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: P868114

Luminaire Tested: **MEM2-HSN-SA-30-740-U-T4W**

Issue Date: 08/21/2024

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: | P868114 |
| Test Lab: | INNOVATION CENTER(G3) |
| Issue Date: | 08/21/2024 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS (FORMERLY EATON) |
| Product Line: | STREETWORKS |
| Catalog Number: | MEM2-HSN-SA-30-740-U-T4W |
| Description: | EPIC MODERN SHORT HOUSING DISCRETE LED ARRAYS 30W 70CRI 4000K FIXTURE w/ TYPE IV WIDE DISTRIBUTION OPTIC |
| Light Source: | (10) 4000K CCT, 70 CRI LEDS |
| Ballast/Driver: | ELECTRONIC DRIVER |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 4883.2 lumens |
| Efficiency: | N/A |
| Efficacy: | 148.9 lumens/watt |
| Luminous Opening: | Rectangular (W 0.33' x L: 0.33' x H: 0') |
| IES Classification: | Type IV - Short |
| BUG Rating: | B1 - U0 - G1 |

| | |
|---|---|
| Input Watts (W): | 32.8 |
| Input Voltage (V): | 120 |
| Input Current (Ain): | NR |
| Voltage Rise (V): | NR |
| Power Factor: | 0.99 |
| Total Harmonic Distortion (THDi): | 9.76% |
| Frequency (hertz): | 60 |
| Stabilization Time: | NR |
| Operation Time: | NR |
| Ambient Temperature (°C): | NR |
| Test Distance: | 24 FT |

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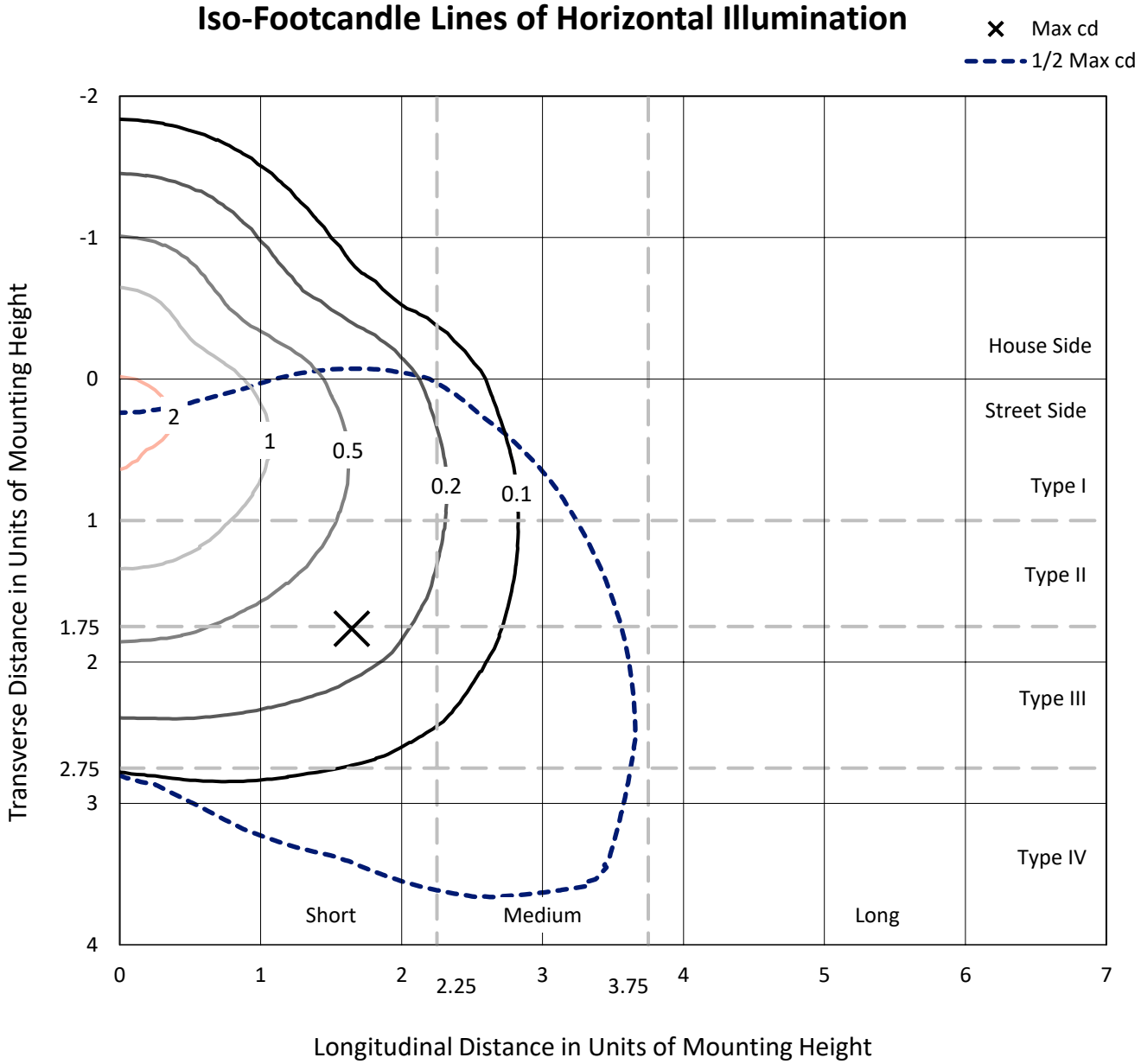
Scaled Data Report

REPORT NUMBER: P868114
CATALOG NUMBER: MEM2-HSN-SA-30-740-U-T4W

## Iso-Footcandle Lines of Horizontal Illumination




Based on 20 foot mounting height. Maximum calculated value = 2.3 fc
Type IV - Short - N/A

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REPORT NUMBER: P868114
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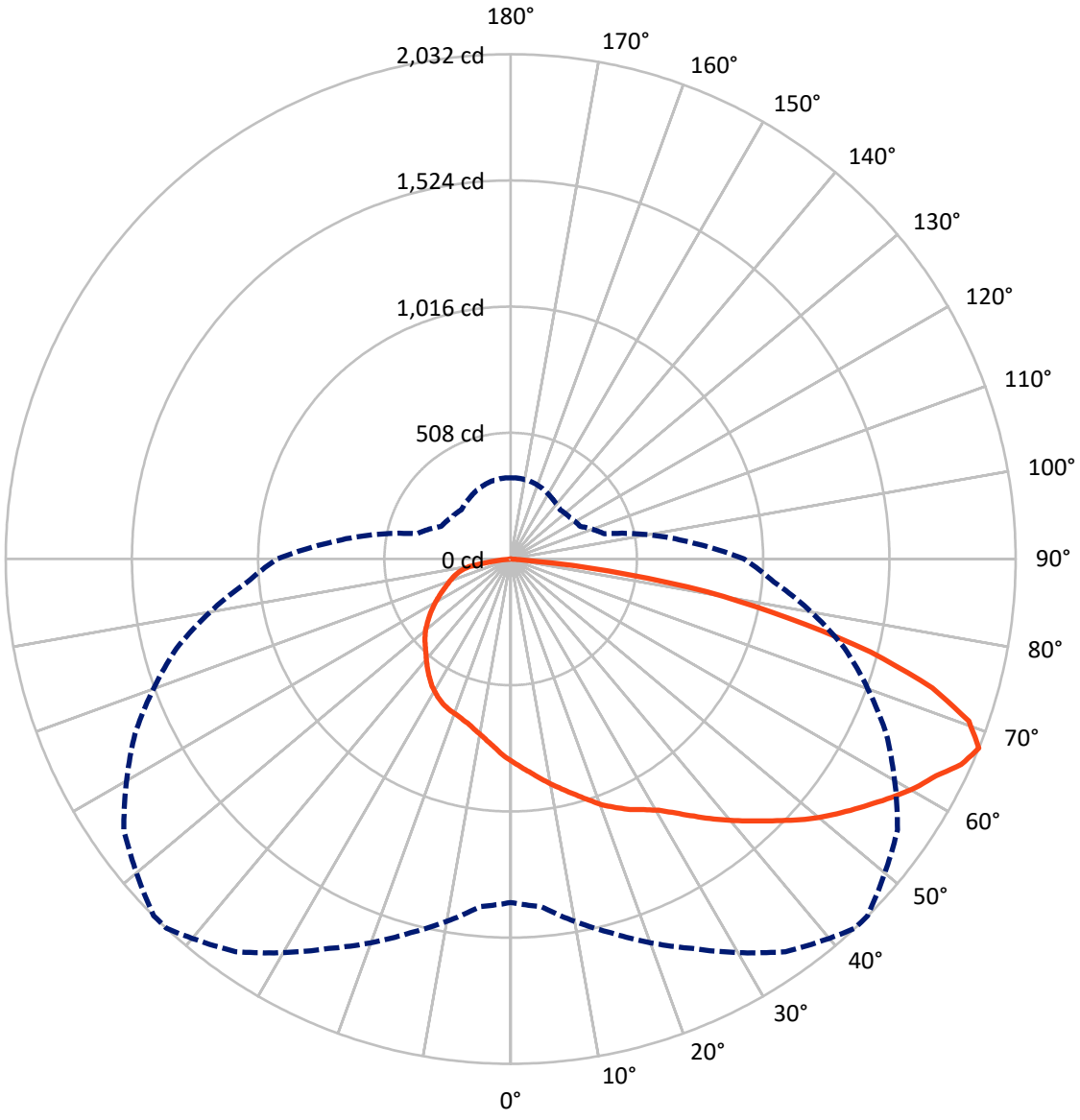
## Luminous Intensity Polar Plot



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Scaled Data Report

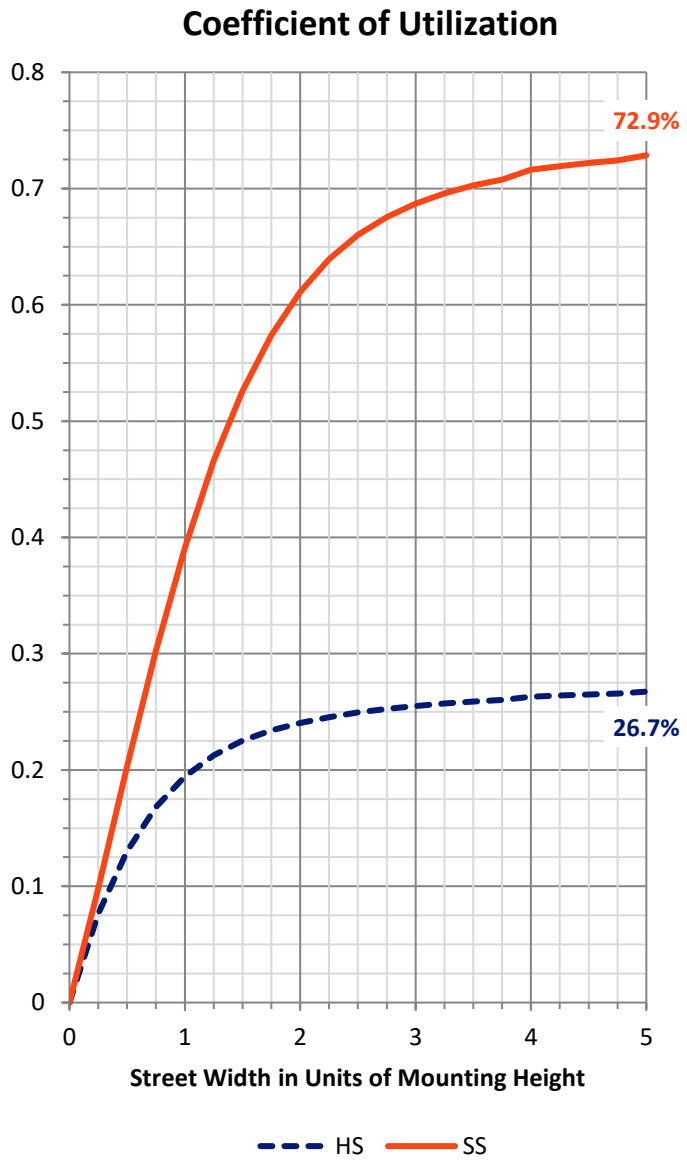
REPORT NUMBER: P868114
CATALOG NUMBER: MEM2-HSN-SA-30-740-U-T4W

**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 1313.6 | 0.0 | 1313.6 |
| | % Fixture | 26.9 | 0.0 | 26.9 |
| **Street Side** | Lumens | 3569.6 | 0.0 | 3569.6 |
| | % Fixture | 73.1 | 0.0 | 73.1 |
| **Total** | Lumens | 4883.2 | 0.0 | 4883.2 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 78.0 | 1.6 |
| 10°-20° | 238.2 | 4.9 |
| 20°-30° | 406.5 | 8.3 |
| 30°-40° | 592.8 | 12.1 |
| 40°-50° | 796.4 | 16.3 |
| 50°-60° | 974.9 | 20.0 |
| 60°-70° | 1026.0 | 21.0 |
| 70°-80° | 669.9 | 13.7 |
| 80°-90° | 100.5 | 2.1 |
| 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° | 4883.2 | 100.0 |
| 0°-180° | 4883.2 | 100.0 |



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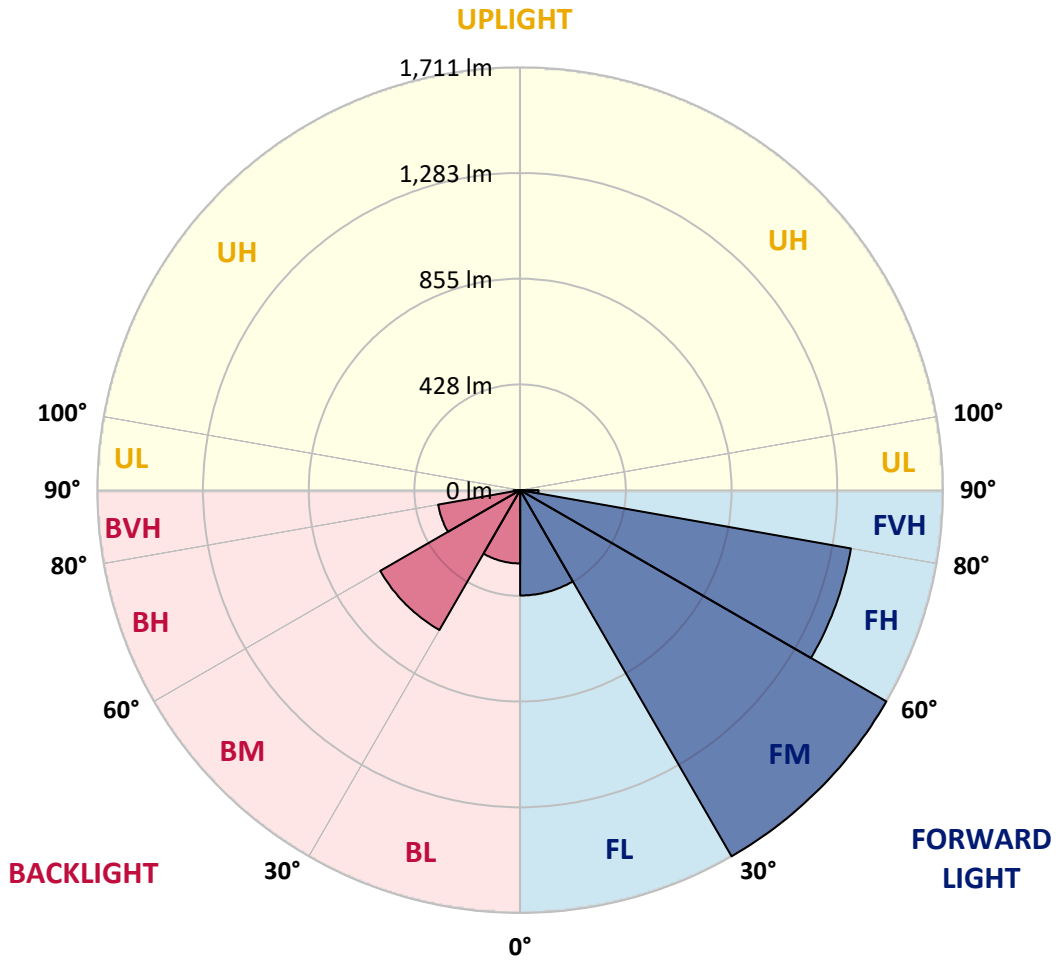
## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 426.2 | 8.7 | | | |
| FM | (30°-60°) | 1710.5 | 35.0 | | | |
| FH | (60°-80°) | 1358.8 | 27.8 | | | G1/1800 |
| FVH | (80°-90°) | 74.1 | 1.5 | | | G1/100 |
| BL | (0°-30°) | 296.6 | 6.1 | B1/500 | | |
| BM | (30°-60°) | 653.6 | 13.4 | B1/1000 | | |
| BH | (60°-80°) | 337.1 | 6.9 | B1/500 | | G1/500 |
| BVH | (80°-90°) | 26.4 | 0.5 | | | G1/100 |
| UL | (90°-100°) | 0.0 | 0.0 | | U0/0 | |
| UH | (100°-180°) | 0.0 | 0.0 | | U0/0 | |

**BUG Rating: B1-U0-G1**
Type IV Short



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REPORT NUMBER: P868114
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**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 43° | 45° | 55° | 65° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 815.2 | 815.2 | 815.2 | 815.2 | 815.2 | *815.2* | 815.2 | 815.2 | 815.2 | 815.2 | 815.2 |
| 2.5° | 852.7 | 851.7 | 848.7 | 846.8 | 840.8 | *839.9* | 839.9 | 833.9 | 827.0 | 823.1 | 819.1 |
| 5° | 891.2 | 886.3 | 884.3 | 880.4 | 870.5 | *864.6* | 866.5 | 855.7 | 841.8 | 832.0 | 821.1 |
| 7.5° | 925.8 | 923.8 | 916.9 | 912.0 | 900.1 | *894.2* | 892.2 | 875.4 | 857.6 | 842.8 | 825.0 |
| 10° | 967.3 | 962.4 | 958.4 | 948.5 | 932.7 | *923.8* | 920.9 | 899.1 | 876.4 | 856.7 | 832.9 |
| 12.5° | 1004.9 | 998.9 | 994.0 | 984.1 | 968.3 | *953.5* | 949.5 | 924.8 | 896.2 | 869.5 | 839.9 |
| 15° | 1033.5 | 1034.5 | 1029.6 | 1020.7 | 1002.9 | *985.1* | 982.1 | 949.5 | 914.9 | 882.3 | 846.8 |
| 17.5° | 1060.2 | 1064.1 | 1061.2 | 1055.3 | 1037.5 | *1019.7* | 1016.7 | 980.2 | 938.7 | 897.2 | 854.7 |
| 20° | 1085.9 | 1085.9 | 1084.9 | 1080.9 | 1068.1 | *1056.2* | 1050.3 | 1013.8 | 961.4 | 913.0 | 865.5 |
| 22.5° | 1100.7 | 1104.7 | 1104.7 | 1104.7 | 1096.8 | *1086.9* | 1084.9 | 1049.3 | 992.0 | 932.7 | 875.4 |
| 25° | 1123.4 | 1128.4 | 1128.4 | 1126.4 | 1119.5 | *1116.5* | 1113.5 | 1080.0 | 1021.7 | 955.5 | 886.3 |
| 27.5° | 1171.8 | 1170.9 | 1163.0 | 1153.1 | 1143.2 | *1142.2* | 1138.3 | 1114.5 | 1056.2 | 980.2 | 901.1 |
| 30° | 1239.0 | 1241.0 | 1231.1 | 1200.5 | 1177.8 | *1172.8* | 1173.8 | 1153.1 | 1096.8 | 1008.8 | 917.9 |
| 32.5° | 1341.8 | 1341.8 | 1303.3 | 1263.7 | 1231.1 | *1218.3* | 1215.3 | 1197.5 | 1138.3 | 1040.4 | 936.7 |
| 35° | 1418.9 | 1415.9 | 1394.2 | 1347.7 | 1307.2 | *1270.7* | 1265.7 | 1242.0 | 1184.7 | 1076.0 | 957.4 |
| 37.5° | 1477.2 | 1483.1 | 1466.3 | 1430.7 | 1391.2 | *1328.0* | 1318.1 | 1284.5 | 1227.2 | 1110.6 | 978.2 |
| 40° | 1589.8 | 1575.0 | 1534.5 | 1501.9 | 1454.4 | *1384.3* | 1375.4 | 1333.9 | 1270.7 | 1149.1 | 1003.9 |
| 42.5° | 1671.8 | 1651.1 | 1604.6 | 1561.1 | 1501.9 | *1440.6* | 1432.7 | 1387.2 | 1321.0 | 1192.6 | 1030.6 |
| 45° | 1789.4 | 1742.9 | 1678.7 | 1640.2 | 1556.2 | *1501.9* | 1492.0 | 1442.6 | 1373.4 | 1239.0 | 1064.1 |
| 47.5° | 1903.0 | 1822.0 | 1753.8 | 1736.0 | 1615.5 | *1568.1* | 1560.2 | 1502.8 | 1429.7 | 1289.4 | 1096.8 |
| 50° | 1888.2 | 1834.8 | 1812.1 | 1795.3 | 1666.9 | *1630.3* | 1622.4 | 1564.1 | 1487.0 | 1342.8 | 1129.4 |
| 52.5° | 1850.6 | 1855.6 | 1856.6 | 1816.1 | 1715.3 | *1688.6* | 1680.7 | 1630.3 | 1546.3 | 1389.2 | 1161.0 |
| 55° | 1890.2 | 1896.1 | 1895.1 | 1833.8 | 1771.6 | *1746.9* | 1742.0 | 1697.5 | 1603.6 | 1432.7 | 1183.7 |
| 57.5° | 1950.4 | 1930.7 | 1927.7 | 1878.3 | 1831.9 | *1809.1* | 1803.2 | 1764.7 | 1652.0 | 1464.3 | 1201.5 |
| 60° | 1961.3 | 1921.8 | 1934.6 | 1888.2 | 1877.3 | *1870.4* | 1868.4 | 1823.0 | 1697.5 | 1490.0 | 1208.4 |
| 62.5° | 1839.8 | 1832.9 | 1883.3 | 1864.5 | 1901.0 | *1920.8* | 1921.8 | 1864.5 | 1722.2 | 1499.9 | 1201.5 |
| 65° | 1632.3 | 1659.9 | 1768.6 | 1823.0 | 1936.6 | *1992.9* | 1990.9 | 1889.2 | 1719.2 | 1471.2 | 1159.0 |
| 67.5° | *1382.3* | *1404.0* | *1557.2* | *1729.1* | *1928.7* | *2031.5* | *2030.5* | *1900.0* | *1667.9* | *1392.2* | *1063.2* |
| 70° | 1048.3 | 1116.5 | 1333.9 | 1560.2 | 1822.0 | *1955.4* | 1972.2 | 1838.8 | 1550.3 | 1247.9 | 917.9 |
| 72.5° | 797.4 | 808.2 | 1071.1 | 1308.2 | 1631.3 | *1774.6* | 1771.6 | 1643.2 | 1353.6 | 1051.3 | 764.8 |
| 75° | 566.2 | 589.9 | 806.3 | 1013.8 | 1336.9 | *1495.9* | 1489.0 | 1347.7 | 1080.0 | 818.1 | 584.9 |
| 77.5° | 421.9 | 430.8 | 589.9 | 751.9 | 999.9 | *1143.2* | 1140.2 | 996.0 | 794.4 | 600.7 | 435.7 |
| 80° | 308.3 | 323.1 | 424.9 | 524.7 | 677.8 | *801.3* | 797.4 | 661.0 | 509.8 | 419.9 | 318.2 |
| 82.5° | 172.9 | 183.8 | 247.0 | 317.2 | 357.7 | *396.2* | 379.4 | 317.2 | 232.2 | 180.8 | 156.1 |
| 85° | 4.9 | 5.9 | 8.9 | 10.9 | 18.8 | *31.6* | 34.6 | 30.6 | 36.6 | 22.7 | 24.7 |
| 87.5° | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | *3.0* | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| 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: P868114
CATALOG NUMBER: MEM2-HSN-SA-30-740-U-T4W

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 815.2 | 815.2 | 815.2 | 815.2 | 815.2 | 815.2 | 815.2 | 815.2 | 815.2 | 815.2 | 815.2 |
| 2.5° | 817.1 | 813.2 | 805.3 | 800.3 | 797.4 | 793.4 | 787.5 | 783.5 | 780.6 | 784.5 | 783.5 |
| 5° | 816.1 | 808.2 | 794.4 | 784.5 | 774.6 | 766.7 | 757.8 | 750.9 | 747.0 | 749.0 | 748.0 |
| 7.5° | 816.1 | 806.3 | 784.5 | 768.7 | 753.9 | 742.0 | 732.2 | 723.3 | 719.3 | 720.3 | 719.3 |
| 10° | 820.1 | 806.3 | 777.6 | 754.9 | 735.1 | 721.3 | 710.4 | 702.5 | 699.5 | 702.5 | 703.5 |
| 12.5° | 824.0 | 806.3 | 771.7 | 743.0 | 717.3 | 702.5 | 692.6 | 687.7 | 689.7 | 690.7 | 691.6 |
| 15° | 826.0 | 805.3 | 765.7 | 729.2 | 700.5 | 684.7 | 678.8 | 677.8 | 682.8 | 687.7 | 688.7 |
| 17.5° | 831.0 | 804.3 | 756.9 | 715.4 | 685.7 | 672.9 | 669.9 | 673.9 | 683.7 | 690.7 | 692.6 |
| 20° | 836.9 | 806.3 | 747.0 | 698.6 | 670.9 | 661.0 | 666.0 | 674.8 | 686.7 | 696.6 | 698.6 |
| 22.5° | 842.8 | 807.2 | 738.1 | 683.7 | 655.1 | 653.1 | 664.0 | 676.8 | 690.7 | 700.5 | 702.5 |
| 25° | 849.7 | 807.2 | 726.2 | 665.0 | 639.3 | 642.2 | 659.0 | 675.8 | 688.7 | 701.5 | 703.5 |
| 27.5° | 856.7 | 809.2 | 713.4 | 644.2 | 619.5 | 628.4 | 649.2 | 669.9 | 683.7 | 696.6 | 699.5 |
| 30° | 868.5 | 813.2 | 702.5 | 626.4 | 599.8 | 611.6 | 636.3 | 660.0 | 674.8 | 688.7 | 691.6 |
| 32.5° | 880.4 | 819.1 | 693.6 | 607.7 | 580.0 | 593.8 | 621.5 | 648.2 | 664.0 | 676.8 | 678.8 |
| 35° | 896.2 | 827.0 | 686.7 | 588.9 | 560.2 | 571.1 | 600.7 | 630.4 | 648.2 | 658.1 | 663.0 |
| 37.5° | 913.0 | 837.9 | 680.8 | 572.1 | 538.5 | 548.4 | 580.0 | 611.6 | 630.4 | 640.3 | 642.2 |
| 40° | 933.7 | 852.7 | 676.8 | 556.3 | 517.7 | 525.7 | 557.3 | 591.9 | 609.6 | 616.6 | 620.5 |
| 42.5° | 956.4 | 868.5 | 673.9 | 540.5 | 495.0 | 502.9 | 536.5 | 570.1 | 587.9 | 593.8 | 596.8 |
| 45° | 985.1 | 889.3 | 671.9 | 523.7 | 476.2 | 483.2 | 516.8 | 550.4 | 565.2 | 573.1 | 576.0 |
| 47.5° | 1011.8 | 910.0 | 666.0 | 503.9 | 455.5 | 465.4 | 496.0 | 525.7 | 542.4 | 547.4 | 550.4 |
| 50° | 1038.5 | 927.8 | 654.1 | 482.2 | 436.7 | 445.6 | 473.3 | 495.0 | 507.9 | 513.8 | 515.8 |
| 52.5° | 1064.1 | 940.6 | 635.3 | 459.4 | 417.0 | 422.9 | 445.6 | 466.4 | 475.3 | 477.2 | 483.2 |
| 55° | 1080.9 | 947.6 | 608.6 | 432.8 | 397.2 | 399.2 | 416.0 | 434.7 | 439.7 | 440.7 | 440.7 |
| 57.5° | 1092.8 | 943.6 | 577.0 | 406.1 | 377.4 | 377.4 | 387.3 | 402.1 | 404.1 | 405.1 | 407.1 |
| 60° | 1094.8 | 929.8 | 536.5 | 381.4 | 355.7 | 352.7 | 362.6 | 371.5 | 372.5 | 374.5 | 376.5 |
| 62.5° | 1080.0 | 899.1 | 493.0 | 357.7 | 335.0 | 328.0 | 336.9 | 345.8 | 350.8 | 353.7 | 355.7 |
| 65° | 1034.5 | 836.9 | 443.6 | 334.0 | 315.2 | 303.3 | 314.2 | 329.0 | 338.9 | 339.9 | 339.9 |
| 67.5° | *939.6* | *736.1* | *391.3* | *309.3* | *291.5* | *280.6* | *294.4* | *310.3* | *322.1* | *327.0* | *326.1* |
| 70° | 796.4 | 624.5 | 342.9 | 283.6 | 267.8 | 260.8 | 275.7 | 293.5 | 303.3 | 307.3 | 309.3 |
| 72.5° | 641.3 | 500.0 | 300.4 | 257.9 | 247.0 | 243.1 | 257.9 | 275.7 | 289.5 | 295.4 | 296.4 |
| 75° | 499.0 | 393.2 | 264.8 | 231.2 | 222.3 | 223.3 | 239.1 | 256.9 | 271.7 | 274.7 | 265.8 |
| 77.5° | 387.3 | 313.2 | 231.2 | 199.6 | 194.6 | 201.6 | 217.4 | 236.1 | 245.0 | 248.0 | 242.1 |
| 80° | 279.6 | 240.1 | 186.7 | 157.1 | 157.1 | 168.0 | 181.8 | 203.5 | 206.5 | 202.6 | 204.5 |
| 82.5° | 132.4 | 116.6 | 91.9 | 76.1 | 71.1 | 79.0 | 84.0 | 90.9 | 98.8 | 100.8 | 95.8 |
| 85° | 17.8 | 11.9 | 8.9 | 9.9 | 8.9 | 5.9 | 4.0 | 4.0 | 4.0 | 3.0 | 3.0 |
| 87.5° | 3.0 | 3.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.0 | 1.0 | 1.0 |
| 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

Streetworks

Report Number: SP1-2407-157-5

Test Date: 08/07/2024

Luminaire Tested: MEM2-HTN-SA-30-740-U-5WQ-2

Data in this report applies to families of products including MEM2-HTN-SA-30-740-U-5WQ-2

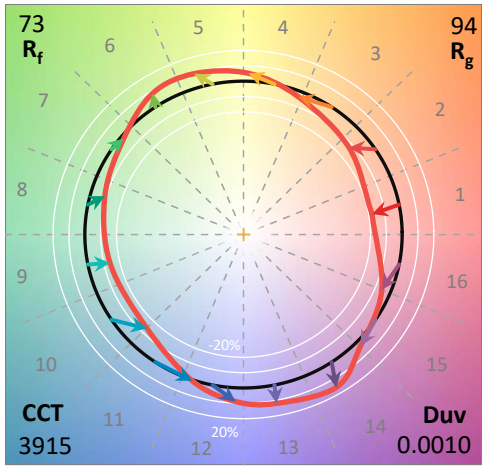
Report Generated By FNC07603 / LDUCLS01DT446
Version: v7.04

## Test Information

| | |
|---|---|
| Test Method: | LM-79-2019 |
| Report Number: | SP1-2407-157-5 |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Photometer: | SP1 - 76IN SPHERE |
| Measurement Geometry: | 4π |
| Issue Date: | 08/20/2024 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS |
| Product Line: | Streetworks |
| Catalog Number: | **MEM2-HTN-SA-30-740-U-5WQ-2** |
| Description: | Epic Modern Light Square 30W 5WQ Optic and Flare Trim |

## Spectral Parameters

| | | | | | |
|---|---|---|---|---|---|
| CCT (K): | 3915 | CRI (Ra): | 71.0 | | |
| CIE u': | 0.2262 | R1: | 67.6 | R9: | -38.4 |
| CIE v': | 0.5044 | R2: | 78.3 | R10: | 48.9 |
| Duv: | 0.0010 | R3: | 87.1 | R11: | 65.3 |
| CIE x: | 0.3850 | R4: | 69.7 | R12: | 40.4 |
| CIE y: | 0.3816 | R5: | 67.4 | R13: | 69.3 |
| CIE z: | 0.2334 | R6: | 69.3 | R14: | 92.6 |
| Peak Wavelength (nm): | 449 | R7: | 79.7 | R15: | 59.9 |
| Dominant Wavelength (nm): | 578 | R8: | 48.7 | | |
| Purity: | 30.05482 | | | | |
| Rf: | 73.2 | | | | |
| Rg: | 93.9 | | | | |




## Test Conditions

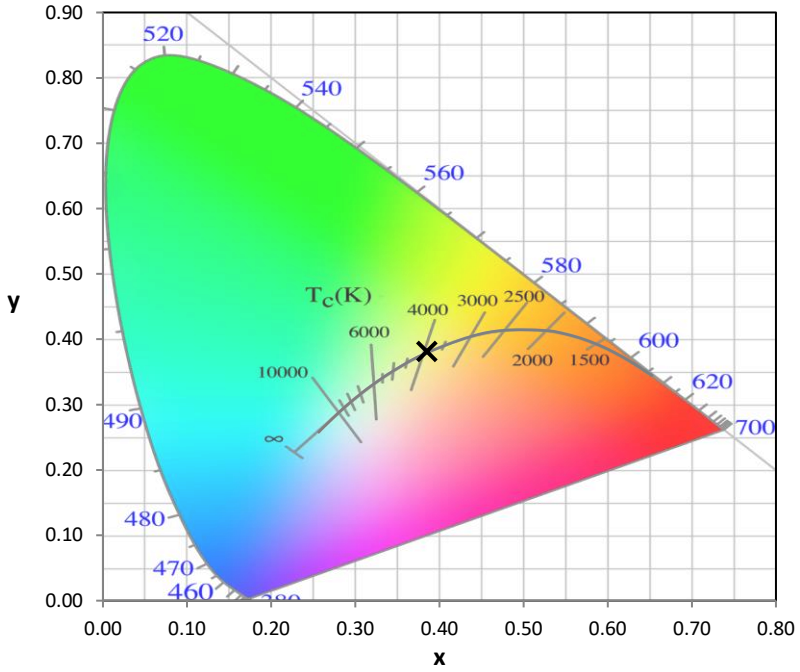
| | |
|---|---|
| Stabilization Time: | 21M |
| Operation Time: | 1H 21M |
| Sphere Temperature (°C): | 24.2 |

REPORT NUMBER: SP1-2407-157-5

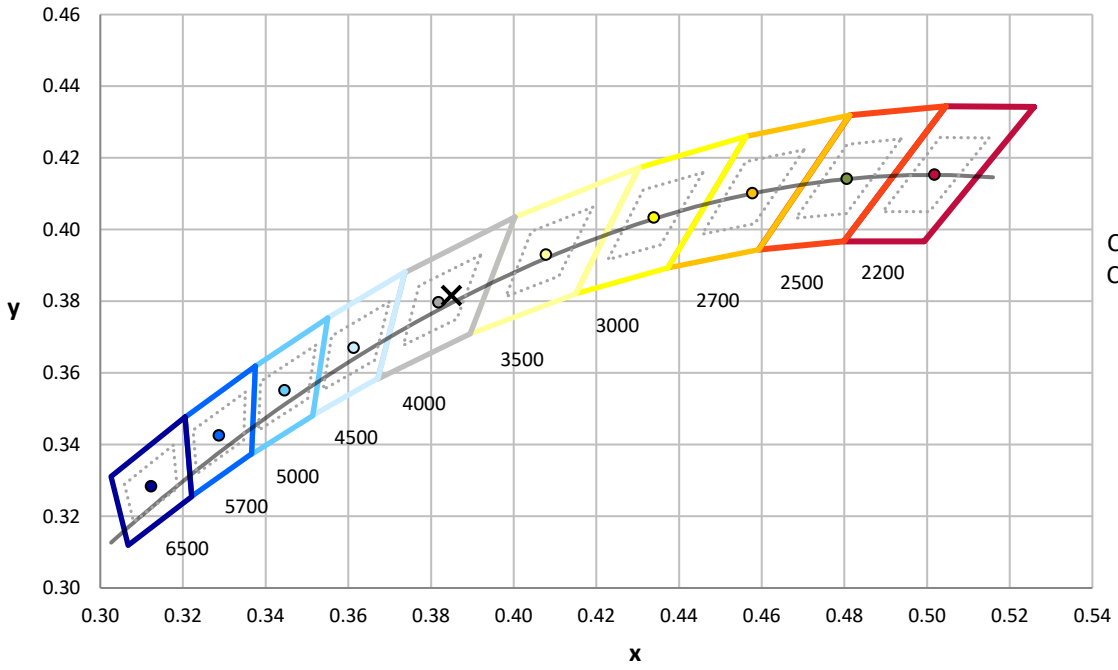
| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 6/18/2024 | 12/18/2024 |
| Power Meter | INXT2011004 | 2/8/2024 | 2/8/2025 |
| AC Power Source | IN0063 | 10/24/2023 | 10/24/2024 |
| DC 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: SP1-2407-157-5

## CIE 1931 Chromaticity Diagram




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




CCT = 3915K
CIE x = 0.3850
CIE y = 0.3816
Duv = 0.0010

Point lies inside the ANSI 4000K 4-step quadrangle

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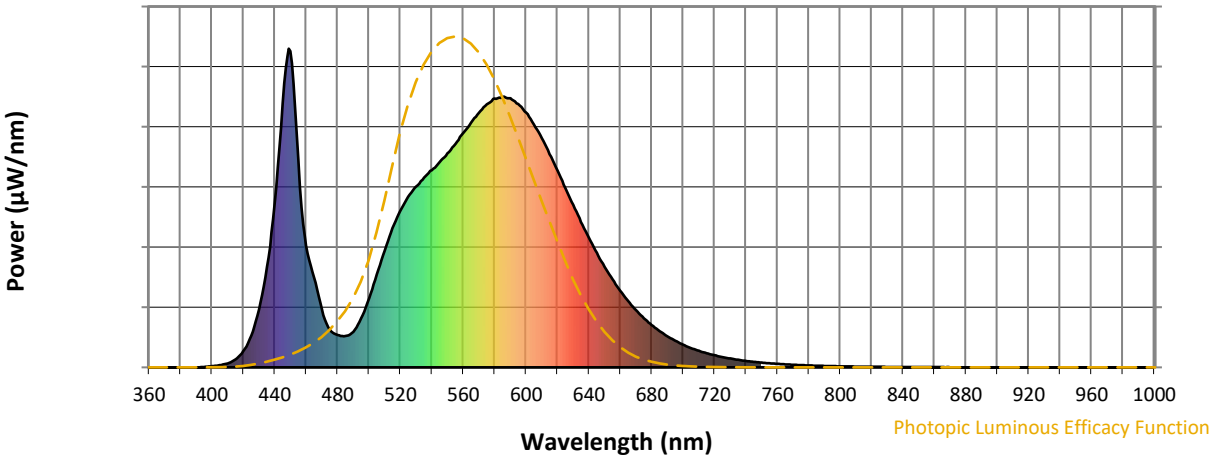
## Photopic Flux vs. Wavelength




## 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 | 112 | NR | 620 | 618 | NR | 750 | 15 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 153 | NR | 625 | 563 | NR | 755 | 13 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 216 | NR | 630 | 510 | NR | 760 | 11 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 291 | NR | 635 | 456 | NR | 765 | 9 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 366 | NR | 640 | 407 | NR | 770 | 8 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 436 | NR | 645 | 359 | NR | 775 | 7 | NR | 905 | 0 | NR |
| 390 | 0 | NR | 520 | 492 | NR | 650 | 316 | NR | 780 | 6 | NR | 910 | 0 | NR |
| 395 | 2 | NR | 525 | 536 | NR | 655 | 277 | NR | 785 | 5 | NR | 915 | 0 | NR |
| 400 | 4 | NR | 530 | 567 | NR | 660 | 240 | NR | 790 | 4 | NR | 920 | 0 | NR |
| 405 | 7 | NR | 535 | 596 | NR | 665 | 208 | NR | 795 | 4 | NR | 925 | 0 | NR |
| 410 | 12 | NR | 540 | 619 | NR | 670 | 179 | NR | 800 | 3 | NR | 930 | 0 | NR |
| 415 | 25 | NR | 545 | 644 | NR | 675 | 154 | NR | 805 | 3 | NR | 935 | 0 | NR |
| 420 | 51 | NR | 550 | 671 | NR | 680 | 133 | NR | 810 | 3 | NR | 940 | 0 | NR |
| 425 | 100 | NR | 555 | 701 | NR | 685 | 114 | NR | 815 | 2 | NR | 945 | 0 | NR |
| 430 | 180 | NR | 560 | 735 | NR | 690 | 98 | NR | 820 | 2 | NR | 950 | 0 | NR |
| 435 | 315 | NR | 565 | 768 | NR | 695 | 83 | NR | 825 | 2 | NR | 955 | 0 | NR |
| 440 | 514 | NR | 570 | 798 | NR | 700 | 71 | NR | 830 | 1 | NR | 960 | 0 | NR |
| 445 | 828 | NR | 575 | 825 | NR | 705 | 61 | NR | 835 | 1 | NR | 965 | 0 | NR |
| 450 | 992 | NR | 580 | 843 | NR | 710 | 52 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 652 | NR | 585 | 848 | NR | 715 | 44 | NR | 845 | 1 | NR | 975 | 0 | NR |
| 460 | 382 | NR | 590 | 844 | NR | 720 | 38 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 282 | NR | 595 | 826 | NR | 725 | 32 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 180 | NR | 600 | 800 | NR | 730 | 28 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 119 | NR | 605 | 762 | NR | 735 | 24 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 101 | NR | 610 | 719 | NR | 740 | 20 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 98 | NR | 615 | 669 | NR | 745 | 17 | NR | 875 | 0 | NR | | | |

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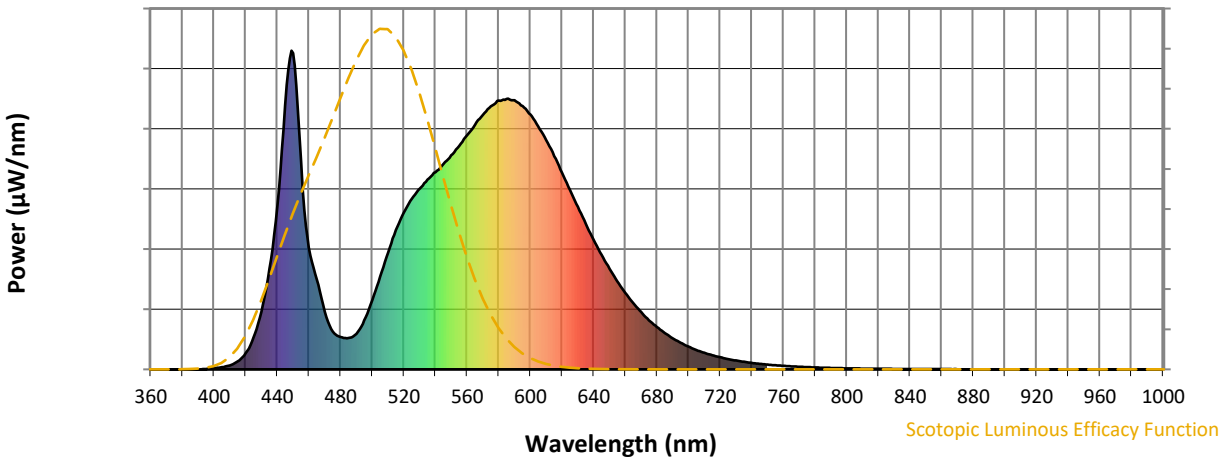
## Scotopic Flux vs. Wavelength




**Scotopic Lumens: NR** **S/P: 1.49**

| 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 | 112 | NR | 620 | 618 | NR | 750 | 15 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 153 | NR | 625 | 563 | NR | 755 | 13 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 216 | NR | 630 | 510 | NR | 760 | 11 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 291 | NR | 635 | 456 | NR | 765 | 9 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 366 | NR | 640 | 407 | NR | 770 | 8 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 436 | NR | 645 | 359 | NR | 775 | 7 | NR | 905 | 0 | NR |
| 390 | 0 | NR | 520 | 492 | NR | 650 | 316 | NR | 780 | 6 | NR | 910 | 0 | NR |
| 395 | 2 | NR | 525 | 536 | NR | 655 | 277 | NR | 785 | 5 | NR | 915 | 0 | NR |
| 400 | 4 | NR | 530 | 567 | NR | 660 | 240 | NR | 790 | 4 | NR | 920 | 0 | NR |
| 405 | 7 | NR | 535 | 596 | NR | 665 | 208 | NR | 795 | 4 | NR | 925 | 0 | NR |
| 410 | 12 | NR | 540 | 619 | NR | 670 | 179 | NR | 800 | 3 | NR | 930 | 0 | NR |
| 415 | 25 | NR | 545 | 644 | NR | 675 | 154 | NR | 805 | 3 | NR | 935 | 0 | NR |
| 420 | 51 | NR | 550 | 671 | NR | 680 | 133 | NR | 810 | 3 | NR | 940 | 0 | NR |
| 425 | 100 | NR | 555 | 701 | NR | 685 | 114 | NR | 815 | 2 | NR | 945 | 0 | NR |
| 430 | 180 | NR | 560 | 735 | NR | 690 | 98 | NR | 820 | 2 | NR | 950 | 0 | NR |
| 435 | 315 | NR | 565 | 768 | NR | 695 | 83 | NR | 825 | 2 | NR | 955 | 0 | NR |
| 440 | 514 | NR | 570 | 798 | NR | 700 | 71 | NR | 830 | 1 | NR | 960 | 0 | NR |
| 445 | 828 | NR | 575 | 825 | NR | 705 | 61 | NR | 835 | 1 | NR | 965 | 0 | NR |
| 450 | 992 | NR | 580 | 843 | NR | 710 | 52 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 652 | NR | 585 | 848 | NR | 715 | 44 | NR | 845 | 1 | NR | 975 | 0 | NR |
| 460 | 382 | NR | 590 | 844 | NR | 720 | 38 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 282 | NR | 595 | 826 | NR | 725 | 32 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 180 | NR | 600 | 800 | NR | 730 | 28 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 119 | NR | 605 | 762 | NR | 735 | 24 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 101 | NR | 610 | 719 | NR | 740 | 20 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 98 | NR | 615 | 669 | NR | 745 | 17 | NR | 875 | 0 | NR | | | |

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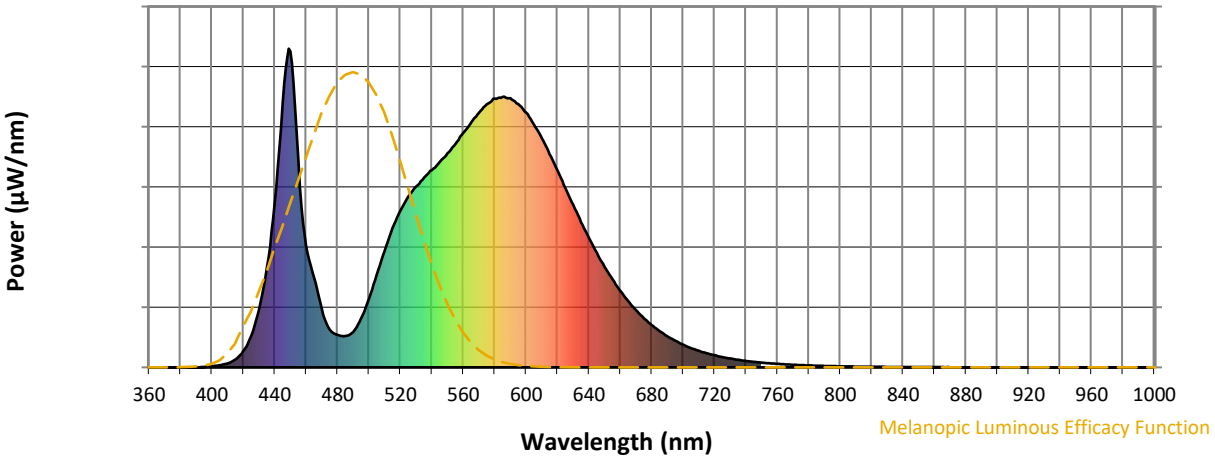
## Melanopic Flux vs. Wavelength




**Melanopic Lumens: NR** **M/P: 2.88**

| 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 | 112 | NR | 620 | 618 | NR | 750 | 15 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 153 | NR | 625 | 563 | NR | 755 | 13 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 216 | NR | 630 | 510 | NR | 760 | 11 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 291 | NR | 635 | 456 | NR | 765 | 9 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 366 | NR | 640 | 407 | NR | 770 | 8 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 436 | NR | 645 | 359 | NR | 775 | 7 | NR | 905 | 0 | NR |
| 390 | 0 | NR | 520 | 492 | NR | 650 | 316 | NR | 780 | 6 | NR | 910 | 0 | NR |
| 395 | 2 | NR | 525 | 536 | NR | 655 | 277 | NR | 785 | 5 | NR | 915 | 0 | NR |
| 400 | 4 | NR | 530 | 567 | NR | 660 | 240 | NR | 790 | 4 | NR | 920 | 0 | NR |
| 405 | 7 | NR | 535 | 596 | NR | 665 | 208 | NR | 795 | 4 | NR | 925 | 0 | NR |
| 410 | 12 | NR | 540 | 619 | NR | 670 | 179 | NR | 800 | 3 | NR | 930 | 0 | NR |
| 415 | 25 | NR | 545 | 644 | NR | 675 | 154 | NR | 805 | 3 | NR | 935 | 0 | NR |
| 420 | 51 | NR | 550 | 671 | NR | 680 | 133 | NR | 810 | 3 | NR | 940 | 0 | NR |
| 425 | 100 | NR | 555 | 701 | NR | 685 | 114 | NR | 815 | 2 | NR | 945 | 0 | NR |
| 430 | 180 | NR | 560 | 735 | NR | 690 | 98 | NR | 820 | 2 | NR | 950 | 0 | NR |
| 435 | 315 | NR | 565 | 768 | NR | 695 | 83 | NR | 825 | 2 | NR | 955 | 0 | NR |
| 440 | 514 | NR | 570 | 798 | NR | 700 | 71 | NR | 830 | 1 | NR | 960 | 0 | NR |
| 445 | 828 | NR | 575 | 825 | NR | 705 | 61 | NR | 835 | 1 | NR | 965 | 0 | NR |
| 450 | 992 | NR | 580 | 843 | NR | 710 | 52 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 652 | NR | 585 | 848 | NR | 715 | 44 | NR | 845 | 1 | NR | 975 | 0 | NR |
| 460 | 382 | NR | 590 | 844 | NR | 720 | 38 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 282 | NR | 595 | 826 | NR | 725 | 32 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 180 | NR | 600 | 800 | NR | 730 | 28 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 119 | NR | 605 | 762 | NR | 735 | 24 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 101 | NR | 610 | 719 | NR | 740 | 20 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 98 | NR | 615 | 669 | NR | 745 | 17 | NR | 875 | 0 | NR | | | |

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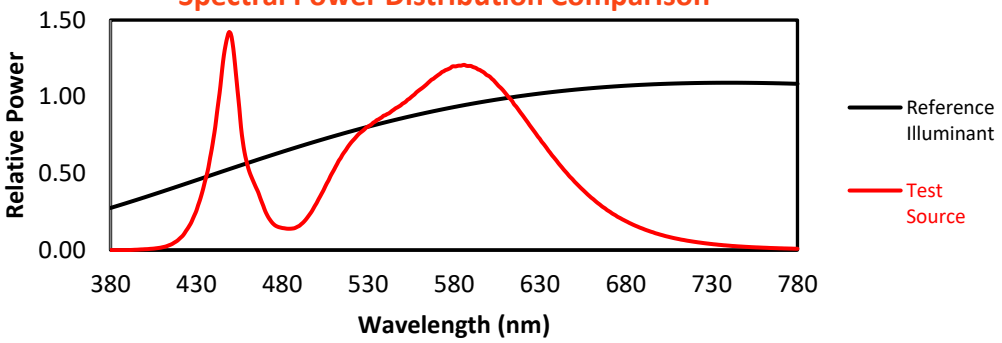
# TM-30-18

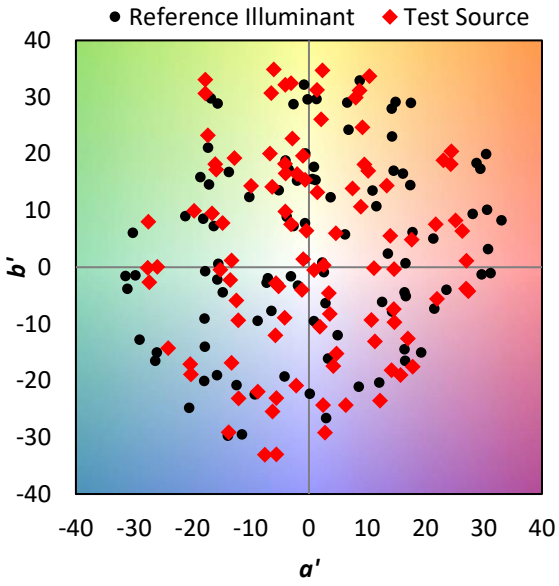
## Summary

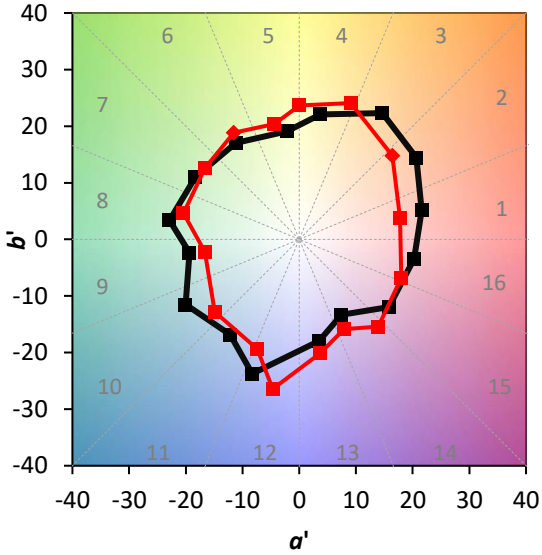
$R_f$ = 73.2
$R_g$ = 93.9
CIE $R_a$ = 71.0
$R_9$ = -38.4

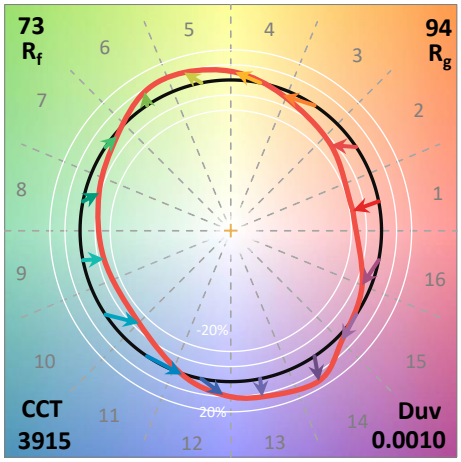
## Spectral Power Distribution Comparison

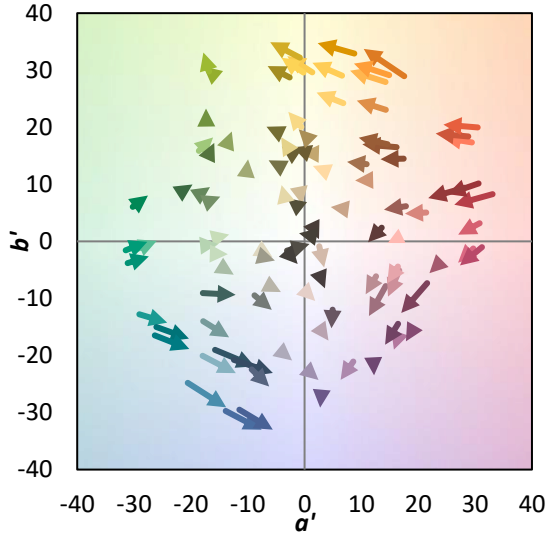



## Color Vector Graphics



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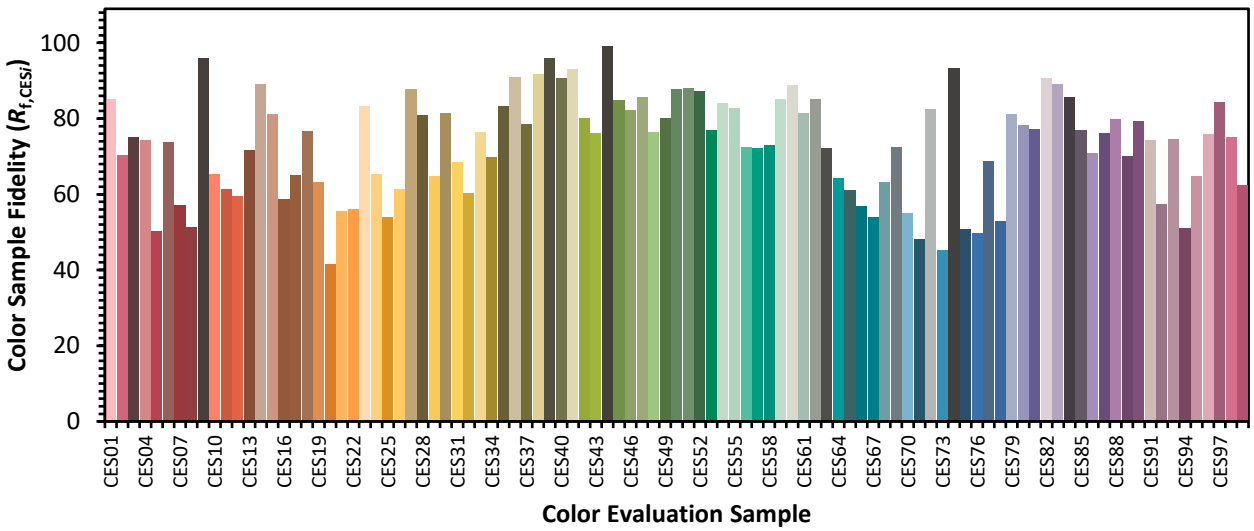
# TM-30-18

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

| | | | |
|---|---|---|---|
| CES01 = 85 | CES26 = 61 | CES51 = 88 | CES76 = 50 |
| CES02 = 61 | CES27 = 88 | CES52 = 87 | CES77 = 69 |
| CES03 = 30 | CES28 = 81 | CES53 = 77 | CES78 = 53 |
| CES04 = 70 | CES29 = 65 | CES54 = 84 | CES79 = 81 |
| CES05 = 47 | CES30 = 81 | CES55 = 83 | CES80 = 78 |
| CES06 = 50 | CES31 = 69 | CES56 = 73 | CES81 = 77 |
| CES07 = 40 | CES32 = 60 | CES57 = 72 | CES82 = 91 |
| CES08 = 39 | CES33 = 76 | CES58 = 73 | CES83 = 89 |
| CES09 = 29 | CES34 = 70 | CES59 = 85 | CES84 = 86 |
| CES10 = 74 | CES35 = 83 | CES60 = 89 | CES85 = 77 |
| CES11 = 57 | CES36 = 91 | CES61 = 81 | CES86 = 71 |
| CES12 = 63 | CES37 = 79 | CES62 = 85 | CES87 = 76 |
| CES13 = 42 | CES38 = 92 | CES63 = 72 | CES88 = 80 |
| CES14 = 74 | CES39 = 96 | CES64 = 64 | CES89 = 70 |
| CES15 = 71 | CES40 = 91 | CES65 = 61 | CES90 = 79 |
| CES16 = 46 | CES41 = 93 | CES66 = 57 | CES91 = 74 |
| CES17 = 49 | CES42 = 80 | CES67 = 54 | CES92 = 57 |
| CES18 = 56 | CES43 = 76 | CES68 = 63 | CES93 = 74 |
| CES19 = 72 | CES44 = 99 | CES69 = 73 | CES94 = 51 |
| CES20 = 65 | CES45 = 85 | CES70 = 55 | CES95 = 65 |
| CES21 = 86 | CES46 = 82 | CES71 = 48 | CES96 = 76 |
| CES22 = 78 | CES47 = 86 | CES72 = 83 | CES97 = 84 |
| CES23 = 92 | CES48 = 77 | CES73 = 45 | CES98 = 75 |
| CES24 = 91 | CES49 = 80 | CES74 = 93 | CES99 = 62 |
| CES25 = 72 | CES50 = 88 | CES75 = 51 | |



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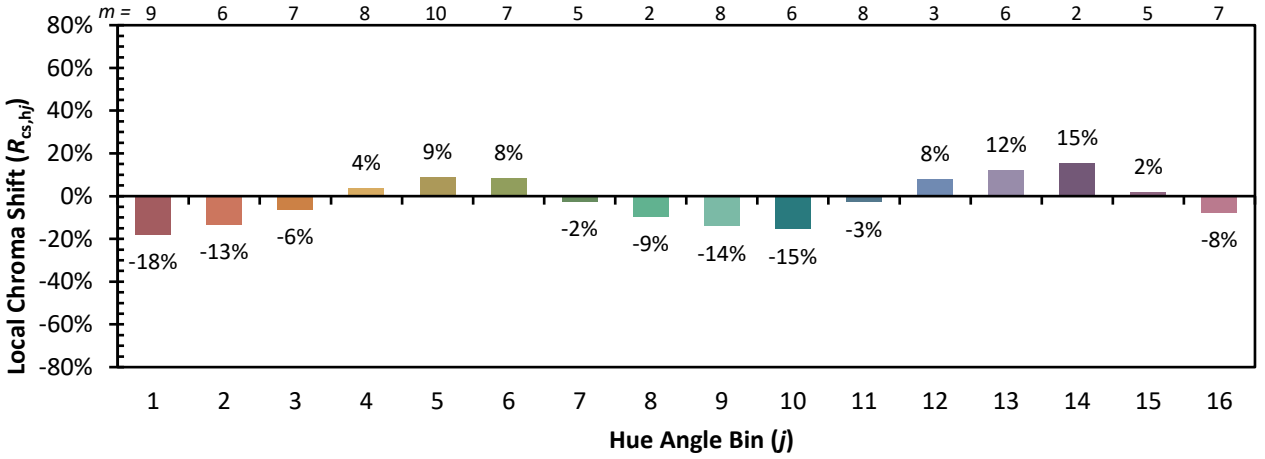
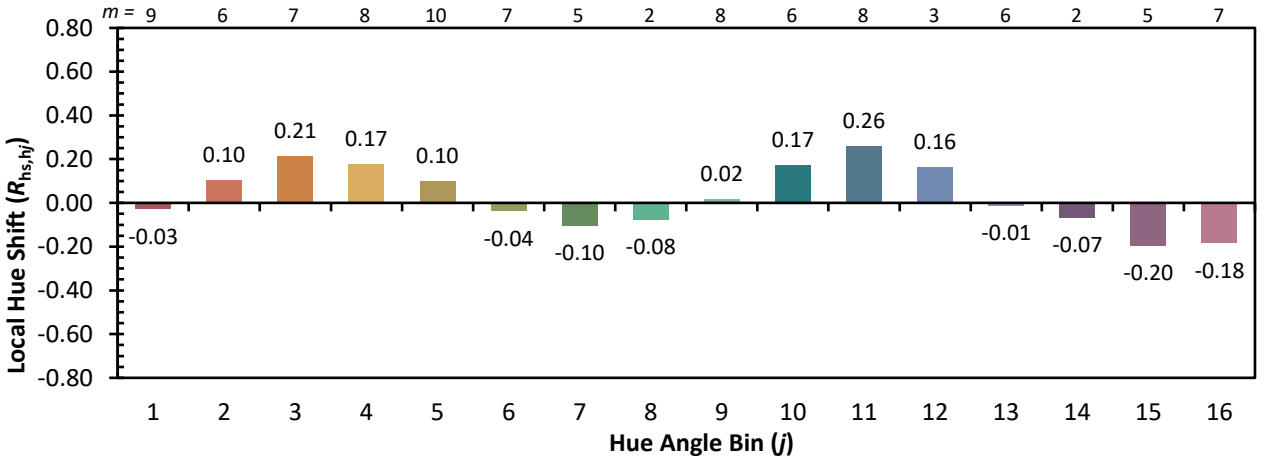
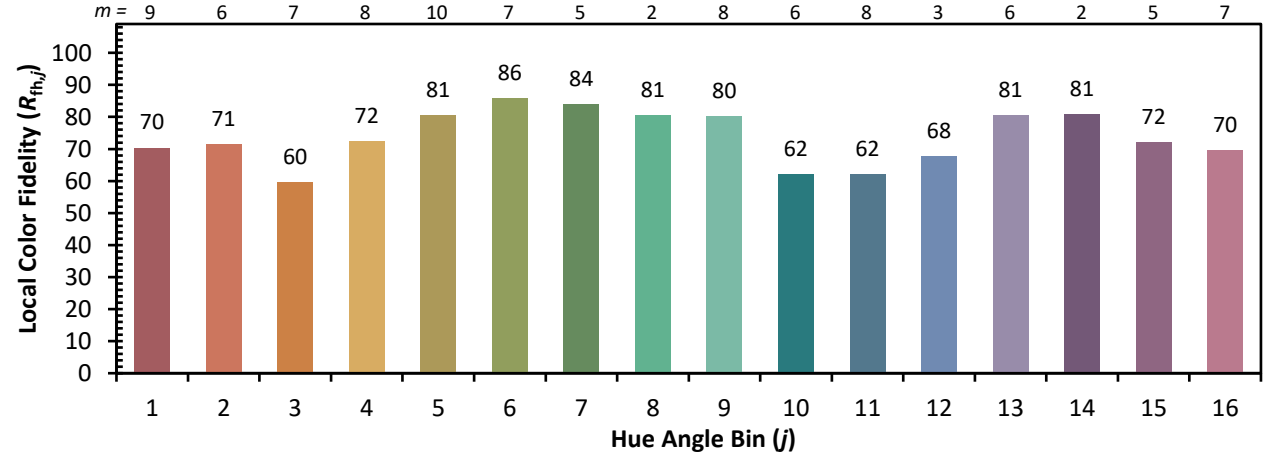
## Color Rendition by Hue-Angle Bin



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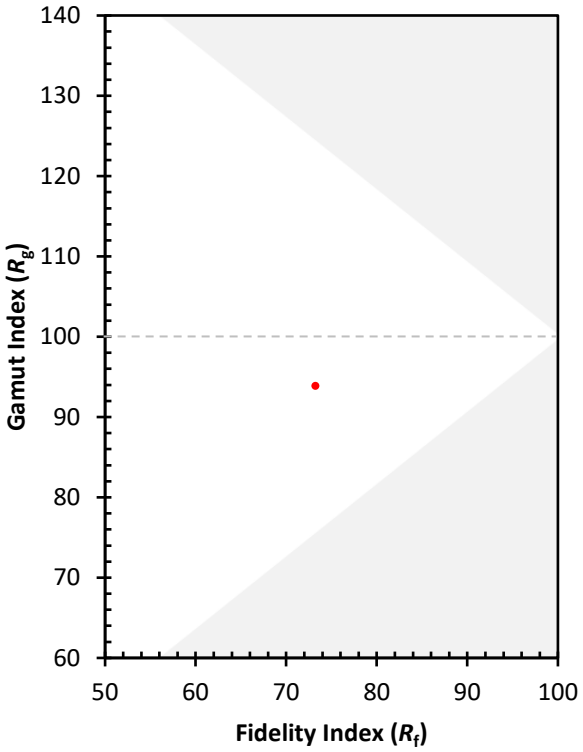
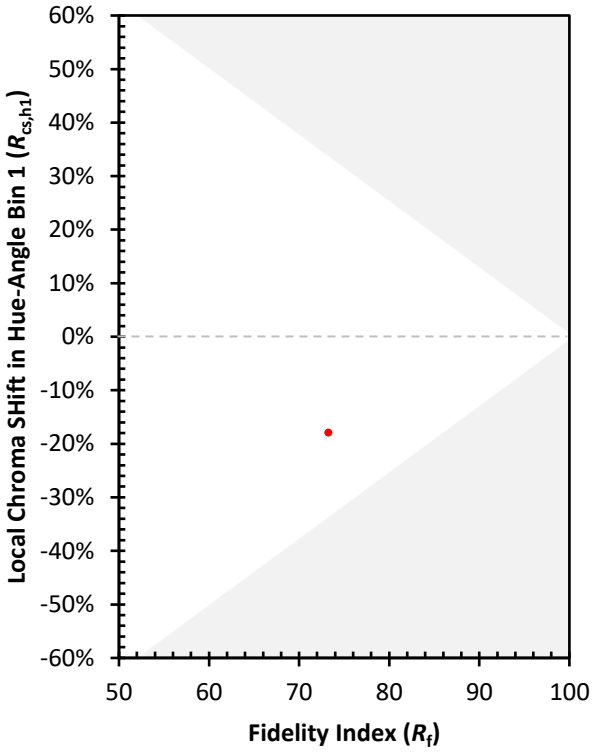
## Measure Comparisons

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