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: P821416

Luminaire Tested: **TT-D2-750-12VDC-T4-PM**

Issue Date: 5/19/2020

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: | P821416 |
| | TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G3-1908-473-26) |
| Test Lab: | INNOVATION CENTER |
| Issue Date: | 5/19/2020 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS (FORMERLY EATON) |
| Product Line: | McGRAW-EDISON |
| Catalog Number: | TT-D2-750-12VDC-T4-PM |
| Description: | TOPTIER LED SITE LUMINAIRE |
| | 5000K, 70 CRI LEDS AND DRIVE LANE DISTRIBUTION |
| Light Source: | - |
| Ballast/Driver: | ELECTRONIC DRIVER |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 4475 lumens |
| Efficiency: | N/A |
| Efficacy: | 117.8 lumens/watt |
| Luminous Opening: | Circular (Dia: 1.12' x H: 0') |
| IES Classification: | Type IV - Short |
| BUG Rating: | B2 - U0 - G3 |

| | |
|---|---|
| Input Watts (W): | 38 |
| 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: | 25 FT |

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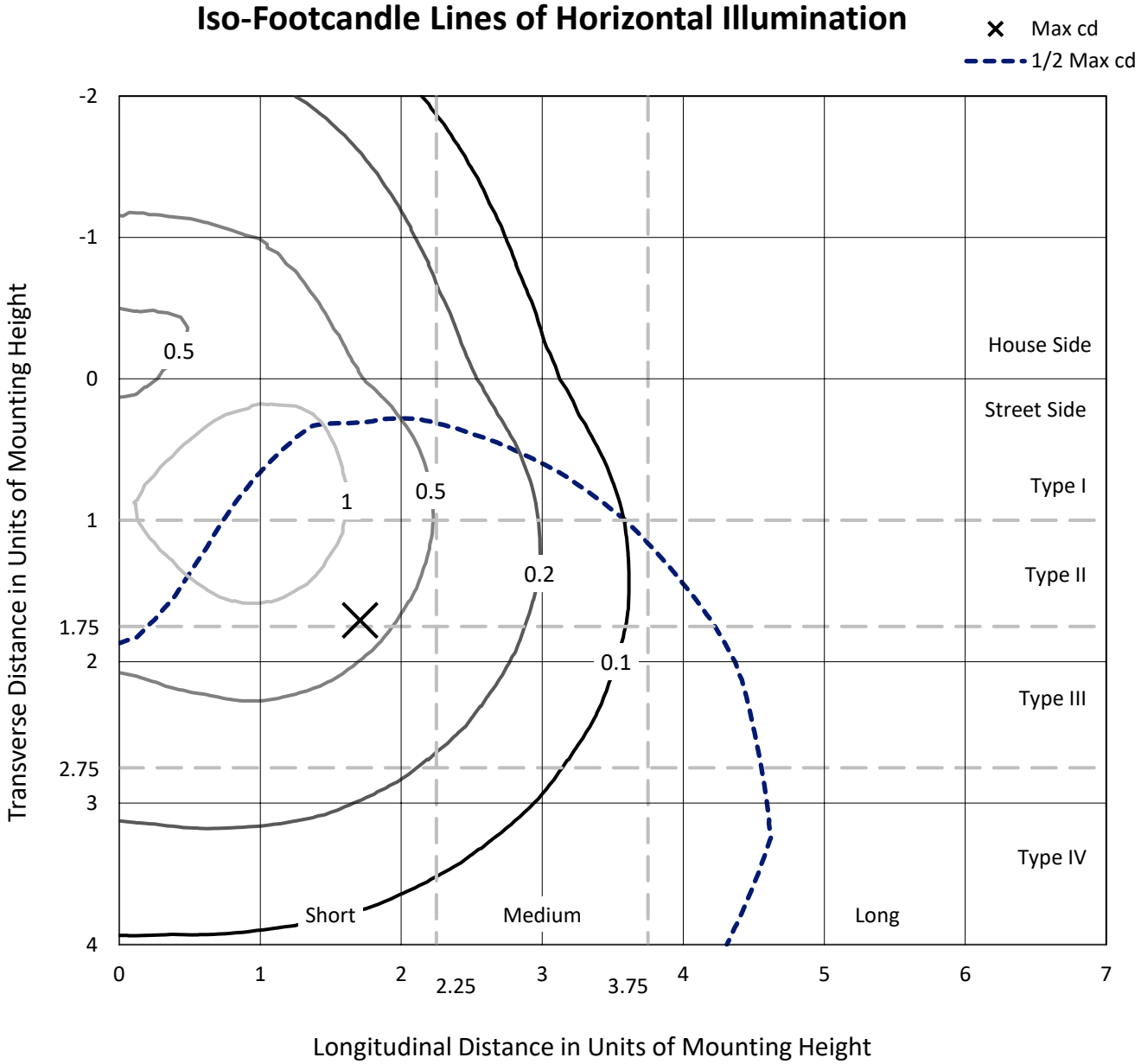
Scaled Data Report

REPORT NUMBER: P821416
CATALOG NUMBER: TT-D2-750-12VDC-T4-PM

## Iso-Footcandle Lines of Horizontal Illumination




Based on 15 foot mounting height. Maximum calculated value = 1.5 fc
Type IV - Short - N/A

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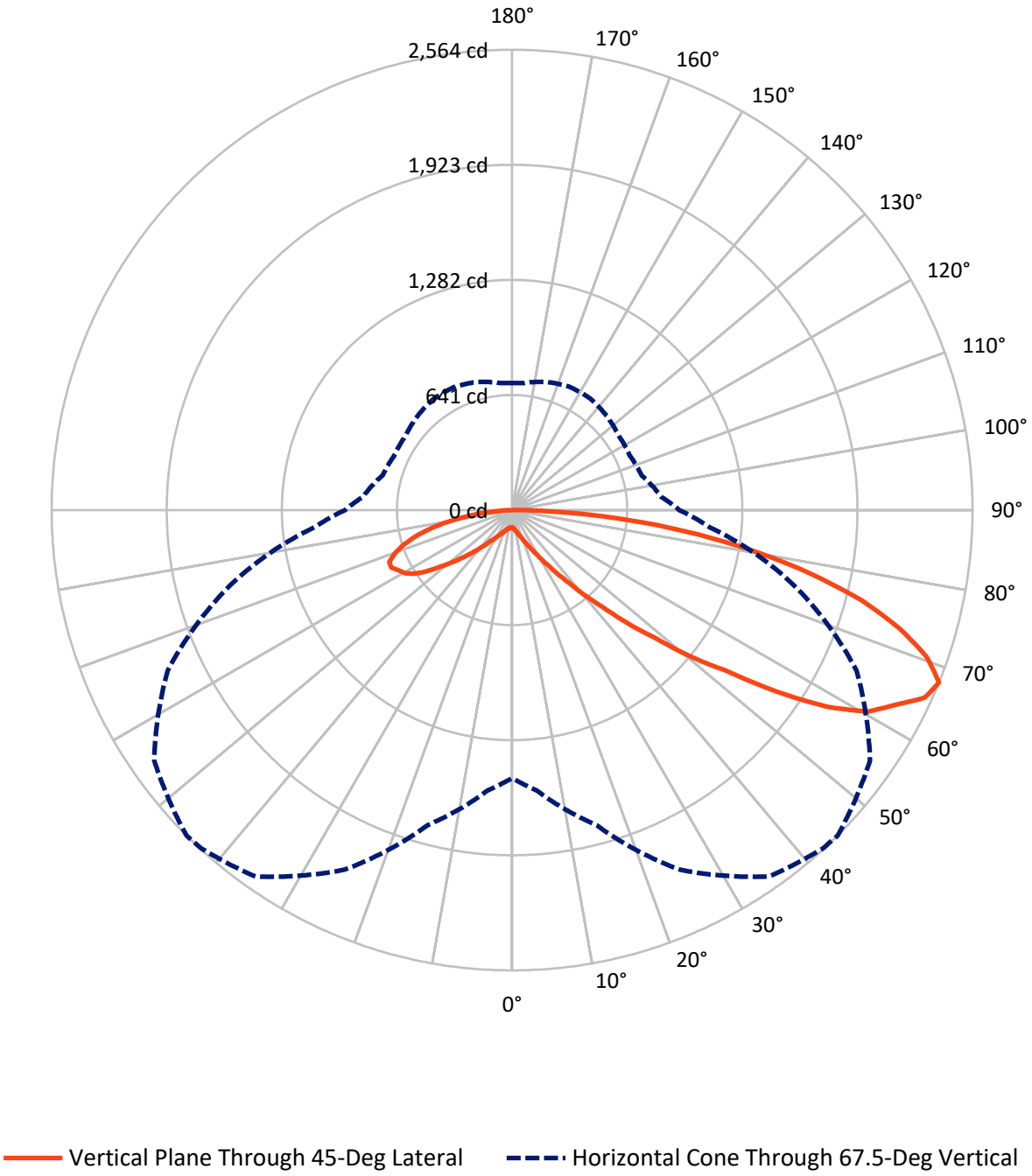
Scaled Data Report

REPORT NUMBER: P821416
CATALOG NUMBER: TT-D2-750-12VDC-T4-PM

## Luminous Intensity Polar Plot



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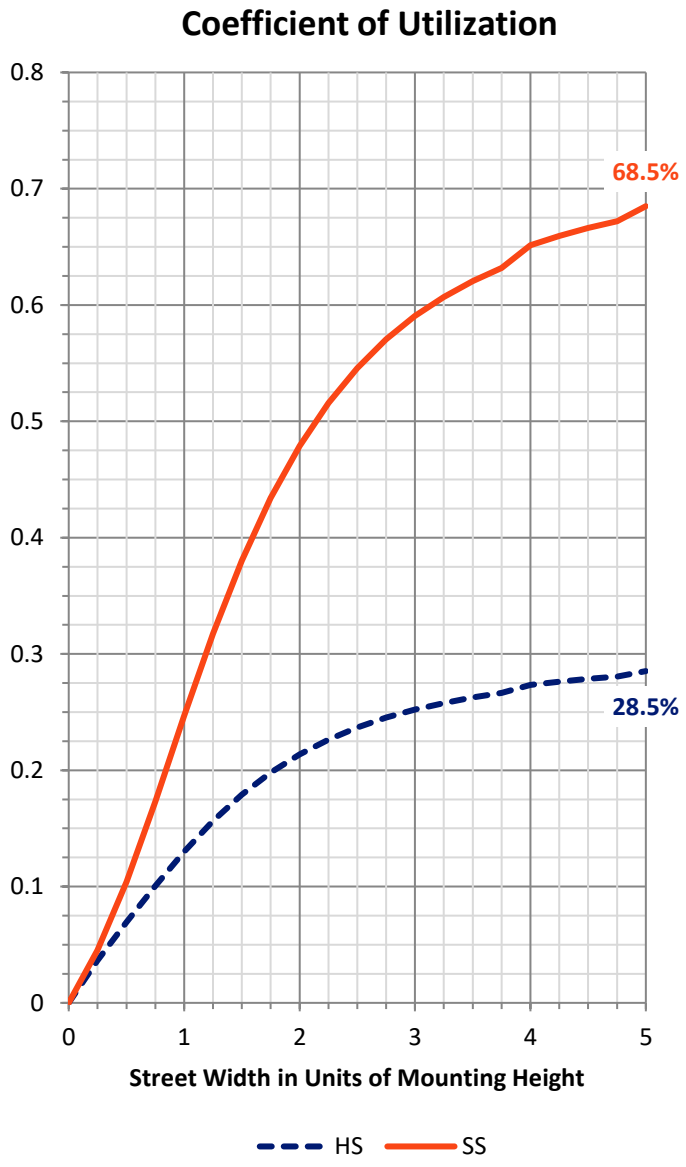
**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 1304.0 | 0.0 | 1304.0 |
| | % Fixture | 29.1 | 0.0 | 29.1 |
| **Street Side** | Lumens | 3171.0 | 0.0 | 3171.0 |
| | % Fixture | 70.9 | 0.0 | 70.9 |
| **Total** | Lumens | 4475.0 | 0.0 | 4475.0 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 10.0 | 0.2 |
| 10°-20° | 37.1 | 0.8 |
| 20°-30° | 87.8 | 2.0 |
| 30°-40° | 198.7 | 4.4 |
| 40°-50° | 442.9 | 9.9 |
| 50°-60° | 890.5 | 19.9 |
| 60°-70° | 1307.9 | 29.2 |
| 70°-80° | 1150.0 | 25.7 |
| 80°-90° | 350.1 | 7.8 |
| 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° | 4475.0 | 100.0 |
| 0°-180° | 4475.0 | 100.0 |



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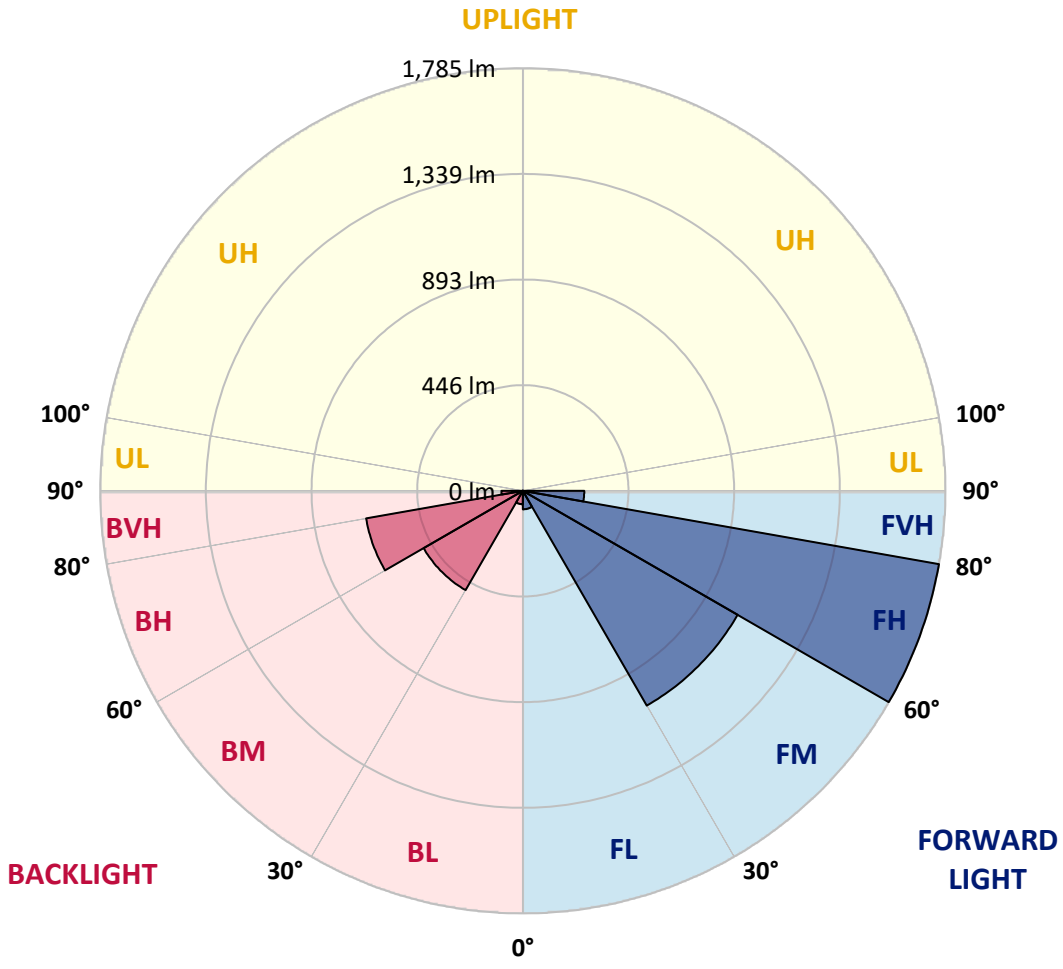
REPORT NUMBER: P821416
CATALOG NUMBER: TT-D2-750-12VDC-T4-PM

## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 78.1 | 1.7 | | | |
| FM | (30°-60°) | 1047.9 | 23.4 | | | |
| FH | (60°-80°) | 1785.4 | 39.9 | | | G1/1800 |
| FVH | (80°-90°) | 259.4 | 5.8 | | | G3/500 |
| BL | (0°-30°) | 56.8 | 1.3 | B0/110 | | |
| BM | (30°-60°) | 484.1 | 10.8 | B1/1000 | | |
| BH | (60°-80°) | 672.5 | 15.0 | B2/1000 | | G2/1000 |
| BVH | (80°-90°) | 90.7 | 2.0 | | | G1/100 |
| UL | (90°-100°) | 0.0 | 0.0 | | U0/0 | |
| UH | (100°-180°) | 0.0 | 0.0 | | U0/0 | |

**BUG Rating: B2-U0-G3**
Type IV Short



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REPORT NUMBER: P821416
CATALOG NUMBER: TT-D2-750-12VDC-T4-PM

**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 42.5° | 45° | 55° | 65° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 97.1 | 97.1 | 97.1 | 97.1 | 97.1 | 97.1 | *97.1* | 97.1 | 97.1 | 97.1 | 97.1 |
| 2.5° | 101.3 | 100.4 | 100.4 | 100.4 | 99.6 | 99.6 | *99.6* | 99.6 | 98.7 | 98.7 | 98.7 |
| 5° | 107.1 | 106.3 | 107.1 | 105.4 | 104.6 | 104.6 | *103.8* | 103.8 | 102.9 | 102.1 | 101.3 |
| 7.5° | 115.5 | 114.6 | 114.6 | 113.0 | 112.1 | 111.3 | *111.3* | 109.6 | 108.8 | 107.1 | 105.4 |
| 10° | 124.7 | 124.7 | 123.8 | 123.0 | 121.3 | 119.7 | *119.7* | 117.1 | 116.3 | 113.8 | 111.3 |
| 12.5° | 135.6 | 135.6 | 135.6 | 133.9 | 132.2 | 131.4 | *129.7* | 128.0 | 125.5 | 121.3 | 118.8 |
| 15° | 148.9 | 148.9 | 148.9 | 147.3 | 145.6 | 143.9 | *143.1* | 139.7 | 135.6 | 131.4 | 126.4 |
| 17.5° | 165.7 | 164.0 | 164.0 | 162.3 | 160.7 | 159.8 | *158.2* | 154.8 | 148.9 | 143.9 | 137.2 |
| 20° | 184.1 | 183.3 | 182.4 | 182.4 | 180.7 | 179.1 | *178.2* | 173.2 | 166.5 | 157.3 | 148.9 |
| 22.5° | 205.0 | 204.2 | 204.2 | 205.8 | 205.0 | 202.5 | *202.5* | 195.0 | 185.8 | 174.9 | 162.3 |
| 25° | 231.0 | 230.1 | 231.8 | 235.1 | 235.1 | 233.5 | *231.0* | 223.4 | 210.0 | 195.0 | 179.9 |
| 27.5° | 259.4 | 258.6 | 261.9 | 267.8 | 269.4 | 266.9 | *265.3* | 256.9 | 241.8 | 221.7 | 200.0 |
| 30° | 293.7 | 294.5 | 303.8 | 310.4 | 314.6 | 313.0 | *312.1* | 302.9 | 278.6 | 255.2 | 226.8 |
| 32.5° | 335.6 | 333.0 | 344.8 | 355.6 | 363.2 | 367.3 | *364.8* | 354.0 | 333.0 | 296.2 | 260.2 |
| 35° | 379.9 | 380.7 | 395.0 | 410.9 | 428.4 | 430.1 | *435.1* | 424.2 | 395.8 | 352.3 | 302.1 |
| 37.5° | 437.6 | 430.9 | 449.4 | 479.5 | 500.4 | 518.8 | *515.5* | 508.8 | 475.3 | 417.6 | 348.9 |
| 40° | 489.5 | 487.8 | 513.8 | 555.6 | 594.1 | 620.9 | *624.2* | 615.9 | 571.5 | 489.5 | 399.1 |
| 42.5° | 548.9 | 554.0 | 589.9 | 647.7 | 706.2 | 744.7 | *735.5* | 731.3 | 679.5 | 574.9 | 467.8 |
| 45° | 609.2 | 625.9 | 671.9 | 755.6 | 824.2 | 879.5 | *895.4* | 881.1 | 817.5 | 709.6 | 554.8 |
| 47.5° | 682.0 | 704.6 | 761.5 | 874.4 | 986.6 | 1051.0 | *1054.3* | 1097.0 | 1000.8 | 839.3 | 645.2 |
| 50° | 778.2 | 788.2 | 867.7 | 1005.8 | 1159.8 | 1250.2 | *1276.1* | 1276.9 | 1180.7 | 969.8 | 747.2 |
| 52.5° | 872.8 | 880.3 | 984.9 | 1163.1 | 1372.3 | 1475.2 | *1481.1* | 1513.7 | 1382.4 | 1180.7 | 893.7 |
| 55° | 986.6 | 983.2 | 1127.1 | 1341.4 | 1588.2 | 1738.0 | *1781.5* | 1825.9 | 1658.5 | 1347.2 | 977.4 |
| 57.5° | 1097.0 | 1092.0 | 1265.2 | 1546.4 | 1883.6 | 2032.5 | *2068.5* | 2036.7 | 1788.2 | 1416.7 | 1018.4 |
| 60° | 1199.1 | 1216.7 | 1427.6 | 1773.1 | 2112.0 | 2254.3 | *2278.6* | 2192.4 | 1871.9 | 1470.2 | 1044.3 |
| 62.5° | 1305.4 | 1340.5 | 1595.7 | 1962.3 | 2286.9 | 2389.0 | *2390.7* | 2289.4 | 2011.6 | 1574.0 | 1128.8 |
| 65° | 1405.0 | 1461.0 | 1726.3 | 2123.8 | 2409.1 | 2511.2 | *2522.9* | 2431.7 | 2148.9 | 1664.4 | 1143.0 |
| 67.5° | *1492.8* | *1567.3* | *1816.7* | *2210.8* | *2491.9* | *2558.0* | *2563.9* | *2432.5* | *2116.2* | *1627.5* | *1103.7* |
| 70° | 1563.9 | 1624.2 | 1872.7 | 2212.5 | 2434.2 | 2452.6 | *2448.4* | 2308.7 | 2025.9 | 1554.7 | 1037.6 |
| 72.5° | 1591.6 | 1640.9 | 1845.9 | 2108.7 | 2264.3 | 2260.2 | *2256.8* | 2127.9 | 1876.9 | 1433.4 | 942.2 |
| 75° | 1552.2 | 1566.5 | 1699.5 | 1886.9 | 1985.7 | 2009.1 | *2012.5* | 1896.2 | 1646.8 | 1253.5 | 808.3 |
| 77.5° | 1389.9 | 1382.4 | 1484.5 | 1608.3 | 1682.8 | 1699.5 | *1696.2* | 1599.1 | 1380.7 | 1041.8 | 677.8 |
| 80° | 1102.0 | 1117.9 | 1181.5 | 1263.5 | 1338.0 | 1356.4 | *1344.7* | 1271.1 | 1074.4 | 812.5 | 520.5 |
| 82.5° | 770.7 | 789.9 | 843.5 | 905.4 | 961.5 | 961.5 | *972.3* | 901.2 | 761.5 | 583.2 | 364.0 |
| 85° | 415.9 | 405.0 | 463.6 | 533.9 | 574.0 | 581.6 | *585.7* | 562.3 | 471.1 | 352.3 | 215.9 |
| 87.5° | 68.6 | 73.6 | 91.2 | 139.7 | 159.0 | 184.1 | *195.8* | 153.1 | 92.9 | 59.4 | 43.5 |
| 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: P821416
CATALOG NUMBER: TT-D2-750-12VDC-T4-PM

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 97.1 | 97.1 | 97.1 | 97.1 | 97.1 | 97.1 | 97.1 | 97.1 | 97.1 | 97.1 | 97.1 |
| 2.5° | 98.7 | 97.9 | 97.1 | 96.2 | 96.2 | 95.4 | 95.4 | 95.4 | 96.2 | 96.2 | 96.2 |
| 5° | 101.3 | 100.4 | 99.6 | 98.7 | 97.1 | 97.1 | 97.1 | 97.1 | 97.1 | 97.1 | 97.1 |
| 7.5° | 105.4 | 103.8 | 102.9 | 101.3 | 99.6 | 99.6 | 98.7 | 98.7 | 98.7 | 99.6 | 98.7 |
| 10° | 110.5 | 108.8 | 107.1 | 104.6 | 103.8 | 102.9 | 102.1 | 102.1 | 102.9 | 102.9 | 102.1 |
| 12.5° | 116.3 | 115.5 | 112.1 | 109.6 | 107.9 | 107.1 | 106.3 | 107.1 | 106.3 | 107.1 | 107.1 |
| 15° | 124.7 | 122.2 | 118.0 | 115.5 | 113.0 | 112.1 | 111.3 | 112.1 | 112.1 | 113.0 | 112.1 |
| 17.5° | 133.9 | 130.5 | 126.4 | 122.2 | 118.8 | 118.0 | 118.0 | 118.0 | 118.8 | 119.7 | 118.8 |
| 20° | 144.8 | 140.6 | 134.7 | 129.7 | 126.4 | 125.5 | 125.5 | 126.4 | 127.2 | 128.0 | 128.0 |
| 22.5° | 155.6 | 152.3 | 143.9 | 137.2 | 135.6 | 134.7 | 133.9 | 135.6 | 137.2 | 138.1 | 138.9 |
| 25° | 172.4 | 165.7 | 155.6 | 148.1 | 144.8 | 144.8 | 145.6 | 147.3 | 148.1 | 149.8 | 148.9 |
| 27.5° | 189.9 | 182.4 | 169.9 | 159.8 | 157.3 | 156.5 | 158.2 | 159.8 | 163.2 | 163.2 | 162.3 |
| 30° | 214.2 | 201.7 | 185.8 | 176.6 | 169.9 | 170.7 | 173.2 | 175.7 | 179.1 | 180.7 | 180.7 |
| 32.5° | 241.8 | 228.4 | 206.7 | 192.5 | 189.1 | 189.9 | 190.8 | 195.0 | 198.3 | 201.7 | 199.2 |
| 35° | 277.8 | 261.1 | 234.3 | 218.4 | 210.0 | 209.2 | 212.5 | 217.6 | 220.9 | 222.6 | 222.6 |
| 37.5° | 317.1 | 295.4 | 261.9 | 248.5 | 238.5 | 237.6 | 238.5 | 242.7 | 246.9 | 248.5 | 251.9 |
| 40° | 364.8 | 338.1 | 298.7 | 277.0 | 269.4 | 267.8 | 271.1 | 277.0 | 277.0 | 279.5 | 280.3 |
| 42.5° | 423.4 | 389.1 | 345.6 | 317.1 | 307.9 | 307.9 | 307.1 | 312.1 | 312.1 | 312.1 | 310.4 |
| 45° | 497.9 | 459.4 | 402.5 | 373.2 | 357.3 | 348.9 | 351.4 | 348.1 | 347.3 | 349.8 | 342.2 |
| 47.5° | 569.8 | 521.3 | 454.4 | 422.6 | 406.7 | 401.7 | 392.5 | 389.9 | 385.8 | 385.8 | 374.9 |
| 50° | 653.5 | 593.3 | 528.8 | 483.7 | 468.6 | 454.4 | 446.8 | 435.1 | 422.6 | 420.1 | 415.9 |
| 52.5° | 793.3 | 718.0 | 616.7 | 568.2 | 529.7 | 515.5 | 497.9 | 482.8 | 467.8 | 456.0 | 462.7 |
| 55° | 850.2 | 773.2 | 677.0 | 630.1 | 603.3 | 589.9 | 557.3 | 537.2 | 514.6 | 497.9 | 507.1 |
| 57.5° | 878.6 | 794.9 | 705.4 | 670.3 | 662.7 | 650.2 | 625.9 | 591.6 | 565.7 | 544.7 | 546.4 |
| 60° | 894.5 | 806.7 | 720.5 | 688.7 | 684.5 | 692.9 | 680.3 | 656.9 | 616.7 | 595.8 | 593.3 |
| 62.5° | 955.6 | 863.6 | 763.1 | 718.0 | 708.8 | 714.6 | 718.0 | 703.7 | 670.3 | 642.6 | 635.1 |
| 65° | 968.2 | 870.3 | 771.5 | 742.2 | 743.1 | 744.7 | 747.2 | 732.2 | 715.4 | 681.1 | 674.4 |
| 67.5° | *930.5* | *834.3* | *746.4* | *722.1* | *723.8* | *743.1* | *758.1* | *757.3* | *738.9* | *709.6* | *707.1* |
| 70° | 873.6 | 779.9 | 698.7 | 677.0 | 681.1 | 698.7 | 731.3 | 748.1 | 744.7 | 725.5 | 729.7 |
| 72.5° | 784.9 | 701.2 | 630.1 | 613.4 | 623.4 | 640.1 | 671.1 | 701.2 | 718.8 | 723.0 | 732.2 |
| 75° | 681.1 | 614.2 | 547.3 | 537.2 | 544.7 | 564.0 | 592.4 | 627.6 | 666.1 | 687.0 | 692.9 |
| 77.5° | 562.3 | 501.2 | 451.9 | 445.2 | 456.0 | 473.6 | 502.1 | 529.7 | 573.2 | 610.0 | 618.4 |
| 80° | 440.1 | 387.4 | 352.3 | 346.4 | 353.1 | 368.2 | 389.9 | 412.5 | 454.4 | 482.8 | 487.0 |
| 82.5° | 305.4 | 273.6 | 251.0 | 247.7 | 251.9 | 257.7 | 275.3 | 296.2 | 319.7 | 342.2 | 344.8 |
| 85° | 177.4 | 157.3 | 151.5 | 146.4 | 155.6 | 155.6 | 159.8 | 171.5 | 183.3 | 184.9 | 189.9 |
| 87.5° | 32.6 | 31.0 | 31.8 | 23.4 | 29.3 | 20.9 | 20.9 | 26.8 | 20.1 | 23.4 | 19.2 |
| 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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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: SP1-2407-176-6

Test Date: 09/26/2024

Luminaire Tested: MEM2-HTN-VA-30-750-U-WQ

Data in this report applies to families of products including MEM2-HTN-VA-30-750-U-WQ

Report Generated By FNC07603 / LDUCLS01DT446
Version: v7.04

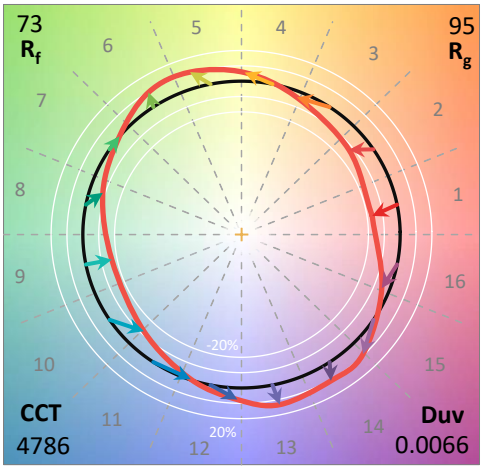
## Test Information

| | |
|---|---|
| Test Method: | LM-79-2019 |
| Report Number: | SP1-2407-176-6 |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Photometer: | SP1 - 76IN SPHERE |
| Measurement Geometry: | 4π |
| Issue Date: | 09/27/2024 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS |
| Product Line: | Streetworks |
| Catalog Number: | **MEM2-HTN-VA-30-750-U-WQ** |
| Description: | EPIC MODERN VISUAL COMFORT 30W WAVESTREAM WIDE |

## Spectral Parameters

| | |
|---|---|
| CCT (K): | 4786 |
| CIE u': | 0.2093 |
| CIE v': | 0.4953 |
| Duv: | 0.0066 |
| CIE x: | 0.3533 |
| CIE y: | 0.3716 |
| CIE z: | 0.2751 |
| Peak Wavelength (nm): | 449 |
| Dominant Wavelength (nm): | 570 |
| Purity: | 17.53512 |
| Rf: | 73 |
| Rg: | 94.6 |

| | | | | | |
|---|---|---|---|---|---|
| CRI (Ra): | 70.9 | | | | |
| R1: | 67.8 | R9: | -29.8 | | |
| R2: | 75.1 | R10: | 40.9 | | |
| R3: | 80.6 | R11: | 67.4 | | |
| R4: | 71.6 | R12: | 35.3 | | |
| R5: | 67.8 | R13: | 68.5 | | |
| R6: | 65.4 | R14: | 89.0 | | |
| R7: | 82.0 | R15: | 60.9 | | |
| R8: | 57.0 | | | | |




## Test Conditions

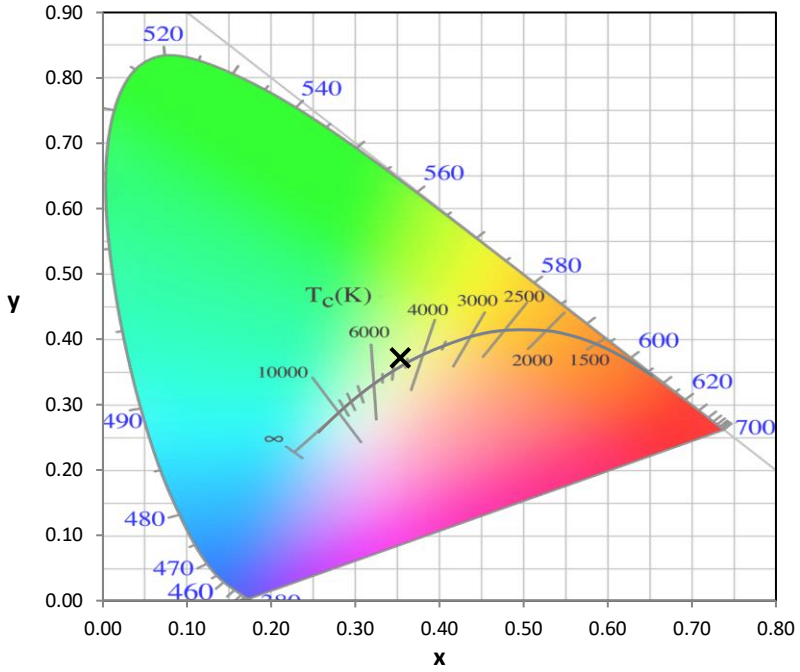
| | |
|---|---|
| Stabilization Time: | 45M |
| Operation Time: | 1H 45M |
| Sphere Temperature (°C): | 25.2 |

REPORT NUMBER: SP1-2407-176-6

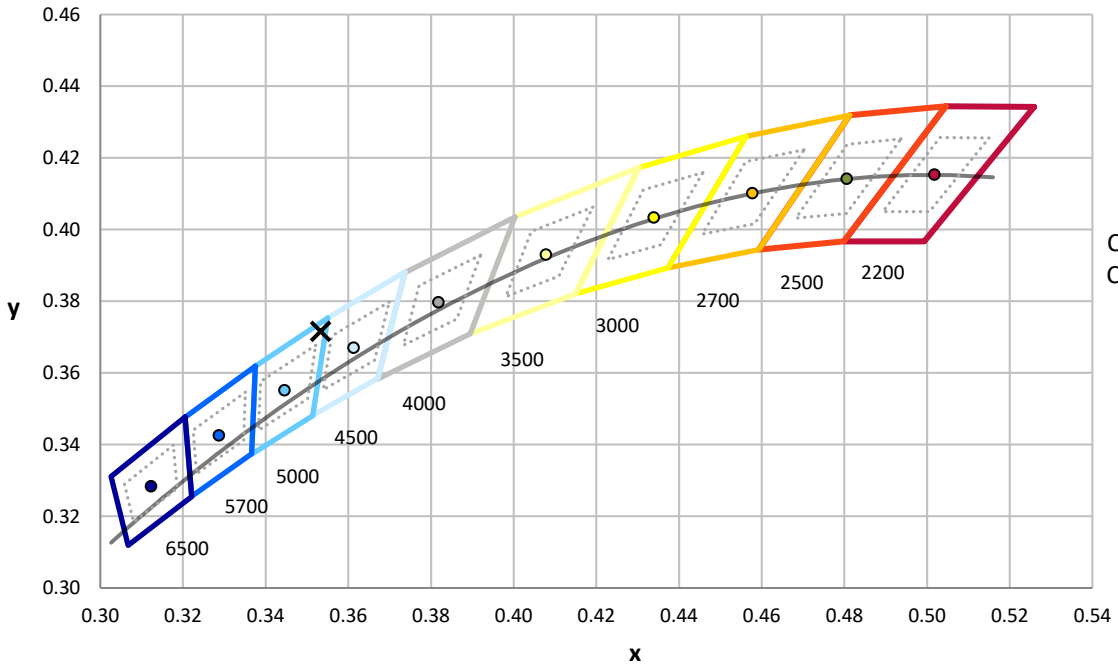
| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 6/18/2024 | 12/18/2024 |
| Power Meter | INXT2011004 | 2/8/2024 | 2/8/2025 |
| AC Power Source | IN0063 | 10/24/2023 | 10/24/2024 |
| DC 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: SP1-2407-176-6

## CIE 1931 Chromaticity Diagram




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




CCT = 4786K
CIE x = 0.3533
CIE y = 0.3716
Duv = 0.0066

Point lies inside the ANSI 5000K 7-step quadrangle

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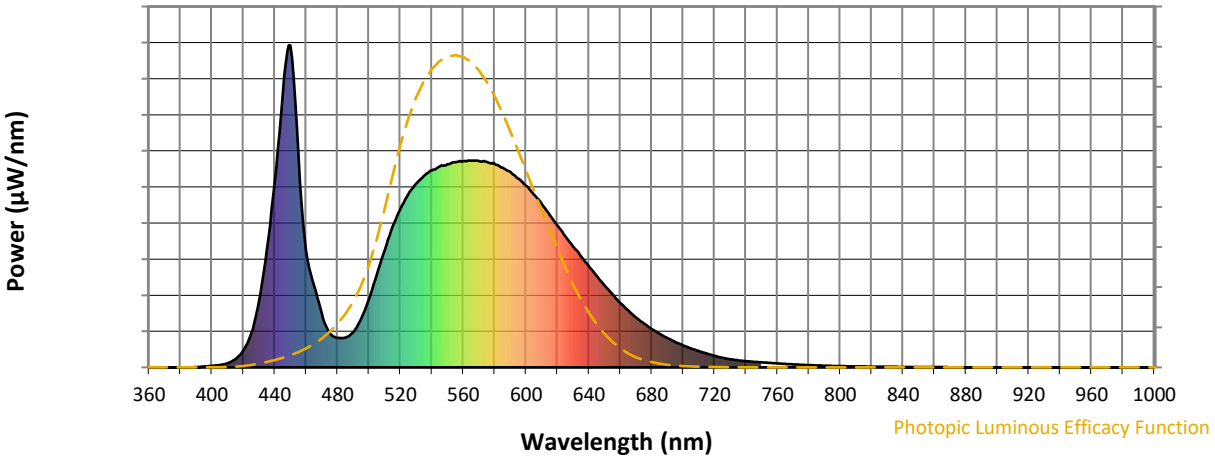
## Photopic Flux vs. Wavelength




## 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 | 110 | NR | 620 | 440 | NR | 750 | 16 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 150 | NR | 625 | 407 | NR | 755 | 14 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 213 | NR | 630 | 375 | NR | 760 | 12 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 288 | NR | 635 | 345 | NR | 765 | 11 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 364 | NR | 640 | 314 | NR | 770 | 9 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 436 | NR | 645 | 283 | NR | 775 | 8 | NR | 905 | 0 | NR |
| 390 | 1 | NR | 520 | 492 | NR | 650 | 254 | NR | 780 | 7 | NR | 910 | 0 | NR |
| 395 | 3 | NR | 525 | 537 | NR | 655 | 227 | NR | 785 | 6 | NR | 915 | 0 | NR |
| 400 | 5 | NR | 530 | 570 | NR | 660 | 200 | NR | 790 | 5 | NR | 920 | 0 | NR |
| 405 | 7 | NR | 535 | 595 | NR | 665 | 177 | NR | 795 | 4 | NR | 925 | 0 | NR |
| 410 | 13 | NR | 540 | 611 | NR | 670 | 155 | NR | 800 | 4 | NR | 930 | 0 | NR |
| 415 | 25 | NR | 545 | 624 | NR | 675 | 136 | NR | 805 | 3 | NR | 935 | 0 | NR |
| 420 | 52 | NR | 550 | 631 | NR | 680 | 119 | NR | 810 | 3 | NR | 940 | 0 | NR |
| 425 | 106 | NR | 555 | 637 | NR | 685 | 104 | NR | 815 | 3 | NR | 945 | 0 | NR |
| 430 | 204 | NR | 560 | 640 | NR | 690 | 91 | NR | 820 | 2 | NR | 950 | 0 | NR |
| 435 | 369 | NR | 565 | 642 | NR | 695 | 79 | NR | 825 | 2 | NR | 955 | 0 | NR |
| 440 | 573 | NR | 570 | 641 | NR | 700 | 68 | NR | 830 | 2 | NR | 960 | 0 | NR |
| 445 | 844 | NR | 575 | 638 | NR | 705 | 59 | NR | 835 | 2 | NR | 965 | 0 | NR |
| 450 | 999 | NR | 580 | 632 | NR | 710 | 50 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 668 | NR | 585 | 620 | NR | 715 | 43 | NR | 845 | 1 | NR | 975 | 0 | NR |
| 460 | 361 | NR | 590 | 607 | NR | 720 | 36 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 255 | NR | 595 | 586 | NR | 725 | 30 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 165 | NR | 600 | 564 | NR | 730 | 25 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 106 | NR | 605 | 537 | NR | 735 | 22 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 91 | NR | 610 | 507 | NR | 740 | 19 | NR | 870 | 0 | NR | 1000 | 0 | NR |
| 485 | 93 | NR | 615 | 474 | NR | 745 | 17 | NR | 875 | 0 | NR | | | |

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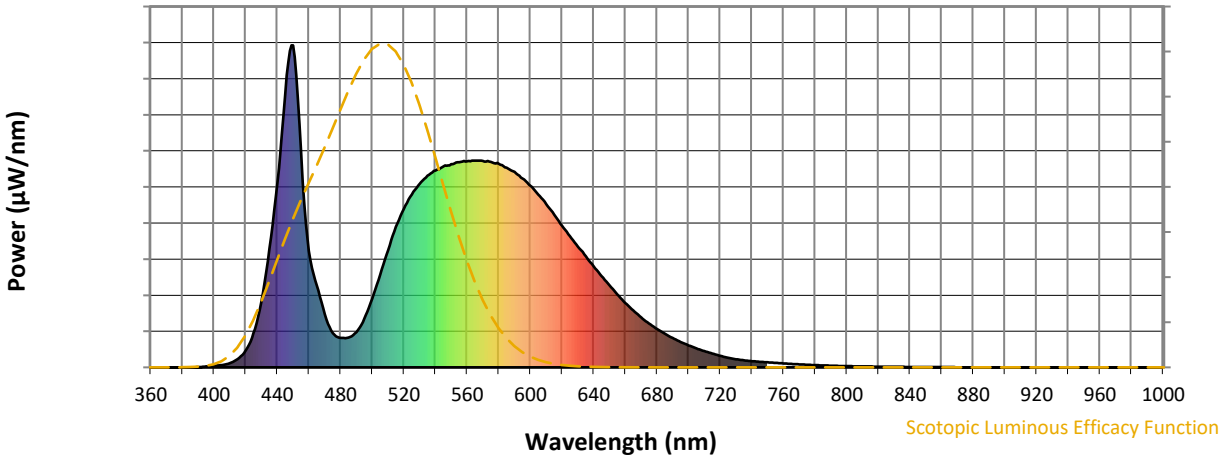
## Scotopic Flux vs. Wavelength




**Scotopic Lumens: NR** **S/P: 1.69**

| 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 | 110 | NR | 620 | 440 | NR | 750 | 16 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 150 | NR | 625 | 407 | NR | 755 | 14 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 213 | NR | 630 | 375 | NR | 760 | 12 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 288 | NR | 635 | 345 | NR | 765 | 11 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 364 | NR | 640 | 314 | NR | 770 | 9 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 436 | NR | 645 | 283 | NR | 775 | 8 | NR | 905 | 0 | NR |
| 390 | 1 | NR | 520 | 492 | NR | 650 | 254 | NR | 780 | 7 | NR | 910 | 0 | NR |
| 395 | 3 | NR | 525 | 537 | NR | 655 | 227 | NR | 785 | 6 | NR | 915 | 0 | NR |
| 400 | 5 | NR | 530 | 570 | NR | 660 | 200 | NR | 790 | 5 | NR | 920 | 0 | NR |
| 405 | 7 | NR | 535 | 595 | NR | 665 | 177 | NR | 795 | 4 | NR | 925 | 0 | NR |
| 410 | 13 | NR | 540 | 611 | NR | 670 | 155 | NR | 800 | 4 | NR | 930 | 0 | NR |
| 415 | 25 | NR | 545 | 624 | NR | 675 | 136 | NR | 805 | 3 | NR | 935 | 0 | NR |
| 420 | 52 | NR | 550 | 631 | NR | 680 | 119 | NR | 810 | 3 | NR | 940 | 0 | NR |
| 425 | 106 | NR | 555 | 637 | NR | 685 | 104 | NR | 815 | 3 | NR | 945 | 0 | NR |
| 430 | 204 | NR | 560 | 640 | NR | 690 | 91 | NR | 820 | 2 | NR | 950 | 0 | NR |
| 435 | 369 | NR | 565 | 642 | NR | 695 | 79 | NR | 825 | 2 | NR | 955 | 0 | NR |
| 440 | 573 | NR | 570 | 641 | NR | 700 | 68 | NR | 830 | 2 | NR | 960 | 0 | NR |
| 445 | 844 | NR | 575 | 638 | NR | 705 | 59 | NR | 835 | 2 | NR | 965 | 0 | NR |
| 450 | 999 | NR | 580 | 632 | NR | 710 | 50 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 668 | NR | 585 | 620 | NR | 715 | 43 | NR | 845 | 1 | NR | 975 | 0 | NR |
| 460 | 361 | NR | 590 | 607 | NR | 720 | 36 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 255 | NR | 595 | 586 | NR | 725 | 30 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 165 | NR | 600 | 564 | NR | 730 | 25 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 106 | NR | 605 | 537 | NR | 735 | 22 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 91 | NR | 610 | 507 | NR | 740 | 19 | NR | 870 | 0 | NR | 1000 | 0 | NR |
| 485 | 93 | NR | 615 | 474 | NR | 745 | 17 | NR | 875 | 0 | NR | | | |

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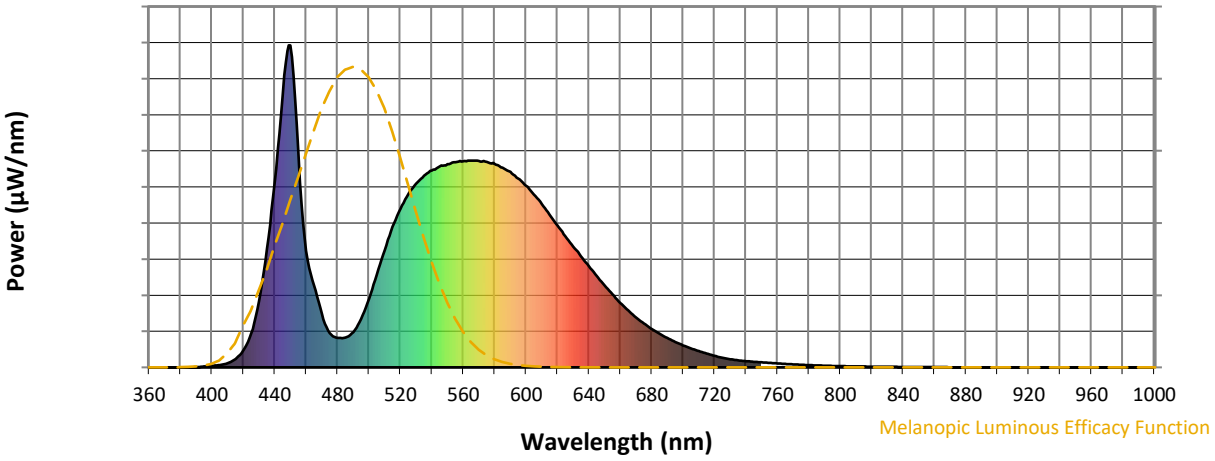
## Melanopic Flux vs. Wavelength




**Melanopic Lumens: NR** **M/P: 3.36**

| 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 | 110 | NR | 620 | 440 | NR | 750 | 16 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 150 | NR | 625 | 407 | NR | 755 | 14 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 213 | NR | 630 | 375 | NR | 760 | 12 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 288 | NR | 635 | 345 | NR | 765 | 11 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 364 | NR | 640 | 314 | NR | 770 | 9 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 436 | NR | 645 | 283 | NR | 775 | 8 | NR | 905 | 0 | NR |
| 390 | 1 | NR | 520 | 492 | NR | 650 | 254 | NR | 780 | 7 | NR | 910 | 0 | NR |
| 395 | 3 | NR | 525 | 537 | NR | 655 | 227 | NR | 785 | 6 | NR | 915 | 0 | NR |
| 400 | 5 | NR | 530 | 570 | NR | 660 | 200 | NR | 790 | 5 | NR | 920 | 0 | NR |
| 405 | 7 | NR | 535 | 595 | NR | 665 | 177 | NR | 795 | 4 | NR | 925 | 0 | NR |
| 410 | 13 | NR | 540 | 611 | NR | 670 | 155 | NR | 800 | 4 | NR | 930 | 0 | NR |
| 415 | 25 | NR | 545 | 624 | NR | 675 | 136 | NR | 805 | 3 | NR | 935 | 0 | NR |
| 420 | 52 | NR | 550 | 631 | NR | 680 | 119 | NR | 810 | 3 | NR | 940 | 0 | NR |
| 425 | 106 | NR | 555 | 637 | NR | 685 | 104 | NR | 815 | 3 | NR | 945 | 0 | NR |
| 430 | 204 | NR | 560 | 640 | NR | 690 | 91 | NR | 820 | 2 | NR | 950 | 0 | NR |
| 435 | 369 | NR | 565 | 642 | NR | 695 | 79 | NR | 825 | 2 | NR | 955 | 0 | NR |
| 440 | 573 | NR | 570 | 641 | NR | 700 | 68 | NR | 830 | 2 | NR | 960 | 0 | NR |
| 445 | 844 | NR | 575 | 638 | NR | 705 | 59 | NR | 835 | 2 | NR | 965 | 0 | NR |
| 450 | 999 | NR | 580 | 632 | NR | 710 | 50 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 668 | NR | 585 | 620 | NR | 715 | 43 | NR | 845 | 1 | NR | 975 | 0 | NR |
| 460 | 361 | NR | 590 | 607 | NR | 720 | 36 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 255 | NR | 595 | 586 | NR | 725 | 30 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 165 | NR | 600 | 564 | NR | 730 | 25 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 106 | NR | 605 | 537 | NR | 735 | 22 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 91 | NR | 610 | 507 | NR | 740 | 19 | NR | 870 | 0 | NR | 1000 | 0 | NR |
| 485 | 93 | NR | 615 | 474 | NR | 745 | 17 | NR | 875 | 0 | NR | | | |

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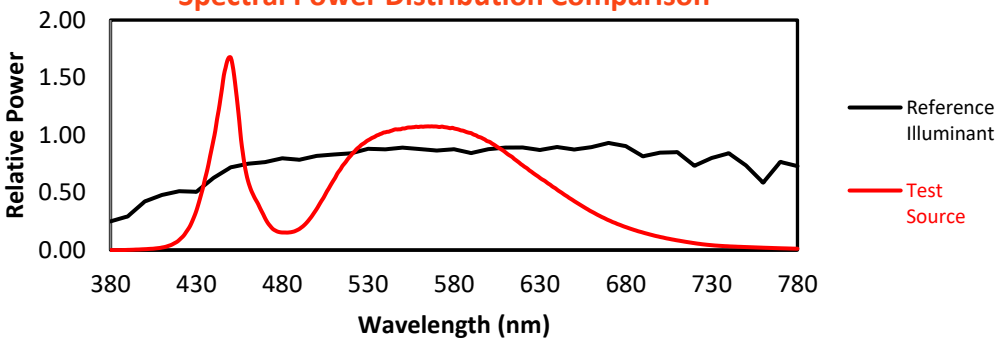
# TM-30-18

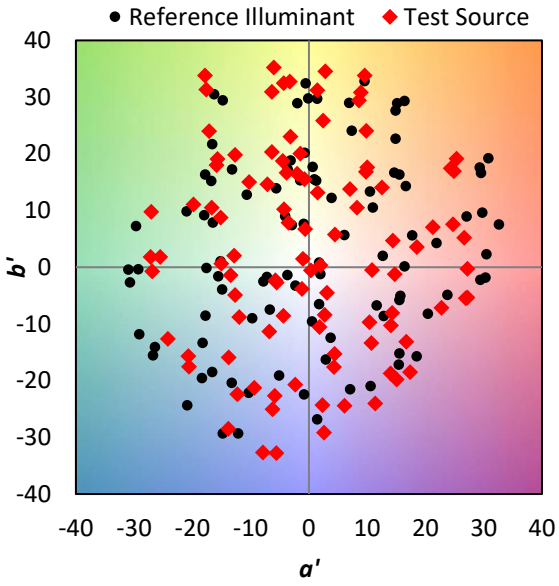
## Summary

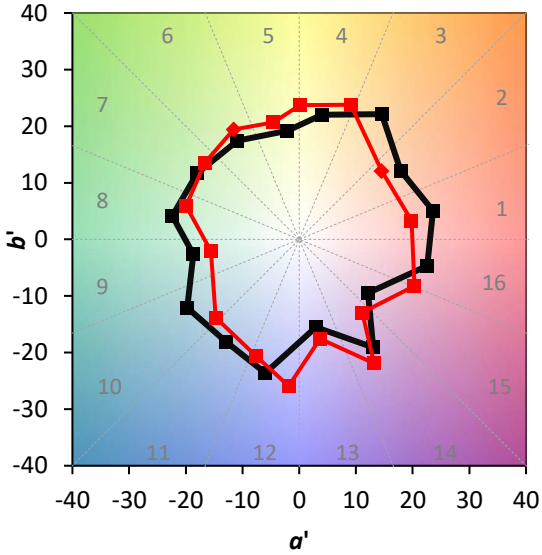
$R_f$ = 73
$R_g$ = 94.6
CIE $R_a$ = 70.9
$R_9$ = -29.8

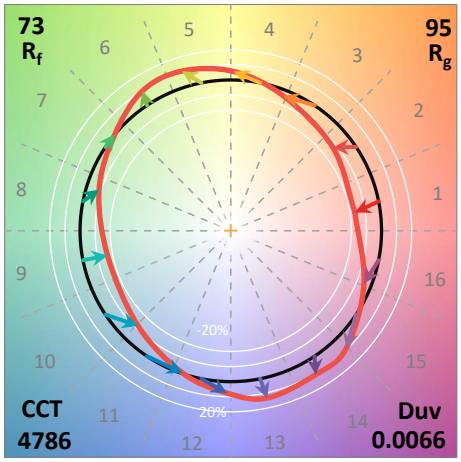
## Spectral Power Distribution Comparison

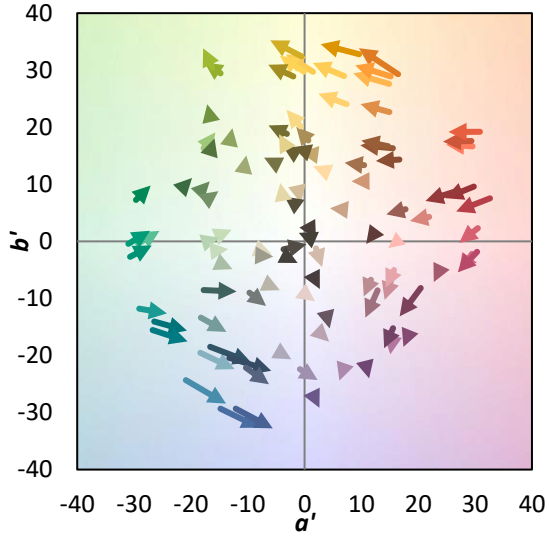



## Color Vector Graphics



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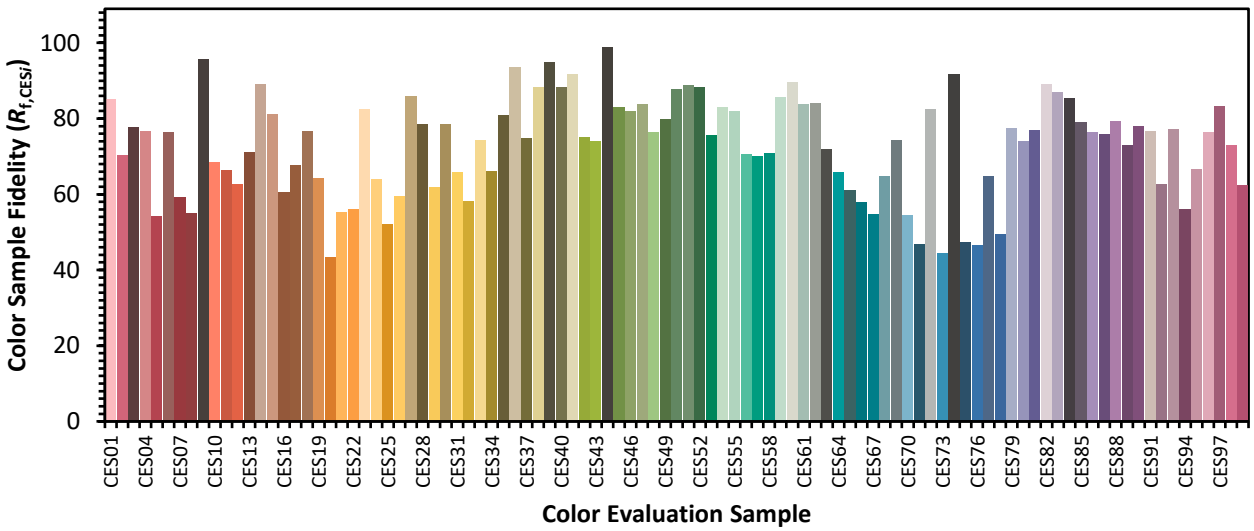
# TM-30-18

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

| | | | |
|---|---|---|---|
| CES01 = 85 | CES26 = 60 | CES51 = 89 | CES76 = 46 |
| CES02 = 59 | CES27 = 86 | CES52 = 88 | CES77 = 65 |
| CES03 = 30 | CES28 = 78 | CES53 = 76 | CES78 = 49 |
| CES04 = 69 | CES29 = 62 | CES54 = 83 | CES79 = 78 |
| CES05 = 46 | CES30 = 79 | CES55 = 82 | CES80 = 74 |
| CES06 = 50 | CES31 = 66 | CES56 = 71 | CES81 = 77 |
| CES07 = 39 | CES32 = 58 | CES57 = 70 | CES82 = 89 |
| CES08 = 38 | CES33 = 74 | CES58 = 71 | CES83 = 87 |
| CES09 = 29 | CES34 = 66 | CES59 = 86 | CES84 = 86 |
| CES10 = 72 | CES35 = 81 | CES60 = 90 | CES85 = 79 |
| CES11 = 56 | CES36 = 94 | CES61 = 84 | CES86 = 76 |
| CES12 = 61 | CES37 = 75 | CES62 = 84 | CES87 = 76 |
| CES13 = 41 | CES38 = 88 | CES63 = 72 | CES88 = 79 |
| CES14 = 74 | CES39 = 95 | CES64 = 66 | CES89 = 73 |
| CES15 = 70 | CES40 = 88 | CES65 = 61 | CES90 = 78 |
| CES16 = 46 | CES41 = 92 | CES66 = 58 | CES91 = 77 |
| CES17 = 49 | CES42 = 75 | CES67 = 55 | CES92 = 63 |
| CES18 = 55 | CES43 = 74 | CES68 = 65 | CES93 = 77 |
| CES19 = 71 | CES44 = 99 | CES69 = 74 | CES94 = 56 |
| CES20 = 64 | CES45 = 83 | CES70 = 55 | CES95 = 67 |
| CES21 = 85 | CES46 = 82 | CES71 = 47 | CES96 = 76 |
| CES22 = 77 | CES47 = 84 | CES72 = 82 | CES97 = 83 |
| CES23 = 91 | CES48 = 76 | CES73 = 44 | CES98 = 73 |
| CES24 = 90 | CES49 = 80 | CES74 = 92 | CES99 = 62 |
| CES25 = 71 | CES50 = 88 | CES75 = 47 | |



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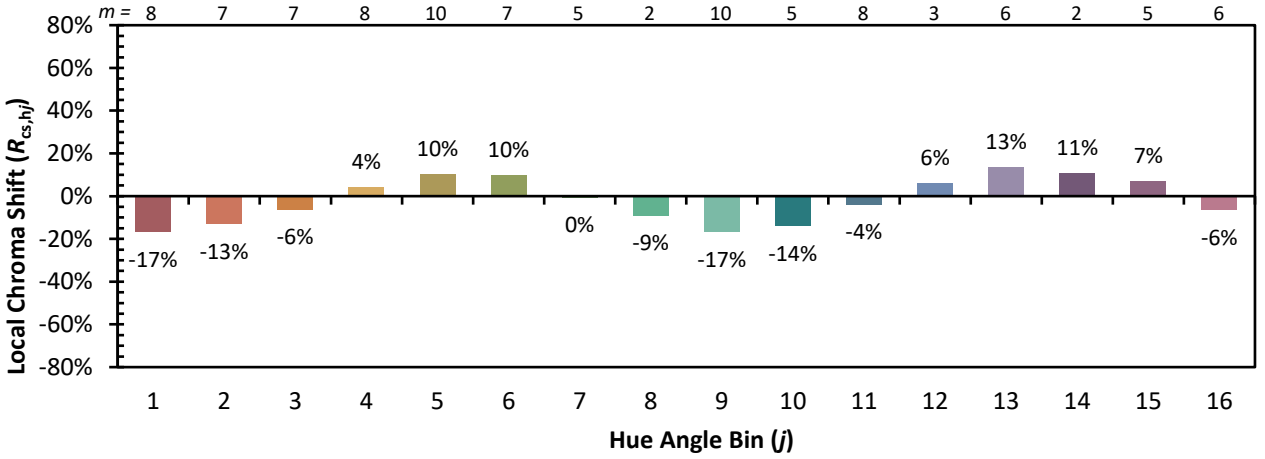
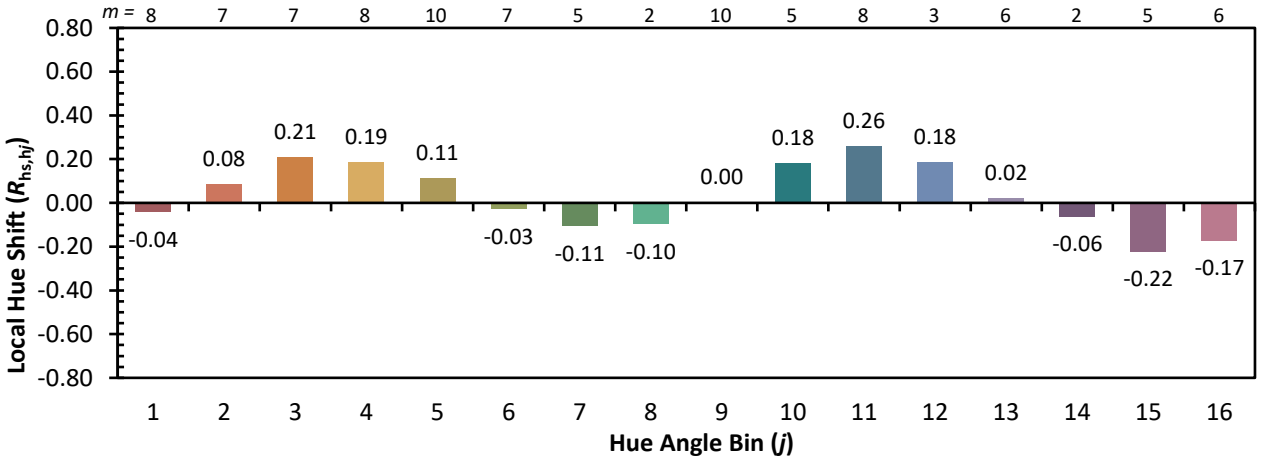
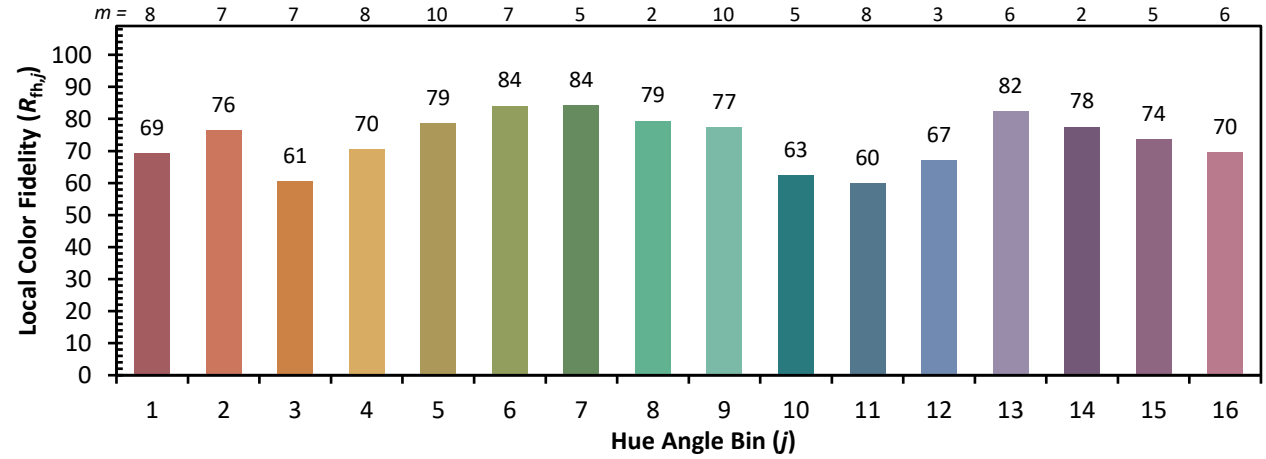
## Color Rendition by Hue-Angle Bin



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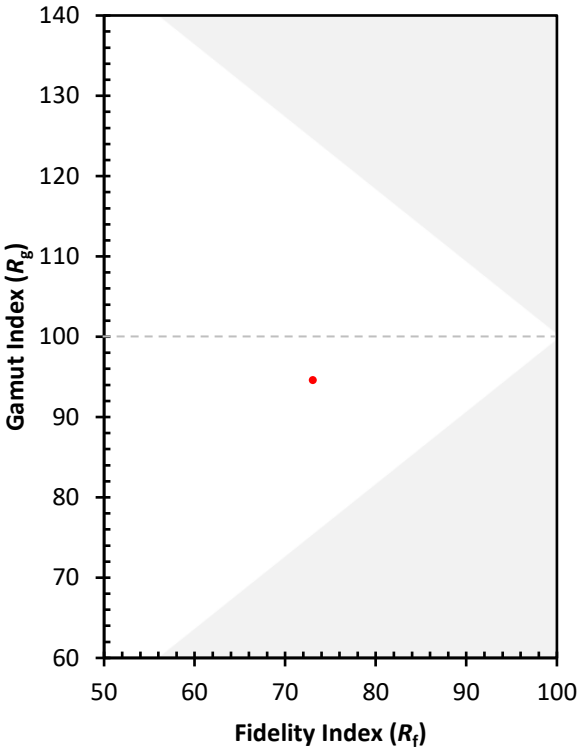
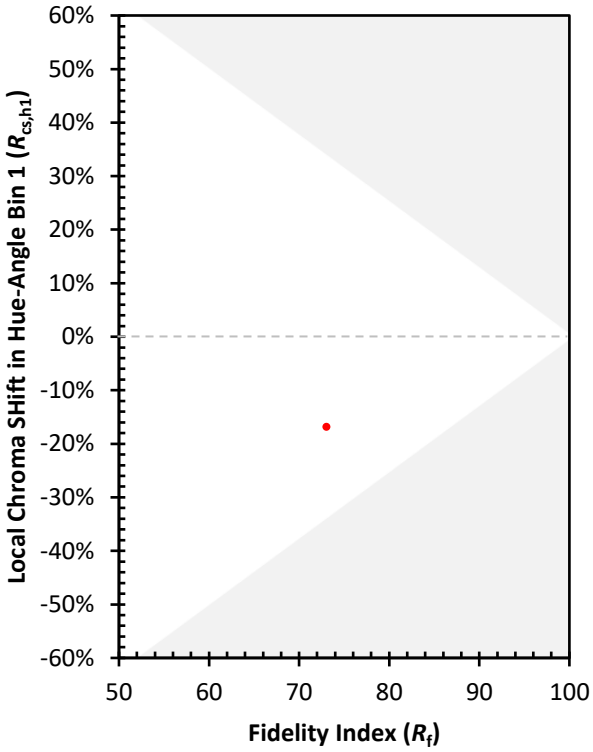
## TM-30-18

### Measure Comparisons

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