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: P867967

Luminaire Tested: **MEM2-HSN-SA-30-730-U-T2U**

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: | P867967 |
| Test Lab: | INNOVATION CENTER(G3) |
| Issue Date: | 08/21/2024 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS (FORMERLY EATON) |
| Product Line: | STREETWORKS |
| Catalog Number: | MEM2-HSN-SA-30-730-U-T2U |
| Description: | EPIC MODERN SHORT HOUSING DISCRETE LED ARRAYS 30W 70CRI 3000K FIXTURE w/ TYPE II URBAN DISTRIBUTION OPTIC |
| Light Source: | (10) 3000K CCT, 70 CRI LEDS |
| Ballast/Driver: | ELECTRONIC DRIVER |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 4711.1 lumens |
| Efficiency: | N/A |
| Efficacy: | 143.6 lumens/watt |
| Luminous Opening: | Rectangular (W 0.33' x L: 0.33' x H: 0') |
| IES Classification: | Type III - Medium |
| 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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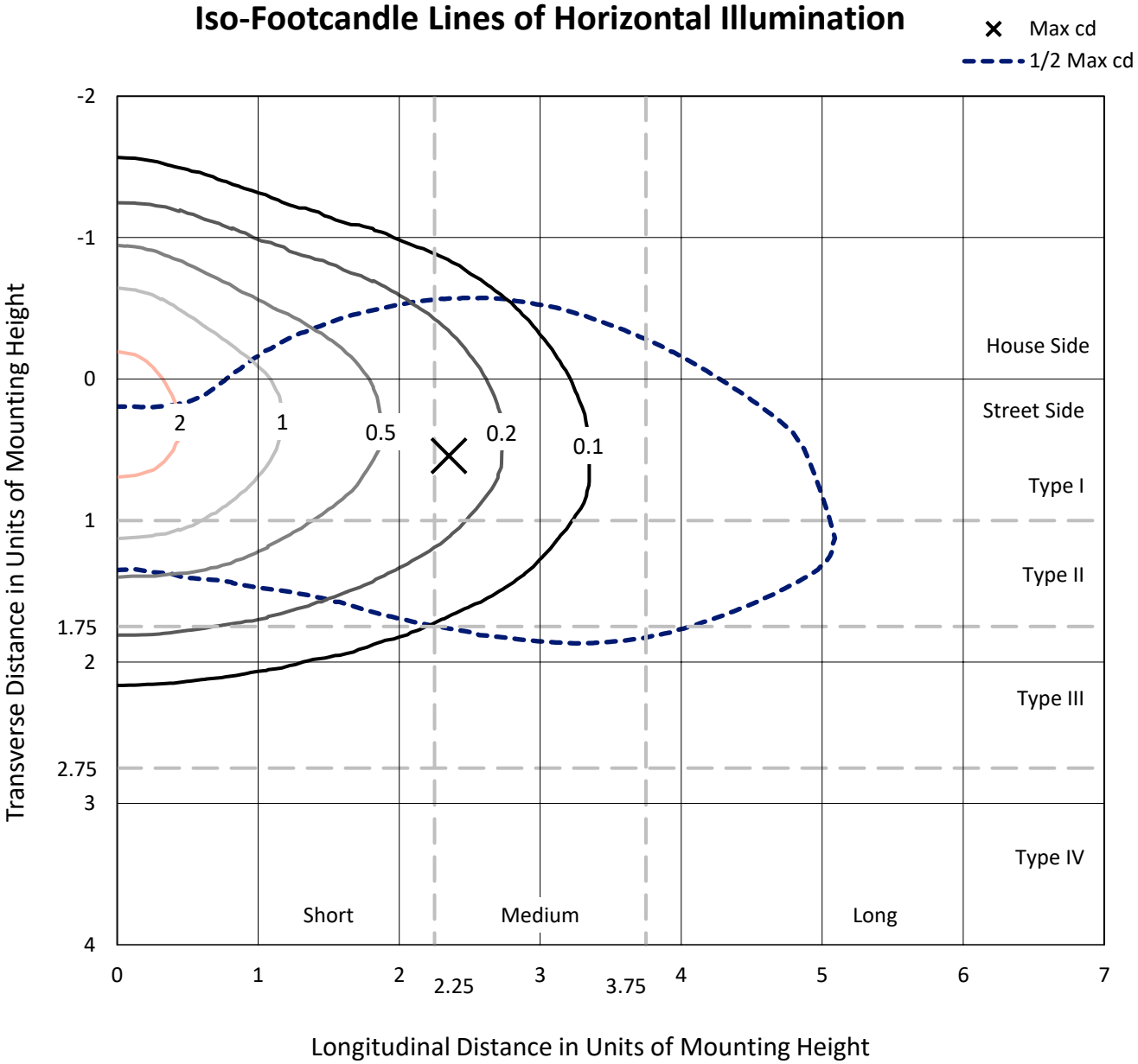
Scaled Data Report

REPORT NUMBER: P867967
CATALOG NUMBER: MEM2-HSN-SA-30-730-U-T2U

## Iso-Footcandle Lines of Horizontal Illumination




Based on 20 foot mounting height. Maximum calculated value = 2.5 fc
Type III - Medium - N/A

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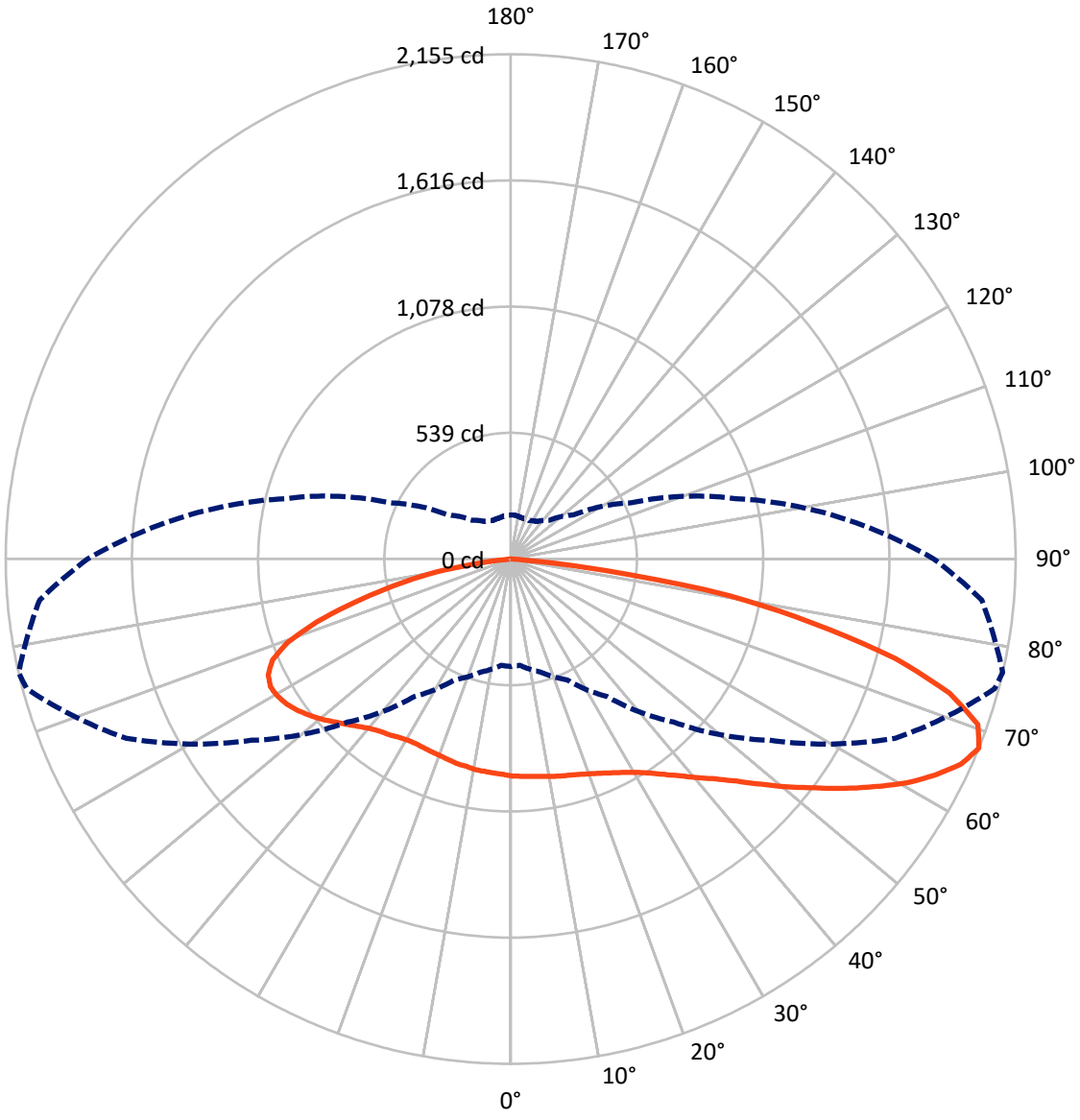
## Luminous Intensity Polar Plot



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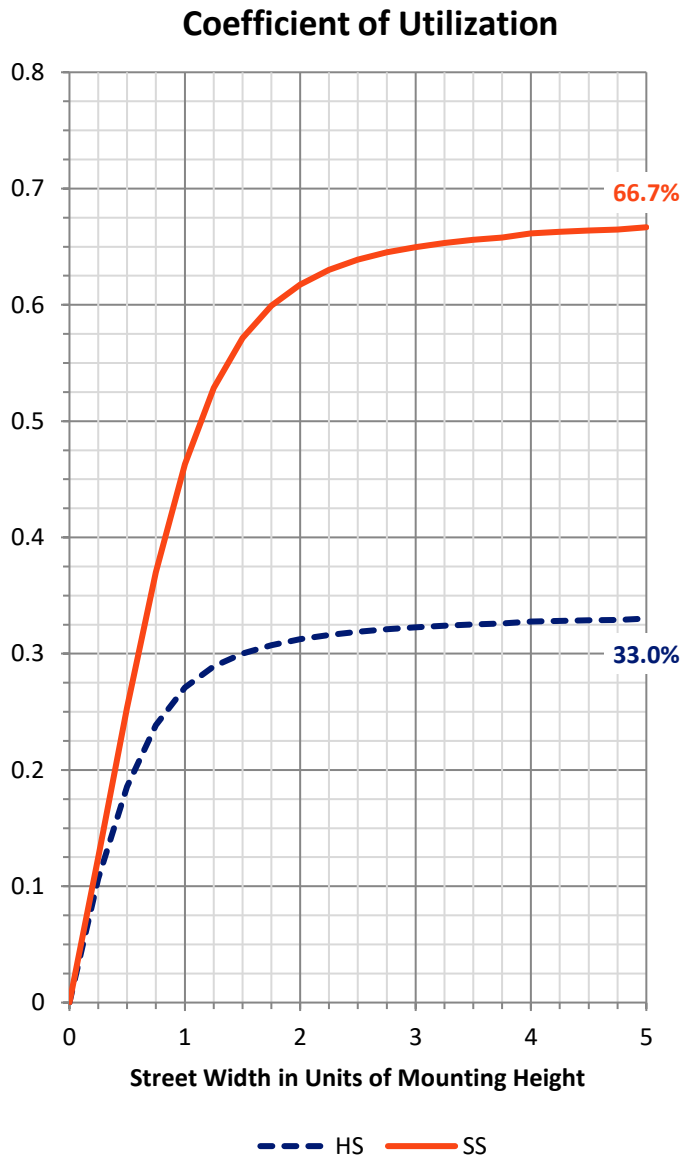
REPORT NUMBER: P867967
CATALOG NUMBER: MEM2-HSN-SA-30-730-U-T2U

**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 1566.6 | 0.0 | 1566.6 |
| | % Fixture | 33.3 | 0.0 | 33.3 |
| **Street Side** | Lumens | 3144.5 | 0.0 | 3144.5 |
| | % Fixture | 66.7 | 0.0 | 66.7 |
| **Total** | Lumens | 4711.1 | 0.0 | 4711.1 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 89.0 | 1.9 |
| 10°-20° | 270.0 | 5.7 |
| 20°-30° | 455.2 | 9.7 |
| 30°-40° | 645.9 | 13.7 |
| 40°-50° | 817.3 | 17.3 |
| 50°-60° | 895.3 | 19.0 |
| 60°-70° | 865.4 | 18.4 |
| 70°-80° | 582.0 | 12.4 |
| 80°-90° | 91.0 | 1.9 |
| 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° | 4711.1 | 100.0 |
| 0°-180° | 4711.1 | 100.0 |



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REPORT NUMBER: P867967
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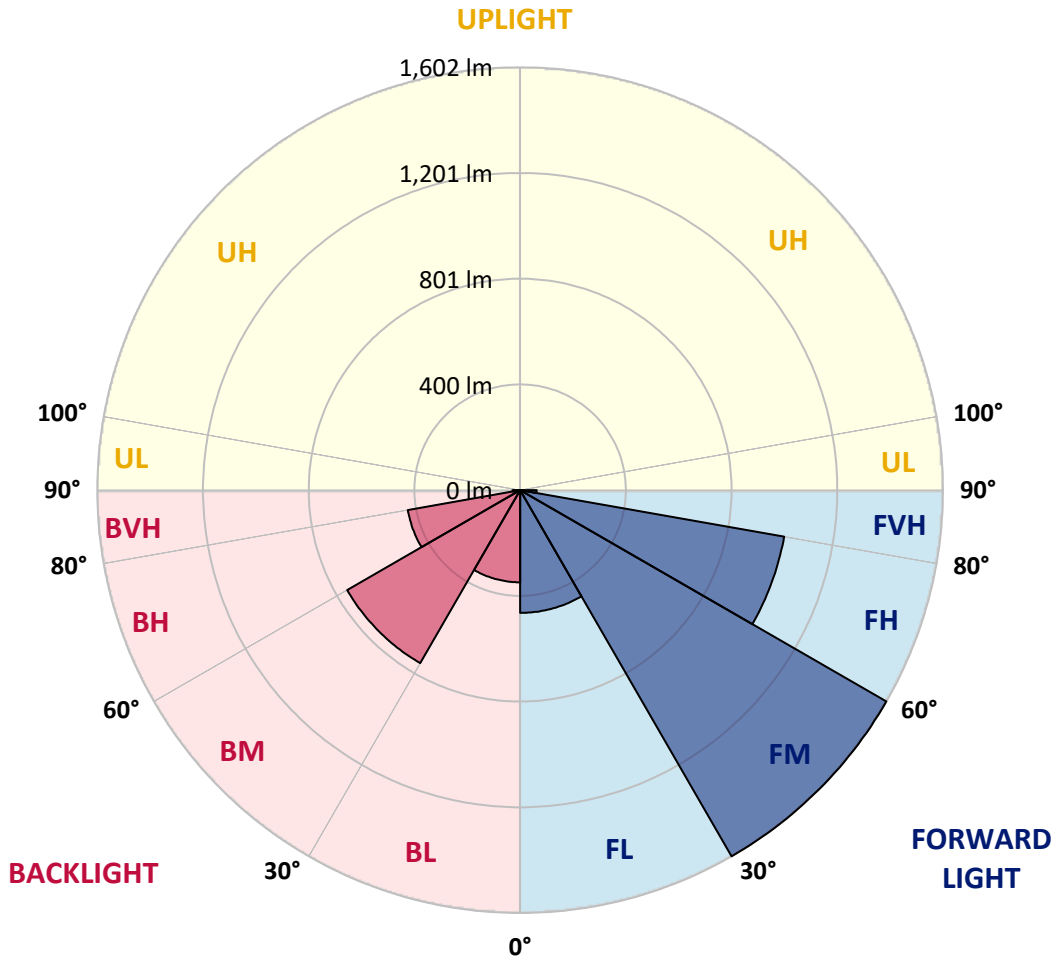
## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 465.0 | 9.9 | | | |
| FM | (30°-60°) | 1601.8 | 34.0 | | | |
| FH | (60°-80°) | 1015.4 | 21.6 | | | G1/1800 |
| FVH | (80°-90°) | 62.3 | 1.3 | | | G1/100 |
| BL | (0°-30°) | 349.2 | 7.4 | B1/500 | | |
| BM | (30°-60°) | 756.6 | 16.1 | B1/1000 | | |
| BH | (60°-80°) | 432.1 | 9.2 | B1/500 | | G1/500 |
| BVH | (80°-90°) | 28.7 | 0.6 | | | 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 III Medium



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Scaled Data Report

REPORT NUMBER: P867967
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**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 65° | 75° | 77° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 926.2 | 926.2 | 926.2 | 926.2 | 926.2 | 926.2 | 926.2 | 926.2 | 926.2 | *926.2* | 926.2 |
| 2.5° | 946.7 | 945.8 | 941.2 | 943.0 | 937.4 | 941.2 | 935.6 | 930.9 | 930.0 | *929.0* | 930.0 |
| 5° | 976.6 | 971.9 | 967.2 | 964.5 | 959.8 | 957.9 | 948.6 | 939.3 | 933.7 | *932.8* | 930.9 |
| 7.5° | 1011.0 | 1009.2 | 1002.7 | 998.9 | 985.9 | 979.4 | 966.3 | 949.5 | 941.2 | *937.4* | 932.8 |
| 10° | 1046.5 | 1051.1 | 1042.7 | 1035.3 | 1020.4 | 1006.4 | 984.0 | 962.6 | 945.8 | *944.0* | 933.7 |
| 12.5° | 1090.3 | 1089.3 | 1083.7 | 1070.7 | 1053.0 | 1033.4 | 1006.4 | 976.6 | 954.2 | *950.5* | 935.6 |
| 15° | 1129.4 | 1128.5 | 1121.0 | 1108.9 | 1085.6 | 1061.4 | 1025.0 | 990.5 | 962.6 | *957.0* | 939.3 |
| 17.5° | 1165.7 | 1163.9 | 1159.2 | 1146.2 | 1117.3 | 1087.5 | 1052.0 | 1006.4 | 972.8 | *966.3* | 942.1 |
| 20° | 1197.4 | 1199.3 | 1193.7 | 1180.6 | 1153.6 | 1121.9 | 1077.2 | 1026.9 | 985.9 | *978.4* | 950.5 |
| 22.5° | 1231.9 | 1232.8 | 1230.0 | 1225.4 | 1190.9 | 1157.3 | 1108.9 | 1050.2 | 1000.8 | *993.3* | 959.8 |
| 25° | 1268.2 | 1269.2 | 1271.0 | 1268.2 | 1229.1 | 1192.8 | 1141.5 | 1079.1 | 1021.3 | *1011.0* | 972.8 |
| 27.5° | 1310.2 | 1311.1 | 1314.8 | 1309.2 | 1267.3 | 1229.1 | 1177.8 | 1109.8 | 1042.7 | *1031.5* | 984.0 |
| 30° | 1357.7 | 1361.4 | 1358.6 | 1356.8 | 1308.3 | 1271.0 | 1214.2 | 1141.5 | 1070.7 | *1056.7* | 1003.6 |
| 32.5° | 1414.5 | 1413.6 | 1408.0 | 1402.4 | 1353.0 | 1313.9 | 1255.2 | 1182.5 | 1105.2 | *1089.3* | 1035.3 |
| 35° | 1455.5 | 1455.5 | 1447.1 | 1444.4 | 1398.7 | 1357.7 | 1299.9 | 1228.2 | 1144.3 | *1129.4* | 1068.8 |
| 37.5° | 1480.7 | 1484.4 | 1477.9 | 1479.8 | 1436.0 | 1397.8 | 1344.6 | 1274.8 | 1187.2 | *1174.1* | 1109.8 |
| 40° | 1490.0 | 1499.3 | 1504.9 | 1512.4 | 1468.6 | 1436.0 | 1392.2 | 1325.1 | 1242.1 | *1227.2* | 1159.2 |
| 42.5° | 1491.9 | 1505.9 | 1525.4 | 1541.3 | 1491.9 | 1464.9 | 1437.8 | 1376.3 | 1296.2 | *1283.1* | 1213.3 |
| 45° | 1482.6 | 1476.0 | 1523.6 | 1525.4 | 1504.9 | 1488.1 | 1477.9 | 1437.8 | 1374.5 | *1353.0* | 1280.3 |
| 47.5° | 1411.7 | 1404.3 | 1417.3 | 1477.0 | 1489.1 | 1498.4 | 1518.9 | 1509.6 | 1452.7 | *1436.0* | 1357.7 |
| 50° | 1297.1 | 1293.4 | 1345.6 | 1409.9 | 1449.9 | 1497.5 | 1552.4 | 1578.5 | 1539.4 | *1529.1* | 1455.5 |
| 52.5° | 1108.0 | 1097.7 | 1203.9 | 1328.8 | 1398.7 | 1488.1 | 1575.7 | 1649.4 | 1637.2 | *1622.3* | 1539.4 |
| 55° | 987.7 | 987.7 | 1059.5 | 1215.1 | 1333.5 | 1454.6 | 1590.7 | 1723.9 | 1745.3 | *1728.6* | 1635.4 |
| 57.5° | 859.2 | 869.4 | 944.0 | 1051.1 | 1239.3 | 1393.1 | 1588.8 | 1786.3 | 1849.7 | *1833.9* | 1736.9 |
| 60° | 749.2 | 757.6 | 800.5 | 908.5 | 1128.5 | 1312.0 | 1568.3 | 1837.6 | 1946.6 | *1941.0* | 1826.4 |
| 62.5° | 637.4 | 647.6 | 682.1 | 783.7 | 982.2 | 1218.8 | 1525.4 | 1865.5 | 2037.9 | *2032.3* | 1916.8 |
| 65° | 547.9 | 548.9 | 583.3 | 668.1 | 835.9 | 1106.1 | 1449.9 | 1860.0 | 2108.8 | *2112.5* | 1993.2 |
| 67.5° | *458.5* | *455.7* | *500.4* | *569.4* | *716.6* | *985.0* | *1349.3* | *1810.6* | *2138.6* | *2155.3* | *2018.4* |
| 70° | 337.3 | 341.1 | 403.5 | 479.9 | 605.7 | 845.2 | 1208.6 | 1714.6 | 2090.1 | *2116.2* | 1960.6 |
| 72.5° | 253.5 | 260.9 | 321.5 | 400.7 | 506.0 | 705.4 | 1054.8 | 1547.8 | 1955.0 | *1958.7* | 1784.5 |
| 75° | 205.9 | 207.8 | 261.8 | 332.7 | 414.7 | 565.6 | 847.0 | 1292.5 | 1653.1 | *1695.9* | 1516.1 |
| 77.5° | 175.2 | 173.3 | 199.4 | 268.4 | 334.5 | 451.9 | 638.3 | 983.1 | 1298.1 | *1317.6* | 1187.2 |
| 80° | 149.1 | 148.2 | 157.5 | 217.1 | 261.8 | 322.4 | 437.0 | 684.9 | 926.2 | *947.7* | 843.3 |
| 82.5° | 78.3 | 83.9 | 82.0 | 134.2 | 148.2 | 169.6 | 209.7 | 311.2 | 404.4 | *410.0* | 387.6 |
| 85° | 3.7 | 3.7 | 3.7 | 5.6 | 9.3 | 14.9 | 28.9 | 28.9 | 31.7 | *60.6* | 69.0 |
| 87.5° | 0.9 | 0.9 | 1.9 | 1.9 | 1.9 | 2.8 | 2.8 | 3.7 | 3.7 | *3.7* | 3.7 |
| 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: P867967
CATALOG NUMBER: MEM2-HSN-SA-30-730-U-T2U

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 926.2 | 926.2 | 926.2 | 926.2 | 926.2 | 926.2 | 926.2 | 926.2 | 926.2 | 926.2 | 926.2 |
| 2.5° | 928.1 | 924.4 | 918.8 | 919.7 | 918.8 | 918.8 | 914.1 | 910.4 | 909.5 | 911.3 | 915.1 |
| 5° | 929.0 | 923.5 | 915.1 | 912.3 | 909.5 | 907.6 | 900.2 | 894.6 | 891.8 | 893.6 | 894.6 |
| 7.5° | 929.0 | 920.7 | 911.3 | 905.7 | 898.3 | 892.7 | 884.3 | 876.9 | 873.1 | 874.1 | 875.9 |
| 10° | 927.2 | 917.9 | 910.4 | 899.2 | 887.1 | 880.6 | 867.5 | 858.2 | 853.6 | 854.5 | 849.8 |
| 12.5° | 927.2 | 916.9 | 902.0 | 891.8 | 875.0 | 861.0 | 850.8 | 840.5 | 836.8 | 833.1 | 831.2 |
| 15° | 928.1 | 915.1 | 900.2 | 878.7 | 859.2 | 844.2 | 831.2 | 824.7 | 819.1 | 817.2 | 818.2 |
| 17.5° | 928.1 | 915.1 | 892.7 | 867.5 | 845.2 | 826.5 | 815.4 | 807.9 | 806.0 | 804.2 | 804.2 |
| 20° | 932.8 | 916.0 | 886.2 | 856.4 | 828.4 | 808.8 | 798.6 | 793.9 | 793.9 | 791.1 | 791.1 |
| 22.5° | 940.2 | 917.9 | 882.5 | 847.0 | 814.4 | 793.0 | 781.8 | 776.2 | 779.0 | 777.2 | 776.2 |
| 25° | 948.6 | 924.4 | 877.8 | 834.0 | 795.8 | 773.4 | 762.2 | 758.5 | 757.6 | 752.9 | 759.4 |
| 27.5° | 955.1 | 929.0 | 875.0 | 821.0 | 779.0 | 752.9 | 738.9 | 732.4 | 727.8 | 729.6 | 727.8 |
| 30° | 972.8 | 942.1 | 875.9 | 809.8 | 760.4 | 728.7 | 711.9 | 704.5 | 702.6 | 702.6 | 702.6 |
| 32.5° | 997.1 | 958.9 | 882.5 | 805.1 | 742.7 | 705.4 | 684.9 | 677.4 | 675.6 | 671.9 | 673.7 |
| 35° | 1027.8 | 984.0 | 892.7 | 797.7 | 728.7 | 678.4 | 656.0 | 645.8 | 643.0 | 639.2 | 639.2 |
| 37.5° | 1062.3 | 1009.2 | 900.2 | 793.9 | 710.1 | 650.4 | 625.3 | 612.2 | 610.4 | 606.6 | 608.5 |
| 40° | 1106.1 | 1043.7 | 912.3 | 786.5 | 688.6 | 625.3 | 591.7 | 570.3 | 574.9 | 576.8 | 580.5 |
| 42.5° | 1155.5 | 1087.5 | 930.9 | 779.0 | 671.9 | 599.2 | 549.8 | 528.4 | 533.9 | 532.1 | 535.8 |
| 45° | 1222.6 | 1138.7 | 954.2 | 776.2 | 651.4 | 567.5 | 506.9 | 482.7 | 480.8 | 478.0 | 479.9 |
| 47.5° | 1292.5 | 1200.2 | 976.6 | 770.6 | 629.0 | 528.4 | 458.5 | 427.7 | 420.3 | 416.5 | 412.8 |
| 50° | 1365.1 | 1261.7 | 1002.7 | 766.9 | 599.2 | 484.6 | 410.0 | 374.6 | 360.6 | 356.0 | 351.3 |
| 52.5° | 1447.1 | 1327.9 | 1025.0 | 757.6 | 566.6 | 438.9 | 366.2 | 326.1 | 310.3 | 301.0 | 301.9 |
| 55° | 1533.8 | 1388.4 | 1045.5 | 746.4 | 529.3 | 396.0 | 322.4 | 288.9 | 273.0 | 270.2 | 270.2 |
| 57.5° | 1613.9 | 1450.9 | 1060.4 | 726.8 | 492.0 | 354.1 | 286.1 | 257.2 | 249.7 | 253.5 | 253.5 |
| 60° | 1695.9 | 1501.2 | 1067.9 | 705.4 | 453.8 | 318.7 | 260.9 | 237.6 | 233.9 | 241.3 | 242.3 |
| 62.5° | 1762.1 | 1541.3 | 1066.0 | 675.6 | 411.9 | 287.9 | 236.7 | 218.1 | 219.9 | 233.0 | 235.8 |
| 65° | 1809.6 | 1560.8 | 1042.7 | 630.9 | 371.8 | 260.9 | 215.3 | 197.5 | 197.5 | 206.9 | 209.7 |
| 67.5° | *1805.9* | *1535.7* | *996.1* | *568.4* | *328.9* | *233.9* | *195.7* | *181.7* | *181.7* | *188.2* | *187.3* |
| 70° | 1729.5 | 1449.0 | 907.6 | 492.9 | 287.0 | 210.6 | 178.9 | 168.7 | 167.7 | 170.5 | 169.6 |
| 72.5° | 1545.9 | 1272.9 | 769.7 | 407.2 | 247.9 | 187.3 | 162.1 | 152.8 | 151.0 | 147.2 | 144.4 |
| 75° | 1275.7 | 1045.5 | 601.0 | 324.3 | 209.7 | 164.9 | 146.3 | 137.9 | 130.5 | 135.1 | 132.3 |
| 77.5° | 989.6 | 802.3 | 447.3 | 251.6 | 170.5 | 143.5 | 130.5 | 121.1 | 119.3 | 136.0 | 130.5 |
| 80° | 722.2 | 554.4 | 315.9 | 179.8 | 132.3 | 116.5 | 109.0 | 101.6 | 128.6 | 172.4 | 171.5 |
| 82.5° | 320.6 | 267.4 | 144.4 | 85.7 | 61.5 | 51.3 | 42.9 | 48.5 | 81.1 | 79.2 | 82.0 |
| 85° | 28.9 | 29.8 | 15.8 | 10.3 | 6.5 | 5.6 | 3.7 | 3.7 | 2.8 | 2.8 | 2.8 |
| 87.5° | 3.7 | 3.7 | 2.8 | 2.8 | 1.9 | 1.9 | 1.9 | 1.9 | 0.9 | 0.9 | 0.9 |
| 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
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# LM-79-2019: Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Report Prepared for

Cooper Lighting Solutions

Streetworks

Report Number: SP1-2407-157-4

Test Date: 08/07/2024

Luminaire Tested: MEM2-HTN-SA-30-730-U-5WQ-2

Data in this report applies to families of products including MEM2-HTN-SA-30-730-U-5WQ-2

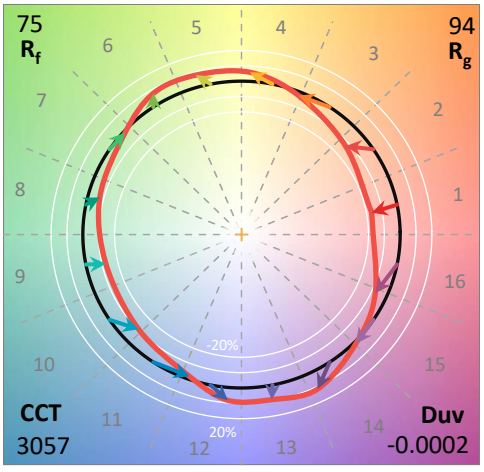
Report Generated By FNC07603 / LDUCLS01DT446
Version: v7.04

## Test Information

| | |
|---|---|
| Test Method: | LM-79-2019 |
| Report Number: | SP1-2407-157-4 |
| 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-30-730-U-5WQ-2** |
| Description: | Epic Modern Light Square 30W 5WQ Optic and Flare Trim |

## Spectral Parameters

| | | | | | |
|---|---|---|---|---|---|
| CCT (K): | 3057 | CRI (Ra): | 71.7 | | |
| CIE u': | 0.2487 | R1: | 68.1 | R9: | -34.8 |
| CIE v': | 0.5199 | R2: | 82.0 | R10: | 58.5 |
| Duv: | -0.0002 | R3: | 93.5 | R11: | 62.5 |
| CIE x: | 0.4326 | R4: | 67.5 | R12: | 47.5 |
| CIE y: | 0.4020 | R5: | 67.2 | R13: | 70.7 |
| CIE z: | 0.1654 | R6: | 74.9 | R14: | 96.4 |
| Peak Wavelength (nm): | 593 | R7: | 77.4 | R15: | 60.0 |
| Dominant Wavelength (nm): | 582 | R8: | 43.1 | | |
| Purity: | 50.50735 | | | | |
| Rf: | 74.6 | | | | |
| Rg: | 94 | | | | |



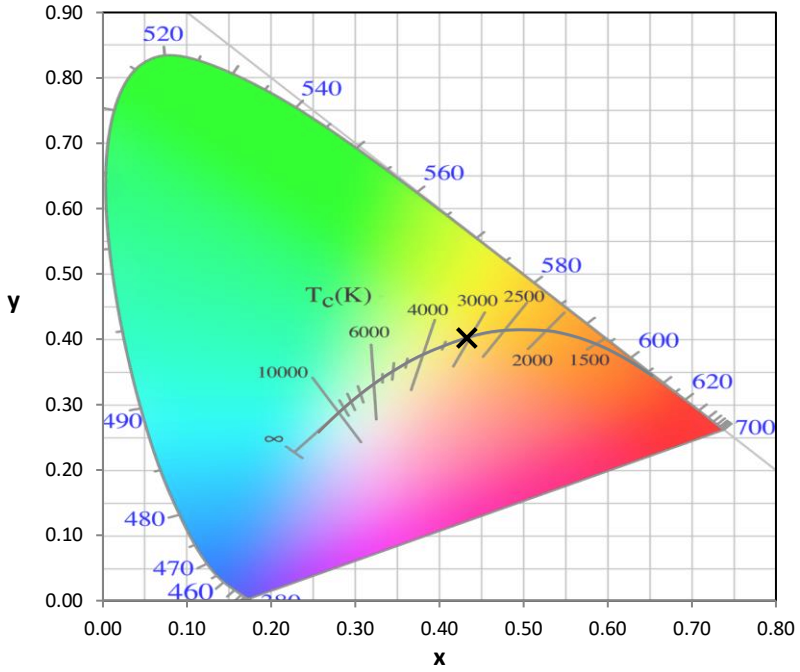

## Test Conditions

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

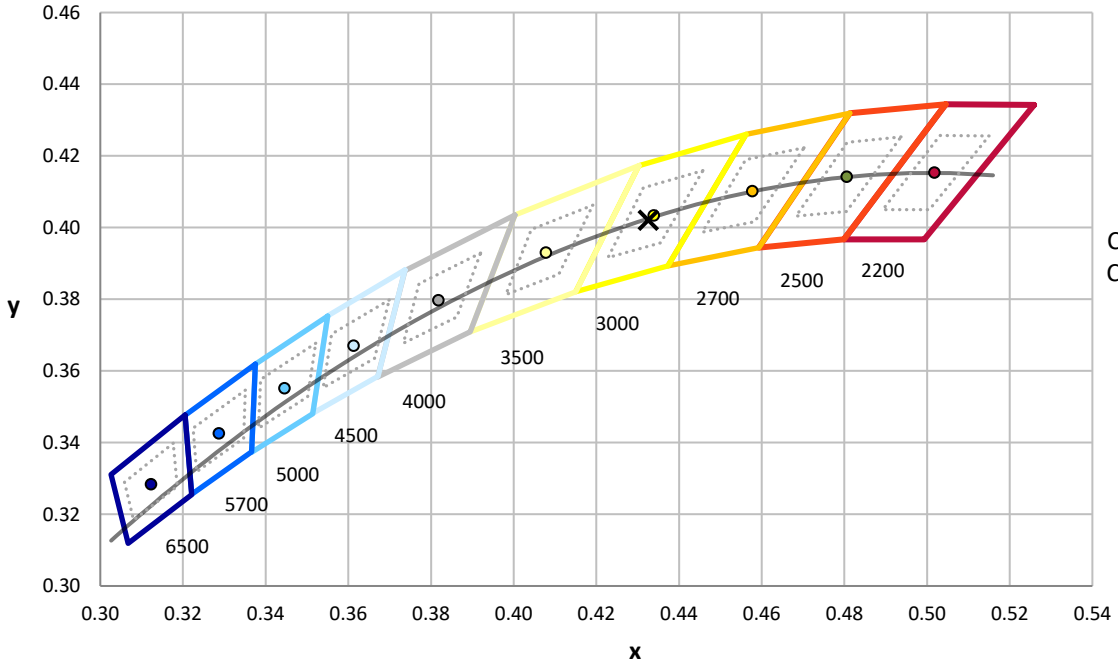
| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 6/18/2024 | 12/18/2024 |
| Power Meter | INXT2011004 | 2/8/2024 | 2/8/2025 |
| AC Power Source | IN0063 | 10/24/2023 | 10/24/2024 |
| DC 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: SP1-2407-157-4

## CIE 1931 Chromaticity Diagram




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




CCT = 3057K
CIE x = 0.4326
CIE y = 0.4020
Duv = -0.0002

Point lies inside the ANSI 3000K 4-step quadrangle

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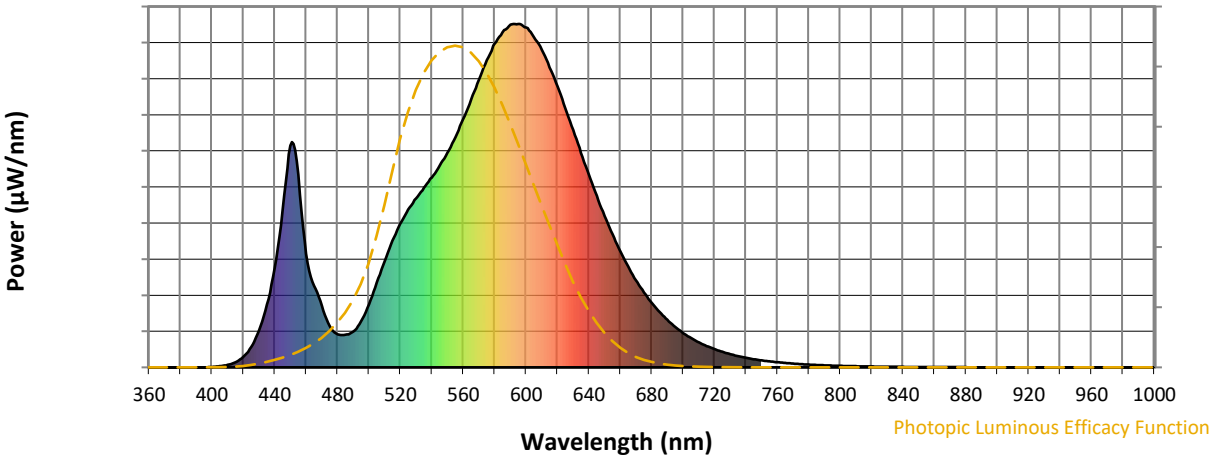
## Photopic Flux vs. Wavelength




## 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 | 104 | NR | 620 | 818 | NR | 750 | 20 | NR | 880 | 1 | NR |
| 365 | 0 | NR | 495 | 135 | NR | 625 | 755 | NR | 755 | 17 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 184 | NR | 630 | 691 | NR | 760 | 15 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 247 | NR | 635 | 625 | NR | 765 | 13 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 309 | NR | 640 | 561 | NR | 770 | 11 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 369 | NR | 645 | 499 | NR | 775 | 9 | NR | 905 | 0 | NR |
| 390 | 0 | NR | 520 | 419 | NR | 650 | 441 | NR | 780 | 8 | NR | 910 | 0 | NR |
| 395 | 0 | NR | 525 | 460 | NR | 655 | 388 | NR | 785 | 7 | NR | 915 | 0 | NR |
| 400 | 1 | NR | 530 | 492 | NR | 660 | 338 | NR | 790 | 6 | NR | 920 | 0 | NR |
| 405 | 3 | NR | 535 | 524 | NR | 665 | 294 | NR | 795 | 5 | NR | 925 | 0 | NR |
| 410 | 7 | NR | 540 | 553 | NR | 670 | 253 | NR | 800 | 4 | NR | 930 | 0 | NR |
| 415 | 15 | NR | 545 | 588 | NR | 675 | 218 | NR | 805 | 4 | NR | 935 | 0 | NR |
| 420 | 31 | NR | 550 | 625 | NR | 680 | 188 | NR | 810 | 3 | NR | 940 | 0 | NR |
| 425 | 60 | NR | 555 | 670 | NR | 685 | 161 | NR | 815 | 3 | NR | 945 | 0 | NR |
| 430 | 107 | NR | 560 | 723 | NR | 690 | 139 | NR | 820 | 3 | NR | 950 | 0 | NR |
| 435 | 183 | NR | 565 | 780 | NR | 695 | 118 | NR | 825 | 2 | NR | 955 | 0 | NR |
| 440 | 289 | NR | 570 | 837 | NR | 700 | 100 | NR | 830 | 2 | NR | 960 | 0 | NR |
| 445 | 460 | NR | 575 | 894 | NR | 705 | 85 | NR | 835 | 2 | NR | 965 | 0 | NR |
| 450 | 646 | NR | 580 | 942 | NR | 710 | 73 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 561 | NR | 585 | 976 | NR | 715 | 62 | NR | 845 | 1 | NR | 975 | 0 | NR |
| 460 | 331 | NR | 590 | 998 | NR | 720 | 53 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 238 | NR | 595 | 1000 | NR | 725 | 45 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 178 | NR | 600 | 990 | NR | 730 | 39 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 120 | NR | 605 | 962 | NR | 735 | 33 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 96 | NR | 610 | 925 | NR | 740 | 28 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 95 | NR | 615 | 873 | NR | 745 | 24 | NR | 875 | 1 | NR | | | |

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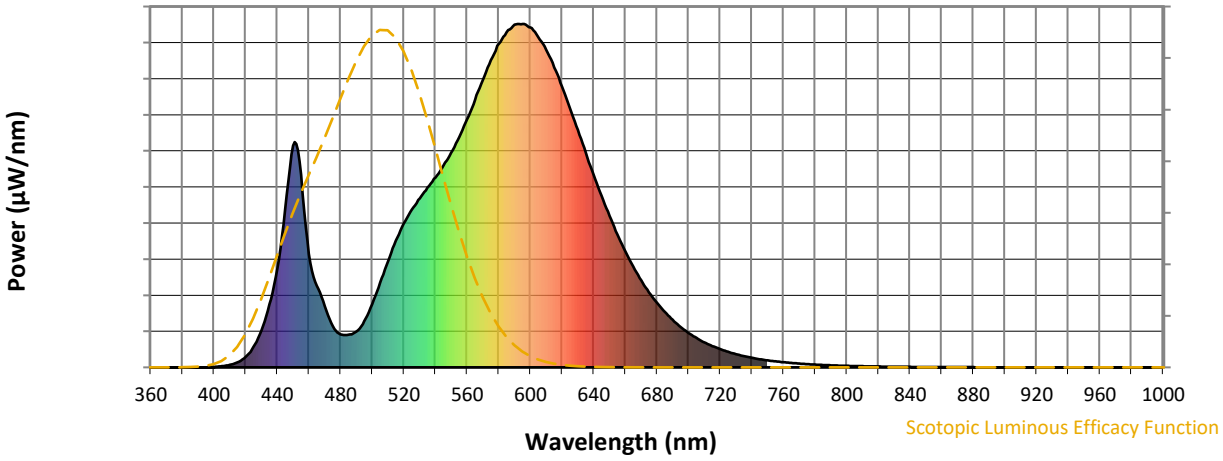
## Scotopic Flux vs. Wavelength




**Scotopic Lumens: NR** **S/P: 1.23**

| 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 | 104 | NR | 620 | 818 | NR | 750 | 20 | NR | 880 | 1 | NR |
| 365 | 0 | NR | 495 | 135 | NR | 625 | 755 | NR | 755 | 17 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 184 | NR | 630 | 691 | NR | 760 | 15 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 247 | NR | 635 | 625 | NR | 765 | 13 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 309 | NR | 640 | 561 | NR | 770 | 11 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 369 | NR | 645 | 499 | NR | 775 | 9 | NR | 905 | 0 | NR |
| 390 | 0 | NR | 520 | 419 | NR | 650 | 441 | NR | 780 | 8 | NR | 910 | 0 | NR |
| 395 | 0 | NR | 525 | 460 | NR | 655 | 388 | NR | 785 | 7 | NR | 915 | 0 | NR |
| 400 | 1 | NR | 530 | 492 | NR | 660 | 338 | NR | 790 | 6 | NR | 920 | 0 | NR |
| 405 | 3 | NR | 535 | 524 | NR | 665 | 294 | NR | 795 | 5 | NR | 925 | 0 | NR |
| 410 | 7 | NR | 540 | 553 | NR | 670 | 253 | NR | 800 | 4 | NR | 930 | 0 | NR |
| 415 | 15 | NR | 545 | 588 | NR | 675 | 218 | NR | 805 | 4 | NR | 935 | 0 | NR |
| 420 | 31 | NR | 550 | 625 | NR | 680 | 188 | NR | 810 | 3 | NR | 940 | 0 | NR |
| 425 | 60 | NR | 555 | 670 | NR | 685 | 161 | NR | 815 | 3 | NR | 945 | 0 | NR |
| 430 | 107 | NR | 560 | 723 | NR | 690 | 139 | NR | 820 | 3 | NR | 950 | 0 | NR |
| 435 | 183 | NR | 565 | 780 | NR | 695 | 118 | NR | 825 | 2 | NR | 955 | 0 | NR |
| 440 | 289 | NR | 570 | 837 | NR | 700 | 100 | NR | 830 | 2 | NR | 960 | 0 | NR |
| 445 | 460 | NR | 575 | 894 | NR | 705 | 85 | NR | 835 | 2 | NR | 965 | 0 | NR |
| 450 | 646 | NR | 580 | 942 | NR | 710 | 73 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 561 | NR | 585 | 976 | NR | 715 | 62 | NR | 845 | 1 | NR | 975 | 0 | NR |
| 460 | 331 | NR | 590 | 998 | NR | 720 | 53 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 238 | NR | 595 | 1000 | NR | 725 | 45 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 178 | NR | 600 | 990 | NR | 730 | 39 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 120 | NR | 605 | 962 | NR | 735 | 33 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 96 | NR | 610 | 925 | NR | 740 | 28 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 95 | NR | 615 | 873 | NR | 745 | 24 | NR | 875 | 1 | NR | | | |

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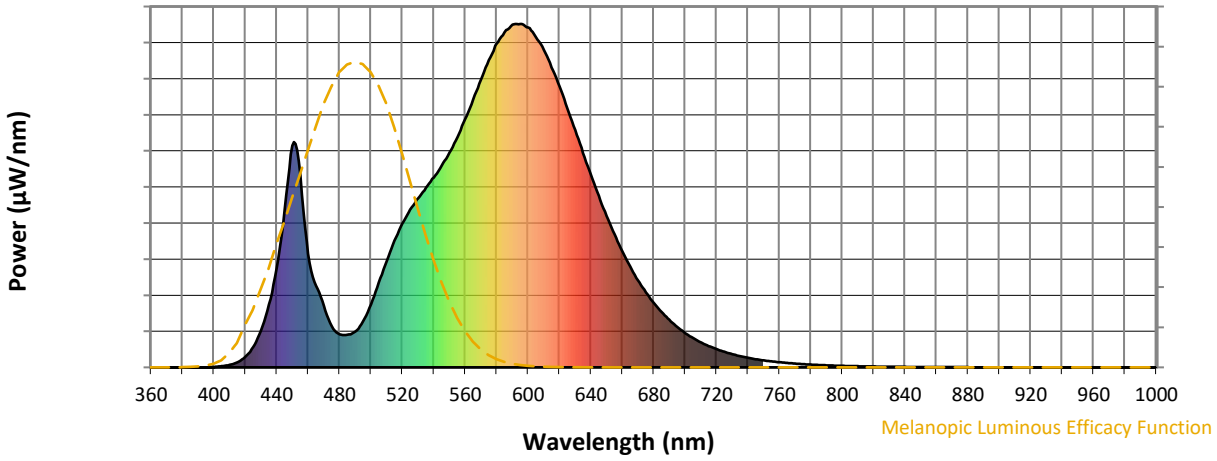
## Melanopic Flux vs. Wavelength




**Melanopic Lumens: NR** **M/P: 2.27**

| 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 | 104 | NR | 620 | 818 | NR | 750 | 20 | NR | 880 | 1 | NR |
| 365 | 0 | NR | 495 | 135 | NR | 625 | 755 | NR | 755 | 17 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 184 | NR | 630 | 691 | NR | 760 | 15 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 247 | NR | 635 | 625 | NR | 765 | 13 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 309 | NR | 640 | 561 | NR | 770 | 11 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 369 | NR | 645 | 499 | NR | 775 | 9 | NR | 905 | 0 | NR |
| 390 | 0 | NR | 520 | 419 | NR | 650 | 441 | NR | 780 | 8 | NR | 910 | 0 | NR |
| 395 | 0 | NR | 525 | 460 | NR | 655 | 388 | NR | 785 | 7 | NR | 915 | 0 | NR |
| 400 | 1 | NR | 530 | 492 | NR | 660 | 338 | NR | 790 | 6 | NR | 920 | 0 | NR |
| 405 | 3 | NR | 535 | 524 | NR | 665 | 294 | NR | 795 | 5 | NR | 925 | 0 | NR |
| 410 | 7 | NR | 540 | 553 | NR | 670 | 253 | NR | 800 | 4 | NR | 930 | 0 | NR |
| 415 | 15 | NR | 545 | 588 | NR | 675 | 218 | NR | 805 | 4 | NR | 935 | 0 | NR |
| 420 | 31 | NR | 550 | 625 | NR | 680 | 188 | NR | 810 | 3 | NR | 940 | 0 | NR |
| 425 | 60 | NR | 555 | 670 | NR | 685 | 161 | NR | 815 | 3 | NR | 945 | 0 | NR |
| 430 | 107 | NR | 560 | 723 | NR | 690 | 139 | NR | 820 | 3 | NR | 950 | 0 | NR |
| 435 | 183 | NR | 565 | 780 | NR | 695 | 118 | NR | 825 | 2 | NR | 955 | 0 | NR |
| 440 | 289 | NR | 570 | 837 | NR | 700 | 100 | NR | 830 | 2 | NR | 960 | 0 | NR |
| 445 | 460 | NR | 575 | 894 | NR | 705 | 85 | NR | 835 | 2 | NR | 965 | 0 | NR |
| 450 | 646 | NR | 580 | 942 | NR | 710 | 73 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 561 | NR | 585 | 976 | NR | 715 | 62 | NR | 845 | 1 | NR | 975 | 0 | NR |
| 460 | 331 | NR | 590 | 998 | NR | 720 | 53 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 238 | NR | 595 | 1000 | NR | 725 | 45 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 178 | NR | 600 | 990 | NR | 730 | 39 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 120 | NR | 605 | 962 | NR | 735 | 33 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 96 | NR | 610 | 925 | NR | 740 | 28 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 95 | NR | 615 | 873 | NR | 745 | 24 | NR | 875 | 1 | NR | | | |

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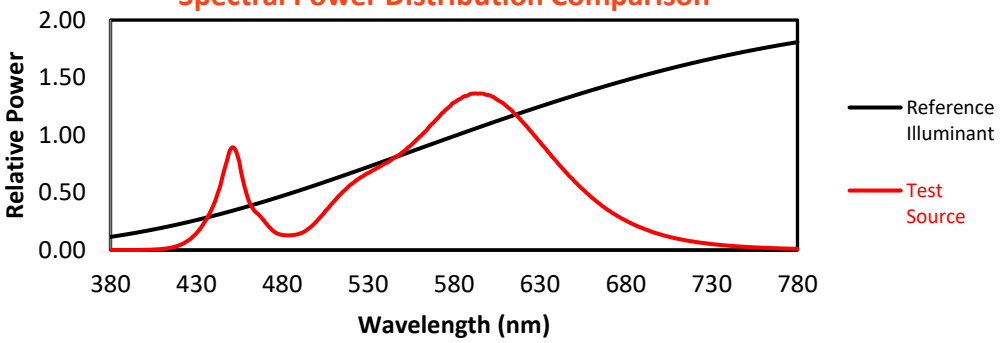
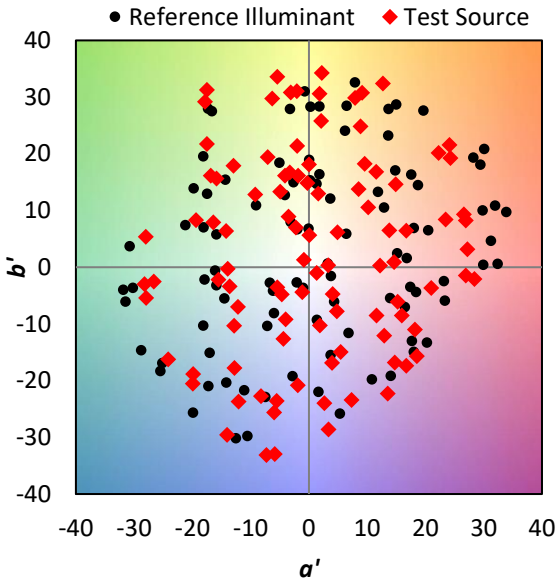
## Summary

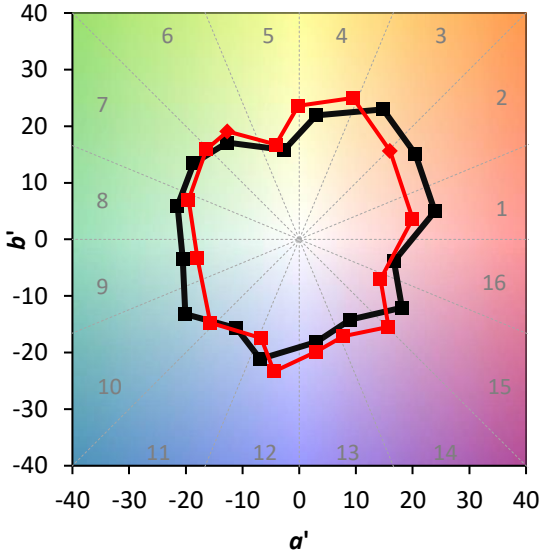
$R_f$ = 74.6
$R_g$ = 94
CIE $R_a$ = 71.7
$R_9$ = -34.8

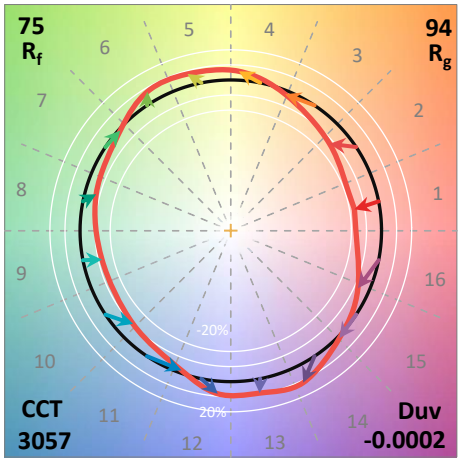
## Spectral Power Distribution Comparison

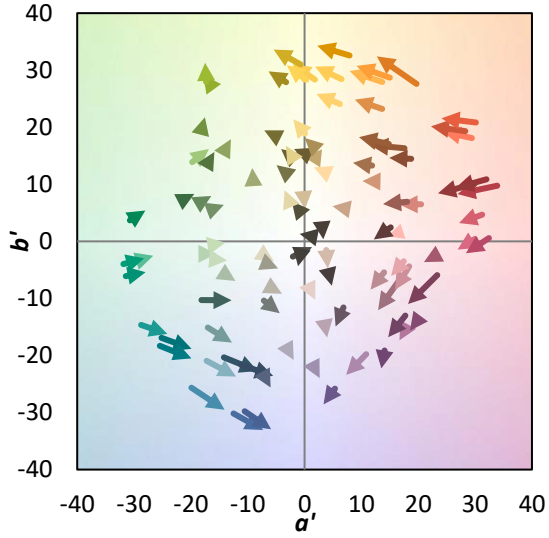



## Color Vector Graphics



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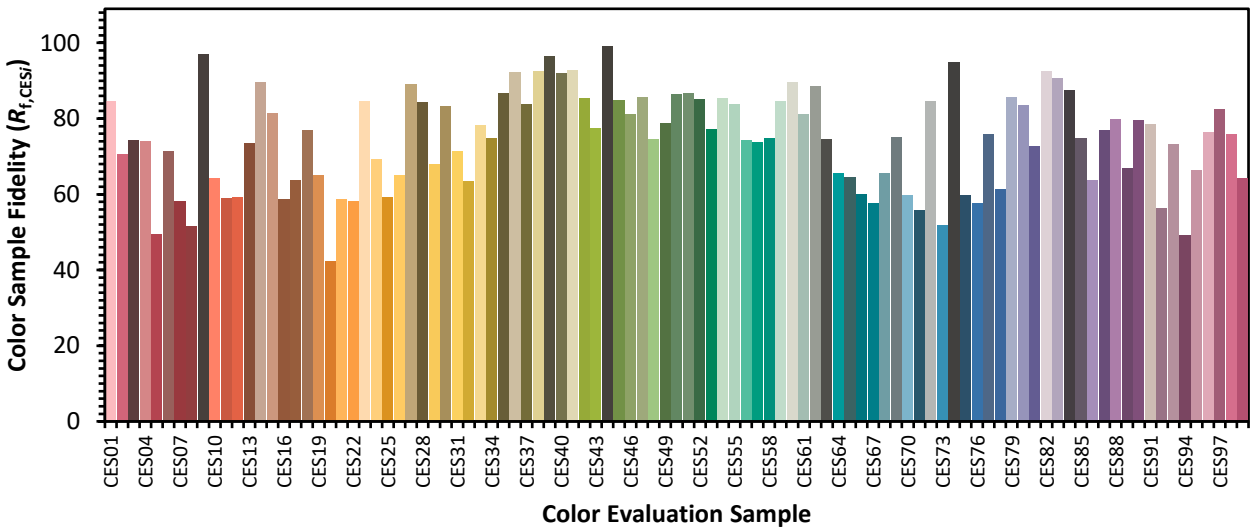
## Individual Sample Fidelity Index ($R_{f,i}$)

| | | | |
|---|---|---|---|
| CES01 = 86 | CES26 = 65 | CES51 = 87 | CES76 = 58 |
| CES02 = 62 | CES27 = 89 | CES52 = 85 | CES77 = 76 |
| CES03 = 31 | CES28 = 84 | CES53 = 77 | CES78 = 61 |
| CES04 = 71 | CES29 = 68 | CES54 = 85 | CES79 = 86 |
| CES05 = 49 | CES30 = 83 | CES55 = 84 | CES80 = 83 |
| CES06 = 51 | CES31 = 71 | CES56 = 74 | CES81 = 73 |
| CES07 = 41 | CES32 = 64 | CES57 = 74 | CES82 = 93 |
| CES08 = 40 | CES33 = 78 | CES58 = 75 | CES83 = 91 |
| CES09 = 29 | CES34 = 75 | CES59 = 85 | CES84 = 88 |
| CES10 = 76 | CES35 = 87 | CES60 = 90 | CES85 = 75 |
| CES11 = 59 | CES36 = 92 | CES61 = 81 | CES86 = 64 |
| CES12 = 65 | CES37 = 84 | CES62 = 89 | CES87 = 77 |
| CES13 = 43 | CES38 = 92 | CES63 = 75 | CES88 = 80 |
| CES14 = 74 | CES39 = 96 | CES64 = 65 | CES89 = 67 |
| CES15 = 71 | CES40 = 92 | CES65 = 64 | CES90 = 80 |
| CES16 = 47 | CES41 = 93 | CES66 = 60 | CES91 = 78 |
| CES17 = 50 | CES42 = 86 | CES67 = 58 | CES92 = 56 |
| CES18 = 56 | CES43 = 77 | CES68 = 66 | CES93 = 73 |
| CES19 = 73 | CES44 = 99 | CES69 = 75 | CES94 = 49 |
| CES20 = 66 | CES45 = 85 | CES70 = 60 | CES95 = 66 |
| CES21 = 87 | CES46 = 81 | CES71 = 56 | CES96 = 76 |
| CES22 = 79 | CES47 = 86 | CES72 = 85 | CES97 = 82 |
| CES23 = 92 | CES48 = 75 | CES73 = 52 | CES98 = 76 |
| CES24 = 91 | CES49 = 79 | CES74 = 95 | CES99 = 64 |
| CES25 = 73 | CES50 = 86 | CES75 = 60 | |



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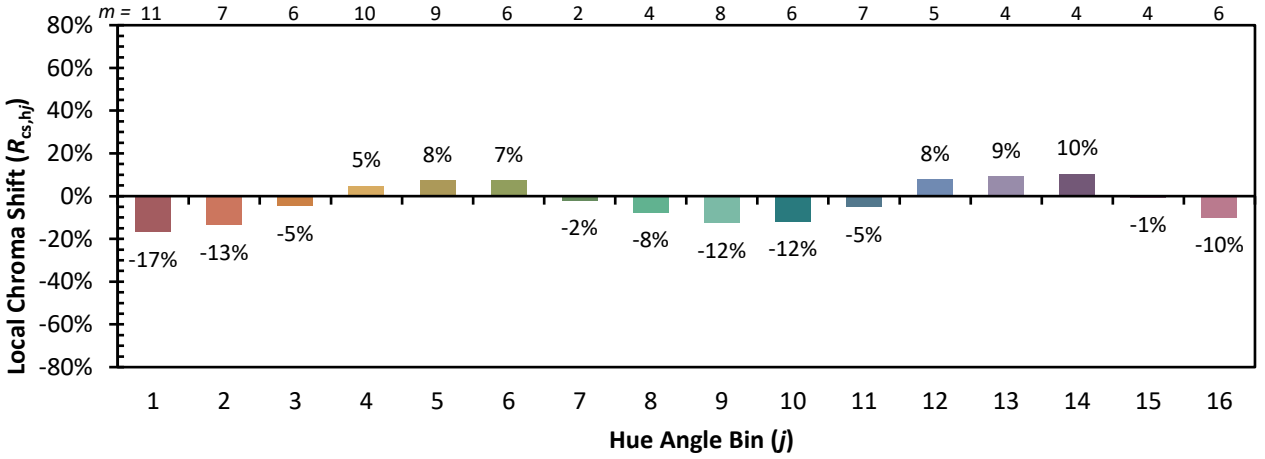
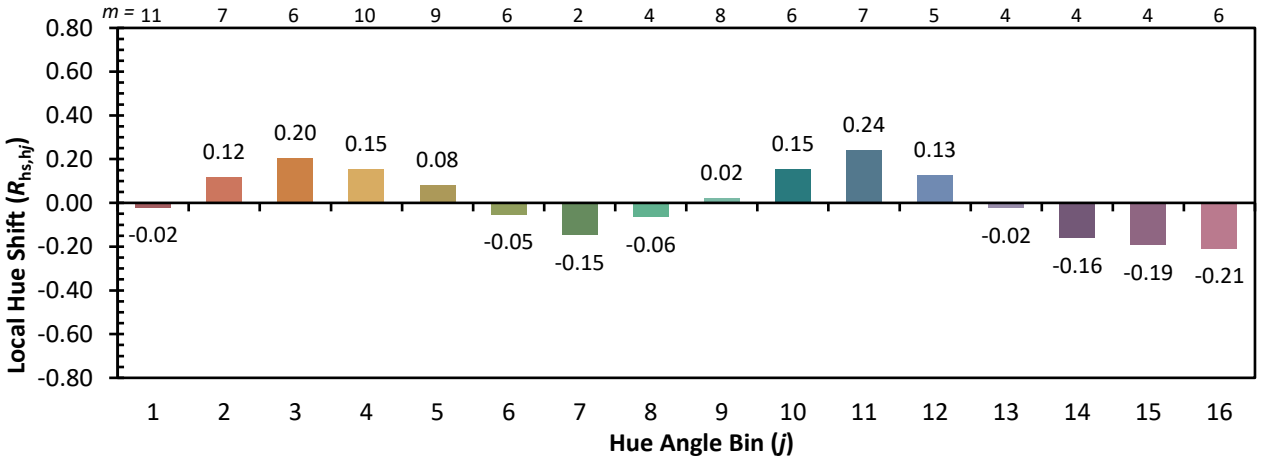
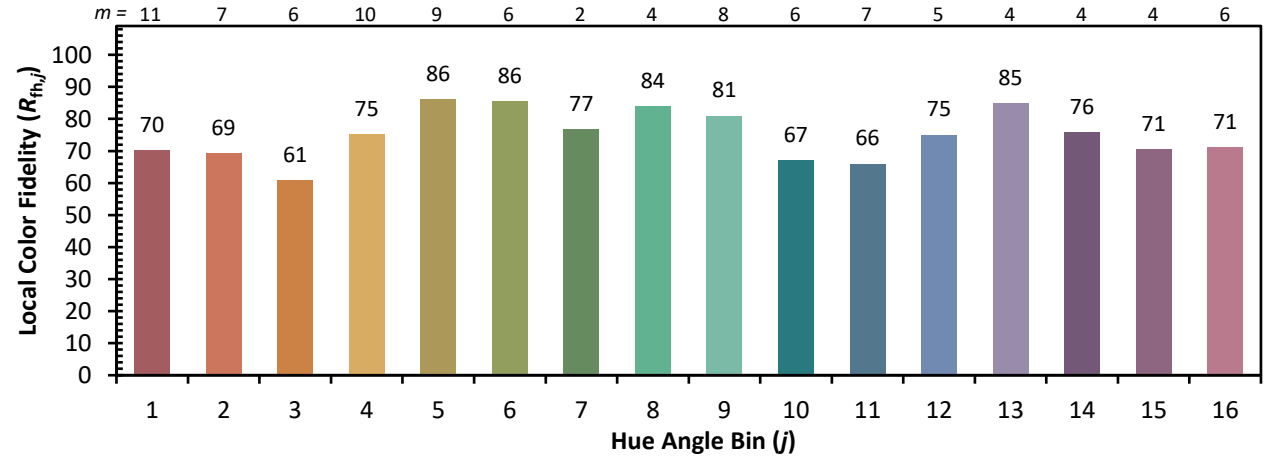
## Color Rendition by Hue-Angle Bin



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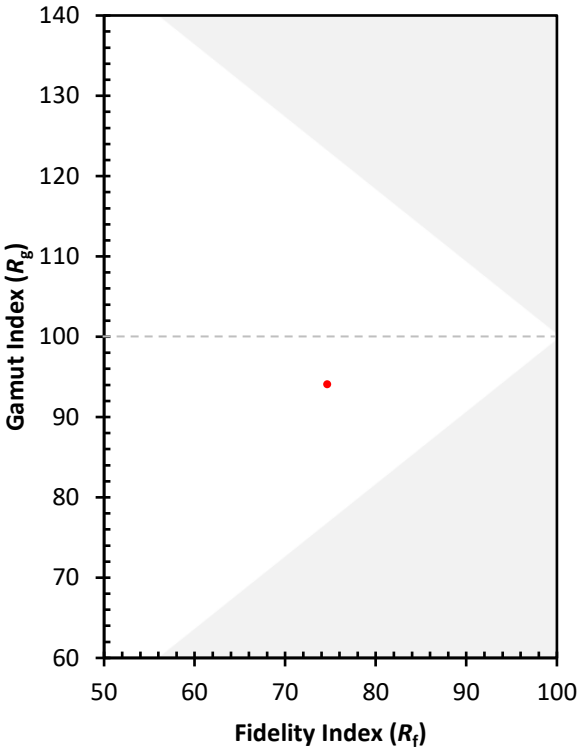
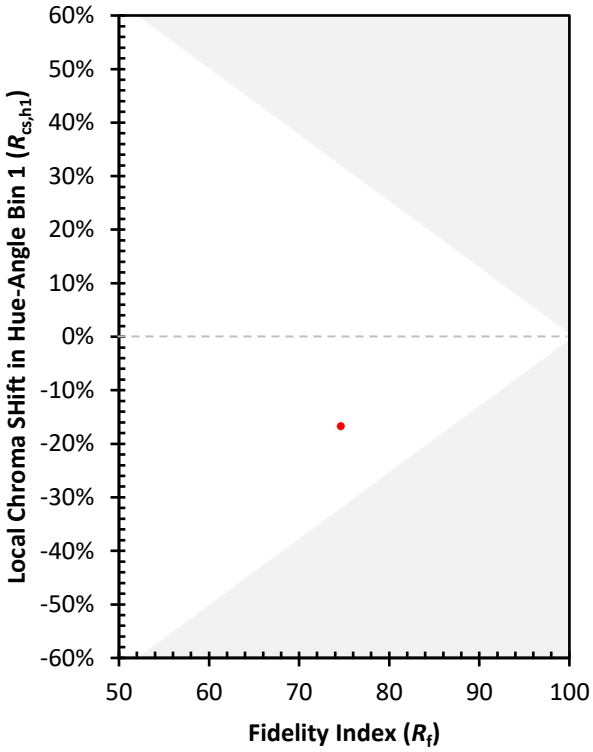
## Measure Comparisons

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