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: P821455

Luminaire Tested: **TT-D2-830-12VDC-WQ**

Issue Date: 2/18/2020

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: | P821455 |
| | TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G3-1908-473-14) |
| Test Lab: | INNOVATIONS CENTER |
| Issue Date: | 2/18/2020 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS (FORMERLY EATON) |
| Product Line: | McGRAW-EDISON |
| Catalog Number: | TT-D2-830-12VDC-WQ |
| Description: | TOPTIER LED PARKING GARAGE LUMINAIRE |
| | 3000K, 80 CRI LEDS AND WIDE DISTRIBUTION |
| Light Source: | - |
| Ballast/Driver: | ELECTRONIC DRIVER |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 4695 lumens |
| Efficiency: | N/A |
| Efficacy: | 123.6 lumens/watt |
| Luminous Opening: | Circular (Dia: 1.12' x H: 0') |
| IES Classification: | Type V - Short |
| BUG Rating: | B3 - U0 - G2 |

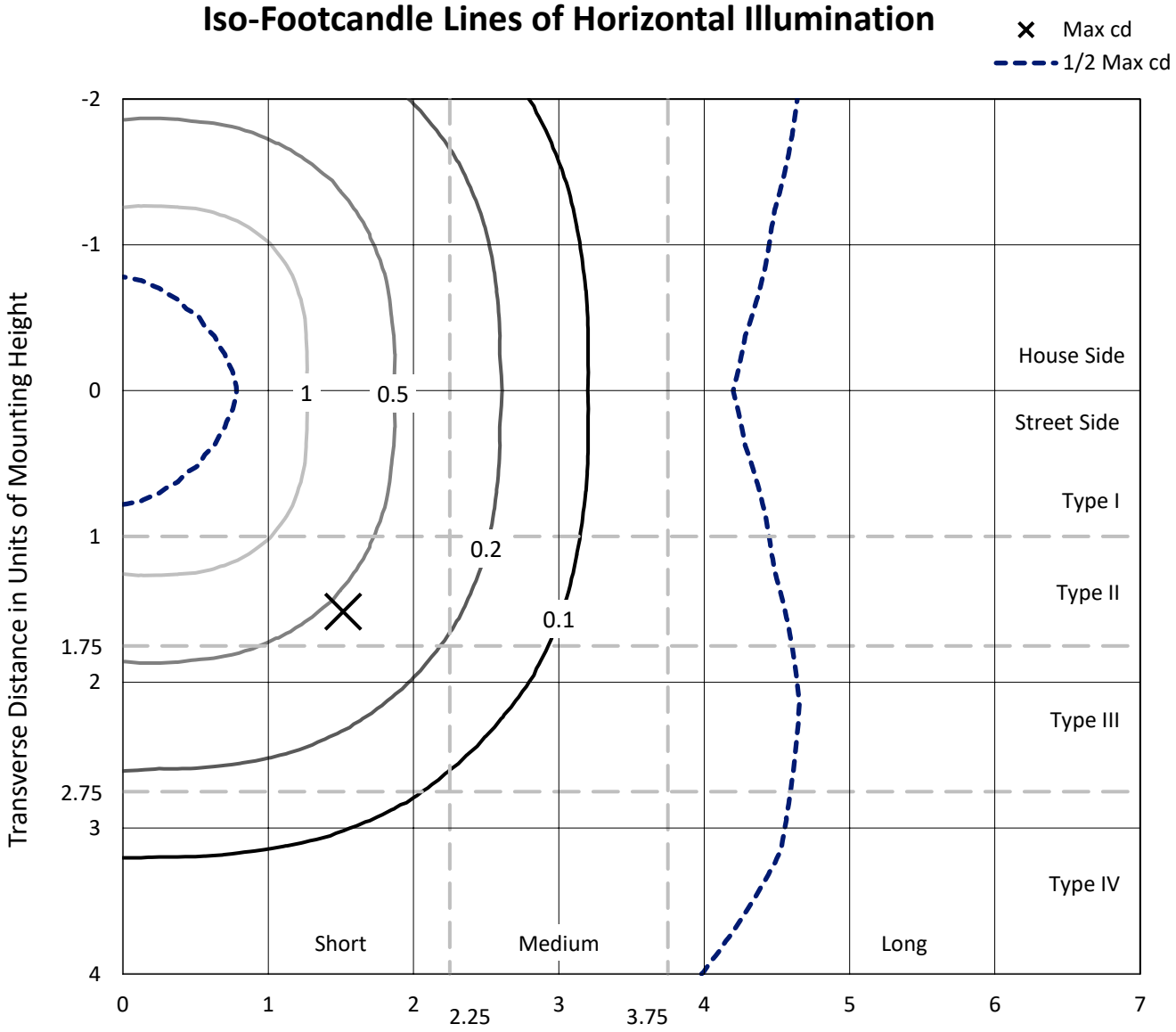
| | |
|---|---|
| Input Watts (W): | 38 |
| Input Voltage (V): | NR |
| Input Current (Ain): | NR |
| Voltage Rise (V): | NR |
| Power Factor: | NR |
| Total Harmonic Distortion (THDi): | NR |
| Frequency (hertz): | 60 |
| Stabilization Time: | NR |
| Operation Time: | NR |
| Ambient Temperature (°C): | NR |
| Test Distance: | 25 FT |

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Scaled Data Report

REPORT NUMBER: P821455
CATALOG NUMBER: TT-D2-830-12VDC-WQ

## Iso-Footcandle Lines of Horizontal Illumination



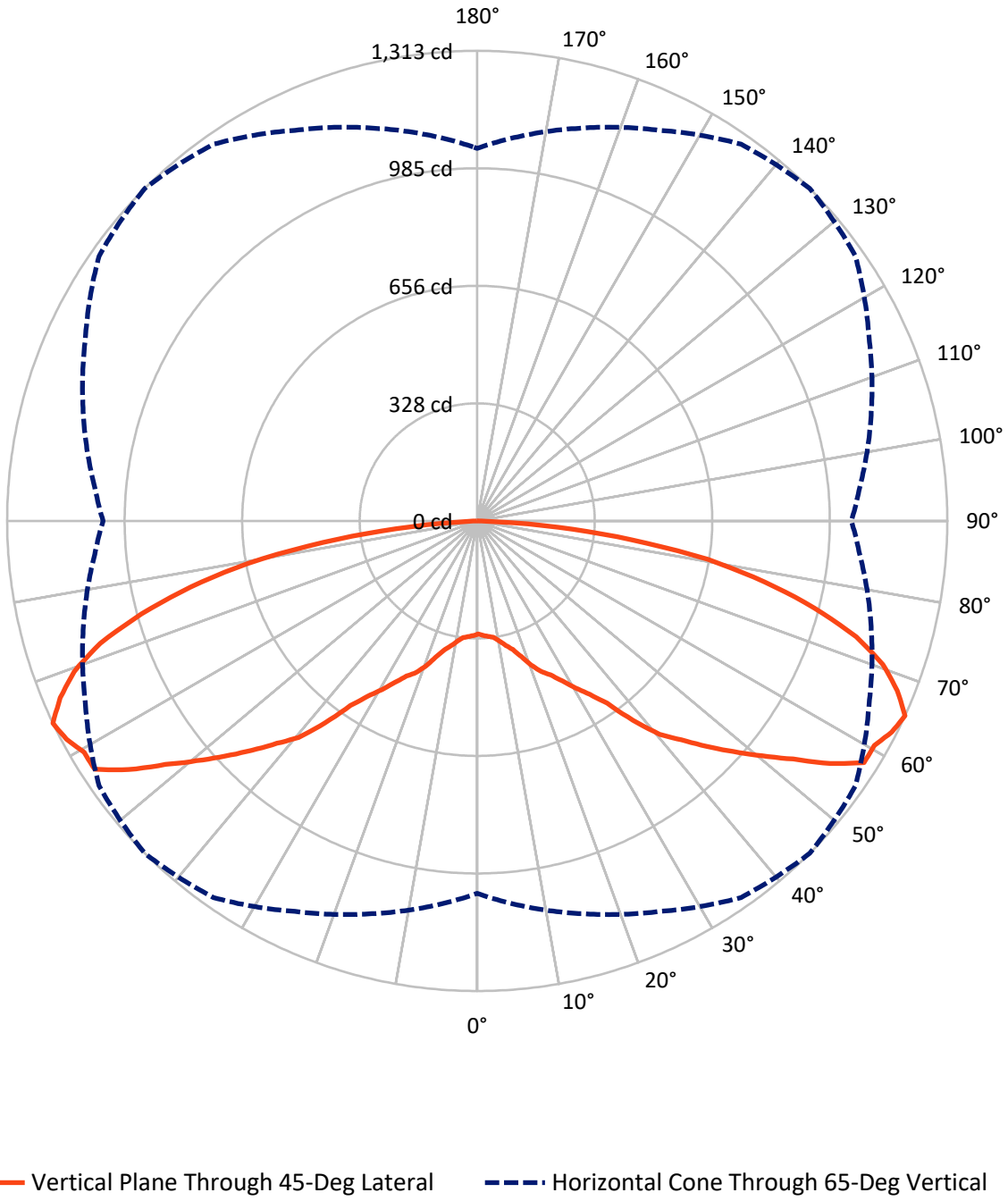

Based on 15 foot mounting height. Maximum calculated value = 1.6 fc
Type V - Short - N/A

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## Luminous Intensity Polar Plot



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Scaled Data Report

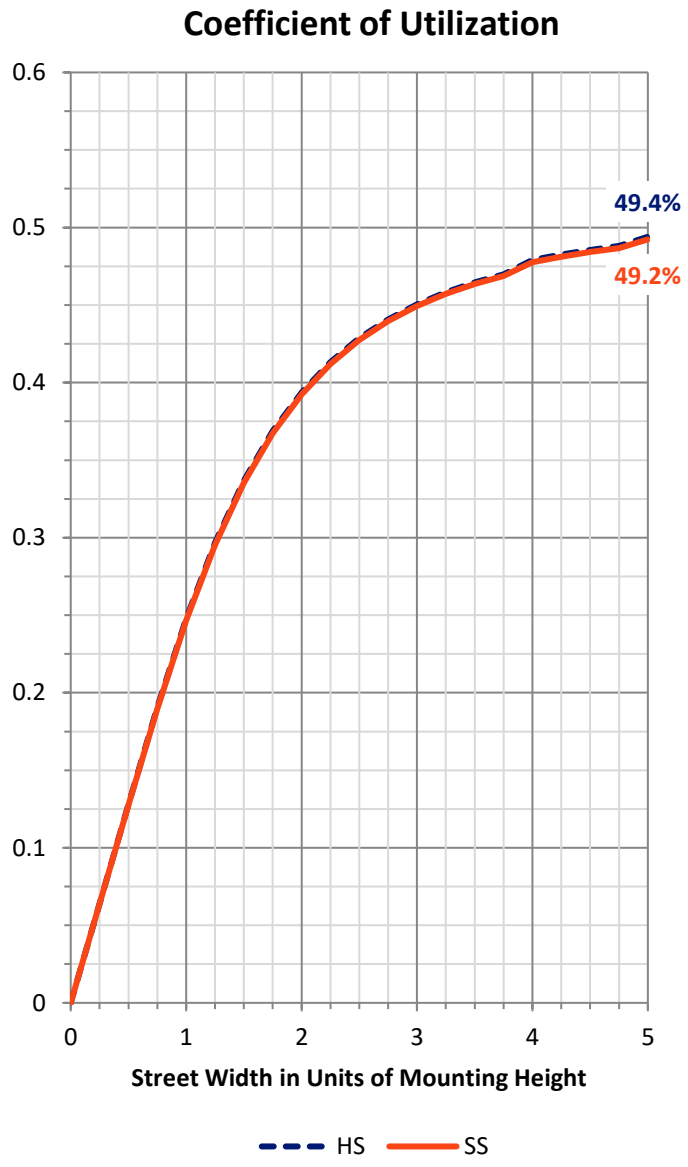
REPORT NUMBER: P821455
CATALOG NUMBER: TT-D2-830-12VDC-WQ

**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 2347.5 | 0.0 | 2347.5 |
| | % Fixture | 50.0 | 0.0 | 50.0 |
| **Street Side** | Lumens | 2347.5 | 0.0 | 2347.5 |
| | % Fixture | 50.0 | 0.0 | 50.0 |
| **Total** | Lumens | 4695.0 | 0.0 | 4695.0 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 31.5 | 0.7 |
| 10°-20° | 108.4 | 2.3 |
| 20°-30° | 222.5 | 4.7 |
| 30°-40° | 395.4 | 8.4 |
| 40°-50° | 666.5 | 14.2 |
| 50°-60° | 983.1 | 20.9 |
| 60°-70° | 1153.8 | 24.6 |
| 70°-80° | 898.9 | 19.1 |
| 80°-90° | 235.0 | 5.0 |
| 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° | 4695.0 | 100.0 |
| 0°-180° | 4695.0 | 100.0 |



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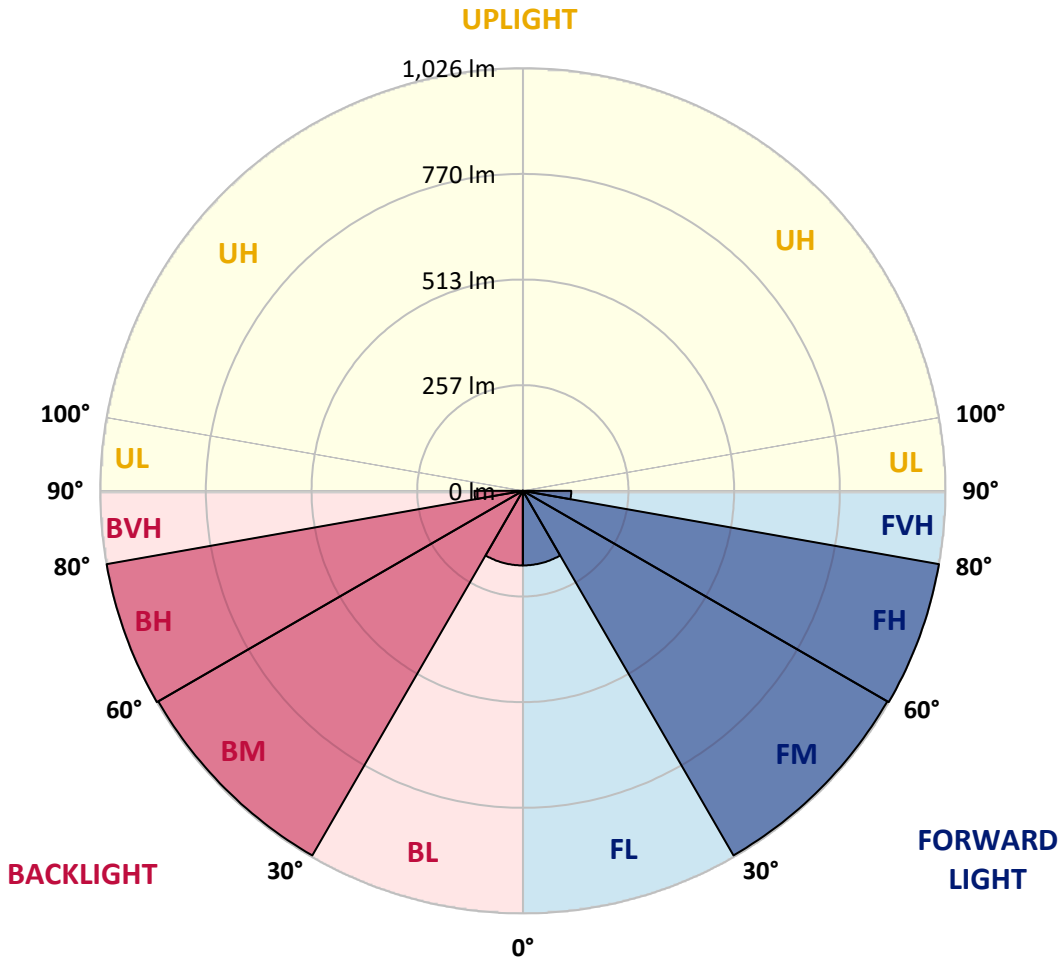
Scaled Data Report

REPORT NUMBER: P821455
CATALOG NUMBER: TT-D2-830-12VDC-WQ

## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 181.2 | 3.9 | | | |
| FM | (30°-60°) | 1022.5 | 21.8 | | | |
| FH | (60°-80°) | 1026.3 | 21.9 | | | G1/1800 |
| FVH | (80°-90°) | 117.5 | 2.5 | | | G2/225 |
| BL | (0°-30°) | 181.2 | 3.9 | B1/500 | | |
| BM | (30°-60°) | 1022.5 | 21.8 | B2/2500 | | |
| BH | (60°-80°) | 1026.3 | 21.9 | B3/2500 | | G1/1800 |
| BVH | (80°-90°) | 117.5 | 2.5 | | | G2/225 |
| UL | (90°-100°) | 0.0 | 0.0 | | U0/0 | |
| UH | (100°-180°) | 0.0 | 0.0 | | U0/0 | |

**BUG Rating: B3-U0-G2**
Type V Short



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REPORT NUMBER: P821455
CATALOG NUMBER: TT-D2-830-12VDC-WQ

**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 65° | 75° | 85° | 90° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 316.0 | 316.0 | 316.0 | 316.0 | 316.0 | *316.0* | 316.0 | 316.0 | 316.0 | 316.0 | 316.0 |
| 2.5° | 321.2 | 321.2 | 321.2 | 320.4 | 320.4 | *320.4* | 320.4 | 321.2 | 321.2 | 321.2 | 321.2 |
| 5° | 328.5 | 328.5 | 327.1 | 325.6 | 324.1 | *324.1* | 324.8 | 325.6 | 326.3 | 327.8 | 327.8 |
| 7.5° | 333.0 | 333.0 | 332.2 | 330.8 | 328.5 | *328.5* | 329.3 | 330.8 | 331.5 | 331.5 | 330.8 |
| 10° | 338.9 | 339.6 | 341.8 | 342.6 | 341.1 | *341.1* | 341.8 | 342.6 | 341.1 | 338.9 | 338.9 |
| 12.5° | 352.9 | 353.6 | 356.6 | 358.8 | 358.8 | *357.3* | 358.1 | 359.5 | 355.9 | 352.2 | 352.9 |
| 15° | 372.8 | 372.8 | 373.6 | 375.8 | 374.3 | *372.8* | 374.3 | 375.1 | 372.8 | 372.1 | 373.6 |
| 17.5° | 399.4 | 399.4 | 395.0 | 398.7 | 399.4 | *398.7* | 400.2 | 396.5 | 394.2 | 397.2 | 398.7 |
| 20° | 428.2 | 425.3 | 423.0 | 426.0 | 431.9 | *429.7* | 432.6 | 424.5 | 422.3 | 423.8 | 424.5 |
| 22.5° | 446.7 | 448.9 | 450.4 | 451.8 | 460.0 | *457.0* | 460.0 | 451.1 | 449.6 | 446.7 | 444.5 |
| 25° | 468.8 | 471.0 | 479.9 | 475.5 | 480.6 | *476.2* | 479.9 | 474.7 | 477.7 | 468.8 | 468.8 |
| 27.5° | 493.9 | 498.3 | 503.5 | 501.3 | 507.9 | *505.7* | 507.9 | 500.6 | 501.3 | 497.6 | 496.1 |
| 30° | 527.9 | 527.9 | 526.4 | 530.8 | 542.6 | *541.2* | 541.9 | 532.3 | 525.7 | 526.4 | 529.4 |
| 32.5° | 561.8 | 557.4 | 559.6 | 572.9 | 580.3 | *577.3* | 578.8 | 574.4 | 559.6 | 556.7 | 558.9 |
| 35° | 593.6 | 600.2 | 605.4 | 616.5 | 626.8 | *625.3* | 624.6 | 617.2 | 607.6 | 595.8 | 592.1 |
| 37.5° | 643.1 | 650.4 | 664.5 | 684.4 | 702.9 | *706.5* | 696.9 | 687.3 | 665.2 | 648.2 | 639.4 |
| 40° | 708.0 | 708.8 | 725.0 | 763.4 | 780.4 | *783.3* | 778.2 | 761.9 | 728.0 | 708.8 | 708.0 |
| 42.5° | 764.9 | 759.7 | 786.3 | 818.8 | 834.3 | *835.7* | 832.1 | 818.8 | 786.3 | 759.0 | 764.1 |
| 45° | 809.2 | 809.2 | 840.9 | 866.8 | 891.9 | *897.8* | 891.1 | 863.1 | 841.7 | 809.9 | 807.7 |
| 47.5° | 849.8 | 860.8 | 887.4 | 919.2 | 954.6 | *962.7* | 954.6 | 921.4 | 885.2 | 861.6 | 849.0 |
| 50° | 898.5 | 911.8 | 931.0 | 980.4 | 1020.3 | *1031.4* | 1019.6 | 983.4 | 931.0 | 911.0 | 903.7 |
| 52.5° | 955.3 | 966.4 | 996.7 | 1058.7 | 1088.2 | *1104.5* | 1094.9 | 1060.2 | 998.2 | 967.9 | 962.0 |
| 55° | 1023.3 | 1012.9 | 1060.2 | 1120.0 | 1174.6 | *1196.0* | 1176.8 | 1121.5 | 1067.6 | 1012.9 | 1023.3 |
| 57.5° | 1058.0 | 1046.2 | 1112.6 | 1169.5 | 1245.5 | *1273.6* | 1249.9 | 1173.9 | 1112.6 | 1049.8 | 1057.2 |
| 60° | 1060.9 | 1066.1 | 1116.3 | 1209.3 | 1261.7 | *1273.6* | 1266.2 | 1216.0 | 1118.5 | 1070.5 | 1056.5 |
| 62.5° | 1052.1 | 1083.8 | 1126.6 | 1222.6 | 1269.9 | *1298.7* | 1273.6 | 1224.1 | 1131.1 | 1089.0 | 1052.8 |
| 65° | *1040.3* | *1072.0* | *1135.5* | *1203.4* | *1283.9* | *1312.7* | *1289.1* | *1207.1* | *1138.4* | *1072.0* | *1044.7* |
| 67.5° | 1019.6 | 1008.5 | 1086.8 | 1177.6 | 1247.7 | *1264.7* | 1249.9 | 1179.0 | 1086.0 | 1007.0 | 1021.8 |
| 70° | 953.9 | 944.3 | 1011.5 | 1111.1 | 1178.3 | *1201.9* | 1184.2 | 1112.6 | 1012.9 | 946.5 | 955.3 |
| 72.5° | 856.4 | 859.4 | 924.3 | 1019.6 | 1091.9 | *1106.7* | 1097.1 | 1018.8 | 928.0 | 863.1 | 851.2 |
| 75° | 742.7 | 750.1 | 812.1 | 898.5 | 964.2 | *973.1* | 963.5 | 902.2 | 811.4 | 754.5 | 739.0 |
| 77.5° | 610.6 | 621.6 | 671.8 | 758.2 | 801.8 | *821.7* | 806.2 | 760.4 | 675.5 | 624.6 | 609.1 |
| 80° | 473.2 | 476.9 | 512.4 | 581.8 | 639.4 | *652.6* | 637.9 | 584.0 | 516.8 | 478.4 | 467.3 |
| 82.5° | 310.1 | 316.0 | 347.7 | 400.9 | 438.5 | *434.9* | 438.5 | 396.5 | 351.4 | 314.5 | 296.1 |
| 85° | 138.1 | 149.9 | 171.3 | 196.4 | 220.7 | *227.4* | 220.7 | 199.3 | 171.3 | 146.9 | 144.0 |
| 87.5° | 9.6 | 11.1 | 13.3 | 14.0 | 15.5 | *11.8* | 11.8 | 11.8 | 10.3 | 11.8 | 9.6 |
| 90° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | *0.0* | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

Cooper Lighting Solutions Photometric Lab
1121 Highway 74 South
Peachtree City, GA 30269

# LM-79-2019: Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Report Prepared for

Cooper Lighting Solutions

Streetworks

Report Number: SP1-2407-176-7

Test Date: 09/27/2024

Luminaire Tested: MEM2-HTN-VA-30-830-U-WQ

Data in this report applies to families of products including MEM2-HTN-VA-30-830-U-WQ

Report Generated By FNC07603 / LDUCLS01DT446
Version: v7.04

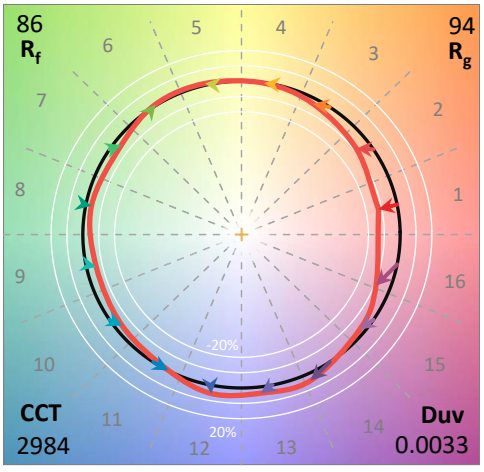
## Test Information

| | |
|---|---|
| Test Method: | LM-79-2019 |
| Report Number: | SP1-2407-176-7 |
| 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-30-830-U-WQ** |
| Description: | EPIC MODERN VISUAL COMFORT 30W WAVESTREAM WIDE |

## Spectral Parameters

| | | | | | |
|---|---|---|---|---|---|
| CCT (K): | 2984 | CRI (Ra): | 81.8 | | |
| CIE u': | 0.2500 | R1: | 79.4 | R9: | -1.1 |
| CIE v': | 0.5264 | R2: | 89.9 | R10: | 78.4 |
| Duv: | 0.0033 | R3: | 96.6 | R11: | 80.8 |
| CIE x: | 0.4431 | R4: | 80.6 | R12: | 72.8 |
| CIE y: | 0.4147 | R5: | 80.1 | R13: | 81.7 |
| CIE z: | 0.1422 | R6: | 88.9 | R14: | 98.5 |
| Peak Wavelength (nm): | 601 | R7: | 82.6 | R15: | 70.2 |
| Dominant Wavelength (nm): | 581 | R8: | 56.0 | | |
| Purity: | 57.4798 | | | | |

| | |
|---|---|
| Rf: | 85.8 |
| Rg: | 94.1 |




## Test Conditions

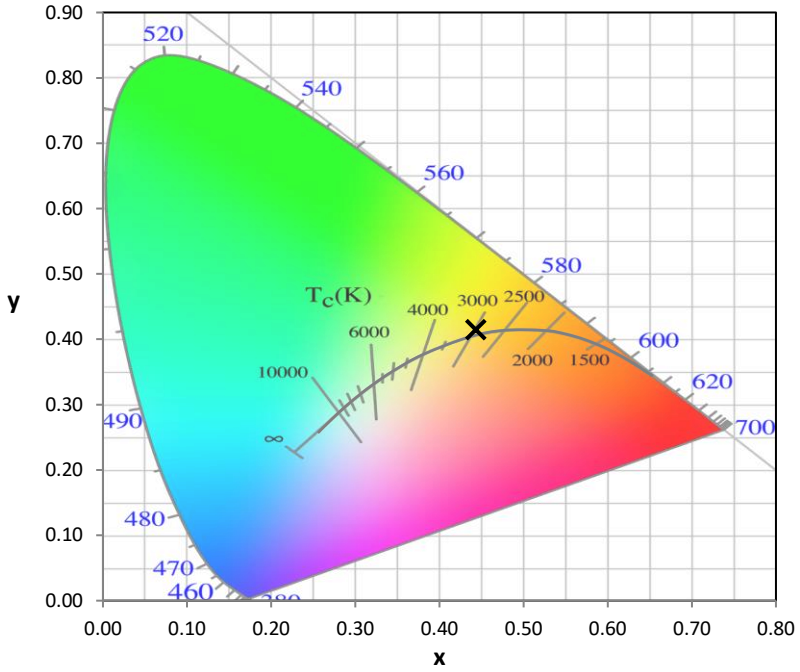
| | |
|---|---|
| Stabilization Time: | 29M |
| Operation Time: | 1H 29M |
| Sphere Temperature (°C): | 25.2 |

REPORT NUMBER: SP1-2407-176-7

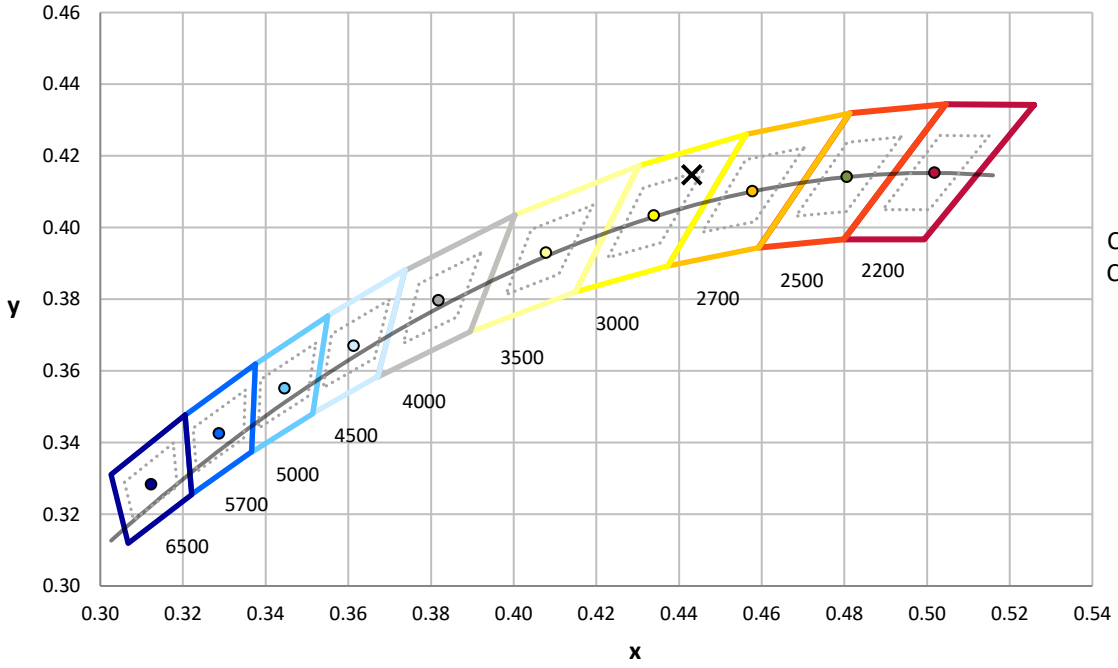
| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 6/18/2024 | 12/18/2024 |
| Power Meter | INXT2011004 | 2/8/2024 | 2/8/2025 |
| AC Power Source | IN0063 | 10/24/2023 | 10/24/2024 |
| DC 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: SP1-2407-176-7

## CIE 1931 Chromaticity Diagram




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

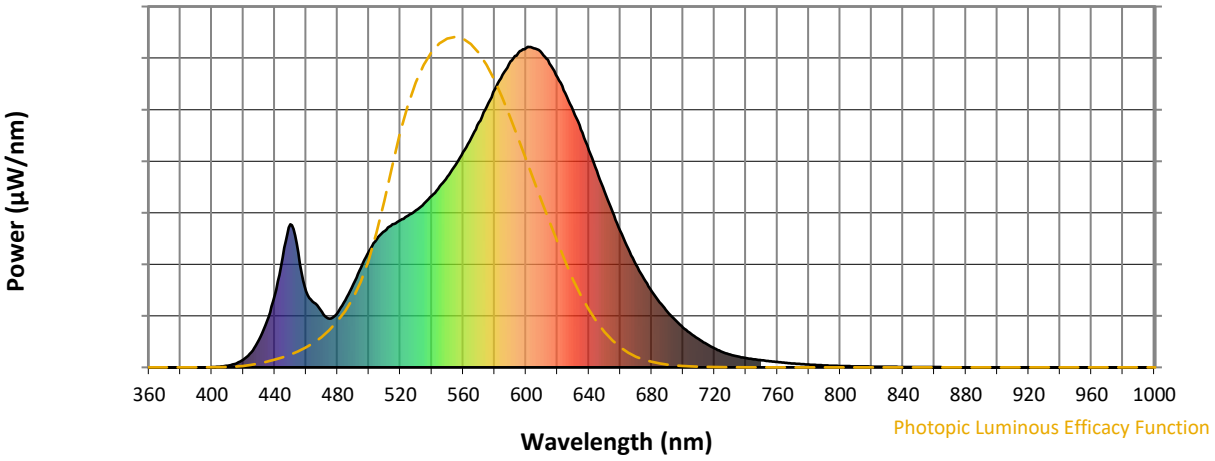



CCT = 2984K
CIE x = 0.4431
CIE y = 0.4147
Duv = 0.0033

Point lies inside the ANSI 3000K 4-step quadrangle

REPORT NUMBER: SP1-2407-176-7

## Photopic Flux vs. Wavelength

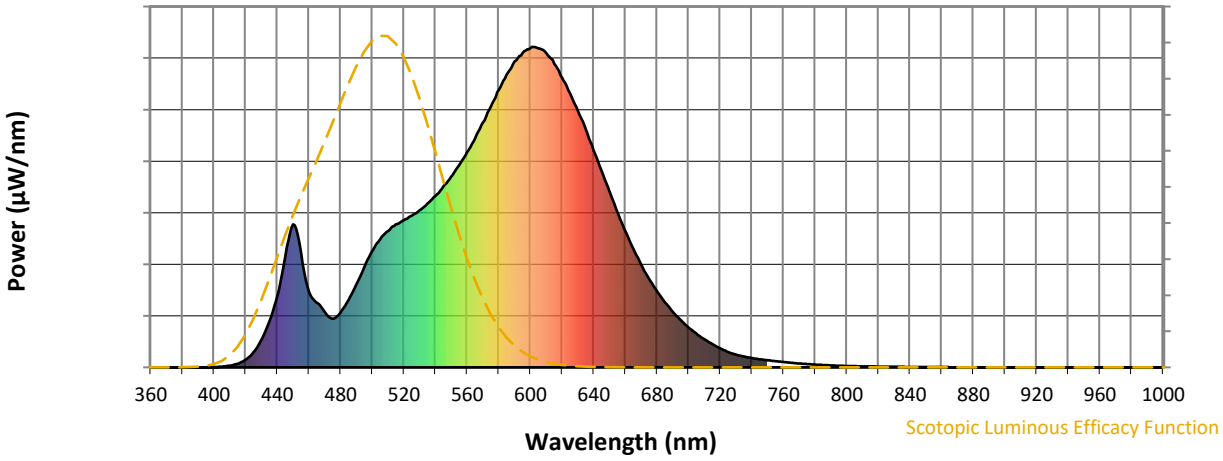



## Photopic Lumens: NR

| 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 | 260 | NR | 620 | 905 | NR | 750 | 22 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 312 | NR | 625 | 856 | NR | 755 | 19 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 362 | NR | 630 | 801 | NR | 760 | 17 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 399 | NR | 635 | 742 | NR | 765 | 14 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 425 | NR | 640 | 677 | NR | 770 | 12 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 446 | NR | 645 | 613 | NR | 775 | 10 | NR | 905 | 0 | NR |
| 390 | 0 | NR | 520 | 459 | NR | 650 | 549 | NR | 780 | 9 | NR | 910 | 0 | NR |
| 395 | 0 | NR | 525 | 473 | NR | 655 | 485 | NR | 785 | 7 | NR | 915 | 0 | NR |
| 400 | 1 | NR | 530 | 490 | NR | 660 | 425 | NR | 790 | 6 | NR | 920 | 0 | NR |
| 405 | 2 | NR | 535 | 511 | NR | 665 | 371 | NR | 795 | 5 | NR | 925 | 0 | NR |
| 410 | 5 | NR | 540 | 535 | NR | 670 | 321 | NR | 800 | 4 | NR | 930 | 0 | NR |
| 415 | 11 | NR | 545 | 565 | NR | 675 | 276 | NR | 805 | 4 | NR | 935 | 0 | NR |
| 420 | 24 | NR | 550 | 595 | NR | 680 | 238 | NR | 810 | 3 | NR | 940 | 0 | NR |
| 425 | 47 | NR | 555 | 631 | NR | 685 | 203 | NR | 815 | 3 | NR | 945 | 0 | NR |
| 430 | 86 | NR | 560 | 672 | NR | 690 | 174 | NR | 820 | 2 | NR | 950 | 0 | NR |
| 435 | 144 | NR | 565 | 715 | NR | 695 | 148 | NR | 825 | 2 | NR | 955 | 0 | NR |
| 440 | 224 | NR | 570 | 763 | NR | 700 | 124 | NR | 830 | 2 | NR | 960 | 0 | NR |
| 445 | 342 | NR | 575 | 814 | NR | 705 | 105 | NR | 835 | 2 | NR | 965 | 0 | NR |
| 450 | 446 | NR | 580 | 866 | NR | 710 | 88 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 357 | NR | 585 | 912 | NR | 715 | 73 | NR | 845 | 1 | NR | 975 | 0 | NR |
| 460 | 237 | NR | 590 | 954 | NR | 720 | 59 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 202 | NR | 595 | 981 | NR | 725 | 48 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 172 | NR | 600 | 996 | NR | 730 | 40 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 152 | NR | 605 | 996 | NR | 735 | 34 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 171 | NR | 610 | 980 | NR | 740 | 29 | NR | 870 | 0 | NR | 1000 | 0 | NR |
| 485 | 210 | NR | 615 | 947 | NR | 745 | 25 | NR | 875 | 0 | NR | | | |

REPORT NUMBER: SP1-2407-176-7

## Scotopic Flux vs. Wavelength

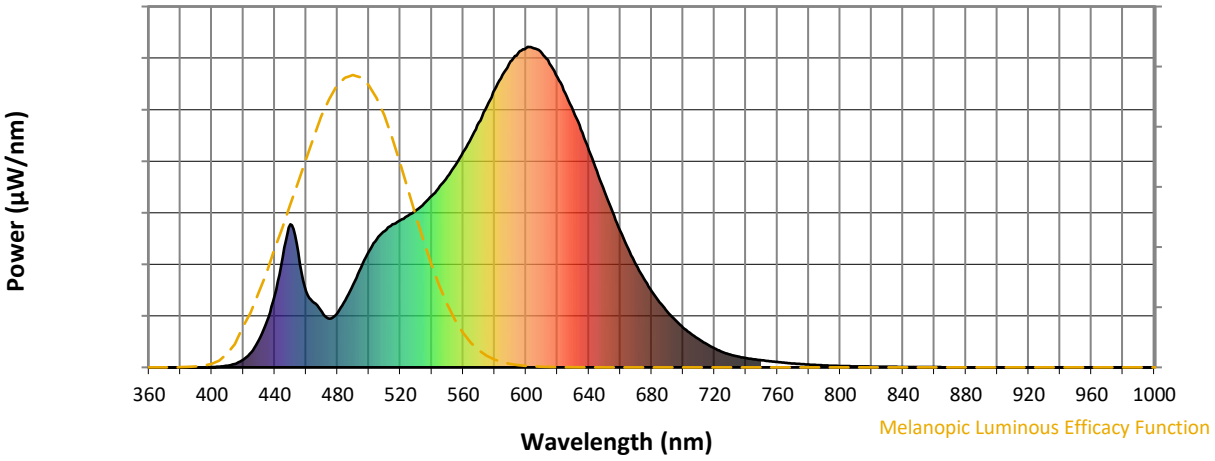



**Scotopic Lumens: NR** **S/P: 1.32**

| 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 | 260 | NR | 620 | 905 | NR | 750 | 22 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 312 | NR | 625 | 856 | NR | 755 | 19 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 362 | NR | 630 | 801 | NR | 760 | 17 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 399 | NR | 635 | 742 | NR | 765 | 14 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 425 | NR | 640 | 677 | NR | 770 | 12 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 446 | NR | 645 | 613 | NR | 775 | 10 | NR | 905 | 0 | NR |
| 390 | 0 | NR | 520 | 459 | NR | 650 | 549 | NR | 780 | 9 | NR | 910 | 0 | NR |
| 395 | 0 | NR | 525 | 473 | NR | 655 | 485 | NR | 785 | 7 | NR | 915 | 0 | NR |
| 400 | 1 | NR | 530 | 490 | NR | 660 | 425 | NR | 790 | 6 | NR | 920 | 0 | NR |
| 405 | 2 | NR | 535 | 511 | NR | 665 | 371 | NR | 795 | 5 | NR | 925 | 0 | NR |
| 410 | 5 | NR | 540 | 535 | NR | 670 | 321 | NR | 800 | 4 | NR | 930 | 0 | NR |
| 415 | 11 | NR | 545 | 565 | NR | 675 | 276 | NR | 805 | 4 | NR | 935 | 0 | NR |
| 420 | 24 | NR | 550 | 595 | NR | 680 | 238 | NR | 810 | 3 | NR | 940 | 0 | NR |
| 425 | 47 | NR | 555 | 631 | NR | 685 | 203 | NR | 815 | 3 | NR | 945 | 0 | NR |
| 430 | 86 | NR | 560 | 672 | NR | 690 | 174 | NR | 820 | 2 | NR | 950 | 0 | NR |
| 435 | 144 | NR | 565 | 715 | NR | 695 | 148 | NR | 825 | 2 | NR | 955 | 0 | NR |
| 440 | 224 | NR | 570 | 763 | NR | 700 | 124 | NR | 830 | 2 | NR | 960 | 0 | NR |
| 445 | 342 | NR | 575 | 814 | NR | 705 | 105 | NR | 835 | 2 | NR | 965 | 0 | NR |
| 450 | 446 | NR | 580 | 866 | NR | 710 | 88 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 357 | NR | 585 | 912 | NR | 715 | 73 | NR | 845 | 1 | NR | 975 | 0 | NR |
| 460 | 237 | NR | 590 | 954 | NR | 720 | 59 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 202 | NR | 595 | 981 | NR | 725 | 48 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 172 | NR | 600 | 996 | NR | 730 | 40 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 152 | NR | 605 | 996 | NR | 735 | 34 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 171 | NR | 610 | 980 | NR | 740 | 29 | NR | 870 | 0 | NR | 1000 | 0 | NR |
| 485 | 210 | NR | 615 | 947 | NR | 745 | 25 | NR | 875 | 0 | NR | | | |

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## Melanopic Flux vs. Wavelength




**Melanopic Lumens: NR** **M/P: 2.51**

| 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 | 260 | NR | 620 | 905 | NR | 750 | 22 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 312 | NR | 625 | 856 | NR | 755 | 19 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 362 | NR | 630 | 801 | NR | 760 | 17 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 399 | NR | 635 | 742 | NR | 765 | 14 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 425 | NR | 640 | 677 | NR | 770 | 12 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 446 | NR | 645 | 613 | NR | 775 | 10 | NR | 905 | 0 | NR |
| 390 | 0 | NR | 520 | 459 | NR | 650 | 549 | NR | 780 | 9 | NR | 910 | 0 | NR |
| 395 | 0 | NR | 525 | 473 | NR | 655 | 485 | NR | 785 | 7 | NR | 915 | 0 | NR |
| 400 | 1 | NR | 530 | 490 | NR | 660 | 425 | NR | 790 | 6 | NR | 920 | 0 | NR |
| 405 | 2 | NR | 535 | 511 | NR | 665 | 371 | NR | 795 | 5 | NR | 925 | 0 | NR |
| 410 | 5 | NR | 540 | 535 | NR | 670 | 321 | NR | 800 | 4 | NR | 930 | 0 | NR |
| 415 | 11 | NR | 545 | 565 | NR | 675 | 276 | NR | 805 | 4 | NR | 935 | 0 | NR |
| 420 | 24 | NR | 550 | 595 | NR | 680 | 238 | NR | 810 | 3 | NR | 940 | 0 | NR |
| 425 | 47 | NR | 555 | 631 | NR | 685 | 203 | NR | 815 | 3 | NR | 945 | 0 | NR |
| 430 | 86 | NR | 560 | 672 | NR | 690 | 174 | NR | 820 | 2 | NR | 950 | 0 | NR |
| 435 | 144 | NR | 565 | 715 | NR | 695 | 148 | NR | 825 | 2 | NR | 955 | 0 | NR |
| 440 | 224 | NR | 570 | 763 | NR | 700 | 124 | NR | 830 | 2 | NR | 960 | 0 | NR |
| 445 | 342 | NR | 575 | 814 | NR | 705 | 105 | NR | 835 | 2 | NR | 965 | 0 | NR |
| 450 | 446 | NR | 580 | 866 | NR | 710 | 88 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 357 | NR | 585 | 912 | NR | 715 | 73 | NR | 845 | 1 | NR | 975 | 0 | NR |
| 460 | 237 | NR | 590 | 954 | NR | 720 | 59 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 202 | NR | 595 | 981 | NR | 725 | 48 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 172 | NR | 600 | 996 | NR | 730 | 40 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 152 | NR | 605 | 996 | NR | 735 | 34 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 171 | NR | 610 | 980 | NR | 740 | 29 | NR | 870 | 0 | NR | 1000 | 0 | NR |
| 485 | 210 | NR | 615 | 947 | NR | 745 | 25 | NR | 875 | 0 | NR | | | |

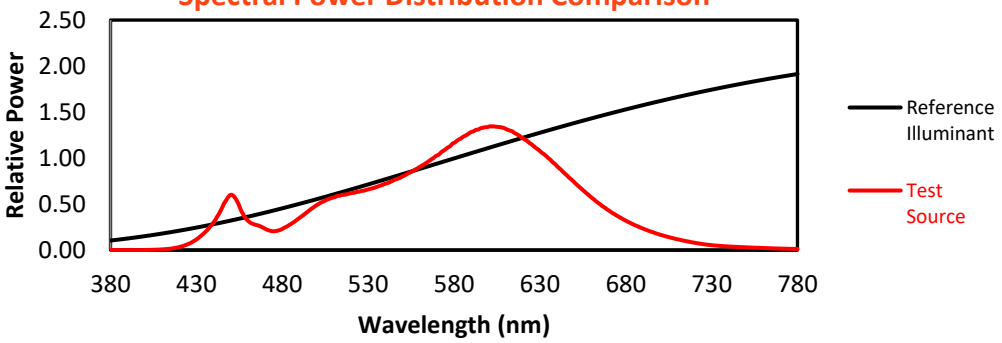
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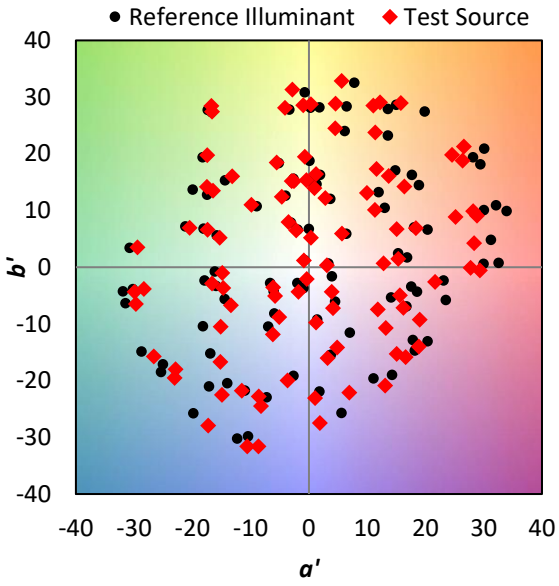
## Summary

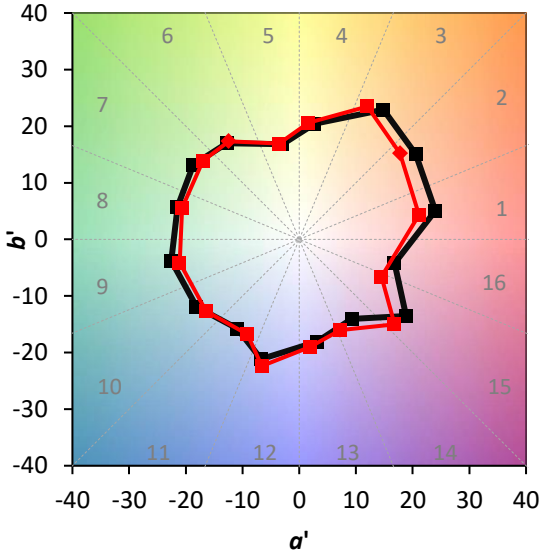
$R_f$ = 85.8
$R_g$ = 94.1
CIE $R_a$ = 81.8
$R_9$ = -1.1

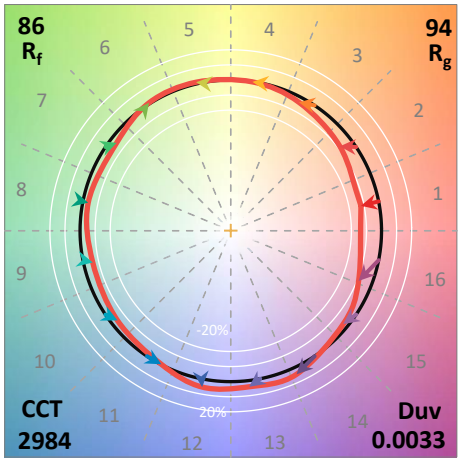
## Spectral Power Distribution Comparison

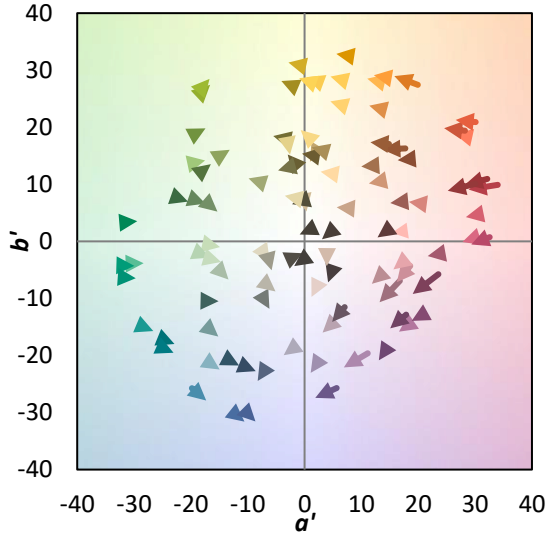



## Color Vector Graphics



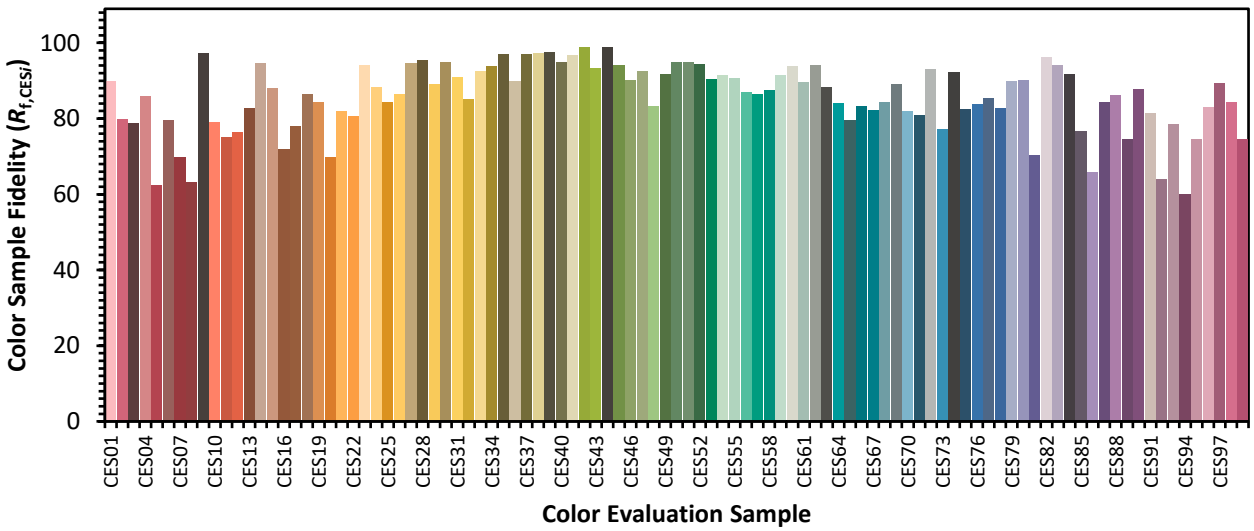



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**Individual Sample Fidelity Index ($R_{f,i}$)**

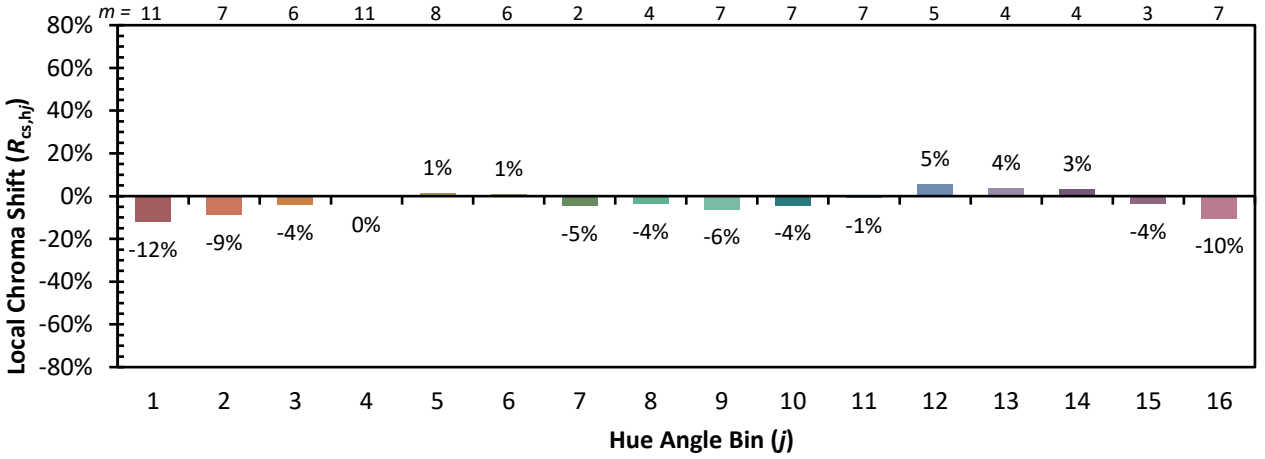
| | | | |
|---|---|---|---|
| CES01 = 86 | CES26 = 86 | CES51 = 95 | CES76 = 84 |
| CES02 = 63 | CES27 = 95 | CES52 = 94 | CES77 = 86 |
| CES03 = 31 | CES28 = 95 | CES53 = 90 | CES78 = 83 |
| CES04 = 70 | CES29 = 89 | CES54 = 91 | CES79 = 90 |
| CES05 = 50 | CES30 = 95 | CES55 = 91 | CES80 = 90 |
| CES06 = 51 | CES31 = 91 | CES56 = 87 | CES81 = 70 |
| CES07 = 42 | CES32 = 85 | CES57 = 86 | CES82 = 96 |
| CES08 = 41 | CES33 = 93 | CES58 = 87 | CES83 = 94 |
| CES09 = 29 | CES34 = 94 | CES59 = 92 | CES84 = 92 |
| CES10 = 76 | CES35 = 97 | CES60 = 94 | CES85 = 77 |
| CES11 = 59 | CES36 = 90 | CES61 = 90 | CES86 = 66 |
| CES12 = 65 | CES37 = 97 | CES62 = 94 | CES87 = 84 |
| CES13 = 43 | CES38 = 97 | CES63 = 88 | CES88 = 86 |
| CES14 = 74 | CES39 = 98 | CES64 = 84 | CES89 = 75 |
| CES15 = 72 | CES40 = 95 | CES65 = 80 | CES90 = 88 |
| CES16 = 47 | CES41 = 97 | CES66 = 83 | CES91 = 81 |
| CES17 = 50 | CES42 = 99 | CES67 = 82 | CES92 = 64 |
| CES18 = 56 | CES43 = 93 | CES68 = 84 | CES93 = 79 |
| CES19 = 72 | CES44 = 99 | CES69 = 89 | CES94 = 60 |
| CES20 = 67 | CES45 = 94 | CES70 = 82 | CES95 = 74 |
| CES21 = 87 | CES46 = 90 | CES71 = 81 | CES96 = 83 |
| CES22 = 79 | CES47 = 93 | CES72 = 93 | CES97 = 89 |
| CES23 = 92 | CES48 = 83 | CES73 = 77 | CES98 = 84 |
| CES24 = 91 | CES49 = 92 | CES74 = 92 | CES99 = 75 |
| CES25 = 72 | CES50 = 95 | CES75 = 83 | |

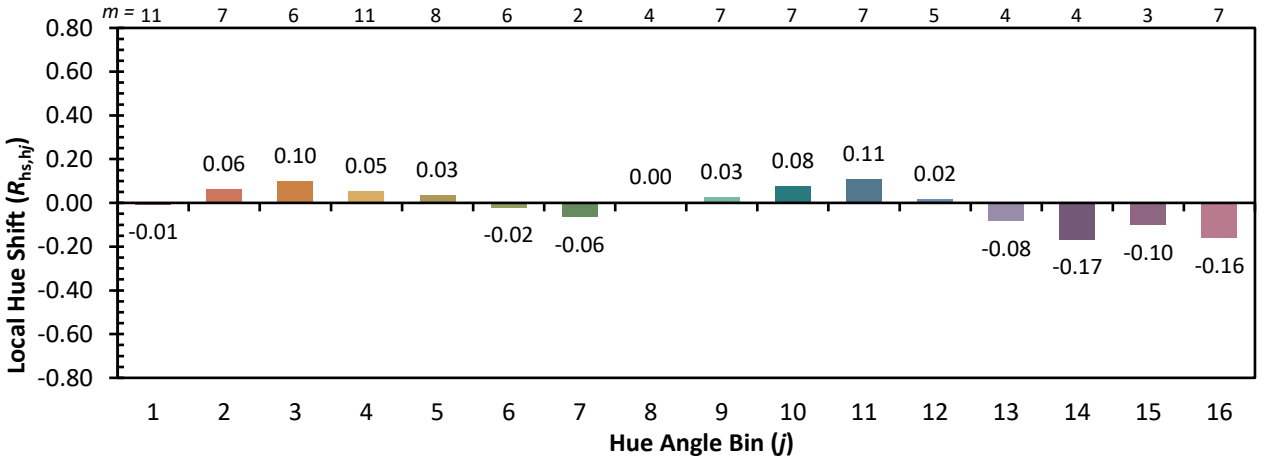


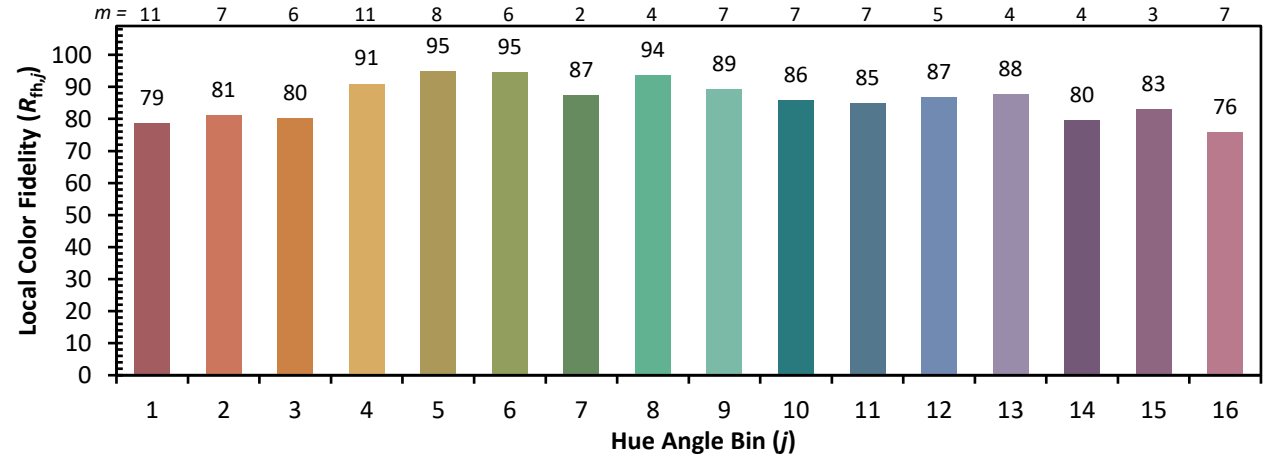
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## Color Rendition by Hue-Angle Bin



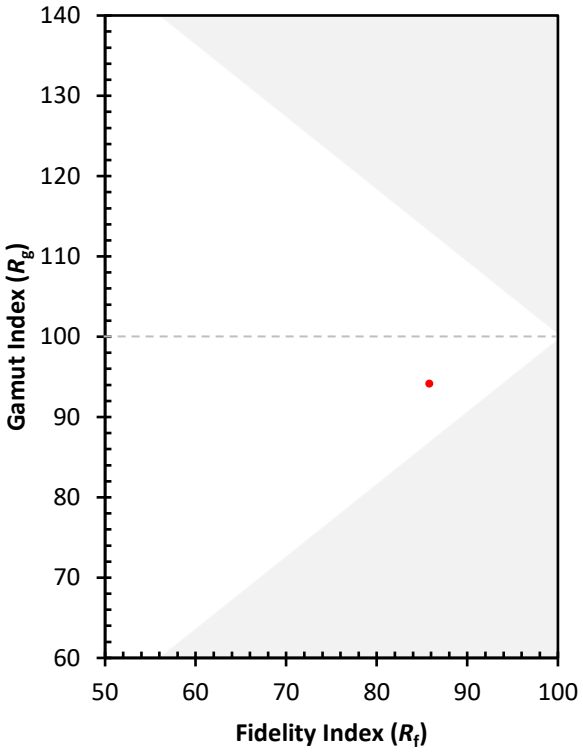



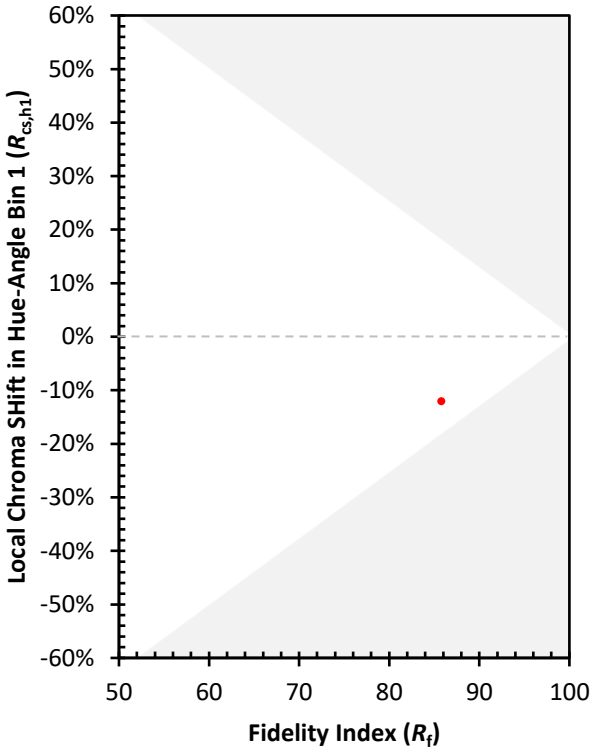



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## Measure Comparisons




(END OF REPORT)