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: P438180

Luminaire Tested: **ISW-SA1B-735-U-SL2**

Issue Date: 12/10/2020

Report Generated By 670245982

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: | P438180 |
| | TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G3-2011-074-14) |
| Test Lab: | INNOVATION CENTER |
| Issue Date: | 12/10/2020 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS (FORMERLY EATON) |
| Product Line: | McGRAW-EDISON |
| Catalog Number: | ISW-SA1B-735-U-SL2 |
| Description: | IMPACT ELITE LED WEDGE LUMINAIRE |
| | (1) 70 CRI, 3500K, 450mA LIGHTSQUARE WITH 16 LEDS AND TYPE II SPILL LIGHT ELIMINATOR OPTICS |
| Light Source: | - |
| Ballast/Driver: | ELECTRONIC DRIVER |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 3215 lumens |
| Efficiency: | N/A |
| Efficacy: | 126.6 lumens/watt |
| Luminous Opening: | Rectangular (W 0.5' x L: 0.5' x H: 0') |
| IES Classification: | Type III - Medium |
| BUG Rating: | B1 - U0 - G1 |

| | |
|---|---|
| Input Watts (W): | 25.4 |
| 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: | 28.75 FT |

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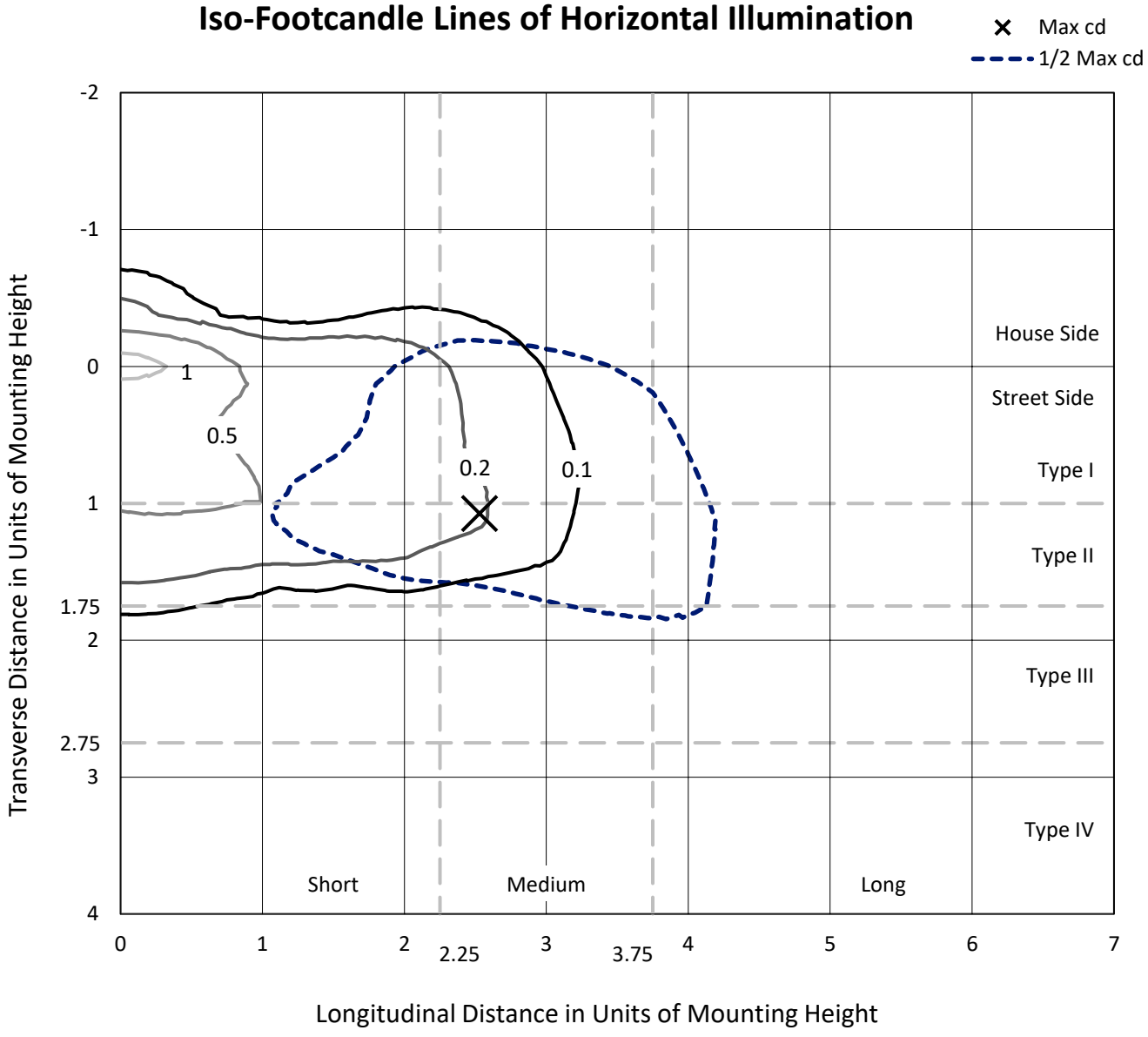
Scaled Data Report

REPORT NUMBER: P438180
CATALOG NUMBER: ISW-SA1B-735-U-SL2

## Iso-Footcandle Lines of Horizontal Illumination




Based on 25 foot mounting height. Maximum calculated value = 1.2 fc
Type III - Medium - N/A

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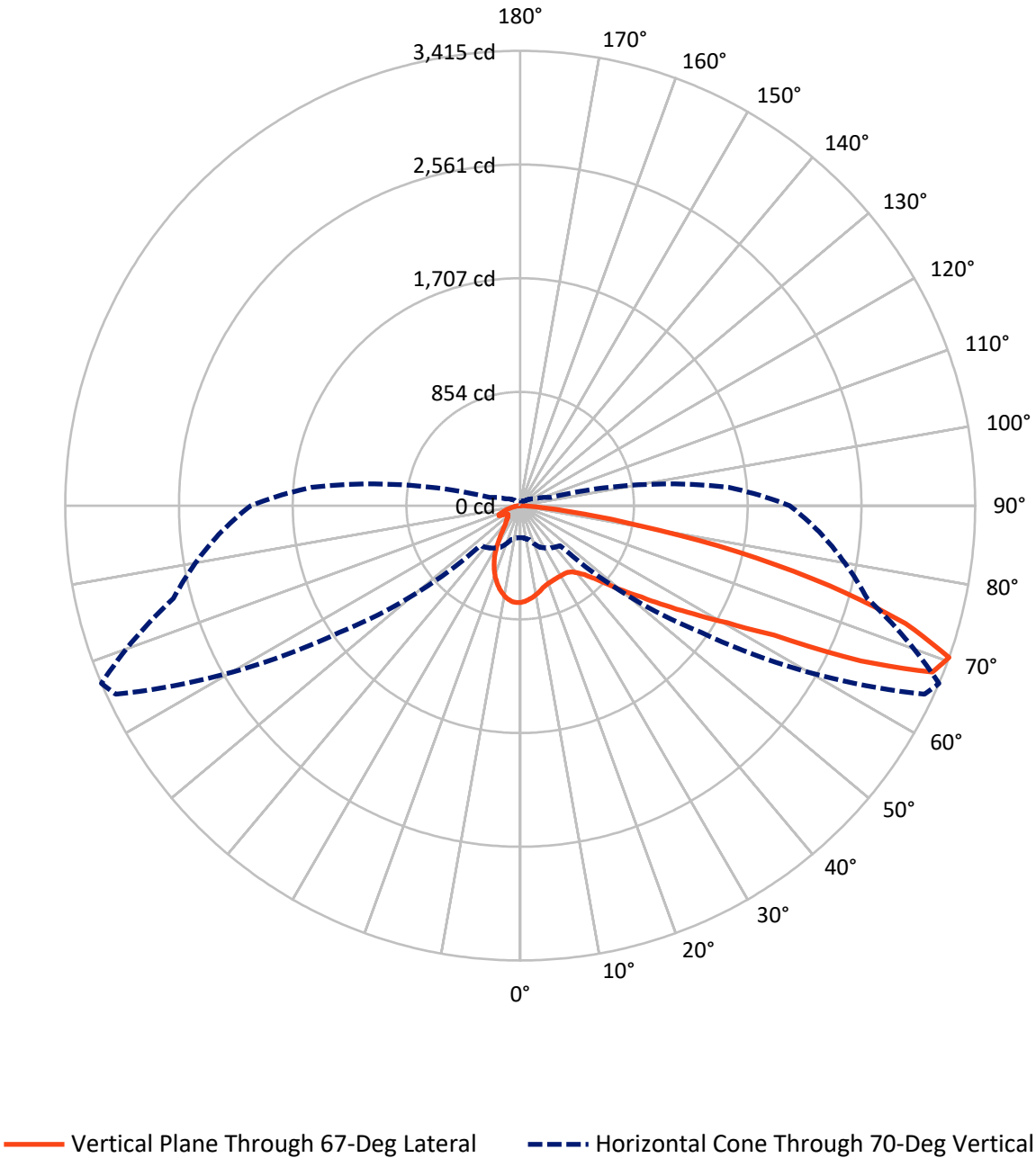
## Luminous Intensity Polar Plot



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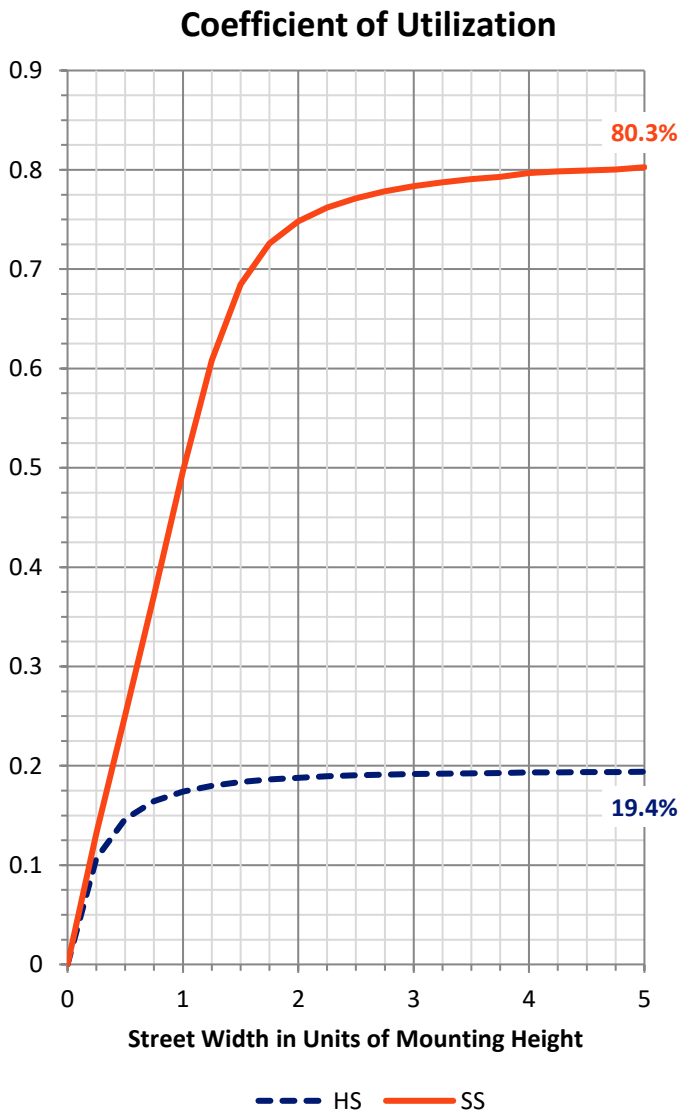
REPORT NUMBER: P438180
CATALOG NUMBER: ISW-SA1B-735-U-SL2

**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 629.7 | 0.0 | 629.7 |
| | % Fixture | 19.6 | 0.0 | 19.6 |
| **Street Side** | Lumens | 2585.3 | 0.0 | 2585.3 |
| | % Fixture | 80.4 | 0.0 | 80.4 |
| **Total** | Lumens | 3215.0 | 0.0 | 3215.0 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 63.7 | 2.0 |
| 10°-20° | 154.3 | 4.8 |
| 20°-30° | 212.7 | 6.6 |
| 30°-40° | 287.2 | 8.9 |
| 40°-50° | 426.2 | 13.3 |
| 50°-60° | 656.0 | 20.4 |
| 60°-70° | 811.1 | 25.2 |
| 70°-80° | 543.3 | 16.9 |
| 80°-90° | 60.6 | 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° | 3215.0 | 100.0 |
| 0°-180° | 3215.0 | 100.0 |



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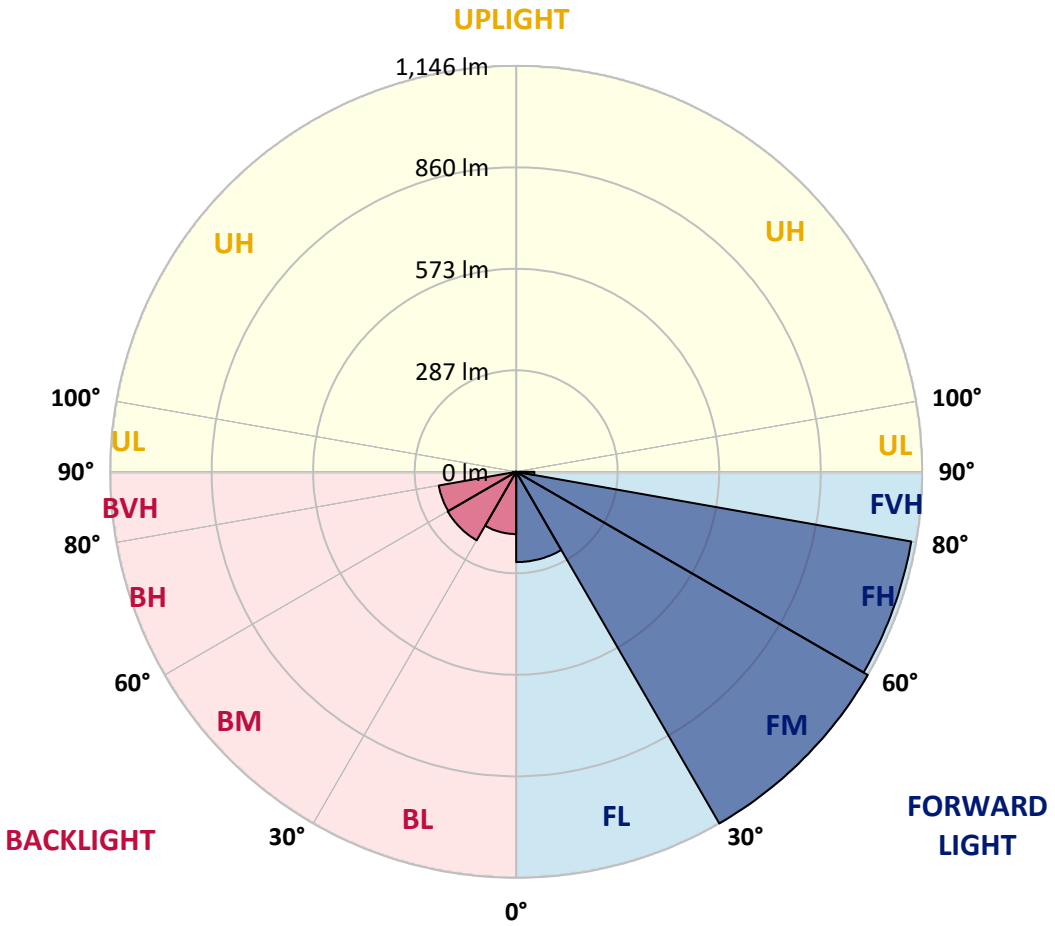
Scaled Data Report

REPORT NUMBER: P438180
CATALOG NUMBER: ISW-SA1B-735-U-SL2

## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 255.0 | 7.9 | | | |
| FM | (30°-60°) | 1146.2 | 35.7 | | | |
| FH | (60°-80°) | 1132.6 | 35.2 | | | G1/1800 |
| FVH | (80°-90°) | 51.5 | 1.6 | | | G1/100 |
| BL | (0°-30°) | 175.7 | 5.5 | B1/500 | | |
| BM | (30°-60°) | 223.2 | 6.9 | B1/1000 | | |
| BH | (60°-80°) | 221.8 | 6.9 | B1/500 | | G1/500 |
| BVH | (80°-90°) | 9.0 | 0.3 | | | G0/10 |
| 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: P438180
CATALOG NUMBER: ISW-SA1B-735-U-SL2

**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 65° | 67° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 726.0 | 726.0 | 726.0 | 726.0 | 726.0 | 726.0 | 726.0 | 726.0 | *726.0* | 726.0 | 726.0 |
| 2.5° | 686.4 | 691.1 | 692.2 | 695.7 | 700.4 | 705.0 | 710.8 | 717.8 | *719.0* | 722.5 | 729.5 |
| 5° | 639.9 | 642.2 | 644.5 | 651.5 | 659.7 | 674.8 | 689.9 | 703.9 | *706.2* | 717.8 | 730.6 |
| 7.5° | 596.8 | 602.7 | 603.8 | 609.6 | 622.4 | 641.0 | 662.0 | 686.4 | *693.4* | 709.7 | 729.5 |
| 10° | 565.4 | 568.9 | 571.2 | 581.7 | 592.2 | 613.1 | 638.7 | 669.0 | *675.9* | 700.4 | 728.3 |
| 12.5° | 539.8 | 545.6 | 549.1 | 556.1 | 572.4 | 591.0 | 616.6 | 649.2 | *658.5* | 688.7 | 723.6 |
| 15° | 525.9 | 530.5 | 531.7 | 539.8 | 552.6 | 571.2 | 595.7 | 632.9 | *639.9* | 677.1 | 723.6 |
| 17.5° | 522.4 | 523.5 | 524.7 | 529.4 | 539.8 | 555.0 | 580.5 | 618.9 | *627.1* | 672.5 | 723.6 |
| 20° | 529.4 | 529.4 | 529.4 | 527.0 | 535.2 | 546.8 | 572.4 | 607.3 | *618.9* | 667.8 | 727.1 |
| 22.5° | 545.6 | 546.8 | 543.3 | 537.5 | 534.0 | 542.2 | 564.3 | 603.8 | *614.3* | 666.6 | 734.1 |
| 25° | 568.9 | 570.1 | 567.7 | 559.6 | 543.3 | 542.2 | 560.8 | 600.3 | *609.6* | 665.5 | 733.0 |
| 27.5° | 600.3 | 607.3 | 600.3 | 591.0 | 570.1 | 551.5 | 564.3 | 598.0 | *608.5* | 665.5 | 735.3 |
| 30° | 644.5 | 649.2 | 645.7 | 630.6 | 603.8 | 571.2 | 568.9 | 600.3 | *608.5* | 664.3 | 734.1 |
| 32.5° | 688.7 | 689.9 | 693.4 | 682.9 | 650.4 | 600.3 | 581.7 | 602.7 | *609.6* | 663.1 | 730.6 |
| 35° | 722.5 | 729.5 | 744.6 | 745.8 | 707.4 | 642.2 | 608.5 | 612.0 | *614.3* | 666.6 | 727.1 |
| 37.5° | 765.5 | 767.9 | 792.3 | 810.9 | 777.2 | 700.4 | 645.7 | 629.4 | *630.6* | 678.3 | 733.0 |
| 40° | 805.1 | 814.4 | 848.1 | 871.4 | 859.8 | 778.3 | 696.9 | 660.8 | *663.1* | 699.2 | 746.9 |
| 42.5° | 864.4 | 871.4 | 906.3 | 938.9 | 942.4 | 866.7 | 767.9 | 714.3 | *708.5* | 739.9 | 777.2 |
| 45° | 916.8 | 924.9 | 969.1 | 1016.8 | 1033.1 | 966.8 | 856.3 | 787.6 | *778.3* | 808.6 | 833.0 |
| 47.5° | 990.1 | 1004.0 | 1038.9 | 1093.6 | 1148.3 | 1089.0 | 969.1 | 887.7 | *879.5* | 900.5 | 907.5 |
| 50° | 1059.9 | 1068.0 | 1097.1 | 1163.4 | 1260.0 | 1242.5 | 1107.6 | 1018.0 | *1005.2* | 1008.7 | 1025.0 |
| 52.5° | 1070.3 | 1073.8 | 1104.1 | 1173.9 | 1355.4 | 1429.8 | 1277.4 | 1164.6 | *1141.3* | 1144.8 | 1164.6 |
| 55° | 991.2 | 1005.2 | 1027.3 | 1125.0 | 1362.4 | 1638.1 | 1515.9 | 1357.7 | *1321.6* | 1308.8 | 1325.1 |
| 57.5° | 827.2 | 843.5 | 874.9 | 976.1 | 1282.1 | 1750.9 | 1906.8 | 1588.1 | *1532.2* | 1472.9 | 1492.7 |
| 60° | 609.6 | 627.1 | 646.9 | 745.8 | 1078.5 | 1768.4 | 2295.4 | 1867.3 | *1784.7* | 1636.9 | 1647.4 |
| 62.5° | 467.7 | 467.7 | 485.1 | 525.9 | 721.3 | 1641.6 | 2523.5 | 2339.6 | *2137.2* | 1837.0 | 1824.2 |
| 65° | 378.1 | 382.8 | 400.2 | 438.6 | 456.1 | 1165.7 | 2614.2 | 3026.1 | *2810.8* | 2076.7 | 2010.4 |
| 67.5° | 313.0 | 314.1 | 333.9 | 394.4 | 399.1 | 641.0 | 2371.0 | 3386.7 | *3335.5* | 2376.9 | 2208.2 |
| 70° | *239.7* | *240.8* | *264.1* | *343.2* | *388.6* | *424.6* | *1659.0* | *3349.5* | *3414.6* | *2695.6* | *2251.2* |
| 72.5° | 159.4 | 166.4 | 194.3 | 272.2 | 387.4 | 400.2 | 900.5 | 2929.5 | *3023.7* | 2820.1 | 2107.0 |
| 75° | 98.9 | 100.1 | 129.1 | 188.5 | 356.0 | 399.1 | 529.4 | 2282.6 | *2399.0* | 2339.6 | 1827.7 |
| 77.5° | 60.5 | 62.8 | 76.8 | 123.3 | 275.7 | 400.2 | 376.9 | 1570.6 | *1667.2* | 1535.7 | 1077.3 |
| 80° | 37.2 | 37.2 | 44.2 | 74.5 | 179.2 | 358.3 | 324.6 | 913.3 | *904.0* | 567.7 | 306.0 |
| 82.5° | 14.0 | 15.1 | 23.3 | 40.7 | 90.7 | 278.1 | 285.0 | 413.0 | *380.4* | 167.5 | 109.4 |
| 85° | 2.3 | 2.3 | 4.7 | 12.8 | 24.4 | 115.2 | 158.2 | 145.4 | *122.2* | 51.2 | 45.4 |
| 87.5° | 0.0 | 0.0 | 0.0 | 1.2 | 1.2 | 2.3 | 3.5 | 3.5 | *3.5* | 3.5 | 4.7 |
| 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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Peachtree City, GA 30269

Scaled Data Report

REPORT NUMBER: P438180
CATALOG NUMBER: ISW-SA1B-735-U-SL2

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 726.0 | 726.0 | 726.0 | 726.0 | 726.0 | 726.0 | 726.0 | 726.0 | 726.0 | 726.0 | 726.0 |
| 2.5° | 729.5 | 731.8 | 730.6 | 727.1 | 723.6 | 721.3 | 715.5 | 712.0 | 713.2 | 713.2 | 714.3 |
| 5° | 731.8 | 735.3 | 729.5 | 722.5 | 709.7 | 695.7 | 682.9 | 675.9 | 666.6 | 670.1 | 667.8 |
| 7.5° | 735.3 | 737.6 | 727.1 | 706.2 | 684.1 | 660.8 | 638.7 | 618.9 | 603.8 | 596.8 | 601.5 |
| 10° | 733.0 | 736.4 | 716.7 | 685.3 | 651.5 | 614.3 | 580.5 | 548.0 | 527.0 | 513.1 | 516.6 |
| 12.5° | 731.8 | 728.3 | 701.5 | 655.0 | 608.5 | 557.3 | 506.1 | 466.5 | 431.6 | 417.7 | 420.0 |
| 15° | 727.1 | 724.8 | 682.9 | 623.6 | 559.6 | 487.5 | 420.0 | 368.8 | 326.9 | 313.0 | 317.6 |
| 17.5° | 729.5 | 722.5 | 660.8 | 585.2 | 497.9 | 409.5 | 326.9 | 276.9 | 256.0 | 251.3 | 250.1 |
| 20° | 727.1 | 714.3 | 638.7 | 543.3 | 432.8 | 317.6 | 243.2 | 216.4 | 216.4 | 223.4 | 224.5 |
| 22.5° | 729.5 | 707.4 | 614.3 | 495.6 | 358.3 | 238.5 | 189.6 | 182.7 | 193.1 | 208.3 | 208.3 |
| 25° | 729.5 | 699.2 | 587.5 | 442.1 | 280.4 | 181.5 | 161.7 | 161.7 | 175.7 | 189.6 | 188.5 |
| 27.5° | 724.8 | 682.9 | 557.3 | 385.1 | 208.3 | 150.1 | 141.9 | 145.4 | 154.7 | 166.4 | 165.2 |
| 30° | 713.2 | 666.6 | 520.0 | 318.8 | 158.2 | 132.6 | 131.5 | 132.6 | 137.3 | 144.3 | 143.1 |
| 32.5° | 702.7 | 648.0 | 484.0 | 247.8 | 133.8 | 123.3 | 122.2 | 123.3 | 124.5 | 126.8 | 126.8 |
| 35° | 695.7 | 631.7 | 440.9 | 190.8 | 121.0 | 117.5 | 115.2 | 115.2 | 112.9 | 114.0 | 114.0 |
| 37.5° | 687.6 | 616.6 | 396.7 | 148.9 | 114.0 | 111.7 | 109.4 | 105.9 | 105.9 | 103.5 | 103.5 |
| 40° | 687.6 | 605.0 | 351.4 | 125.6 | 109.4 | 108.2 | 103.5 | 98.9 | 96.6 | 96.6 | 96.6 |
| 42.5° | 706.2 | 605.0 | 309.5 | 115.2 | 104.7 | 103.5 | 97.7 | 93.1 | 90.7 | 90.7 | 90.7 |
| 45° | 737.6 | 612.0 | 266.4 | 108.2 | 101.2 | 98.9 | 91.9 | 87.3 | 84.9 | 84.9 | 83.8 |
| 47.5° | 792.3 | 641.0 | 228.0 | 104.7 | 97.7 | 94.2 | 86.1 | 81.4 | 79.1 | 79.1 | 79.1 |
| 50° | 884.2 | 699.2 | 196.6 | 101.2 | 94.2 | 88.4 | 81.4 | 76.8 | 74.5 | 74.5 | 73.3 |
| 52.5° | 1011.0 | 786.5 | 181.5 | 98.9 | 89.6 | 82.6 | 76.8 | 72.1 | 69.8 | 68.6 | 68.6 |
| 55° | 1163.4 | 917.9 | 179.2 | 97.7 | 84.9 | 77.9 | 72.1 | 67.5 | 65.2 | 64.0 | 64.0 |
| 57.5° | 1329.8 | 1062.2 | 195.5 | 95.4 | 80.3 | 72.1 | 67.5 | 62.8 | 60.5 | 59.3 | 59.3 |
| 60° | 1490.3 | 1220.4 | 247.8 | 93.1 | 76.8 | 67.5 | 61.7 | 58.2 | 55.8 | 54.7 | 54.7 |
| 62.5° | 1676.5 | 1386.8 | 363.0 | 94.2 | 74.5 | 62.8 | 57.0 | 53.5 | 52.4 | 51.2 | 51.2 |
| 65° | 1881.2 | 1577.6 | 464.2 | 103.5 | 75.6 | 58.2 | 52.4 | 50.0 | 47.7 | 46.5 | 46.5 |
| 67.5° | 2062.7 | 1700.9 | 387.4 | 119.8 | 82.6 | 54.7 | 46.5 | 45.4 | 43.0 | 41.9 | 43.0 |
| 70° | *2022.0* | *1570.6* | *238.5* | *121.0* | *83.8* | *52.4* | *41.9* | *39.6* | *37.2* | *37.2* | *37.2* |
| 72.5° | 1844.0 | 1385.6 | 166.4 | 104.7 | 74.5 | 46.5 | 36.1 | 33.7 | 32.6 | 32.6 | 32.6 |
| 75° | 1552.0 | 1142.5 | 132.6 | 84.9 | 58.2 | 38.4 | 30.2 | 29.1 | 27.9 | 26.8 | 26.8 |
| 77.5° | 849.3 | 621.3 | 98.9 | 65.2 | 43.0 | 29.1 | 25.6 | 23.3 | 22.1 | 22.1 | 22.1 |
| 80° | 249.0 | 212.9 | 61.7 | 46.5 | 27.9 | 20.9 | 19.8 | 17.5 | 16.3 | 16.3 | 16.3 |
| 82.5° | 104.7 | 88.4 | 37.2 | 25.6 | 18.6 | 14.0 | 12.8 | 11.6 | 10.5 | 9.3 | 10.5 |
| 85° | 40.7 | 43.0 | 23.3 | 15.1 | 10.5 | 7.0 | 5.8 | 4.7 | 4.7 | 3.5 | 4.7 |
| 87.5° | 4.7 | 5.8 | 4.7 | 3.5 | 2.3 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 |
| 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-79-08: Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Report Prepared for

Cooper Lighting Solutions

All Brands

Data applicable to all product families using SA light engines

Report Number: SP1-2101-121-7

Luminaire Tested: IFLD-S-SA2A-735-U-T2

Test Date: 03/04/2021

Report Generated By controller / USPTCWHP6086842

## Test Information

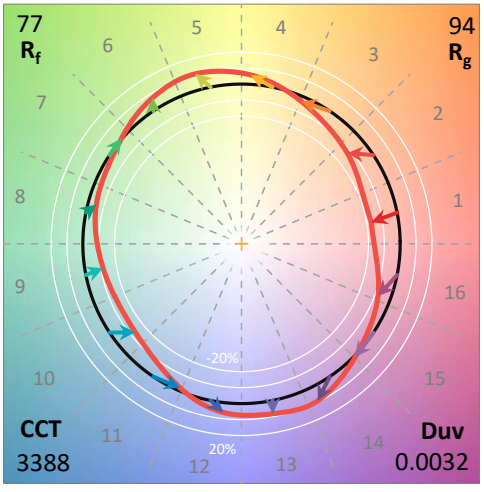
| | |
|---|---|
| Test Method: | LM-79-08 |
| Report Number: | SP1-2101-121-7 |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Photometer: | SP1 |
| Measurement Geometry: | 4π |
| Issue Date: | 03/04/2021 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS (FORMERLY EATON) |
| Product Line: | STREETWORKS |
| Catalog Number: | **IFLD-S-SA2A-735-U-T2** |
| Description: | STREETWORKS INF FLOOD |

PROGRAMMED @ 615mA.

## Spectral Parameters

| | | | | | |
|---|---|---|---|---|---|
| CCT (K): | 3388 | CRI (Ra): | 73.1 | | |
| CIE u': | 0.2371 | R1: | 68.9 | R9: | -34.6 |
| CIE v': | 0.5177 | R2: | 81.1 | R10: | 57.8 |
| Duv: | 0.0032 | R3: | 93.1 | R11: | 68.6 |
| CIE x: | 0.4153 | R4: | 71.6 | R12: | 53.9 |
| CIE y: | 0.4030 | R5: | 69.4 | R13: | 70.9 |
| CIE z: | 0.1817 | R6: | 75.0 | R14: | 96.2 |
| Peak Wavelength (nm): | 590 | R7: | 79.5 | | |
| Dominant Wavelength (nm): | 580 | R8: | 46.4 | | |
| Purity: | 45.7 | | | | |

| | |
|---|---|
| Rf: | 76.9 |
| Rg: | 94.4 |




## Test Conditions

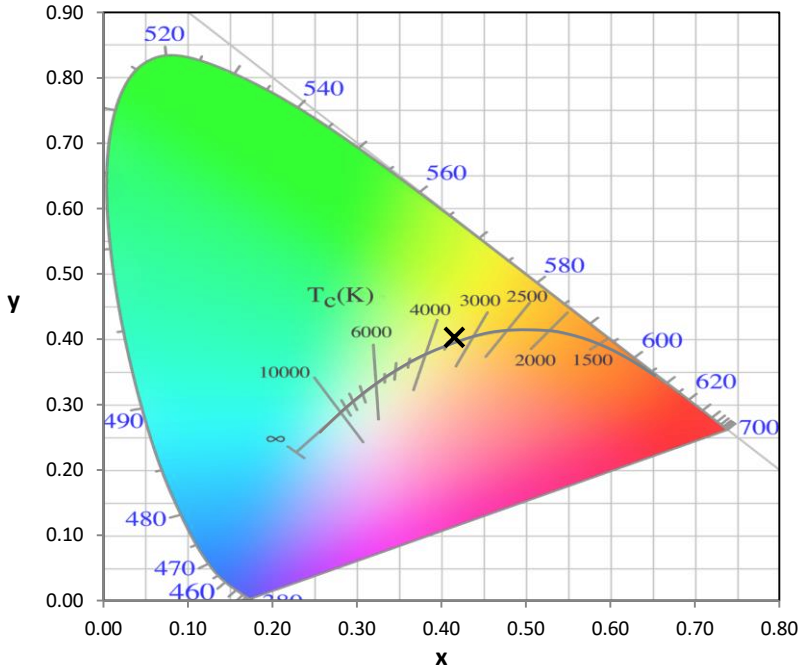
| | |
|---|---|
| Stabilization Time: | 81M |
| Operation Time: | 12H |
| Room Temperature (°C) / RH%: | 25.0/30% |
| Sphere Temperature (°C): | 24.1 |

REPORT NUMBER: SP1-2101-121-7

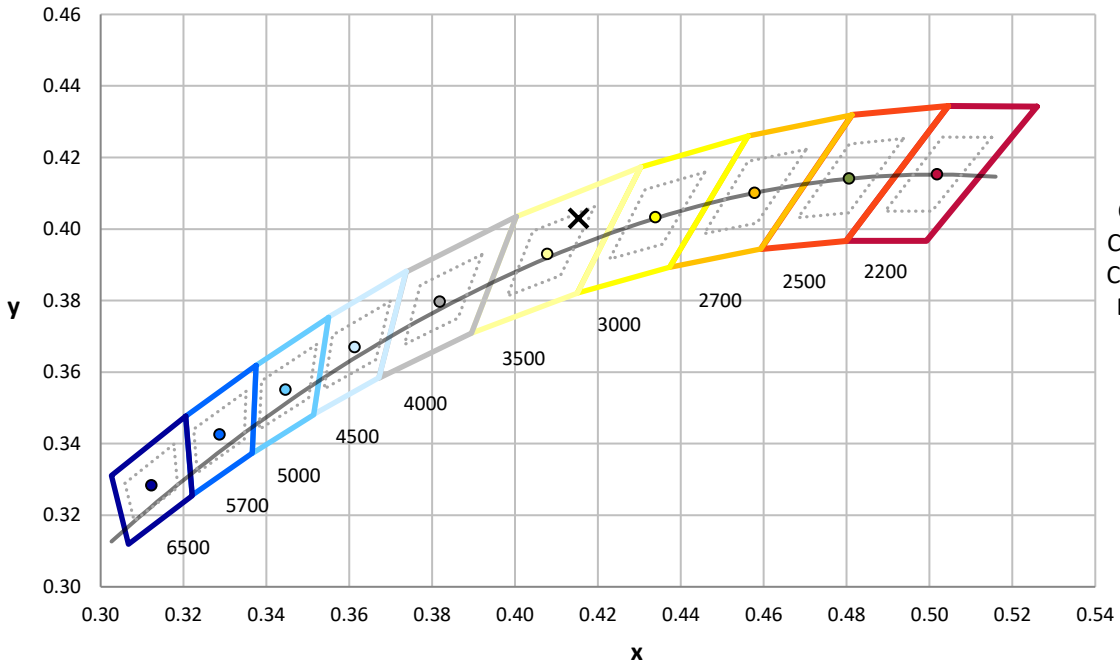
| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 1/31/2021 | 7/31/2021 |
| Power Meter | IN0071 | 12/1/2020 | 12/1/2021 |
| AC Power Source | IN0063 | 12/1/2020 | 12/1/2021 |
| DC Power Source | IN0208 | 12/1/2020 | 12/1/2021 |
| Sphere Thermometer | IN0085 | 12/1/2020 | 12/1/2021 |
| Room Thermometer | IN0046 | 12/1/2020 | 12/1/2021 |

REPORT NUMBER: SP1-2101-121-7

## CIE 1931 Chromaticity Diagram




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




CCT = 3388K
CIE x = 0.4153
CIE y = 0.4030
Duv = 0.0032

Point lies inside the ANSI 3500K 4-step quadrangle

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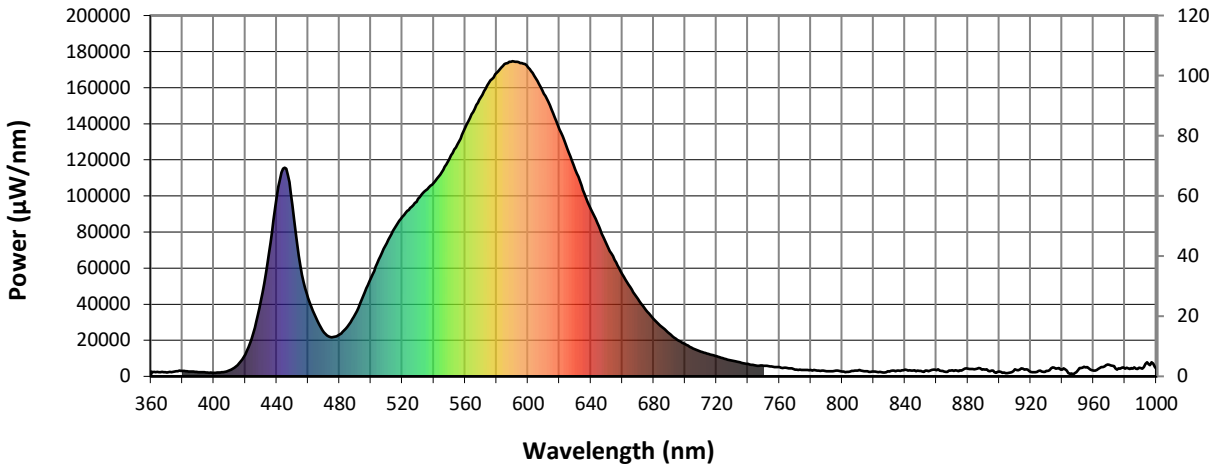
## Photopic Flux vs. Wavelength




######

| λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) | λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) | λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) | λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) | λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 360 | 2672 | 0.0 | 490 | 34553 | 4.9 | 620 | 136720 | 35.6 | 750 | 5870 | 0.0 | 880 | 4216 | 0.0 |
| 365 | 2252 | 0.0 | 495 | 44336 | 8.0 | 625 | 126308 | 27.9 | 755 | 5421 | 0.0 | 885 | 4132 | 0.0 |
| 370 | 2217 | 0.0 | 500 | 54643 | 12.1 | 630 | 114625 | 20.7 | 760 | 5097 | 0.0 | 890 | 3992 | 0.0 |
| 375 | 2697 | 0.0 | 505 | 64676 | 18.1 | 635 | 103216 | 15.5 | 765 | 4626 | 0.0 | 895 | 3214 | 0.0 |
| 380 | 3039 | 0.0 | 510 | 73825 | 25.4 | 640 | 92605 | 11.1 | 770 | 3782 | 0.0 | 900 | 2580 | 0.0 |
| 385 | 2655 | 0.0 | 515 | 81872 | 33.9 | 645 | 83234 | 8.0 | 775 | 3506 | 0.0 | 905 | 1776 | 0.0 |
| 390 | 2357 | 0.0 | 520 | 88574 | 43.0 | 650 | 73263 | 5.4 | 780 | 3507 | 0.0 | 910 | 3995 | 0.0 |
| 395 | 2186 | 0.0 | 525 | 93289 | 50.1 | 655 | 64627 | 3.7 | 785 | 3267 | 0.0 | 915 | 4288 | 0.0 |
| 400 | 2015 | 0.0 | 530 | 98393 | 57.9 | 660 | 56614 | 2.4 | 790 | 2849 | 0.0 | 920 | 2446 | 0.0 |
| 405 | 2234 | 0.0 | 535 | 103269 | 64.0 | 665 | 49537 | 1.6 | 795 | 3037 | 0.0 | 925 | 3009 | 0.0 |
| 410 | 3412 | 0.0 | 540 | 107316 | 69.9 | 670 | 42866 | 0.9 | 800 | 2716 | 0.0 | 930 | 3026 | 0.0 |
| 415 | 6135 | 0.0 | 545 | 113101 | 75.3 | 675 | 36708 | 0.6 | 805 | 2648 | 0.0 | 935 | 4734 | 0.0 |
| 420 | 12146 | 0.0 | 550 | 120690 | 82.0 | 680 | 31814 | 0.4 | 810 | 3187 | 0.0 | 940 | 3719 | 0.0 |
| 425 | 23983 | 0.1 | 555 | 128583 | 87.8 | 685 | 27485 | 0.2 | 815 | 2931 | 0.0 | 945 | 1480 | 0.0 |
| 430 | 42142 | 0.3 | 560 | 137796 | 93.6 | 690 | 23698 | 0.1 | 820 | 2717 | 0.0 | 950 | 3450 | 0.0 |
| 435 | 68228 | 0.8 | 565 | 146577 | 97.5 | 695 | 20309 | 0.1 | 825 | 2236 | 0.0 | 955 | 5051 | 0.0 |
| 440 | 99323 | 1.6 | 570 | 154581 | 100.5 | 700 | 17890 | 0.1 | 830 | 2628 | 0.0 | 960 | 3176 | 0.0 |
| 445 | 115584 | 2.4 | 575 | 162633 | 101.2 | 705 | 15500 | 0.0 | 835 | 3140 | 0.0 | 965 | 5178 | 0.0 |
| 450 | 94997 | 2.5 | 580 | 168101 | 99.9 | 710 | 13699 | 0.0 | 840 | 3675 | 0.0 | 970 | 6385 | 0.0 |
| 455 | 61433 | 2.1 | 585 | 173145 | 96.2 | 715 | 12398 | 0.0 | 845 | 3283 | 0.0 | 975 | 3810 | 0.0 |
| 460 | 43373 | 1.8 | 590 | 174675 | 90.3 | 720 | 11147 | 0.0 | 850 | 3055 | 0.0 | 980 | 4322 | 0.0 |
| 465 | 32472 | 1.7 | 595 | 173724 | 82.3 | 725 | 9761 | 0.0 | 855 | 2932 | 0.0 | 985 | 4200 | 0.0 |
| 470 | 24257 | 1.5 | 600 | 171241 | 73.8 | 730 | 8651 | 0.0 | 860 | 3382 | 0.0 | 990 | 4661 | 0.0 |
| 475 | 21690 | 1.7 | 605 | 165134 | 64.0 | 735 | 7730 | 0.0 | 865 | 2605 | 0.0 | 995 | 6746 | 0.0 |
| 480 | 23173 | 2.2 | 610 | 156652 | 53.8 | 740 | 6847 | 0.0 | 870 | 3325 | 0.0 | 1000 | 4150 | 0.0 |
| 485 | 27564 | 3.3 | 615 | 147879 | 44.6 | 745 | 6124 | 0.0 | 875 | 3325 | 0.0 | | | |

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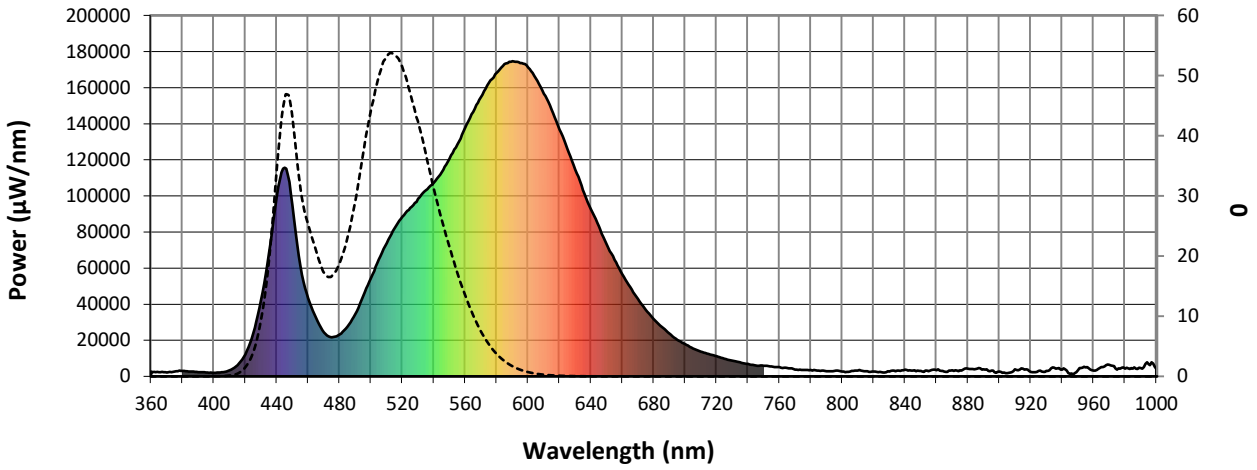
## Scotopic Flux vs. Wavelength




**Scotopic Lumens: 12126** **S/P: 1.36**

| λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) | λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) | λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) | λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) | λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 360 | 2672 | 0.0 | 490 | 34553 | 53.2 | 620 | 136720 | 1.7 | 750 | 5870 | 0.0 | 880 | 4216 | 0.0 |
| 365 | 2252 | 0.0 | 495 | 44336 | 71.7 | 625 | 126308 | 1.1 | 755 | 5421 | 0.0 | 885 | 4132 | 0.0 |
| 370 | 2217 | 0.0 | 500 | 54643 | 91.4 | 630 | 114625 | 0.6 | 760 | 5097 | 0.0 | 890 | 3992 | 0.0 |
| 375 | 2697 | 0.0 | 505 | 64676 | 110.0 | 635 | 103216 | 0.4 | 765 | 4626 | 0.0 | 895 | 3214 | 0.0 |
| 380 | 3039 | 0.0 | 510 | 73825 | 125.1 | 640 | 92605 | 0.2 | 770 | 3782 | 0.0 | 900 | 2580 | 0.0 |
| 385 | 2655 | 0.0 | 515 | 81872 | 135.7 | 645 | 83234 | 0.1 | 775 | 3506 | 0.0 | 905 | 1776 | 0.0 |
| 390 | 2357 | 0.0 | 520 | 88574 | 140.8 | 650 | 73263 | 0.1 | 780 | 3507 | 0.0 | 910 | 3995 | 0.0 |
| 395 | 2186 | 0.0 | 525 | 93289 | 139.6 | 655 | 64627 | 0.1 | 785 | 3267 | 0.0 | 915 | 4288 | 0.0 |
| 400 | 2015 | 0.0 | 530 | 98393 | 135.7 | 660 | 56614 | 0.0 | 790 | 2849 | 0.0 | 920 | 2446 | 0.0 |
| 405 | 2234 | 0.1 | 535 | 103269 | 128.7 | 665 | 49537 | 0.0 | 795 | 3037 | 0.0 | 925 | 3009 | 0.0 |
| 410 | 3412 | 0.2 | 540 | 107316 | 118.6 | 670 | 42866 | 0.0 | 800 | 2716 | 0.0 | 930 | 3026 | 0.0 |
| 415 | 6135 | 0.6 | 545 | 113101 | 108.4 | 675 | 36708 | 0.0 | 805 | 2648 | 0.0 | 935 | 4734 | 0.0 |
| 420 | 12146 | 2.0 | 550 | 120690 | 98.7 | 680 | 31814 | 0.0 | 810 | 3187 | 0.0 | 940 | 3719 | 0.0 |
| 425 | 23983 | 5.9 | 555 | 128583 | 87.9 | 685 | 27485 | 0.0 | 815 | 2931 | 0.0 | 945 | 1480 | 0.0 |
| 430 | 42142 | 14.3 | 560 | 137796 | 77.0 | 690 | 23698 | 0.0 | 820 | 2717 | 0.0 | 950 | 3450 | 0.0 |
| 435 | 68228 | 30.5 | 565 | 146577 | 65.8 | 695 | 20309 | 0.0 | 825 | 2236 | 0.0 | 955 | 5051 | 0.0 |
| 440 | 99323 | 55.5 | 570 | 154581 | 54.6 | 700 | 17890 | 0.0 | 830 | 2628 | 0.0 | 960 | 3176 | 0.0 |
| 445 | 115584 | 77.4 | 575 | 162633 | 44.3 | 705 | 15500 | 0.0 | 835 | 3140 | 0.0 | 965 | 5178 | 0.0 |
| 450 | 94997 | 73.6 | 580 | 168101 | 34.6 | 710 | 13699 | 0.0 | 840 | 3675 | 0.0 | 970 | 6385 | 0.0 |
| 455 | 61433 | 53.7 | 585 | 173145 | 26.5 | 715 | 12398 | 0.0 | 845 | 3283 | 0.0 | 975 | 3810 | 0.0 |
| 460 | 43373 | 41.9 | 590 | 174675 | 19.5 | 720 | 11147 | 0.0 | 850 | 3055 | 0.0 | 980 | 4322 | 0.0 |
| 465 | 32472 | 34.3 | 595 | 173724 | 13.9 | 725 | 9761 | 0.0 | 855 | 2932 | 0.0 | 985 | 4200 | 0.0 |
| 470 | 24257 | 27.9 | 600 | 171241 | 9.7 | 730 | 8651 | 0.0 | 860 | 3382 | 0.0 | 990 | 4661 | 0.0 |
| 475 | 21690 | 27.1 | 605 | 165134 | 6.5 | 735 | 7730 | 0.0 | 865 | 2605 | 0.0 | 995 | 6746 | 0.0 |
| 480 | 23173 | 31.3 | 610 | 156652 | 4.2 | 740 | 6847 | 0.0 | 870 | 3325 | 0.0 | 1000 | 4150 | 0.0 |
| 485 | 27564 | 40.0 | 615 | 147879 | 2.7 | 745 | 6124 | 0.0 | 875 | 3325 | 0.0 | | | |

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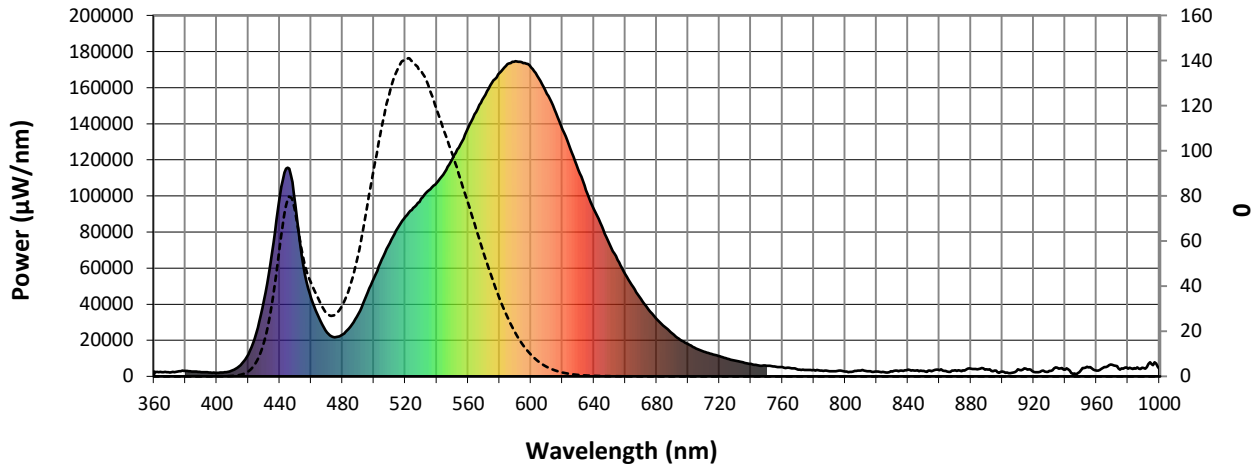
## Melanopic Flux vs. Wavelength




**Melanopic Lumens: 4490.7** **M/P: 0.5**

| λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) | λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) | λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) | λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) | λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 360 | 2672 | 0.0 | 490 | 34553 | 28.8 | 620 | 136720 | 0.1 | 750 | 5870 | 0.0 | 880 | 4216 | 0.0 |
| 365 | 2252 | 0.0 | 495 | 44336 | 36.6 | 625 | 126308 | 0.1 | 755 | 5421 | 0.0 | 885 | 4132 | 0.0 |
| 370 | 2217 | 0.0 | 500 | 54643 | 43.9 | 630 | 114625 | 0.0 | 760 | 5097 | 0.0 | 890 | 3992 | 0.0 |
| 375 | 2697 | 0.0 | 505 | 64676 | 49.6 | 635 | 103216 | 0.0 | 765 | 4626 | 0.0 | 895 | 3214 | 0.0 |
| 380 | 3039 | 0.0 | 510 | 73825 | 53.0 | 640 | 92605 | 0.0 | 770 | 3782 | 0.0 | 900 | 2580 | 0.0 |
| 385 | 2655 | 0.0 | 515 | 81872 | 53.5 | 645 | 83234 | 0.0 | 775 | 3506 | 0.0 | 905 | 1776 | 0.0 |
| 390 | 2357 | 0.0 | 520 | 88574 | 51.6 | 650 | 73263 | 0.0 | 780 | 3507 | 0.0 | 910 | 3995 | 0.0 |
| 395 | 2186 | 0.0 | 525 | 93289 | 47.3 | 655 | 64627 | 0.0 | 785 | 3267 | 0.0 | 915 | 4288 | 0.0 |
| 400 | 2015 | 0.0 | 530 | 98393 | 42.5 | 660 | 56614 | 0.0 | 790 | 2849 | 0.0 | 920 | 2446 | 0.0 |
| 405 | 2234 | 0.0 | 535 | 103269 | 37.2 | 665 | 49537 | 0.0 | 795 | 3037 | 0.0 | 925 | 3009 | 0.0 |
| 410 | 3412 | 0.1 | 540 | 107316 | 31.4 | 670 | 42866 | 0.0 | 800 | 2716 | 0.0 | 930 | 3026 | 0.0 |
| 415 | 6135 | 0.4 | 545 | 113101 | 26.3 | 675 | 36708 | 0.0 | 805 | 2648 | 0.0 | 935 | 4734 | 0.0 |
| 420 | 12146 | 1.4 | 550 | 120690 | 21.7 | 680 | 31814 | 0.0 | 810 | 3187 | 0.0 | 940 | 3719 | 0.0 |
| 425 | 23983 | 3.7 | 555 | 128583 | 17.3 | 685 | 27485 | 0.0 | 815 | 2931 | 0.0 | 945 | 1480 | 0.0 |
| 430 | 42142 | 8.9 | 560 | 137796 | 13.6 | 690 | 23698 | 0.0 | 820 | 2717 | 0.0 | 950 | 3450 | 0.0 |
| 435 | 68228 | 18.2 | 565 | 146577 | 10.3 | 695 | 20309 | 0.0 | 825 | 2236 | 0.0 | 955 | 5051 | 0.0 |
| 440 | 99323 | 33.2 | 570 | 154581 | 7.6 | 700 | 17890 | 0.0 | 830 | 2628 | 0.0 | 960 | 3176 | 0.0 |
| 445 | 115584 | 45.6 | 575 | 162633 | 5.4 | 705 | 15500 | 0.0 | 835 | 3140 | 0.0 | 965 | 5178 | 0.0 |
| 450 | 94997 | 43.8 | 580 | 168101 | 3.8 | 710 | 13699 | 0.0 | 840 | 3675 | 0.0 | 970 | 6385 | 0.0 |
| 455 | 61433 | 32.2 | 585 | 173145 | 2.6 | 715 | 12398 | 0.0 | 845 | 3283 | 0.0 | 975 | 3810 | 0.0 |
| 460 | 43373 | 25.6 | 590 | 174675 | 1.7 | 720 | 11147 | 0.0 | 850 | 3055 | 0.0 | 980 | 4322 | 0.0 |
| 465 | 32472 | 21.2 | 595 | 173724 | 1.1 | 725 | 9761 | 0.0 | 855 | 2932 | 0.0 | 985 | 4200 | 0.0 |
| 470 | 24257 | 17.4 | 600 | 171241 | 0.7 | 730 | 8651 | 0.0 | 860 | 3382 | 0.0 | 990 | 4661 | 0.0 |
| 475 | 21690 | 16.6 | 605 | 165134 | 0.5 | 735 | 7730 | 0.0 | 865 | 2605 | 0.0 | 995 | 6746 | 0.0 |
| 480 | 23173 | 18.6 | 610 | 156652 | 0.3 | 740 | 6847 | 0.0 | 870 | 3325 | 0.0 | 1000 | 4150 | 0.0 |
| 485 | 27564 | 22.7 | 615 | 147879 | 0.2 | 745 | 6124 | 0.0 | 875 | 3325 | 0.0 | | | |

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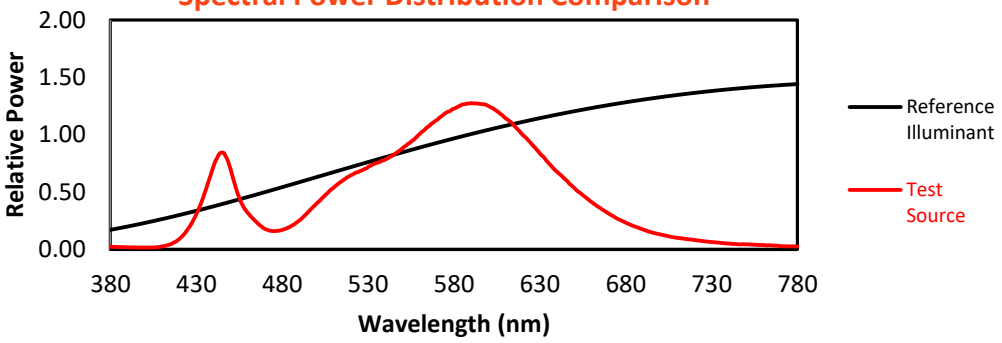
# TM-30-18

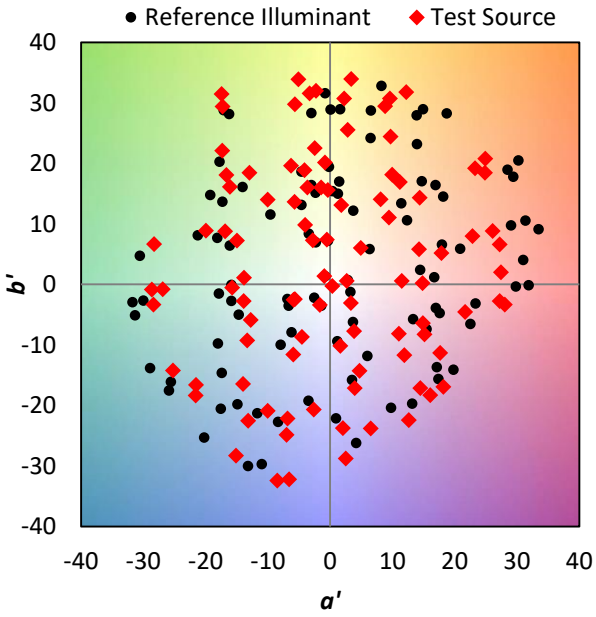
## Summary

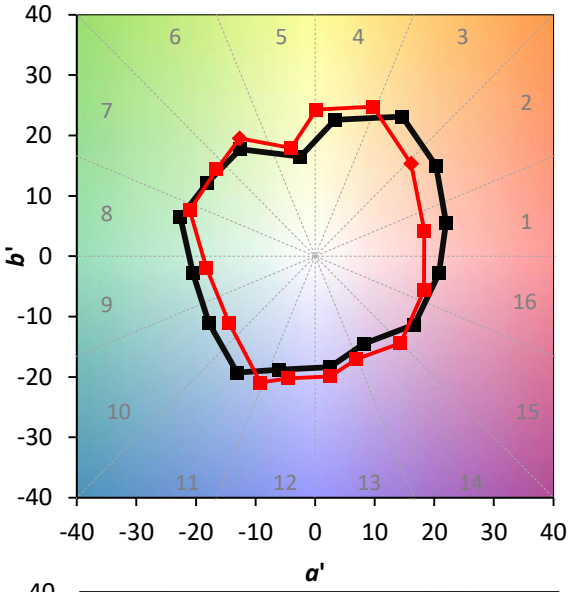
$R_f$ = 76.9
$R_g$ = 94.4
CIE $R_a$ = 73.1
$R_9$ = -34.6

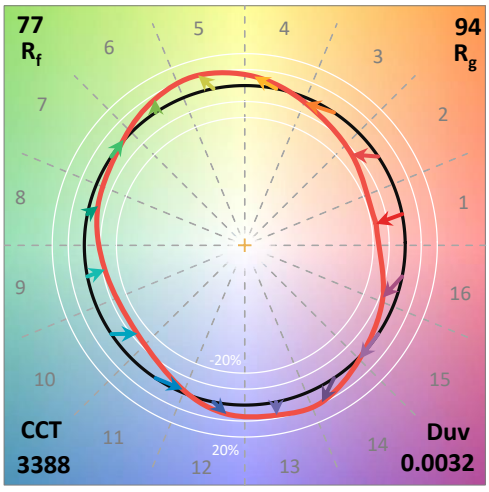
## Spectral Power Distribution Comparison

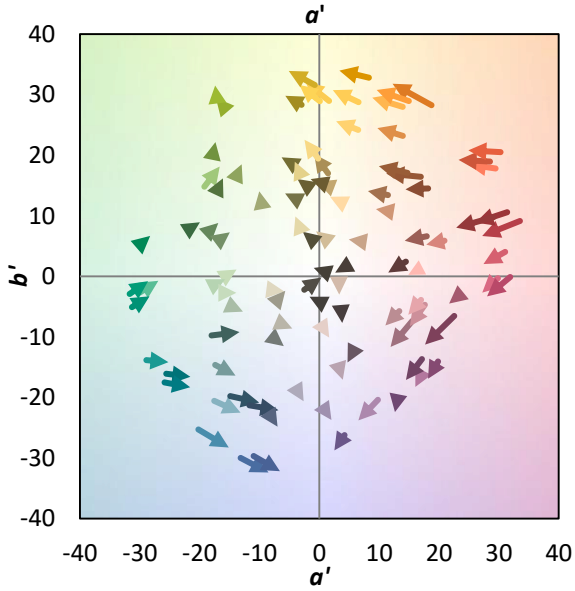



## Color Vector Graphics



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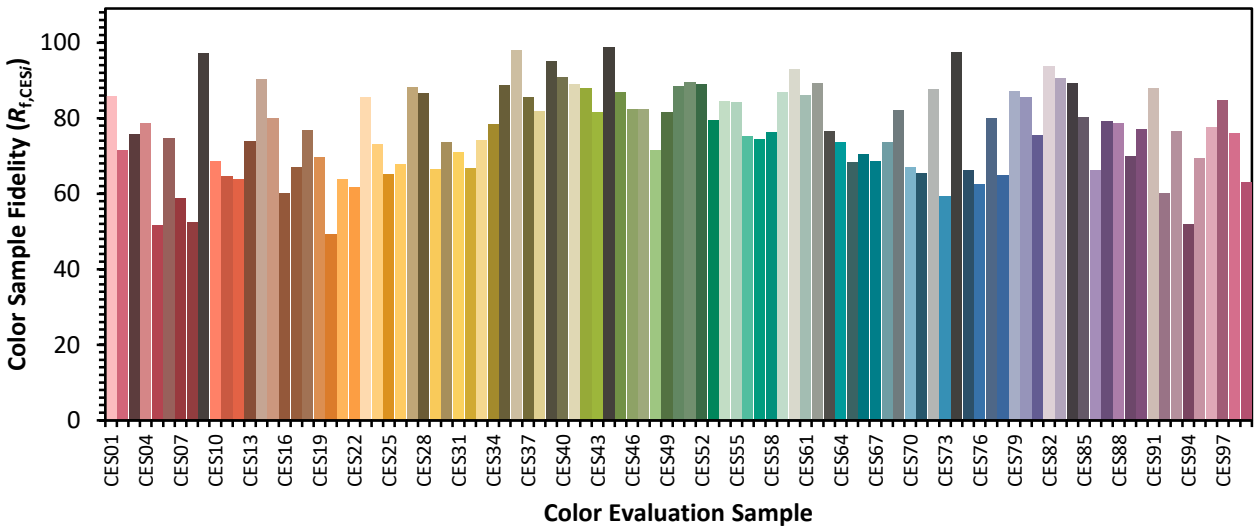
# TM-30-18

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

| | | | |
|---|---|---|---|
| CES01 = 86 | CES26 = 68 | CES51 = 90 | CES76 = 63 |
| CES02 = 62 | CES27 = 88 | CES52 = 89 | CES77 = 80 |
| CES03 = 31 | CES28 = 87 | CES53 = 80 | CES78 = 65 |
| CES04 = 70 | CES29 = 67 | CES54 = 84 | CES79 = 87 |
| CES05 = 48 | CES30 = 74 | CES55 = 84 | CES80 = 86 |
| CES06 = 51 | CES31 = 71 | CES56 = 75 | CES81 = 75 |
| CES07 = 40 | CES32 = 67 | CES57 = 74 | CES82 = 94 |
| CES08 = 39 | CES33 = 74 | CES58 = 76 | CES83 = 91 |
| CES09 = 29 | CES34 = 78 | CES59 = 87 | CES84 = 89 |
| CES10 = 75 | CES35 = 89 | CES60 = 93 | CES85 = 80 |
| CES11 = 58 | CES36 = 98 | CES61 = 86 | CES86 = 66 |
| CES12 = 64 | CES37 = 86 | CES62 = 89 | CES87 = 79 |
| CES13 = 43 | CES38 = 82 | CES63 = 77 | CES88 = 79 |
| CES14 = 74 | CES39 = 95 | CES64 = 74 | CES89 = 70 |
| CES15 = 71 | CES40 = 91 | CES65 = 68 | CES90 = 77 |
| CES16 = 47 | CES41 = 89 | CES66 = 71 | CES91 = 88 |
| CES17 = 50 | CES42 = 88 | CES67 = 69 | CES92 = 60 |
| CES18 = 56 | CES43 = 82 | CES68 = 74 | CES93 = 77 |
| CES19 = 72 | CES44 = 99 | CES69 = 82 | CES94 = 52 |
| CES20 = 65 | CES45 = 87 | CES70 = 67 | CES95 = 69 |
| CES21 = 86 | CES46 = 82 | CES71 = 66 | CES96 = 78 |
| CES22 = 79 | CES47 = 82 | CES72 = 88 | CES97 = 85 |
| CES23 = 92 | CES48 = 72 | CES73 = 59 | CES98 = 76 |
| CES24 = 91 | CES49 = 82 | CES74 = 97 | CES99 = 63 |
| CES25 = 72 | CES50 = 88 | CES75 = 66 | |



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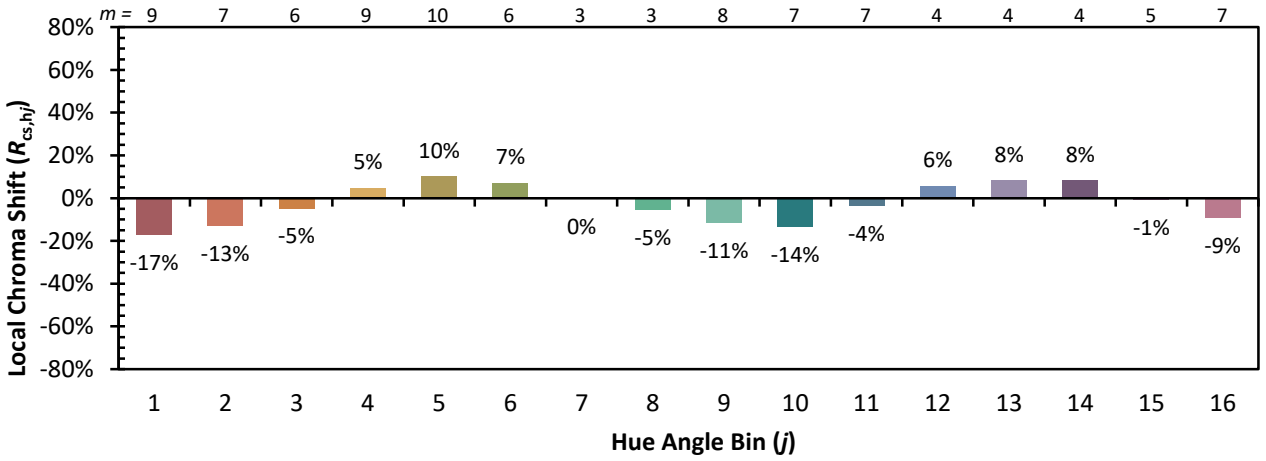
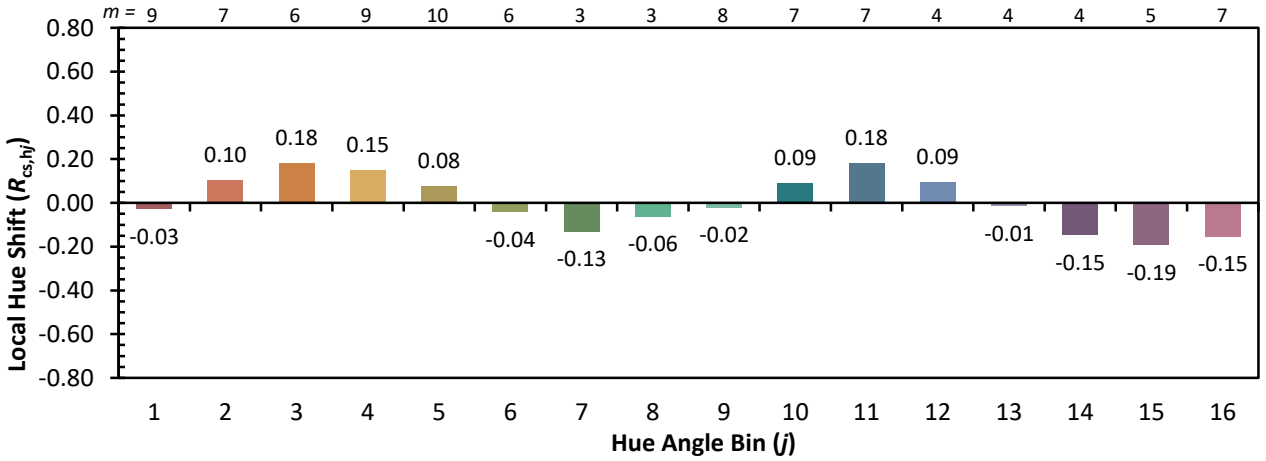
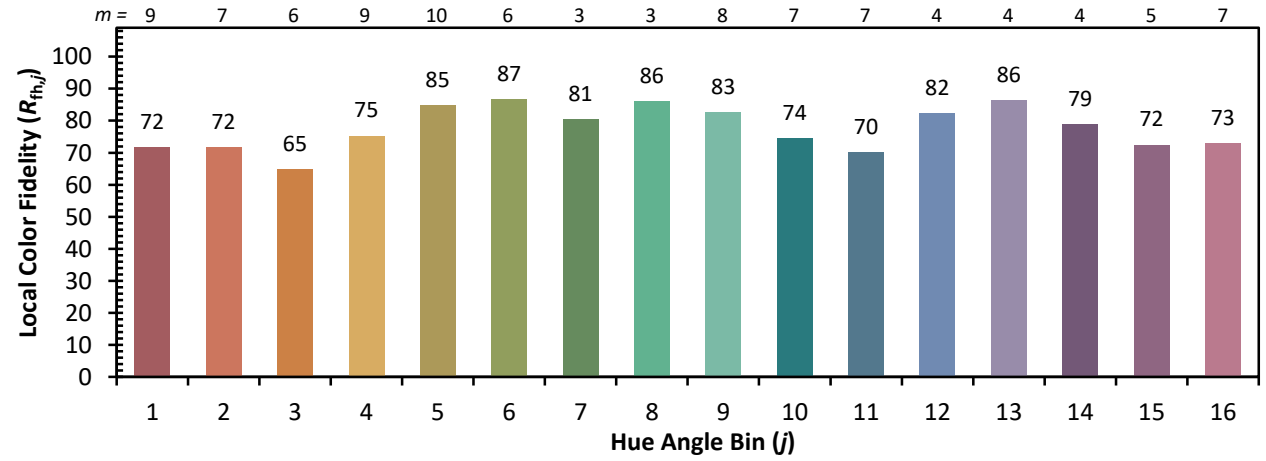
## Color Rendition by Hue-Angle Bin



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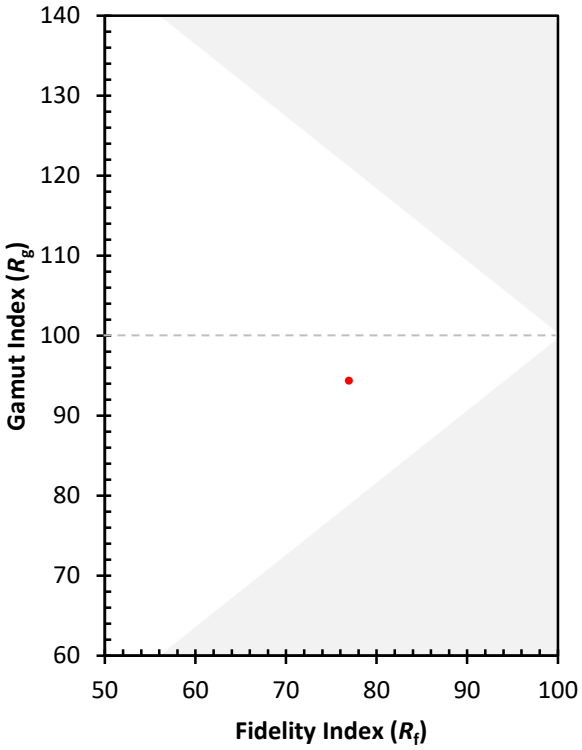
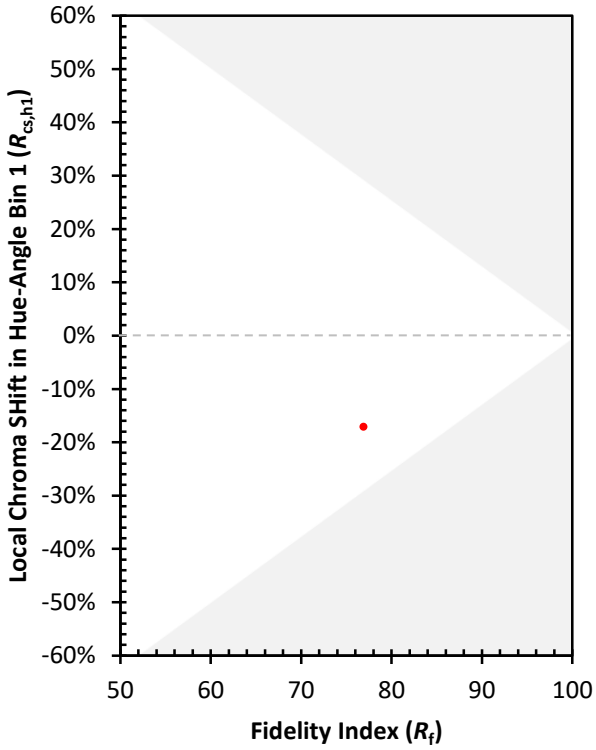
# TM-30-18

## Measure Comparisons




(END OF REPORT)