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: P832691

Luminaire Tested: **TTN-D3-750-U-DL-CG**

Issue Date: 5/14/2024

Report Generated By 670246001

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: | P832691 |
| | TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2312-254-15) |
| Test Lab: | INNOVATION CENTER |
| Issue Date: | 5/14/2024 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS (FORMERLY EATON) |
| Product Line: | McGRAW-EDISON |
| Catalog Number: | TTN-D3-750-U-DL-CG |
| Description: | TOPTIER NANO LED PARKING GARAGE LUMINAIRE |
| | 5000K, 70 CRI LEDS AND DRIVE LANE DISTRIBUTION WITH CLEAR GLASS |
| Light Source: | - |
| Ballast/Driver: | - |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 6612 lumens |
| Efficiency: | N/A |
| Efficacy: | 111.7 lumens/watt |
| Luminous Opening: | Circular (Dia: 0.71' x H: 0') |
| IES Classification: | Type IV - Short |
| BUG Rating: | B1 - U0 - G2 |

| | |
|---|---|
| Input Watts (W): | 59.2 |
| Input Voltage (V): | NR |
| Input Current (Ain): | NR |
| Voltage Rise (V): | NR |
| Power Factor: | NR |
| Total Harmonic Distortion (THDi): | NR |
| Frequency (hertz): | 60 |
| Stabilization Time: | NR |
| Operation Time: | NR |
| Ambient Temperature (°C): | NR |
| Test Distance: | 24 FT |

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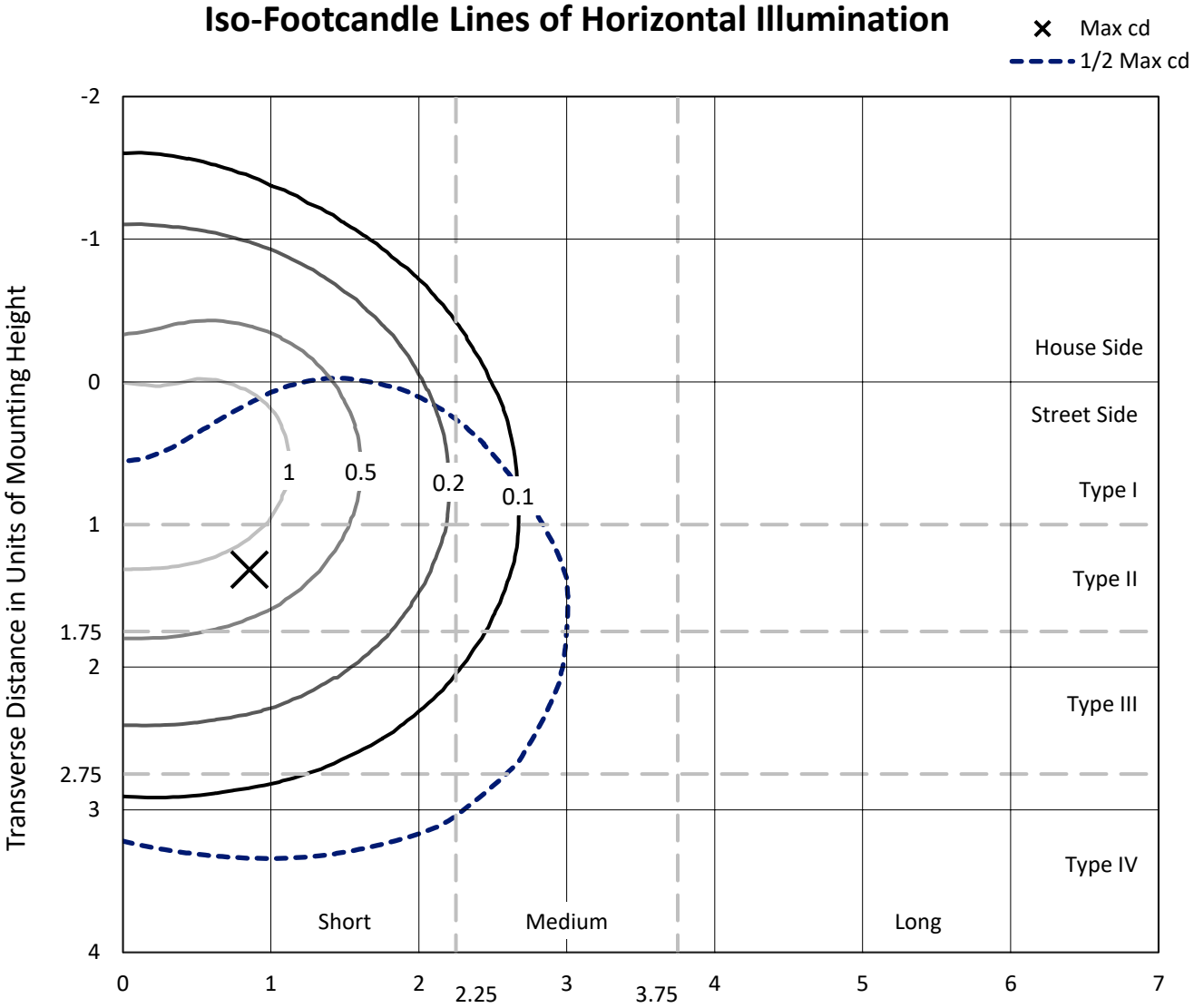
Peachtree City, GA 30269

Scaled Data Report

REPORT NUMBER: P832691
CATALOG NUMBER: TTN-D3-750-U-DL-CG

## Iso-Footcandle Lines of Horizontal Illumination




Based on 25 foot mounting height. Maximum calculated value = 1.7 fc
Type IV - Short - N/A

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Peachtree City, GA 30269

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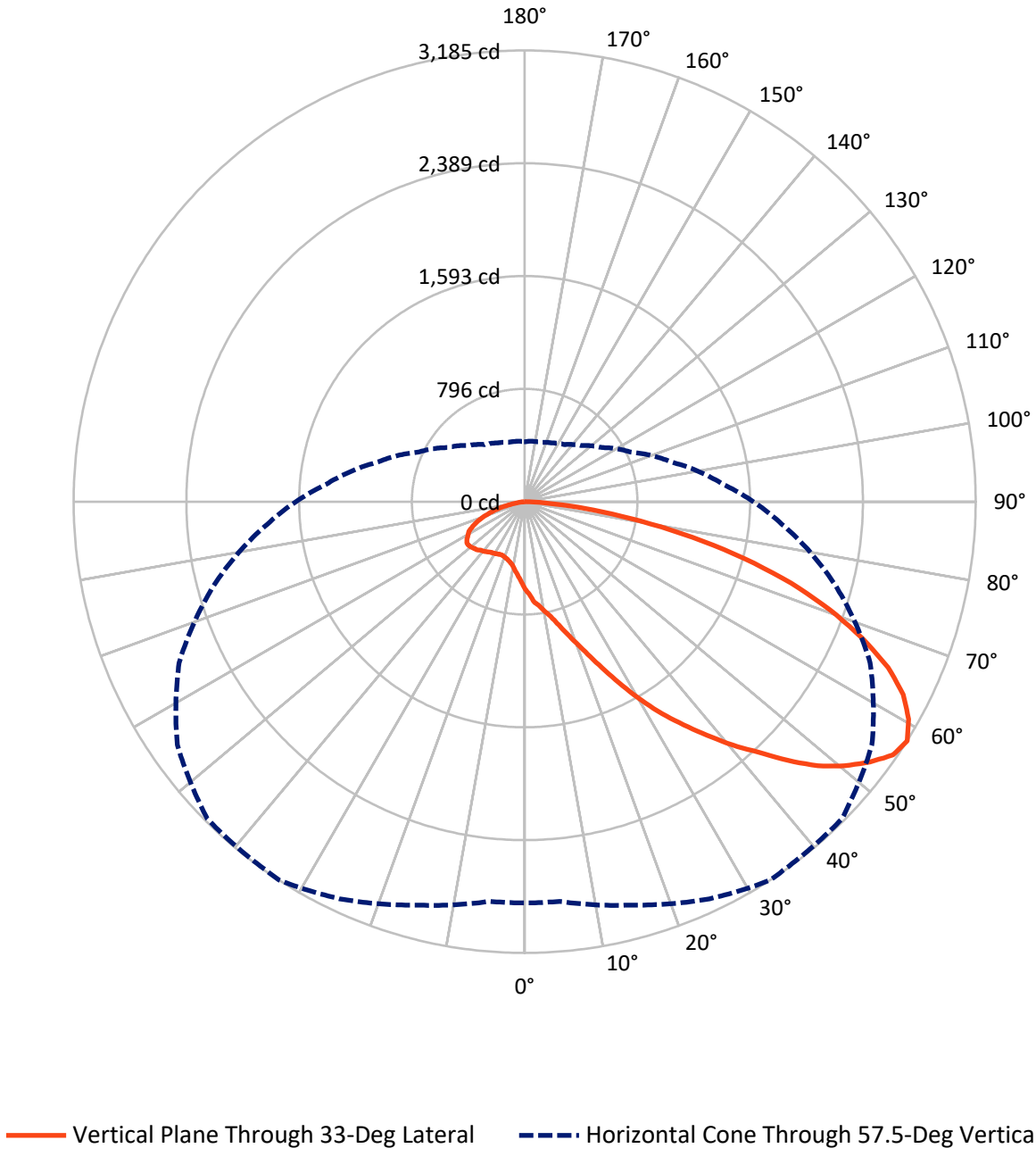
REPORT NUMBER: P832691
CATALOG NUMBER: TTN-D3-750-U-DL-CG

## Luminous Intensity Polar Plot



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Scaled Data Report

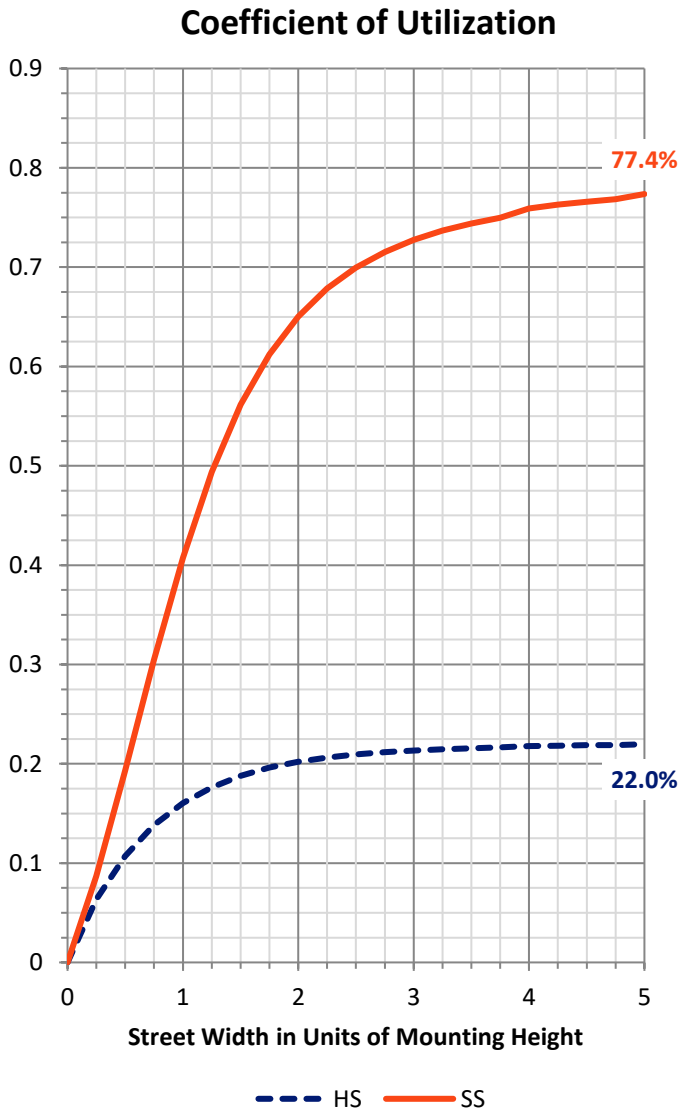
REPORT NUMBER: P832691
CATALOG NUMBER: TTN-D3-750-U-DL-CG

**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 1459.0 | 0.0 | 1459.0 |
| | % Fixture | 22.1 | 0.0 | 22.1 |
| **Street Side** | Lumens | 5153.0 | 0.0 | 5153.0 |
| | % Fixture | 77.9 | 0.0 | 77.9 |
| **Total** | Lumens | 6612.0 | 0.0 | 6612.0 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 59.3 | 0.9 |
| 10°-20° | 192.3 | 2.9 |
| 20°-30° | 405.4 | 6.1 |
| 30°-40° | 736.3 | 11.1 |
| 40°-50° | 1163.5 | 17.6 |
| 50°-60° | 1545.1 | 23.4 |
| 60°-70° | 1487.2 | 22.5 |
| 70°-80° | 873.0 | 13.2 |
| 80°-90° | 149.9 | 2.3 |
| 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° | 6612.0 | 100.0 |
| 0°-180° | 6612.0 | 100.0 |



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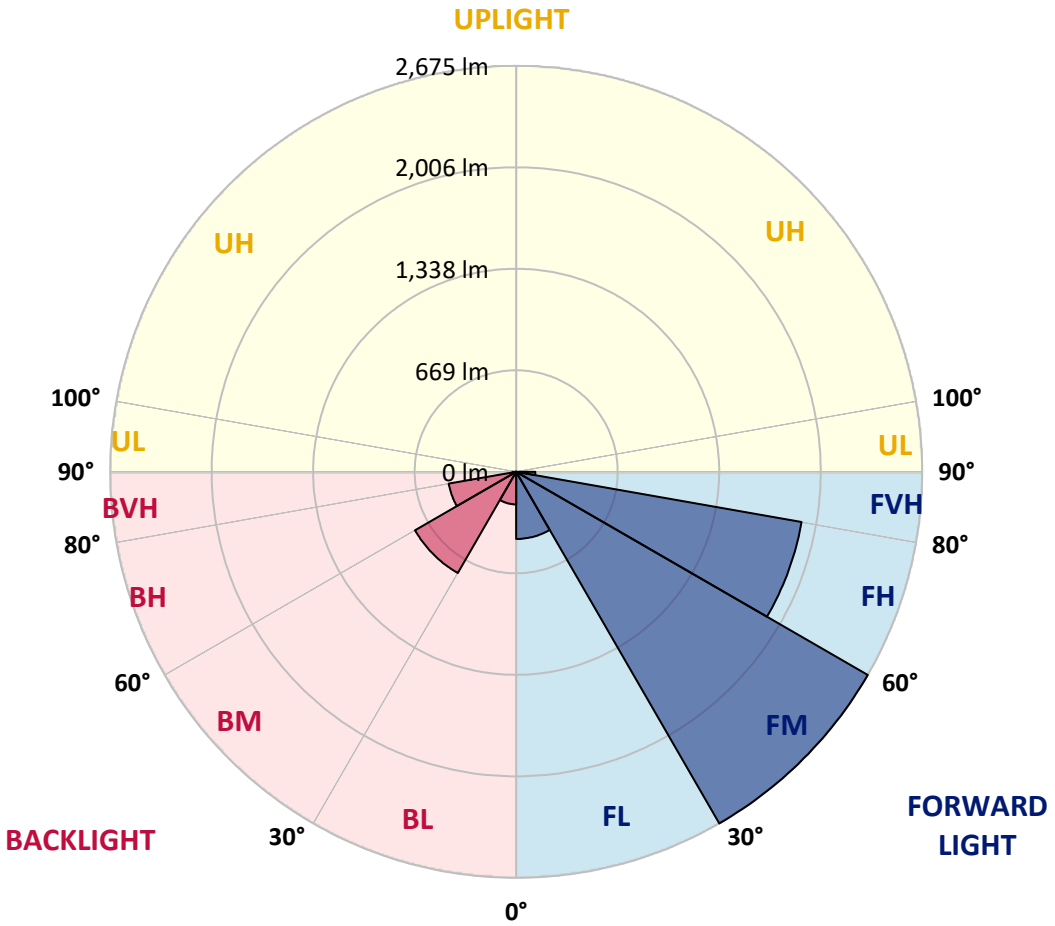
Scaled Data Report

REPORT NUMBER: P832691
CATALOG NUMBER: TTN-D3-750-U-DL-CG

## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 442.4 | 6.7 | | | |
| FM | (30°-60°) | 2675.0 | 40.5 | | | |
| FH | (60°-80°) | 1909.0 | 28.9 | | | G2/5000 |
| FVH | (80°-90°) | 126.6 | 1.9 | | | G2/225 |
| BL | (0°-30°) | 214.6 | 3.2 | B1/500 | | |
| BM | (30°-60°) | 769.9 | 11.6 | B1/1000 | | |
| BH | (60°-80°) | 451.2 | 6.8 | B1/500 | | G1/500 |
| BVH | (80°-90°) | 23.3 | 0.4 | | | 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 IV Short



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Scaled Data Report

REPORT NUMBER: P832691
CATALOG NUMBER: TTN-D3-750-U-DL-CG

**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 33° | 35° | 45° | 55° | 65° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 619.7 | 619.7 | 619.7 | 619.7 | *619.7* | 619.7 | 619.7 | 619.7 | 619.7 | 619.7 | 619.7 |
| 2.5° | 660.2 | 666.0 | 660.2 | 660.2 | *654.5* | 654.5 | 648.7 | 642.9 | 637.1 | 631.3 | 619.7 |
| 5° | 735.5 | 735.5 | 729.7 | 718.2 | *712.4* | 706.6 | 695.0 | 677.6 | 666.0 | 648.7 | 631.3 |
| 7.5° | 770.3 | 770.3 | 764.5 | 752.9 | *741.3* | 735.5 | 718.2 | 695.0 | 677.6 | 654.5 | 631.3 |
| 10° | 816.6 | 822.4 | 810.8 | 799.2 | *787.7* | 781.9 | 758.7 | 729.7 | 700.8 | 671.8 | 637.1 |
| 12.5° | 868.7 | 874.5 | 868.7 | 851.4 | *834.0* | 828.2 | 805.0 | 770.3 | 735.5 | 695.0 | 654.5 |
| 15° | 938.2 | 949.8 | 932.5 | 920.9 | *903.5* | 897.7 | 868.7 | 828.2 | 787.7 | 735.5 | 683.4 |
| 17.5° | 1019.3 | 1025.1 | 1013.5 | 996.2 | *984.6* | 978.8 | 949.8 | 903.5 | 845.6 | 787.7 | 724.0 |
| 20° | 1112.0 | 1117.8 | 1112.0 | 1088.8 | *1077.2* | 1071.5 | 1042.5 | 990.4 | 920.9 | 857.2 | 776.1 |
| 22.5° | 1222.0 | 1233.6 | 1216.2 | 1198.9 | *1187.3* | 1187.3 | 1152.5 | 1094.6 | 1013.5 | 932.5 | 839.8 |
| 25° | 1349.5 | 1366.8 | 1343.7 | 1332.1 | *1320.5* | 1314.7 | 1285.7 | 1216.2 | 1123.6 | 1025.1 | 909.3 |
| 27.5° | 1505.8 | 1517.4 | 1500.0 | 1494.2 | *1471.1* | 1471.1 | 1424.7 | 1343.7 | 1245.2 | 1129.4 | 996.2 |
| 30° | 1644.8 | 1656.4 | 1644.8 | 1644.8 | *1627.4* | 1621.7 | 1575.3 | 1494.2 | 1372.6 | 1233.6 | 1071.5 |
| 32.5° | 1778.0 | 1789.6 | 1783.8 | 1789.6 | *1783.8* | 1778.0 | 1720.1 | 1633.2 | 1511.6 | 1332.1 | 1146.7 |
| 35° | 1911.2 | 1928.6 | 1922.8 | 1940.2 | *1934.4* | 1928.6 | 1882.3 | 1778.0 | 1633.2 | 1453.7 | 1227.8 |
| 37.5° | 2050.2 | 2067.6 | 2067.6 | 2085.0 | *2090.8* | 2090.8 | 2038.7 | 1928.6 | 1766.4 | 1563.7 | 1320.5 |
| 40° | 2200.8 | 2218.2 | 2218.2 | 2247.2 | *2258.7* | 2258.7 | 2200.8 | 2090.8 | 1911.2 | 1685.4 | 1418.9 |
| 42.5° | 2345.6 | 2363.0 | 2368.8 | 2397.7 | *2415.1* | 2420.9 | 2374.6 | 2247.2 | 2038.7 | 1807.0 | 1511.6 |
| 45° | 2484.6 | 2502.0 | 2519.4 | 2577.3 | *2606.2* | 2600.4 | 2565.7 | 2432.5 | 2200.8 | 1934.4 | 1610.1 |
| 47.5° | 2617.8 | 2641.0 | 2669.9 | 2745.2 | *2785.8* | 2780.0 | 2756.8 | 2606.2 | 2351.4 | 2056.0 | 1696.9 |
| 50° | 2722.1 | 2739.4 | 2797.4 | 2878.4 | *2930.6* | 2936.4 | 2901.6 | 2756.8 | 2478.8 | 2148.7 | 1760.7 |
| 52.5° | 2803.1 | 2826.3 | 2895.8 | 3011.6 | *3052.2* | 3069.6 | 3029.0 | 2884.2 | 2606.2 | 2229.8 | 1812.8 |
| 55° | 2861.1 | 2861.1 | 2965.3 | 3098.5 | *3156.4* | 3168.0 | 3168.0 | 2988.5 | 2681.5 | 2281.9 | 1841.7 |
| 57.5° | *2832.1* | *2832.1* | *2947.9* | *3092.7* | *3185.4* | *3179.6* | *3168.0* | *2994.3* | *2693.1* | *2270.3* | *1824.4* |
| 60° | 2751.0 | 2768.4 | 2878.4 | 3023.2 | *3115.9* | 3110.1 | 3075.4 | 2919.0 | 2635.2 | 2224.0 | 1789.6 |
| 62.5° | 2641.0 | 2669.9 | 2785.8 | 2895.8 | *3000.1* | 3017.4 | 2971.1 | 2832.1 | 2536.7 | 2154.5 | 1725.9 |
| 65° | 2432.5 | 2473.0 | 2617.8 | 2739.4 | *2820.5* | 2855.3 | 2797.4 | 2669.9 | 2403.5 | 2021.3 | 1592.7 |
| 67.5° | 2200.8 | 2229.8 | 2351.4 | 2525.2 | *2571.5* | 2606.2 | 2577.3 | 2444.1 | 2218.2 | 1807.0 | 1442.1 |
| 70° | 1934.4 | 1980.7 | 2061.8 | 2235.6 | *2287.7* | 2322.4 | 2322.4 | 2189.2 | 1974.9 | 1586.9 | 1262.6 |
| 72.5° | 1621.7 | 1673.8 | 1772.2 | 1899.7 | *1969.2* | 1992.3 | 1986.5 | 1876.5 | 1685.4 | 1343.7 | 1065.7 |
| 75° | 1280.0 | 1320.5 | 1436.3 | 1529.0 | *1604.3* | 1621.7 | 1615.9 | 1523.2 | 1349.5 | 1083.0 | 845.6 |
| 77.5° | 944.0 | 984.6 | 1071.5 | 1141.0 | *1210.5* | 1198.9 | 1198.9 | 1129.4 | 1019.3 | 805.0 | 642.9 |
| 80° | 619.7 | 654.5 | 729.7 | 752.9 | *828.2* | 822.4 | 822.4 | 770.3 | 695.0 | 538.6 | 428.6 |
| 82.5° | 341.7 | 370.7 | 422.8 | 446.0 | *492.3* | 480.7 | 486.5 | 451.7 | 405.4 | 301.2 | 243.2 |
| 85° | 121.6 | 144.8 | 173.7 | 191.1 | *214.3* | 214.3 | 214.3 | 185.3 | 173.7 | 115.8 | 98.5 |
| 87.5° | 5.8 | 11.6 | 23.2 | 23.2 | *34.7* | 34.7 | 34.7 | 23.2 | 23.2 | 5.8 | 5.8 |
| 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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Peachtree City, GA 30269

Scaled Data Report

REPORT NUMBER: P832691
CATALOG NUMBER: TTN-D3-750-U-DL-CG

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 619.7 | 619.7 | 619.7 | 619.7 | 619.7 | 619.7 | 619.7 | 619.7 | 619.7 | 619.7 | 619.7 |
| 2.5° | 613.9 | 608.1 | 602.3 | 590.7 | 585.0 | 579.2 | 573.4 | 567.6 | 567.6 | 567.6 | 567.6 |
| 5° | 619.7 | 613.9 | 596.5 | 579.2 | 561.8 | 544.4 | 532.8 | 527.0 | 521.2 | 515.5 | 515.5 |
| 7.5° | 619.7 | 608.1 | 585.0 | 561.8 | 544.4 | 521.2 | 503.9 | 486.5 | 474.9 | 469.1 | 469.1 |
| 10° | 625.5 | 608.1 | 579.2 | 556.0 | 527.0 | 498.1 | 474.9 | 451.7 | 440.2 | 428.6 | 428.6 |
| 12.5° | 637.1 | 619.7 | 579.2 | 550.2 | 515.5 | 480.7 | 451.7 | 428.6 | 411.2 | 399.6 | 399.6 |
| 15° | 660.2 | 637.1 | 590.7 | 550.2 | 509.7 | 469.1 | 440.2 | 411.2 | 393.8 | 382.2 | 382.2 |
| 17.5° | 695.0 | 666.0 | 608.1 | 550.2 | 503.9 | 463.3 | 428.6 | 399.6 | 376.5 | 364.9 | 364.9 |
| 20° | 735.5 | 700.8 | 631.3 | 561.8 | 503.9 | 457.5 | 422.8 | 388.0 | 364.9 | 353.3 | 353.3 |
| 22.5° | 793.5 | 741.3 | 660.2 | 579.2 | 515.5 | 463.3 | 417.0 | 382.2 | 359.1 | 347.5 | 347.5 |
| 25° | 857.2 | 799.2 | 695.0 | 602.3 | 527.0 | 463.3 | 417.0 | 382.2 | 359.1 | 347.5 | 341.7 |
| 27.5° | 926.7 | 863.0 | 735.5 | 625.5 | 538.6 | 474.9 | 422.8 | 382.2 | 359.1 | 347.5 | 347.5 |
| 30° | 990.4 | 915.1 | 776.1 | 654.5 | 556.0 | 480.7 | 428.6 | 388.0 | 359.1 | 347.5 | 347.5 |
| 32.5° | 1059.9 | 973.0 | 816.6 | 683.4 | 573.4 | 492.3 | 434.4 | 393.8 | 364.9 | 353.3 | 347.5 |
| 35° | 1129.4 | 1030.9 | 857.2 | 706.6 | 590.7 | 503.9 | 440.2 | 399.6 | 370.7 | 359.1 | 359.1 |
| 37.5° | 1204.7 | 1094.6 | 897.7 | 735.5 | 608.1 | 515.5 | 451.7 | 405.4 | 376.5 | 364.9 | 364.9 |
| 40° | 1285.7 | 1158.3 | 938.2 | 758.7 | 625.5 | 527.0 | 463.3 | 417.0 | 388.0 | 376.5 | 376.5 |
| 42.5° | 1366.8 | 1227.8 | 984.6 | 787.7 | 642.9 | 538.6 | 469.1 | 428.6 | 399.6 | 388.0 | 388.0 |
| 45° | 1447.9 | 1285.7 | 1025.1 | 816.6 | 660.2 | 556.0 | 486.5 | 440.2 | 411.2 | 399.6 | 399.6 |
| 47.5° | 1523.2 | 1349.5 | 1059.9 | 834.0 | 677.6 | 567.6 | 492.3 | 451.7 | 422.8 | 417.0 | 411.2 |
| 50° | 1575.3 | 1390.0 | 1083.0 | 851.4 | 683.4 | 573.4 | 503.9 | 457.5 | 434.4 | 422.8 | 422.8 |
| 52.5° | 1615.9 | 1430.5 | 1100.4 | 863.0 | 689.2 | 579.2 | 509.7 | 469.1 | 446.0 | 434.4 | 428.6 |
| 55° | 1639.0 | 1436.3 | 1100.4 | 851.4 | 683.4 | 579.2 | 509.7 | 469.1 | 446.0 | 434.4 | 434.4 |
| 57.5° | *1615.9* | *1407.4* | *1077.2* | *828.2* | *666.0* | *561.8* | *492.3* | *457.5* | *434.4* | *428.6* | *422.8* |
| 60° | 1569.5 | 1361.0 | 1030.9 | 793.5 | 637.1 | 532.8 | 469.1 | 440.2 | 422.8 | 417.0 | 411.2 |
| 62.5° | 1505.8 | 1303.1 | 984.6 | 747.1 | 596.5 | 498.1 | 451.7 | 417.0 | 405.4 | 399.6 | 393.8 |
| 65° | 1378.4 | 1193.1 | 909.3 | 689.2 | 544.4 | 457.5 | 411.2 | 388.0 | 376.5 | 364.9 | 359.1 |
| 67.5° | 1239.4 | 1071.5 | 805.0 | 619.7 | 480.7 | 411.2 | 370.7 | 347.5 | 330.1 | 330.1 | 324.3 |
| 70° | 1088.8 | 944.0 | 695.0 | 527.0 | 417.0 | 359.1 | 318.5 | 301.2 | 289.6 | 289.6 | 283.8 |
| 72.5° | 909.3 | 793.5 | 579.2 | 428.6 | 341.7 | 295.4 | 266.4 | 249.0 | 243.2 | 243.2 | 237.5 |
| 75° | 729.7 | 625.5 | 457.5 | 335.9 | 266.4 | 231.7 | 208.5 | 196.9 | 191.1 | 191.1 | 185.3 |
| 77.5° | 538.6 | 457.5 | 330.1 | 243.2 | 191.1 | 168.0 | 150.6 | 144.8 | 139.0 | 139.0 | 133.2 |
| 80° | 359.1 | 301.2 | 214.3 | 156.4 | 115.8 | 104.2 | 92.7 | 92.7 | 86.9 | 92.7 | 86.9 |
| 82.5° | 196.9 | 162.2 | 115.8 | 81.1 | 57.9 | 52.1 | 46.3 | 46.3 | 52.1 | 52.1 | 46.3 |
| 85° | 75.3 | 57.9 | 40.5 | 23.2 | 17.4 | 17.4 | 17.4 | 17.4 | 17.4 | 17.4 | 11.6 |
| 87.5° | 5.8 | 5.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 90° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

Cooper Lighting Solutions Photometric Lab
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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

MCGRAW EDISON

Report Number: SP1-2411-284-3

Test Date: 11/21/2024

Luminaire Tested: TTN-D0-750-U-WQ

Data in this report applies to TT and TTN families of products

Report Generated By FNC07603 / LDUCLS01DT446
Version: v7.04

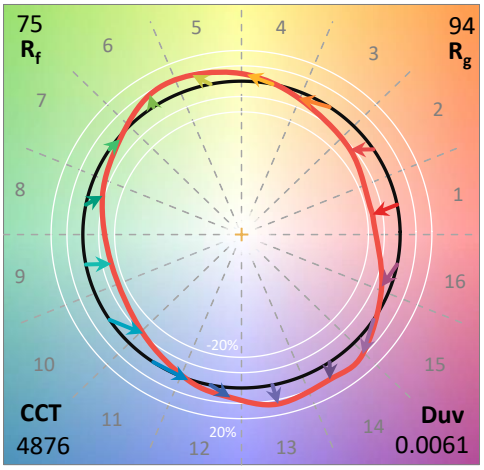
## Test Information

| | |
|---|---|
| Test Method: | LM-79-2019 |
| Report Number: | SP1-2411-284-3 |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Photometer: | SP1 - 76IN SPHERE |
| Measurement Geometry: | 4π |
| Issue Date: | 11/21/2024 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS |
| Product Line: | MCGRAW EDISON |
| Catalog Number: | **TTN-D0-750-U-WQ** |
| Description: | TOPTIER NANO LED PARKING GARAGE LUMINAIRE. 5000K, 70 CRI LEDS AND WIDE DISTRIBUTION |

## Spectral Parameters

| | |
|---|---|
| CCT (K): | 4876 |
| CIE u': | 0.2086 |
| CIE v': | 0.4932 |
| Duv: | 0.0061 |
| CIE x: | 0.3502 |
| CIE y: | 0.3680 |
| CIE z: | 0.2818 |
| Peak Wavelength (nm): | 451 |
| Dominant Wavelength (nm): | 569 |
| Purity: | 15.51324 |
| Rf: | 74.6 |
| Rg: | 94.4 |

| | |
|---|---|
| CRI (Ra): | 72.6 |
| R1: | 69.5 |
| R2: | 77.0 |
| R3: | 82.2 |
| R4: | 72.6 |
| R5: | 69.3 |
| R6: | 67.6 |
| R7: | 83.7 |
| R8: | 58.6 |
| R9: | -24.6 |
| R10: | 44.8 |
| R11: | 68.2 |
| R12: | 36.1 |
| R13: | 70.5 |
| R14: | 89.9 |
| R15: | 63.1 |



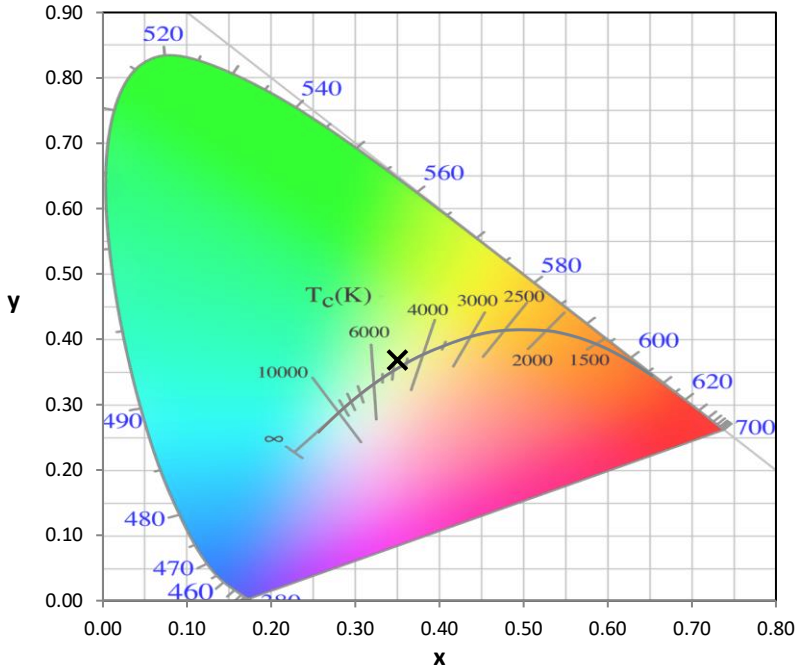

## Test Conditions

| | |
|---|---|
| Stabilization Time: | 51M |
| Operation Time: | 1H 51M |
| Sphere Temperature (°C): | 24.9 |

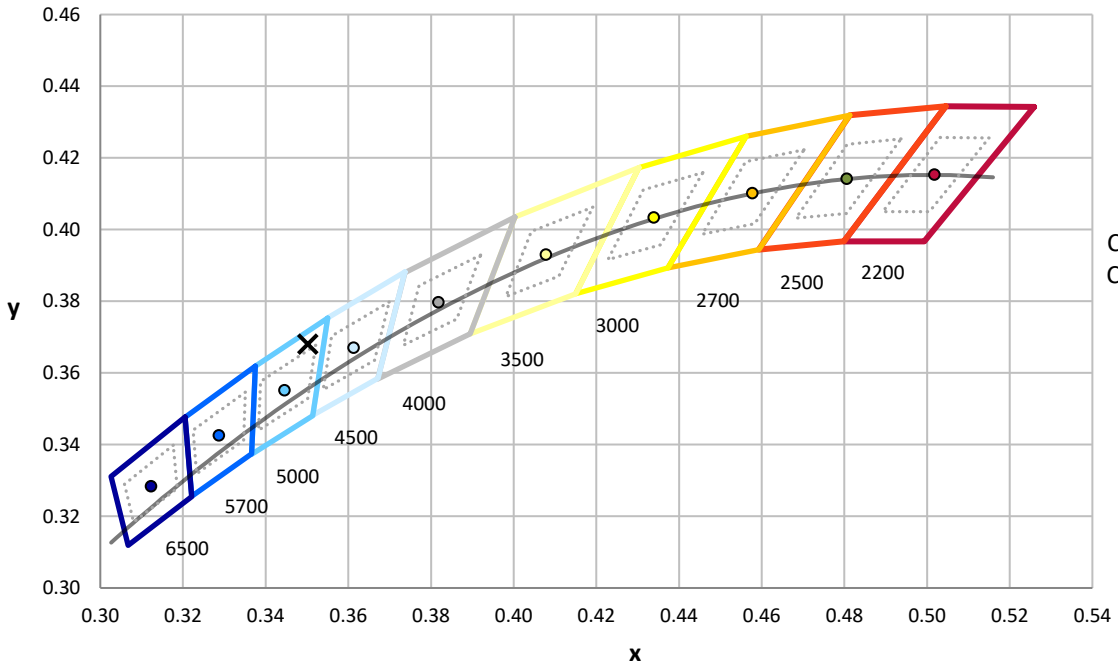
| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 6/18/2024 | 12/18/2024 |
| Power Meter | INXT2011004 | 2/8/2024 | 2/8/2025 |
| AC Power Source | IN0063 | 10/22/2024 | 10/22/2025 |
| DC Power Source | IN0208 | 10/22/2024 | 10/22/2025 |
| Sphere Thermometer | IN0085 | 10/22/2024 | 10/22/2025 |
| Room Thermometer | IN0046 | 10/22/2024 | 10/22/2025 |

REPORT NUMBER: SP1-2411-284-3

**CIE 1931 Chromaticity Diagram**




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




CCT = 4876K
CIE x = 0.3502
CIE y = 0.3680
Duv = 0.0061

Point lies inside the ANSI 5000K 7-step quadrangle

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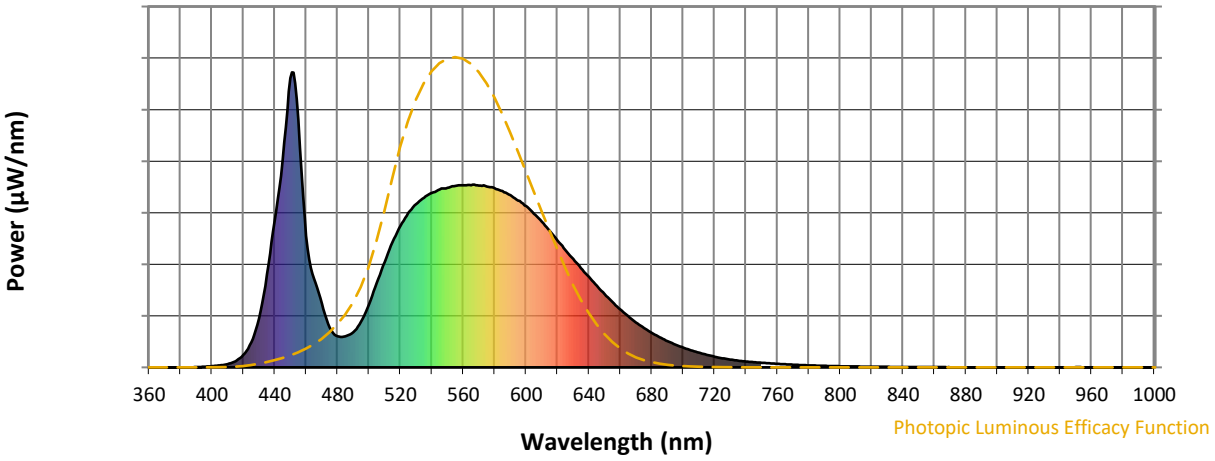
## Photopic Flux vs. Wavelength




## 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 | 119 | NR | 620 | 430 | NR | 750 | 16 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 156 | NR | 625 | 398 | NR | 755 | 14 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 214 | NR | 630 | 368 | NR | 760 | 12 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 286 | NR | 635 | 336 | NR | 765 | 11 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 357 | NR | 640 | 306 | NR | 770 | 9 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 425 | NR | 645 | 276 | NR | 775 | 8 | NR | 905 | 0 | NR |
| 390 | 1 | NR | 520 | 480 | NR | 650 | 248 | NR | 780 | 7 | NR | 910 | 0 | NR |
| 395 | 2 | NR | 525 | 523 | NR | 655 | 221 | NR | 785 | 6 | NR | 915 | 0 | NR |
| 400 | 4 | NR | 530 | 554 | NR | 660 | 196 | NR | 790 | 5 | NR | 920 | 0 | NR |
| 405 | 7 | NR | 535 | 575 | NR | 665 | 173 | NR | 795 | 4 | NR | 925 | 0 | NR |
| 410 | 11 | NR | 540 | 592 | NR | 670 | 152 | NR | 800 | 4 | NR | 930 | 0 | NR |
| 415 | 21 | NR | 545 | 603 | NR | 675 | 133 | NR | 805 | 3 | NR | 935 | 0 | NR |
| 420 | 42 | NR | 550 | 609 | NR | 680 | 117 | NR | 810 | 3 | NR | 940 | 0 | NR |
| 425 | 85 | NR | 555 | 615 | NR | 685 | 102 | NR | 815 | 3 | NR | 945 | 0 | NR |
| 430 | 165 | NR | 560 | 617 | NR | 690 | 89 | NR | 820 | 2 | NR | 950 | 1 | NR |
| 435 | 316 | NR | 565 | 617 | NR | 695 | 77 | NR | 825 | 2 | NR | 955 | 0 | NR |
| 440 | 497 | NR | 570 | 616 | NR | 700 | 67 | NR | 830 | 2 | NR | 960 | 0 | NR |
| 445 | 702 | NR | 575 | 613 | NR | 705 | 58 | NR | 835 | 2 | NR | 965 | 0 | NR |
| 450 | 981 | NR | 580 | 607 | NR | 710 | 50 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 840 | NR | 585 | 598 | NR | 715 | 43 | NR | 845 | 1 | NR | 975 | 0 | NR |
| 460 | 446 | NR | 590 | 583 | NR | 720 | 36 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 300 | NR | 595 | 566 | NR | 725 | 31 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 215 | NR | 600 | 546 | NR | 730 | 26 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 135 | NR | 605 | 521 | NR | 735 | 23 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 105 | NR | 610 | 494 | NR | 740 | 20 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 106 | NR | 615 | 463 | NR | 745 | 18 | NR | 875 | 0 | NR | | | |

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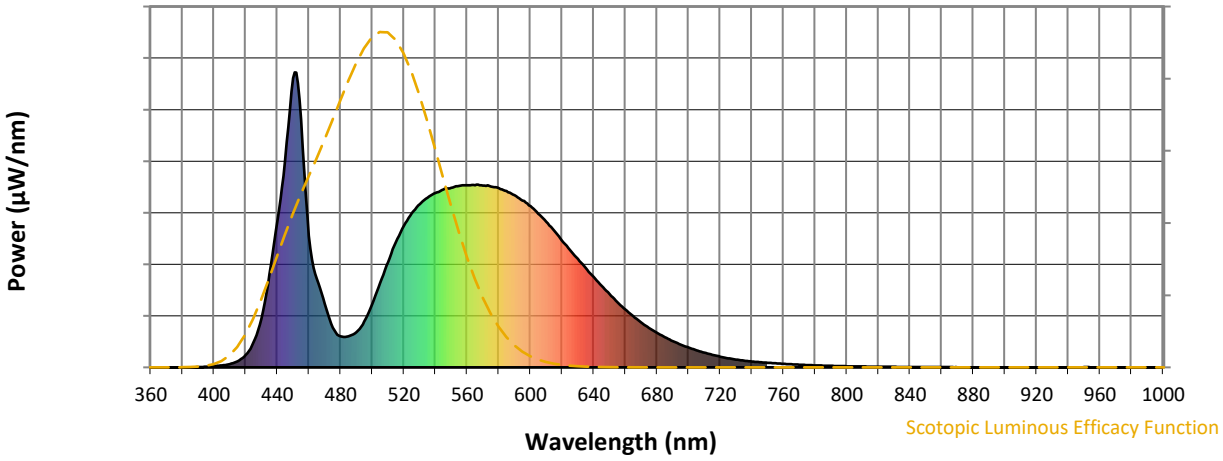
## Scotopic Flux vs. Wavelength




**Scotopic Lumens: NR** **S/P: 1.74**

| 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 | 119 | NR | 620 | 430 | NR | 750 | 16 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 156 | NR | 625 | 398 | NR | 755 | 14 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 214 | NR | 630 | 368 | NR | 760 | 12 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 286 | NR | 635 | 336 | NR | 765 | 11 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 357 | NR | 640 | 306 | NR | 770 | 9 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 425 | NR | 645 | 276 | NR | 775 | 8 | NR | 905 | 0 | NR |
| 390 | 1 | NR | 520 | 480 | NR | 650 | 248 | NR | 780 | 7 | NR | 910 | 0 | NR |
| 395 | 2 | NR | 525 | 523 | NR | 655 | 221 | NR | 785 | 6 | NR | 915 | 0 | NR |
| 400 | 4 | NR | 530 | 554 | NR | 660 | 196 | NR | 790 | 5 | NR | 920 | 0 | NR |
| 405 | 7 | NR | 535 | 575 | NR | 665 | 173 | NR | 795 | 4 | NR | 925 | 0 | NR |
| 410 | 11 | NR | 540 | 592 | NR | 670 | 152 | NR | 800 | 4 | NR | 930 | 0 | NR |
| 415 | 21 | NR | 545 | 603 | NR | 675 | 133 | NR | 805 | 3 | NR | 935 | 0 | NR |
| 420 | 42 | NR | 550 | 609 | NR | 680 | 117 | NR | 810 | 3 | NR | 940 | 0 | NR |
| 425 | 85 | NR | 555 | 615 | NR | 685 | 102 | NR | 815 | 3 | NR | 945 | 0 | NR |
| 430 | 165 | NR | 560 | 617 | NR | 690 | 89 | NR | 820 | 2 | NR | 950 | 1 | NR |
| 435 | 316 | NR | 565 | 617 | NR | 695 | 77 | NR | 825 | 2 | NR | 955 | 0 | NR |
| 440 | 497 | NR | 570 | 616 | NR | 700 | 67 | NR | 830 | 2 | NR | 960 | 0 | NR |
| 445 | 702 | NR | 575 | 613 | NR | 705 | 58 | NR | 835 | 2 | NR | 965 | 0 | NR |
| 450 | 981 | NR | 580 | 607 | NR | 710 | 50 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 840 | NR | 585 | 598 | NR | 715 | 43 | NR | 845 | 1 | NR | 975 | 0 | NR |
| 460 | 446 | NR | 590 | 583 | NR | 720 | 36 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 300 | NR | 595 | 566 | NR | 725 | 31 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 215 | NR | 600 | 546 | NR | 730 | 26 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 135 | NR | 605 | 521 | NR | 735 | 23 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 105 | NR | 610 | 494 | NR | 740 | 20 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 106 | NR | 615 | 463 | NR | 745 | 18 | NR | 875 | 0 | NR | | | |

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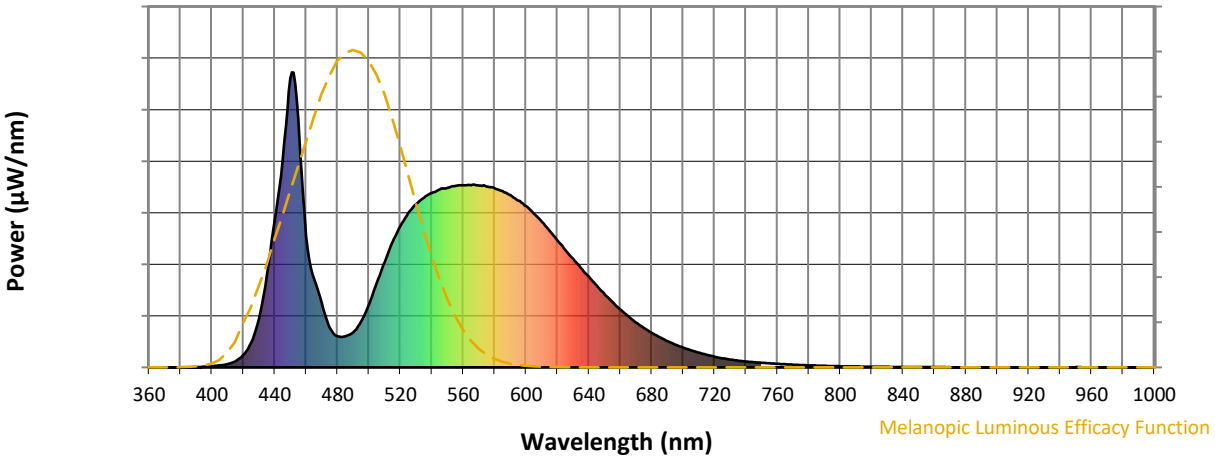
## Melanopic Flux vs. Wavelength




**Melanopic Lumens: NR** **M/P: 3.51**

| 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 | 119 | NR | 620 | 430 | NR | 750 | 16 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 156 | NR | 625 | 398 | NR | 755 | 14 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 214 | NR | 630 | 368 | NR | 760 | 12 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 286 | NR | 635 | 336 | NR | 765 | 11 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 357 | NR | 640 | 306 | NR | 770 | 9 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 425 | NR | 645 | 276 | NR | 775 | 8 | NR | 905 | 0 | NR |
| 390 | 1 | NR | 520 | 480 | NR | 650 | 248 | NR | 780 | 7 | NR | 910 | 0 | NR |
| 395 | 2 | NR | 525 | 523 | NR | 655 | 221 | NR | 785 | 6 | NR | 915 | 0 | NR |
| 400 | 4 | NR | 530 | 554 | NR | 660 | 196 | NR | 790 | 5 | NR | 920 | 0 | NR |
| 405 | 7 | NR | 535 | 575 | NR | 665 | 173 | NR | 795 | 4 | NR | 925 | 0 | NR |
| 410 | 11 | NR | 540 | 592 | NR | 670 | 152 | NR | 800 | 4 | NR | 930 | 0 | NR |
| 415 | 21 | NR | 545 | 603 | NR | 675 | 133 | NR | 805 | 3 | NR | 935 | 0 | NR |
| 420 | 42 | NR | 550 | 609 | NR | 680 | 117 | NR | 810 | 3 | NR | 940 | 0 | NR |
| 425 | 85 | NR | 555 | 615 | NR | 685 | 102 | NR | 815 | 3 | NR | 945 | 0 | NR |
| 430 | 165 | NR | 560 | 617 | NR | 690 | 89 | NR | 820 | 2 | NR | 950 | 1 | NR |
| 435 | 316 | NR | 565 | 617 | NR | 695 | 77 | NR | 825 | 2 | NR | 955 | 0 | NR |
| 440 | 497 | NR | 570 | 616 | NR | 700 | 67 | NR | 830 | 2 | NR | 960 | 0 | NR |
| 445 | 702 | NR | 575 | 613 | NR | 705 | 58 | NR | 835 | 2 | NR | 965 | 0 | NR |
| 450 | 981 | NR | 580 | 607 | NR | 710 | 50 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 840 | NR | 585 | 598 | NR | 715 | 43 | NR | 845 | 1 | NR | 975 | 0 | NR |
| 460 | 446 | NR | 590 | 583 | NR | 720 | 36 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 300 | NR | 595 | 566 | NR | 725 | 31 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 215 | NR | 600 | 546 | NR | 730 | 26 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 135 | NR | 605 | 521 | NR | 735 | 23 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 105 | NR | 610 | 494 | NR | 740 | 20 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 106 | NR | 615 | 463 | NR | 745 | 18 | NR | 875 | 0 | NR | | | |

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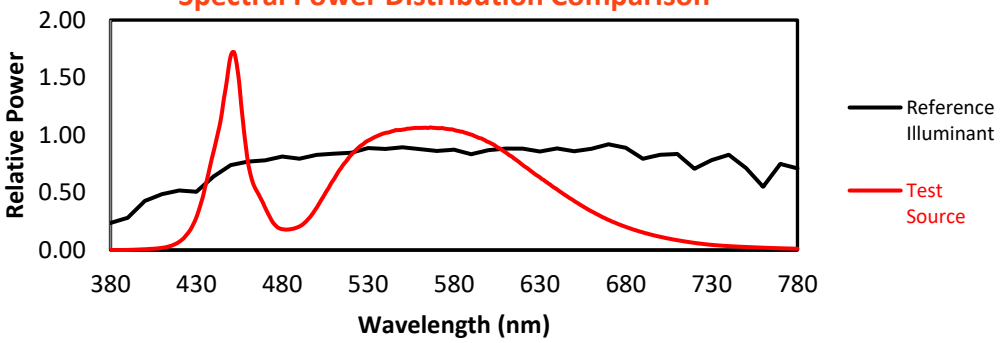
# TM-30-18

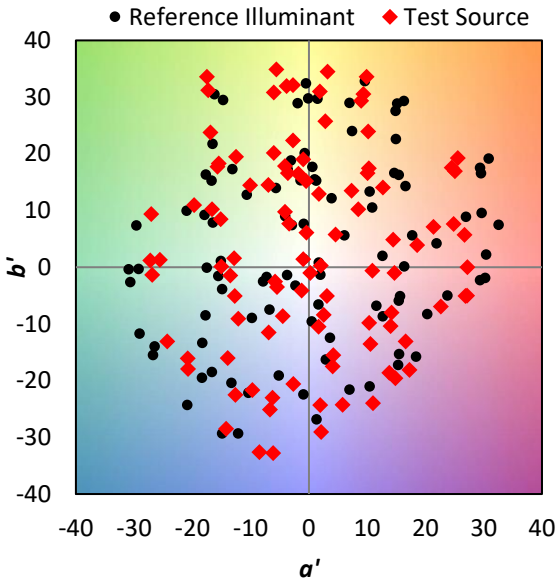
## Summary

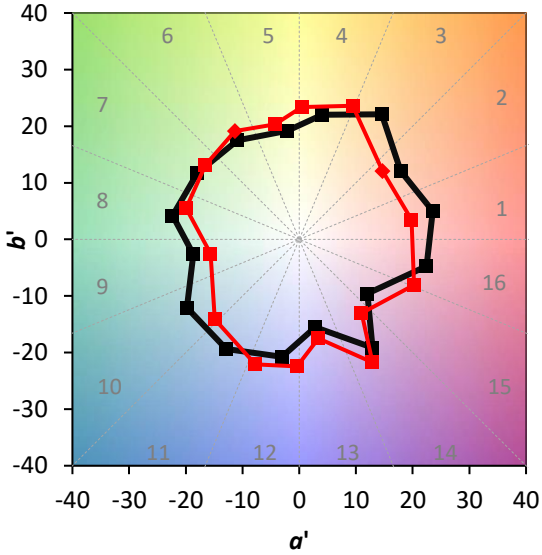
$R_f$ = 74.6
$R_g$ = 94.4
CIE $R_a$ = 72.6
$R_9$ = -24.6

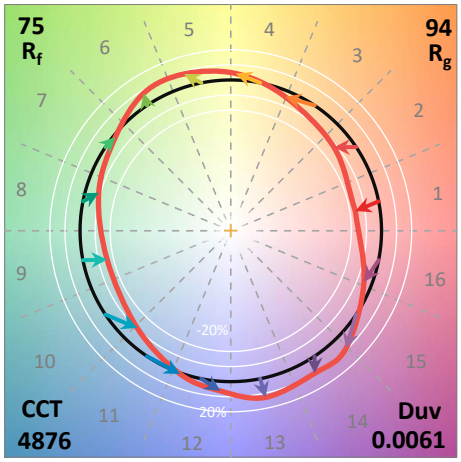
## Spectral Power Distribution Comparison

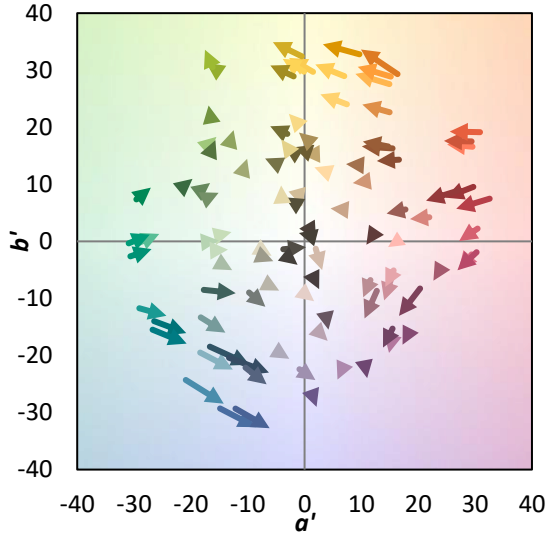



## Color Vector Graphics



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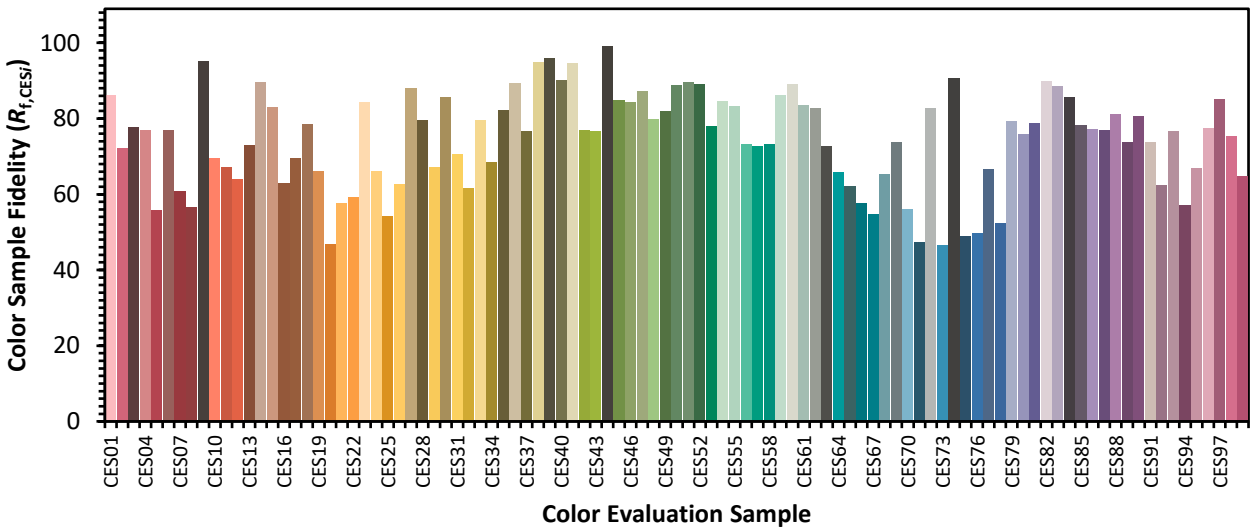
# TM-30-18

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

| | | | |
|---|---|---|---|
| CES01 = 85 | CES26 = 63 | CES51 = 90 | CES76 = 50 |
| CES02 = 59 | CES27 = 88 | CES52 = 89 | CES77 = 67 |
| CES03 = 30 | CES28 = 80 | CES53 = 78 | CES78 = 52 |
| CES04 = 69 | CES29 = 67 | CES54 = 85 | CES79 = 79 |
| CES05 = 46 | CES30 = 86 | CES55 = 83 | CES80 = 76 |
| CES06 = 50 | CES31 = 70 | CES56 = 73 | CES81 = 79 |
| CES07 = 39 | CES32 = 62 | CES57 = 73 | CES82 = 90 |
| CES08 = 38 | CES33 = 80 | CES58 = 73 | CES83 = 89 |
| CES09 = 29 | CES34 = 69 | CES59 = 86 | CES84 = 86 |
| CES10 = 72 | CES35 = 82 | CES60 = 89 | CES85 = 78 |
| CES11 = 55 | CES36 = 89 | CES61 = 83 | CES86 = 77 |
| CES12 = 61 | CES37 = 77 | CES62 = 83 | CES87 = 77 |
| CES13 = 41 | CES38 = 95 | CES63 = 73 | CES88 = 81 |
| CES14 = 74 | CES39 = 96 | CES64 = 66 | CES89 = 74 |
| CES15 = 70 | CES40 = 90 | CES65 = 62 | CES90 = 81 |
| CES16 = 46 | CES41 = 95 | CES66 = 58 | CES91 = 74 |
| CES17 = 49 | CES42 = 77 | CES67 = 55 | CES92 = 62 |
| CES18 = 55 | CES43 = 77 | CES68 = 65 | CES93 = 77 |
| CES19 = 71 | CES44 = 99 | CES69 = 74 | CES94 = 57 |
| CES20 = 64 | CES45 = 85 | CES70 = 56 | CES95 = 67 |
| CES21 = 85 | CES46 = 84 | CES71 = 47 | CES96 = 77 |
| CES22 = 77 | CES47 = 87 | CES72 = 83 | CES97 = 85 |
| CES23 = 91 | CES48 = 80 | CES73 = 46 | CES98 = 75 |
| CES24 = 90 | CES49 = 82 | CES74 = 91 | CES99 = 65 |
| CES25 = 71 | CES50 = 89 | CES75 = 49 | |



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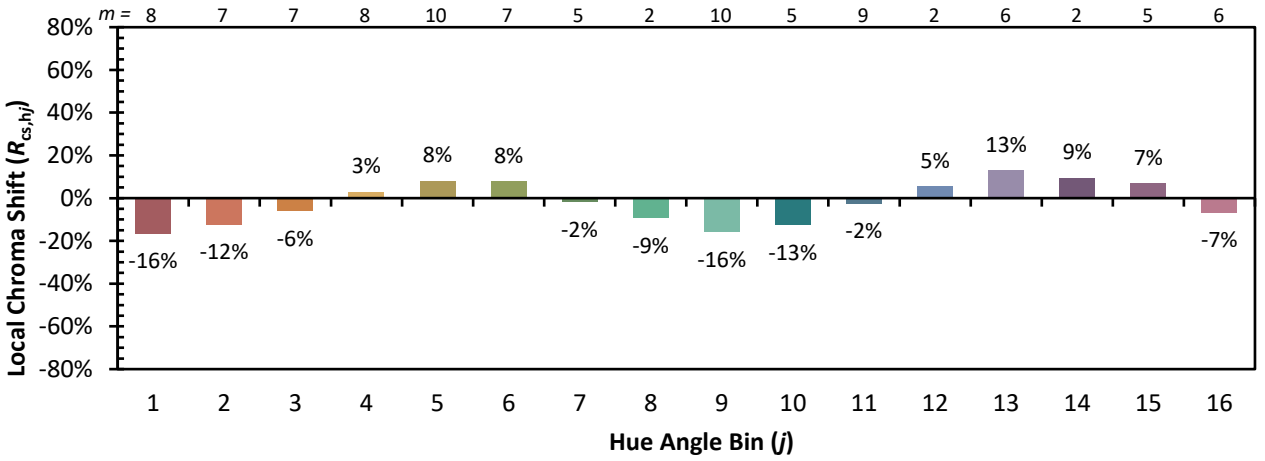
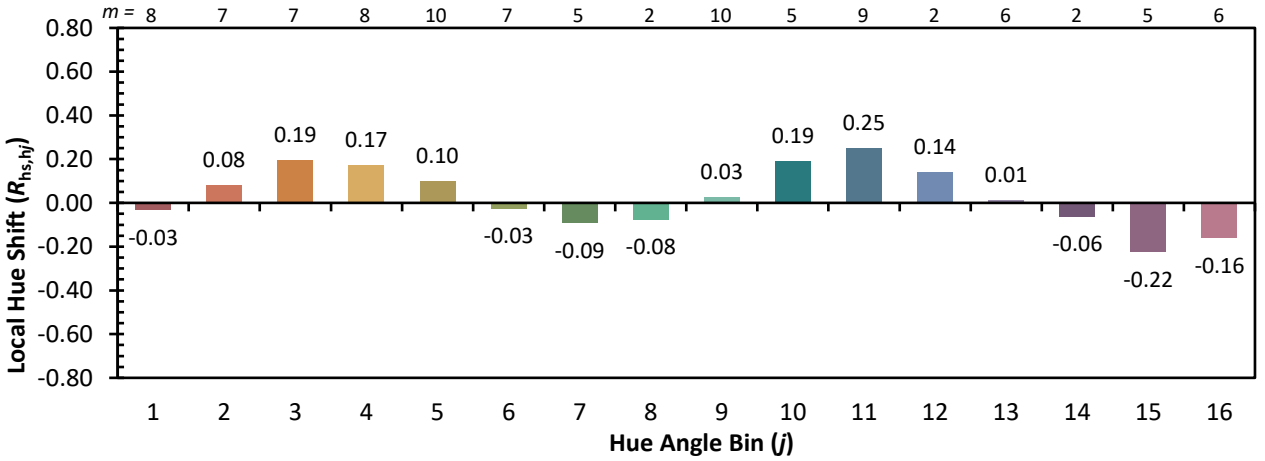
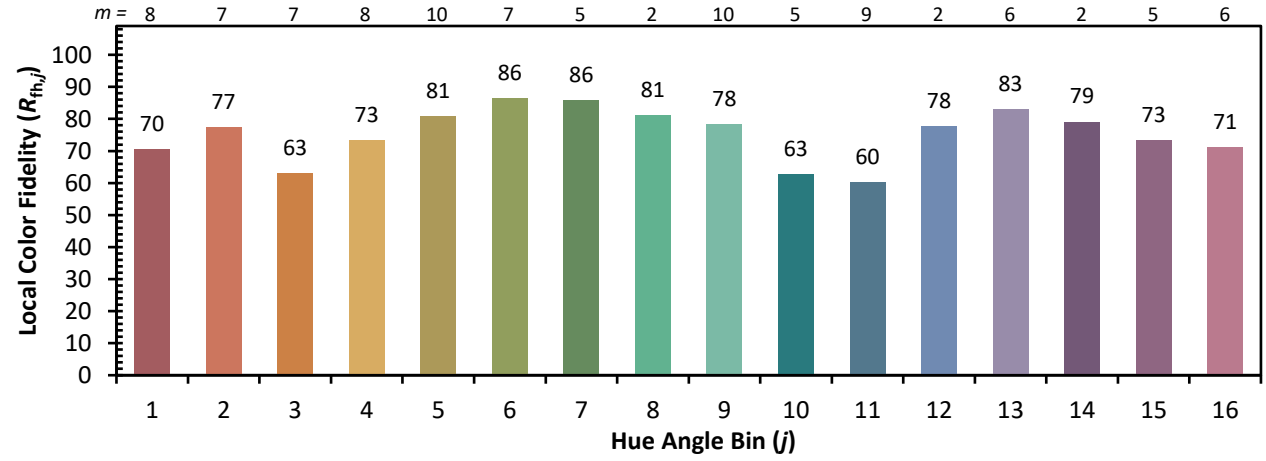
# TM-30-18

## Color Rendition by Hue-Angle Bin



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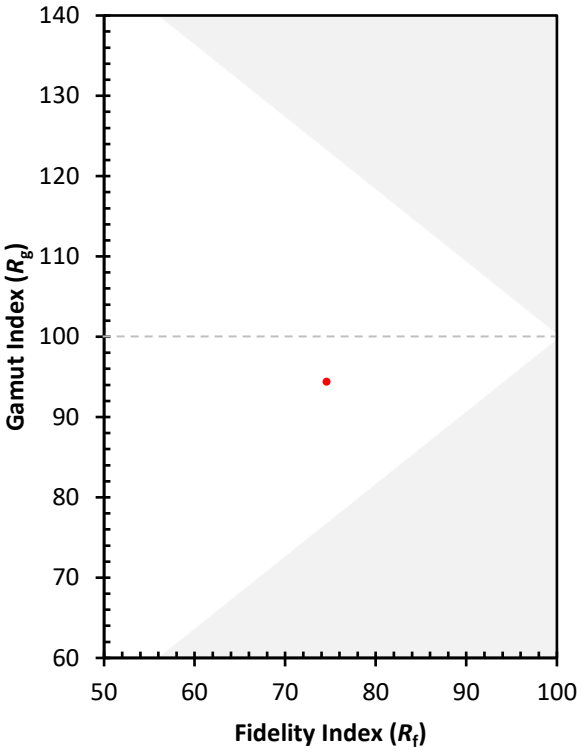
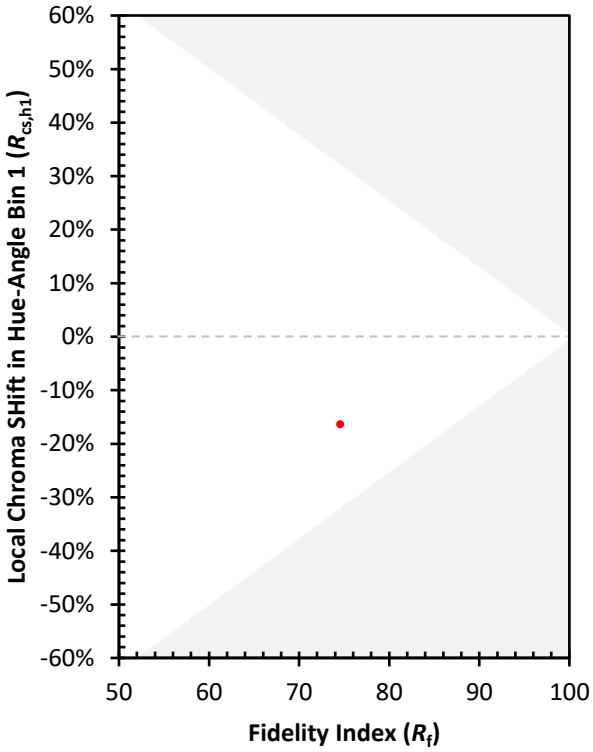
## Measure Comparisons




(END OF REPORT)