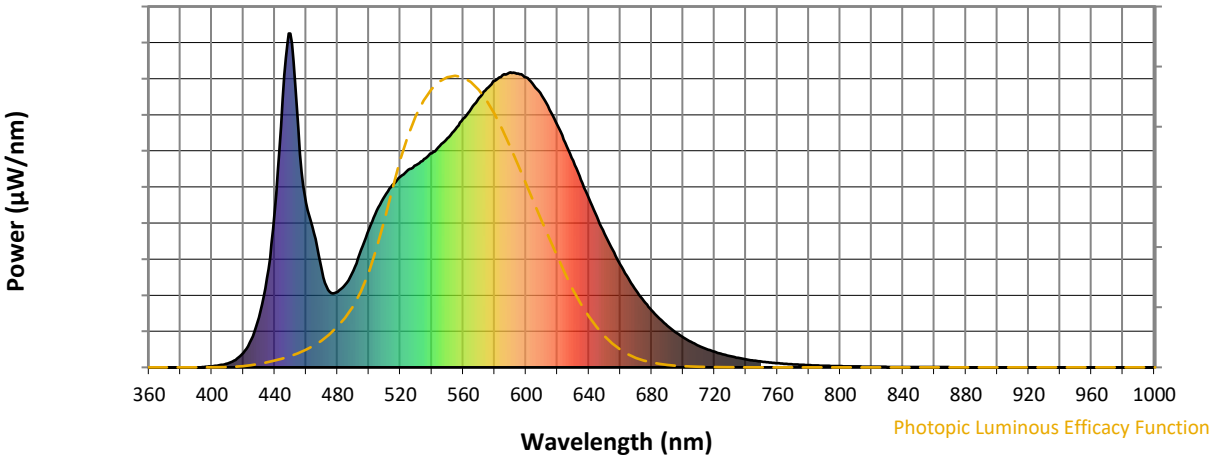
## Photopic Flux vs. Wavelength




## 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 | 289 | NR | 620 | 725 | NR | 750 | 17 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 351 | NR | 625 | 673 | NR | 755 | 15 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 414 | NR | 630 | 619 | NR | 760 | 13 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 470 | NR | 635 | 562 | NR | 765 | 11 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 513 | NR | 640 | 506 | NR | 770 | 9 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 546 | NR | 645 | 452 | NR | 775 | 8 | NR | 905 | 0 | NR |
| 390 | 0 | NR | 520 | 571 | NR | 650 | 400 | NR | 780 | 7 | NR | 910 | 0 | NR |
| 395 | 1 | NR | 525 | 592 | NR | 655 | 352 | NR | 785 | 6 | NR | 915 | 0 | NR |
| 400 | 3 | NR | 530 | 606 | NR | 660 | 307 | NR | 790 | 5 | NR | 920 | 0 | NR |
| 405 | 6 | NR | 535 | 624 | NR | 665 | 267 | NR | 795 | 4 | NR | 925 | 0 | NR |
| 410 | 12 | NR | 540 | 642 | NR | 670 | 231 | NR | 800 | 4 | NR | 930 | 0 | NR |
| 415 | 22 | NR | 545 | 663 | NR | 675 | 199 | NR | 805 | 3 | NR | 935 | 0 | NR |
| 420 | 44 | NR | 550 | 686 | NR | 680 | 171 | NR | 810 | 3 | NR | 940 | 0 | NR |
| 425 | 83 | NR | 555 | 713 | NR | 685 | 146 | NR | 815 | 2 | NR | 945 | 0 | NR |
| 430 | 150 | NR | 560 | 745 | NR | 690 | 125 | NR | 820 | 2 | NR | 950 | 0 | NR |
| 435 | 267 | NR | 565 | 774 | NR | 695 | 106 | NR | 825 | 2 | NR | 955 | 0 | NR |
| 440 | 466 | NR | 570 | 806 | NR | 700 | 90 | NR | 830 | 1 | NR | 960 | 0 | NR |
| 445 | 804 | NR | 575 | 835 | NR | 705 | 76 | NR | 835 | 1 | NR | 965 | 0 | NR |
| 450 | 1000 | NR | 580 | 858 | NR | 710 | 65 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 715 | NR | 585 | 875 | NR | 715 | 55 | NR | 845 | 1 | NR | 975 | 0 | NR |
| 460 | 492 | NR | 590 | 884 | NR | 720 | 47 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 402 | NR | 595 | 880 | NR | 725 | 40 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 288 | NR | 600 | 868 | NR | 730 | 34 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 226 | NR | 605 | 844 | NR | 735 | 28 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 227 | NR | 610 | 814 | NR | 740 | 24 | NR | 870 | 0 | NR | 1000 | 0 | NR |
| 485 | 248 | NR | 615 | 771 | NR | 745 | 20 | NR | 875 | 0 | NR | | | |

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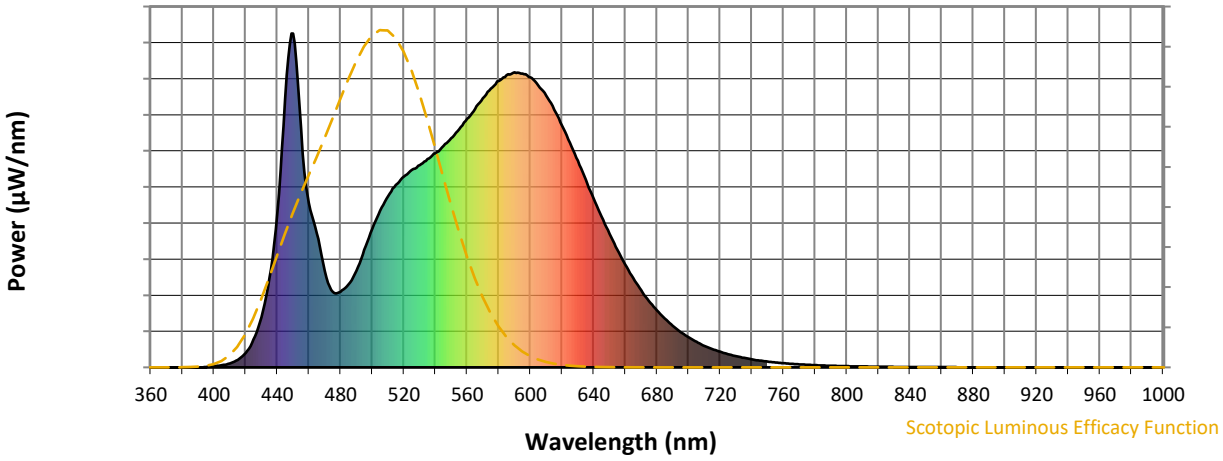
## Scotopic Flux vs. Wavelength




**Scotopic Lumens: NR** **S/P: 1.66**

| 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 | 289 | NR | 620 | 725 | NR | 750 | 17 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 351 | NR | 625 | 673 | NR | 755 | 15 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 414 | NR | 630 | 619 | NR | 760 | 13 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 470 | NR | 635 | 562 | NR | 765 | 11 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 513 | NR | 640 | 506 | NR | 770 | 9 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 546 | NR | 645 | 452 | NR | 775 | 8 | NR | 905 | 0 | NR |
| 390 | 0 | NR | 520 | 571 | NR | 650 | 400 | NR | 780 | 7 | NR | 910 | 0 | NR |
| 395 | 1 | NR | 525 | 592 | NR | 655 | 352 | NR | 785 | 6 | NR | 915 | 0 | NR |
| 400 | 3 | NR | 530 | 606 | NR | 660 | 307 | NR | 790 | 5 | NR | 920 | 0 | NR |
| 405 | 6 | NR | 535 | 624 | NR | 665 | 267 | NR | 795 | 4 | NR | 925 | 0 | NR |
| 410 | 12 | NR | 540 | 642 | NR | 670 | 231 | NR | 800 | 4 | NR | 930 | 0 | NR |
| 415 | 22 | NR | 545 | 663 | NR | 675 | 199 | NR | 805 | 3 | NR | 935 | 0 | NR |
| 420 | 44 | NR | 550 | 686 | NR | 680 | 171 | NR | 810 | 3 | NR | 940 | 0 | NR |
| 425 | 83 | NR | 555 | 713 | NR | 685 | 146 | NR | 815 | 2 | NR | 945 | 0 | NR |
| 430 | 150 | NR | 560 | 745 | NR | 690 | 125 | NR | 820 | 2 | NR | 950 | 0 | NR |
| 435 | 267 | NR | 565 | 774 | NR | 695 | 106 | NR | 825 | 2 | NR | 955 | 0 | NR |
| 440 | 466 | NR | 570 | 806 | NR | 700 | 90 | NR | 830 | 1 | NR | 960 | 0 | NR |
| 445 | 804 | NR | 575 | 835 | NR | 705 | 76 | NR | 835 | 1 | NR | 965 | 0 | NR |
| 450 | 1000 | NR | 580 | 858 | NR | 710 | 65 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 715 | NR | 585 | 875 | NR | 715 | 55 | NR | 845 | 1 | NR | 975 | 0 | NR |
| 460 | 492 | NR | 590 | 884 | NR | 720 | 47 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 402 | NR | 595 | 880 | NR | 725 | 40 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 288 | NR | 600 | 868 | NR | 730 | 34 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 226 | NR | 605 | 844 | NR | 735 | 28 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 227 | NR | 610 | 814 | NR | 740 | 24 | NR | 870 | 0 | NR | 1000 | 0 | NR |
| 485 | 248 | NR | 615 | 771 | NR | 745 | 20 | NR | 875 | 0 | NR | | | |

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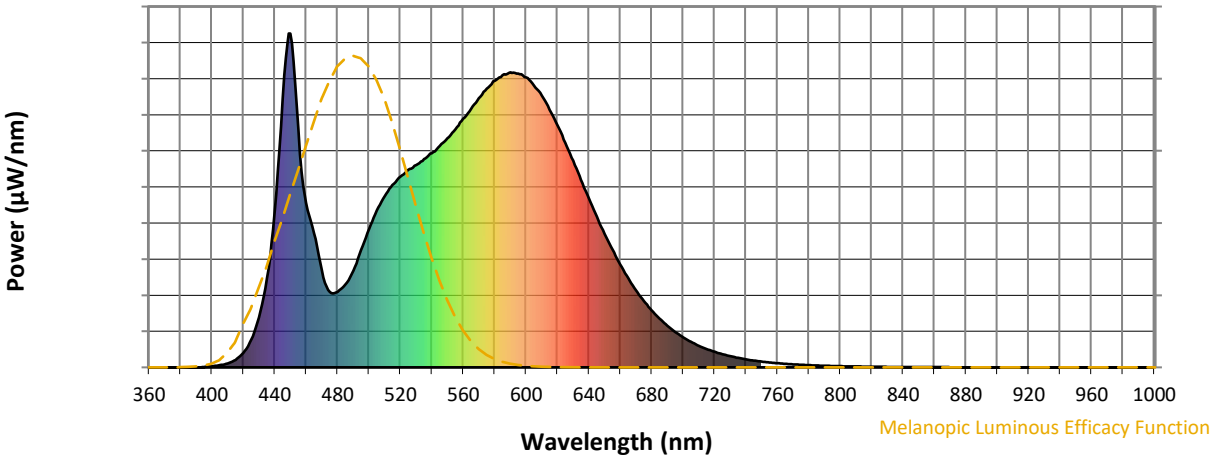
## Melanopic Flux vs. Wavelength




**Melanopic Lumens: NR** **M/P: 3.37**

| 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 | 289 | NR | 620 | 725 | NR | 750 | 17 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 351 | NR | 625 | 673 | NR | 755 | 15 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 414 | NR | 630 | 619 | NR | 760 | 13 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 470 | NR | 635 | 562 | NR | 765 | 11 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 513 | NR | 640 | 506 | NR | 770 | 9 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 546 | NR | 645 | 452 | NR | 775 | 8 | NR | 905 | 0 | NR |
| 390 | 0 | NR | 520 | 571 | NR | 650 | 400 | NR | 780 | 7 | NR | 910 | 0 | NR |
| 395 | 1 | NR | 525 | 592 | NR | 655 | 352 | NR | 785 | 6 | NR | 915 | 0 | NR |
| 400 | 3 | NR | 530 | 606 | NR | 660 | 307 | NR | 790 | 5 | NR | 920 | 0 | NR |
| 405 | 6 | NR | 535 | 624 | NR | 665 | 267 | NR | 795 | 4 | NR | 925 | 0 | NR |
| 410 | 12 | NR | 540 | 642 | NR | 670 | 231 | NR | 800 | 4 | NR | 930 | 0 | NR |
| 415 | 22 | NR | 545 | 663 | NR | 675 | 199 | NR | 805 | 3 | NR | 935 | 0 | NR |
| 420 | 44 | NR | 550 | 686 | NR | 680 | 171 | NR | 810 | 3 | NR | 940 | 0 | NR |
| 425 | 83 | NR | 555 | 713 | NR | 685 | 146 | NR | 815 | 2 | NR | 945 | 0 | NR |
| 430 | 150 | NR | 560 | 745 | NR | 690 | 125 | NR | 820 | 2 | NR | 950 | 0 | NR |
| 435 | 267 | NR | 565 | 774 | NR | 695 | 106 | NR | 825 | 2 | NR | 955 | 0 | NR |
| 440 | 466 | NR | 570 | 806 | NR | 700 | 90 | NR | 830 | 1 | NR | 960 | 0 | NR |
| 445 | 804 | NR | 575 | 835 | NR | 705 | 76 | NR | 835 | 1 | NR | 965 | 0 | NR |
| 450 | 1000 | NR | 580 | 858 | NR | 710 | 65 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 715 | NR | 585 | 875 | NR | 715 | 55 | NR | 845 | 1 | NR | 975 | 0 | NR |
| 460 | 492 | NR | 590 | 884 | NR | 720 | 47 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 402 | NR | 595 | 880 | NR | 725 | 40 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 288 | NR | 600 | 868 | NR | 730 | 34 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 226 | NR | 605 | 844 | NR | 735 | 28 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 227 | NR | 610 | 814 | NR | 740 | 24 | NR | 870 | 0 | NR | 1000 | 0 | NR |
| 485 | 248 | NR | 615 | 771 | NR | 745 | 20 | NR | 875 | 0 | NR | | | |

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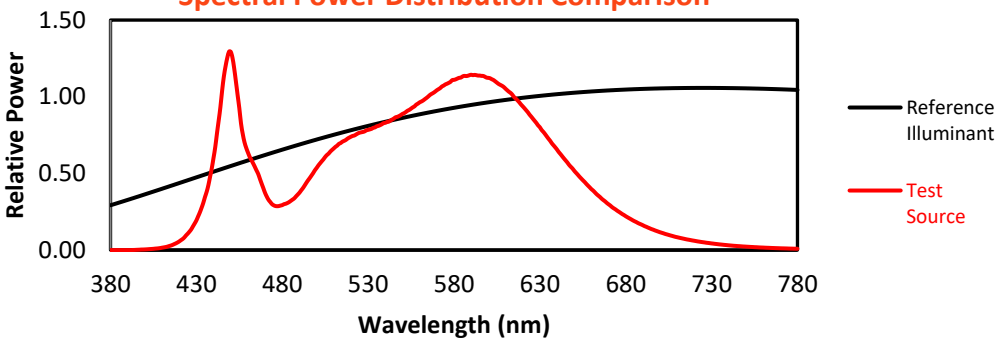
# TM-30-18

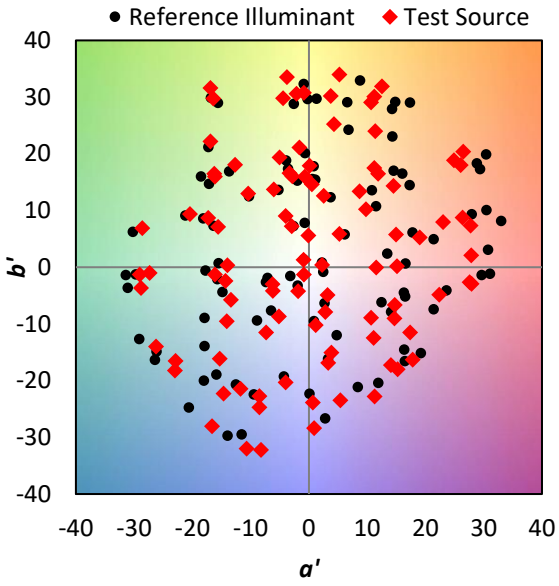
## Summary

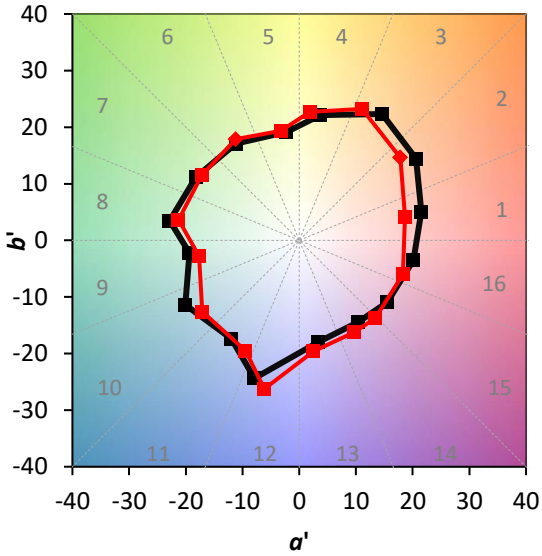
$R_f$ = 82.6
$R_g$ = 95.1
CIE $R_a$ = 80.6
$R_9$ = -5.8

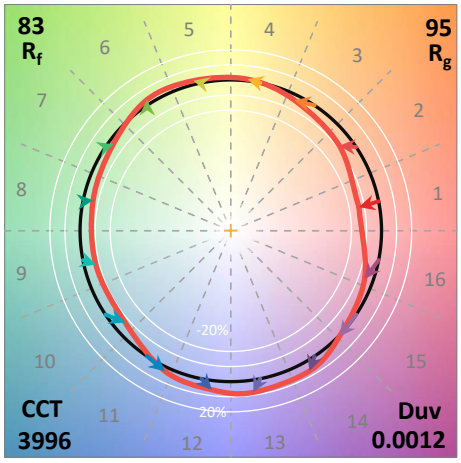
## Spectral Power Distribution Comparison

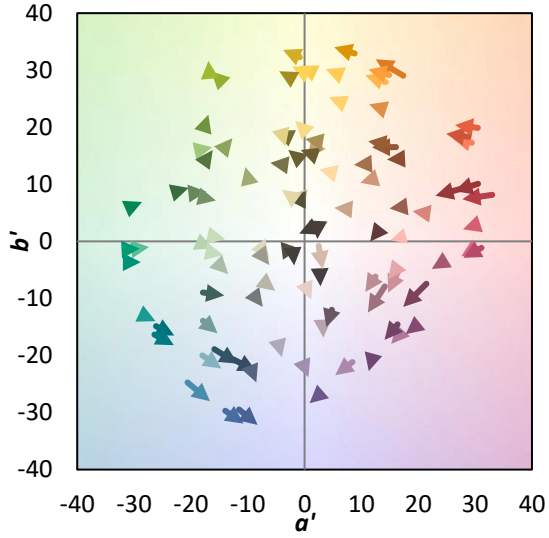



## Color Vector Graphics



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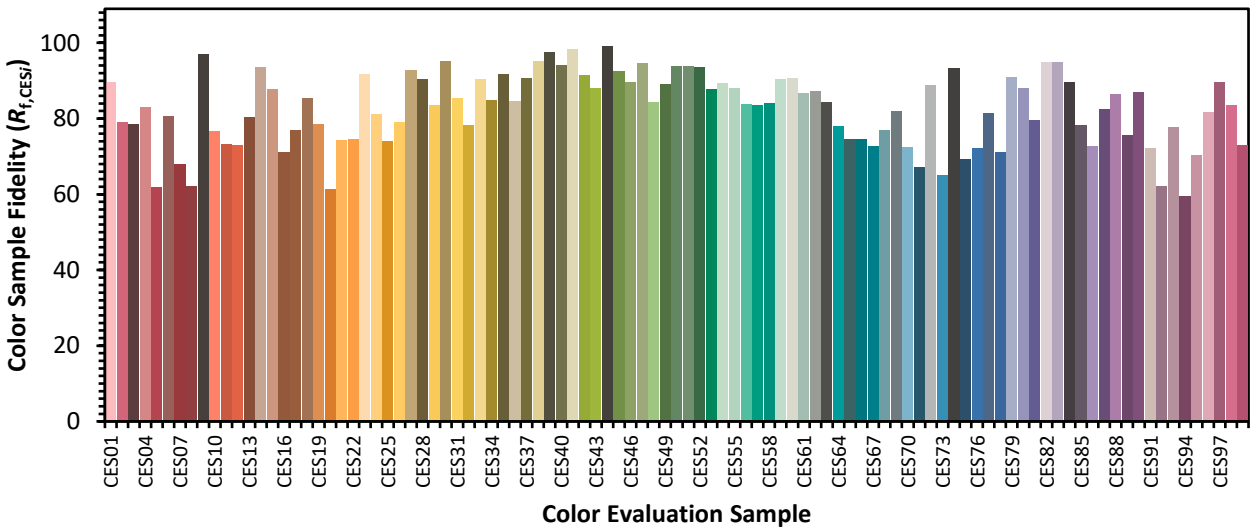
# TM-30-18

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

| | | | |
|---|---|---|---|
| CES01 = 85 | CES26 = 79 | CES51 = 94 | CES76 = 72 |
| CES02 = 61 | CES27 = 93 | CES52 = 94 | CES77 = 82 |
| CES03 = 31 | CES28 = 90 | CES53 = 88 | CES78 = 71 |
| CES04 = 69 | CES29 = 83 | CES54 = 89 | CES79 = 91 |
| CES05 = 48 | CES30 = 95 | CES55 = 88 | CES80 = 88 |
| CES06 = 50 | CES31 = 86 | CES56 = 84 | CES81 = 80 |
| CES07 = 40 | CES32 = 78 | CES57 = 84 | CES82 = 95 |
| CES08 = 39 | CES33 = 90 | CES58 = 84 | CES83 = 95 |
| CES09 = 29 | CES34 = 85 | CES59 = 90 | CES84 = 90 |
| CES10 = 74 | CES35 = 92 | CES60 = 91 | CES85 = 78 |
| CES11 = 57 | CES36 = 85 | CES61 = 87 | CES86 = 73 |
| CES12 = 63 | CES37 = 91 | CES62 = 87 | CES87 = 83 |
| CES13 = 42 | CES38 = 95 | CES63 = 84 | CES88 = 86 |
| CES14 = 74 | CES39 = 98 | CES64 = 78 | CES89 = 76 |
| CES15 = 71 | CES40 = 94 | CES65 = 75 | CES90 = 87 |
| CES16 = 46 | CES41 = 98 | CES66 = 75 | CES91 = 72 |
| CES17 = 49 | CES42 = 92 | CES67 = 73 | CES92 = 62 |
| CES18 = 56 | CES43 = 88 | CES68 = 77 | CES93 = 78 |
| CES19 = 71 | CES44 = 99 | CES69 = 82 | CES94 = 60 |
| CES20 = 65 | CES45 = 93 | CES70 = 72 | CES95 = 70 |
| CES21 = 86 | CES46 = 90 | CES71 = 67 | CES96 = 82 |
| CES22 = 78 | CES47 = 95 | CES72 = 89 | CES97 = 90 |
| CES23 = 91 | CES48 = 84 | CES73 = 65 | CES98 = 84 |
| CES24 = 90 | CES49 = 89 | CES74 = 93 | CES99 = 73 |
| CES25 = 71 | CES50 = 94 | CES75 = 69 | |



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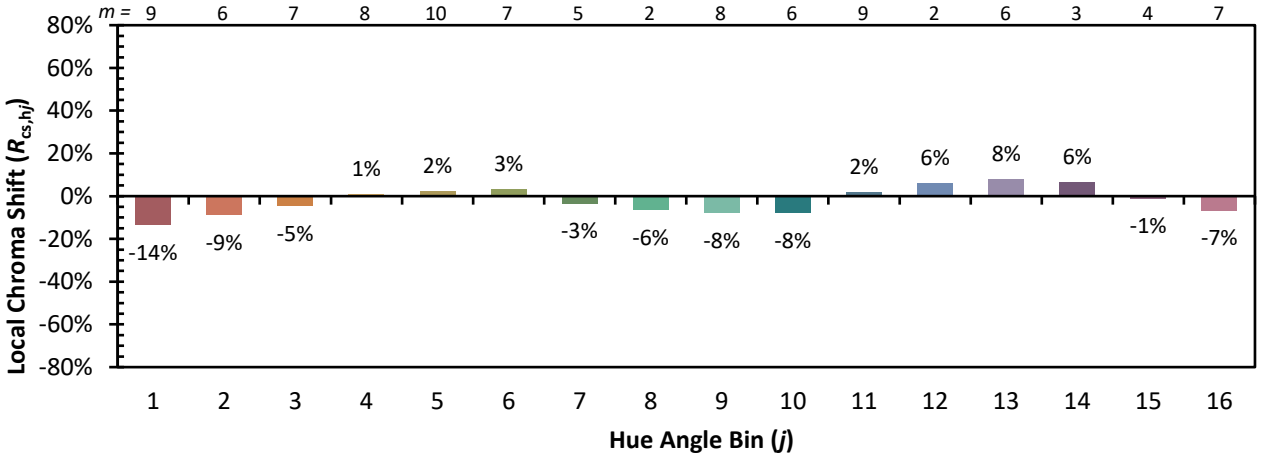
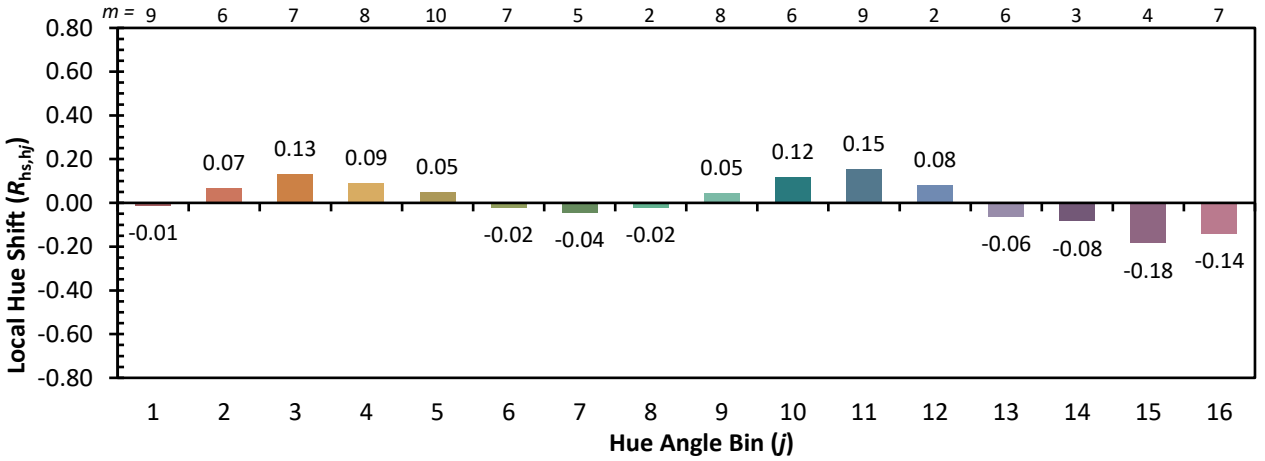
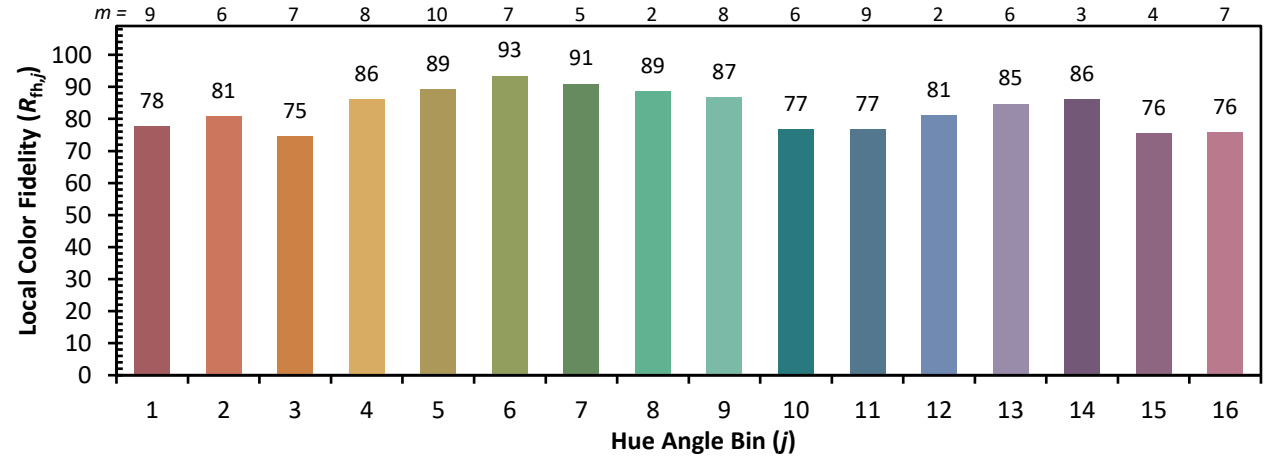
## Color Rendition by Hue-Angle Bin



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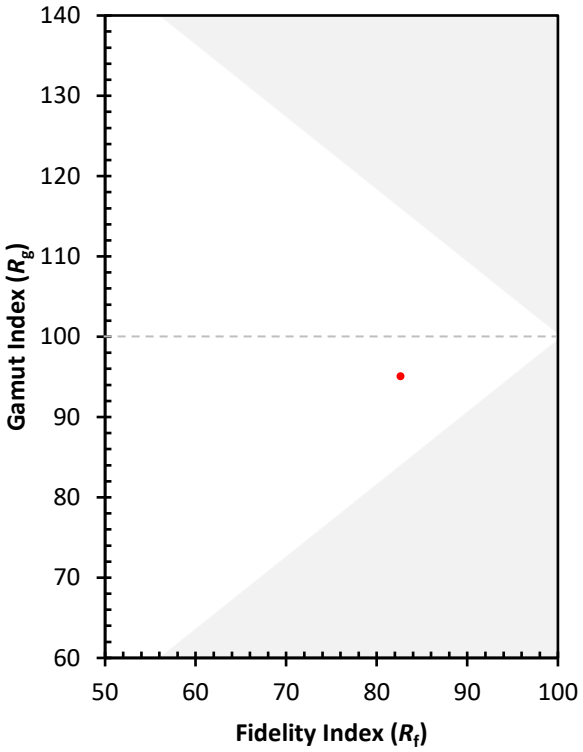
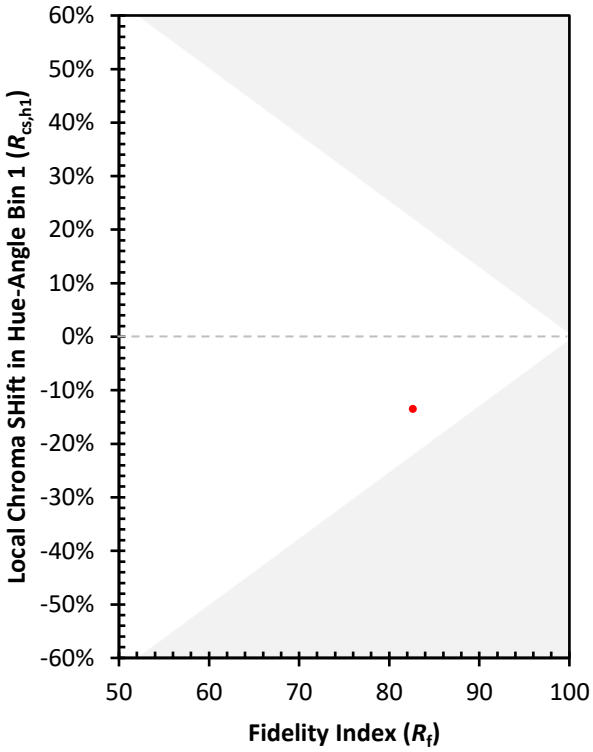
## Measure Comparisons

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