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: P821492

Luminaire Tested: **TT-D2-735-12VDC-MQ-UPL**

Issue Date: 7/23/2020

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: | P821492 |
| | REPORT IS FROM IESNA LM-79-08 TEST DATA - UPLIGHT (G2-2002-677-2) AND |
| Test Lab: | INNOVATION CENTER |
| Issue Date: | 7/23/2020 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS (FORMERLY EATON) |
| Product Line: | McGRAW-EDISON |
| Catalog Number: | TT-D2-735-12VDC-MQ-UPL |
| Description: | TOPTIER LED PARKING GARAGE LUMINAIRE WITH UPLIGHT |
| | 3500K, 70 CRI LEDS AND MEDIUM DISTRIBUTION |
| Light Source: | - |
| Ballast/Driver: | ELECTRONIC DRIVER |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 6104.7 lumens |
| Efficiency: | N/A |
| Efficacy: | 160.7 lumens/watt |
| Luminous Opening: | Vertical Cylinder (Dia: 1.12' x H: 0.1') |
| IES Classification: | Type V - Short |
| BUG Rating: | B2 - U4 - G2 |

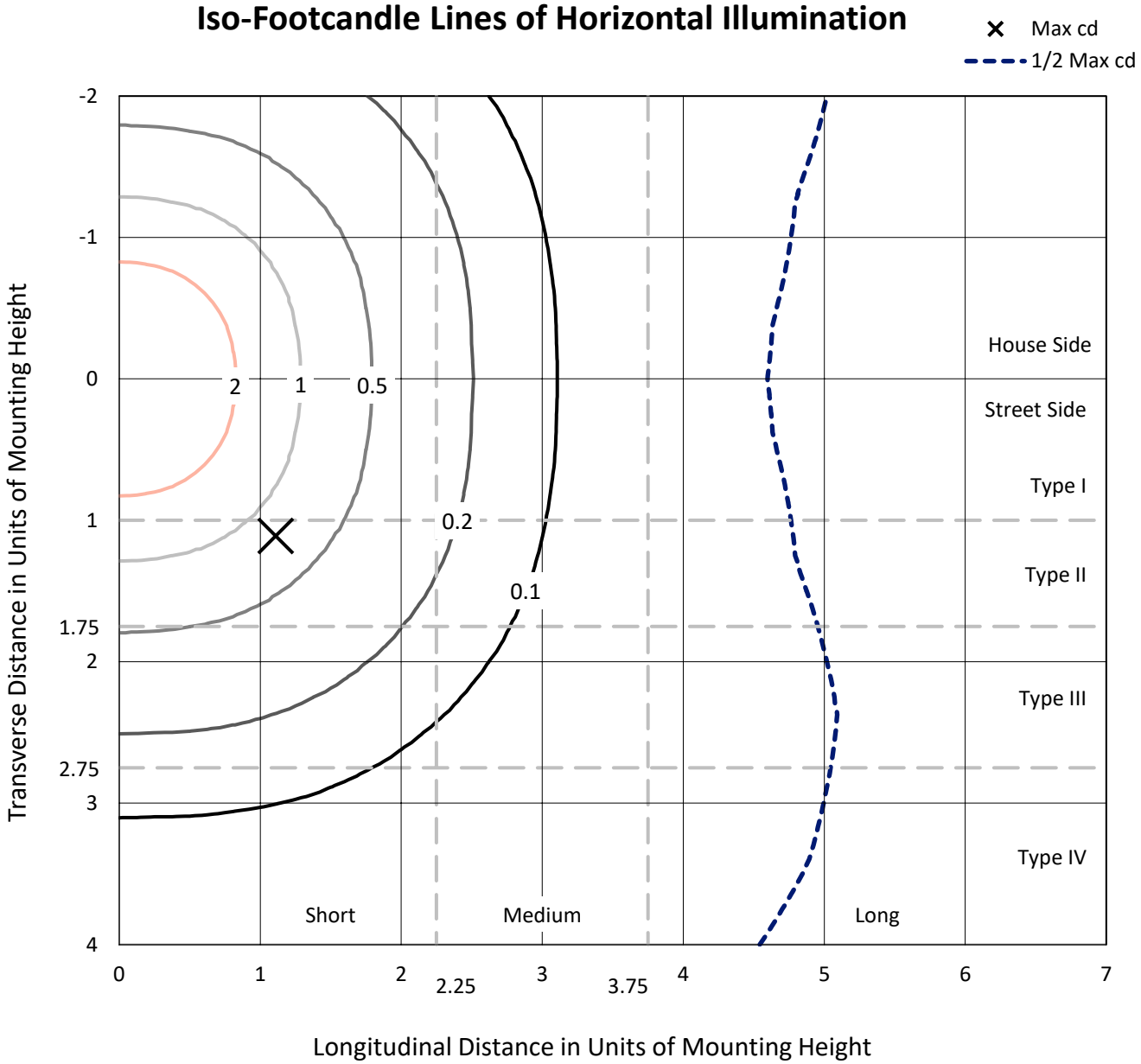
| | |
|---|---|
| Input Watts (W): | 38 |
| Input Voltage (V): | NR |
| Input Current (Ain): | NR |
| Voltage Rise (V): | NR |
| Power Factor: | NR |
| Total Harmonic Distortion (THDi): | NR |
| Frequency (hertz): | 60 |
| Stabilization Time: | NR |
| Operation Time: | NR |
| Ambient Temperature (°C):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

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Scaled Data Report

REPORT NUMBER: P821492
CATALOG NUMBER: TT-D2-735-12VDC-MQ-UPL

## Iso-Footcandle Lines of Horizontal Illumination



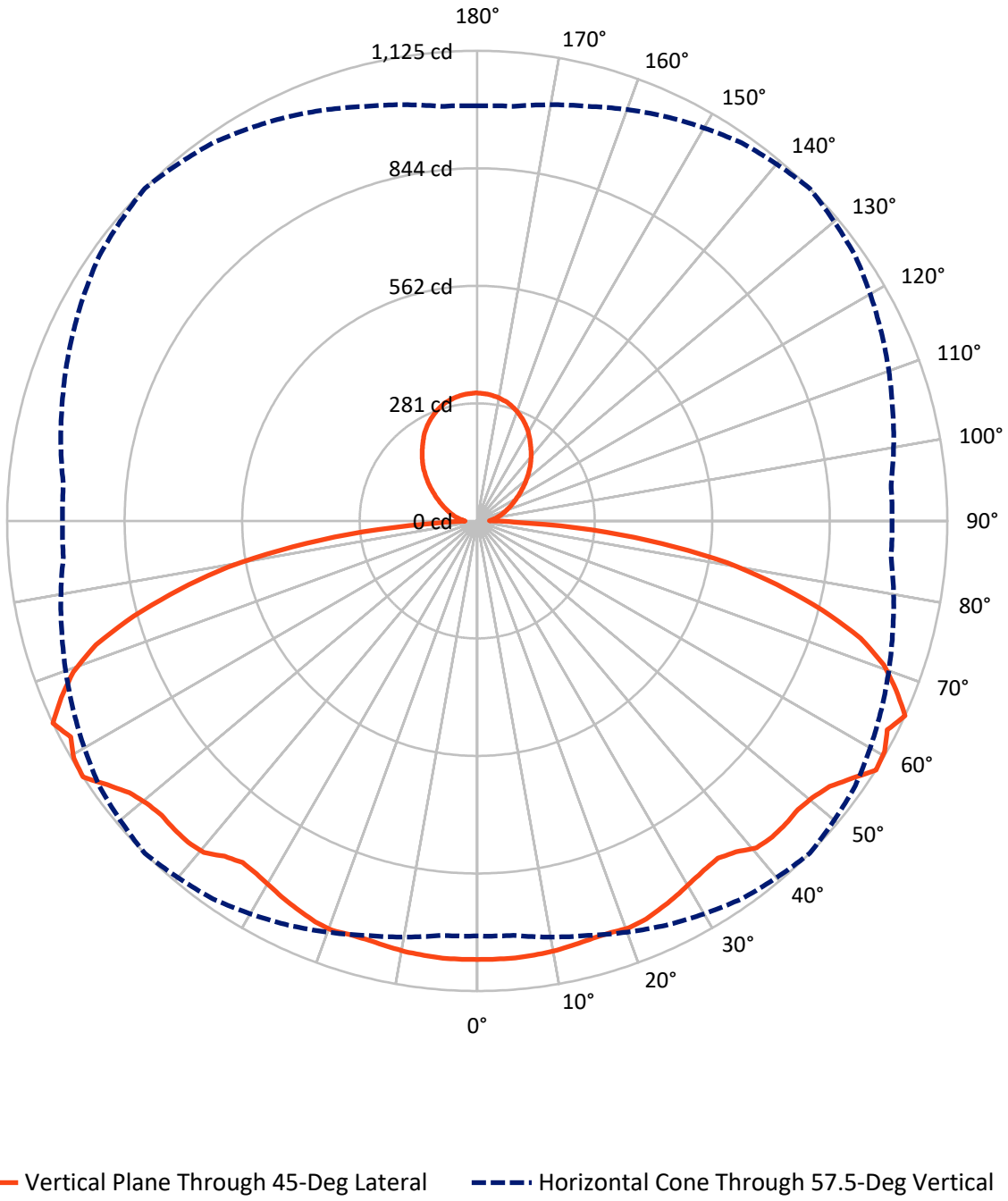

Based on 15 foot mounting height. Maximum calculated value = 4.7 fc
Type V - Short - N/A

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## Luminous Intensity Polar Plot



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Scaled Data Report

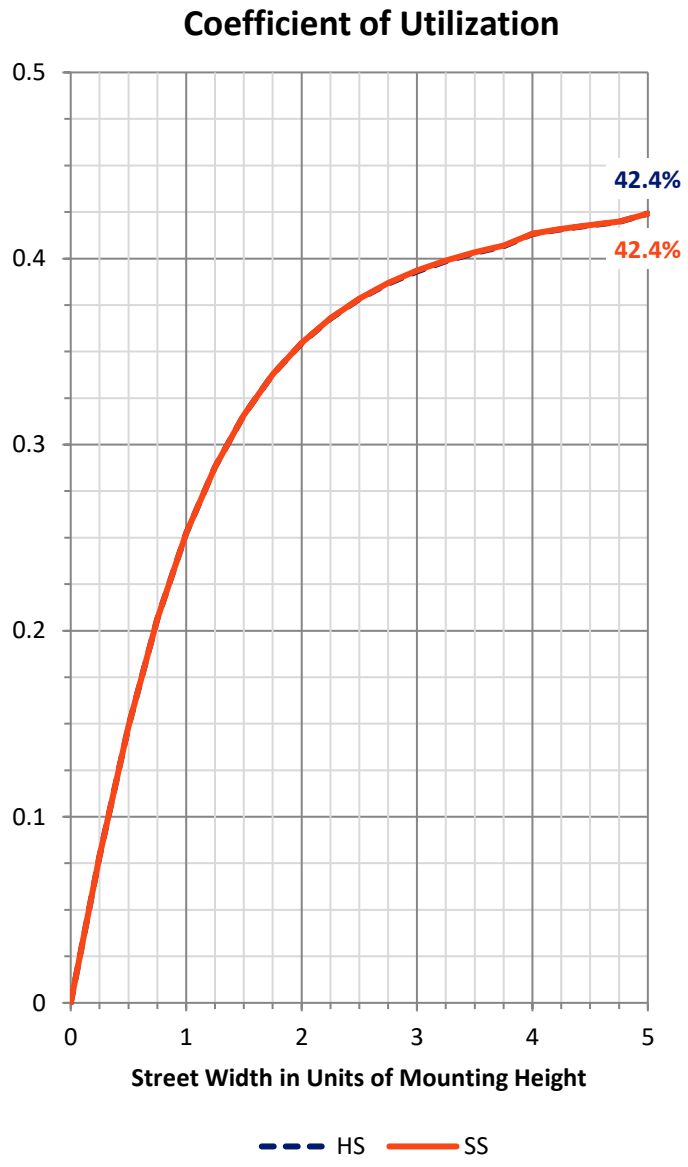
REPORT NUMBER: P821492
CATALOG NUMBER: TT-D2-735-12VDC-MQ-UPL

**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 2636.5 | 415.9 | 3052.4 |
| | % Fixture | 43.2 | 6.8 | 50.0 |
| **Street Side** | Lumens | 2636.5 | 415.9 | 3052.4 |
| | % Fixture | 43.2 | 6.8 | 50.0 |
| **Total** | Lumens | 5273.0 | 831.7 | 6104.7 |
| | % Fixture | 86.4 | 13.6 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 100.0 | 1.6 |
| 10°-20° | 294.1 | 4.8 |
| 20°-30° | 472.6 | 7.7 |
| 30°-40° | 623.9 | 10.2 |
| 40°-50° | 780.6 | 12.8 |
| 50°-60° | 928.5 | 15.2 |
| 60°-70° | 1007.0 | 16.5 |
| 70°-80° | 801.6 | 13.1 |
| 80°-90° | 264.6 | 4.3 |
| 90°-100° | 42.6 | 0.7 |
| 100°-110° | 66.0 | 1.1 |
| 110°-120° | 91.9 | 1.5 |
| 120°-130° | 119.0 | 1.9 |
| 130°-140° | 138.7 | 2.3 |
| 140°-150° | 140.5 | 2.3 |
| 150°-160° | 121.9 | 2.0 |
| 160°-170° | 82.2 | 1.3 |
| 170°-180° | 28.9 | 0.5 |
| 0°-90° | 5273.0 | 86.4 |
| 0°-180° | 6104.7 | 100.0 |



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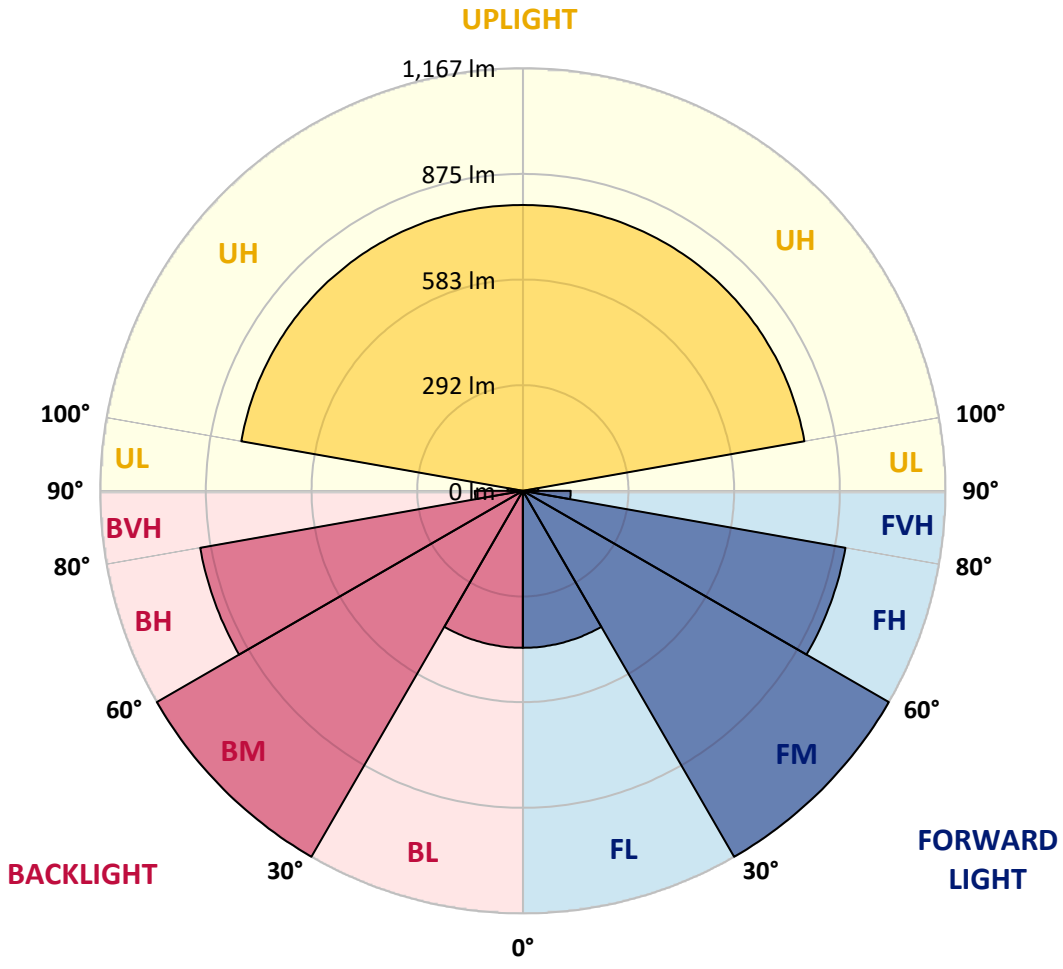
Scaled Data Report

REPORT NUMBER: P821492
CATALOG NUMBER: TT-D2-735-12VDC-MQ-UPL

## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 433.4 | 7.1 | | | |
| FM | (30°-60°) | 1166.5 | 19.1 | | | |
| FH | (60°-80°) | 904.3 | 14.8 | | | G1/1800 |
| FVH | (80°-90°) | 132.3 | 2.2 | | | G2/225 |
| BL | (0°-30°) | 433.4 | 7.1 | B1/500 | | |
| BM | (30°-60°) | 1166.5 | 19.1 | B2/2500 | | |
| BH | (60°-80°) | 904.3 | 14.8 | B2/1000 | | G1/1800 |
| BVH | (80°-90°) | 132.3 | 2.2 | | | G2/225 |
| UL | (90°-100°) | 42.6 | 0.7 | | U2/50 | |
| UH | (100°-180°) | 789.1 | 12.9 | | U4/1000 | |

**BUG Rating: B2-U4-G2**
Type V Short



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REPORT NUMBER: P821492
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**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 65° | 75° | 85° | 90° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 1049.4 | 1049.4 | 1049.4 | 1049.4 | 1049.4 | *1049.4* | 1049.4 | 1049.4 | 1049.4 | 1049.4 | 1049.4 |
| 2.5° | 1051.0 | 1050.2 | 1051.0 | 1050.2 | 1050.2 | *1049.4* | 1050.2 | 1050.2 | 1050.2 | 1050.2 | 1050.2 |
| 5° | 1050.2 | 1049.4 | 1049.4 | 1050.2 | 1049.4 | *1049.4* | 1049.4 | 1049.4 | 1049.4 | 1049.4 | 1049.4 |
| 7.5° | 1047.1 | 1047.1 | 1047.9 | 1047.1 | 1047.1 | *1047.1* | 1047.1 | 1047.1 | 1047.1 | 1047.9 | 1047.9 |
| 10° | 1044.7 | 1043.9 | 1044.7 | 1044.7 | 1043.9 | *1044.7* | 1043.9 | 1044.7 | 1044.7 | 1044.7 | 1044.7 |
| 12.5° | 1041.6 | 1040.8 | 1041.6 | 1041.6 | 1040.8 | *1040.0* | 1040.8 | 1040.8 | 1041.6 | 1041.6 | 1041.6 |
| 15° | 1036.1 | 1036.1 | 1037.7 | 1036.9 | 1036.9 | *1036.1* | 1037.7 | 1036.9 | 1036.1 | 1036.9 | 1036.9 |
| 17.5° | 1032.2 | 1032.2 | 1033.7 | 1035.3 | 1035.3 | *1035.3* | 1035.3 | 1034.5 | 1033.0 | 1033.7 | 1032.2 |
| 20° | 1033.0 | 1033.7 | 1034.5 | 1036.9 | 1038.4 | *1039.2* | 1039.2 | 1036.9 | 1034.5 | 1035.3 | 1034.5 |
| 22.5° | 1030.6 | 1029.8 | 1030.6 | 1032.2 | 1034.5 | *1034.5* | 1034.5 | 1031.4 | 1030.6 | 1029.8 | 1029.8 |
| 25° | 1021.2 | 1021.2 | 1022.8 | 1024.3 | 1025.9 | *1025.1* | 1025.9 | 1024.3 | 1022.8 | 1021.2 | 1021.2 |
| 27.5° | 1010.2 | 1010.2 | 1012.6 | 1014.2 | 1015.7 | *1015.7* | 1014.9 | 1013.4 | 1012.6 | 1011.0 | 1010.2 |
| 30° | 999.3 | 999.3 | 1001.6 | 1003.2 | 1005.5 | *1004.7* | 1004.7 | 1002.4 | 1000.0 | 998.5 | 998.5 |
| 32.5° | 987.5 | 986.7 | 989.1 | 993.0 | 996.1 | *996.1* | 996.1 | 991.4 | 988.3 | 986.7 | 985.9 |
| 35° | 977.3 | 977.3 | 980.5 | 987.5 | 991.4 | *991.4* | 989.9 | 986.7 | 979.7 | 977.3 | 977.3 |
| 37.5° | 974.2 | 976.5 | 985.2 | 995.3 | 1003.2 | *1004.7* | 1002.4 | 993.8 | 984.4 | 977.3 | 975.0 |
| 40° | 984.4 | 986.7 | 997.7 | 1014.2 | 1025.9 | *1028.3* | 1025.9 | 1013.4 | 996.9 | 985.9 | 985.2 |
| 42.5° | 985.9 | 987.5 | 1000.8 | 1019.6 | 1030.6 | *1034.5* | 1030.6 | 1018.1 | 1000.0 | 986.7 | 985.9 |
| 45° | 980.5 | 981.2 | 996.9 | 1016.5 | 1029.8 | *1034.5* | 1029.8 | 1014.9 | 996.1 | 981.2 | 980.5 |
| 47.5° | 973.4 | 975.0 | 992.2 | 1012.6 | 1029.0 | *1032.2* | 1028.3 | 1011.8 | 990.6 | 975.8 | 973.4 |
| 50° | 967.9 | 972.6 | 988.3 | 1011.0 | 1030.6 | *1040.0* | 1030.6 | 1008.7 | 987.5 | 971.0 | 967.9 |
| 52.5° | 971.0 | 972.6 | 993.0 | 1025.1 | 1051.8 | *1055.7* | 1051.0 | 1025.1 | 991.4 | 972.6 | 970.3 |
| 55° | 980.5 | 987.5 | 1009.5 | 1055.7 | 1080.0 | *1087.0* | 1076.9 | 1054.1 | 1010.2 | 987.5 | 980.5 |
| 57.5° | *993.0* | *995.3* | *1026.7* | *1067.4* | *1103.5* | *1124.7* | *1104.3* | *1066.7* | *1029.0* | *993.8* | *992.2* |
| 60° | 982.8 | 975.8 | 1014.9 | 1062.7 | 1111.3 | *1120.0* | 1108.2 | 1063.5 | 1013.4 | 975.0 | 982.0 |
| 62.5° | 955.4 | 960.1 | 992.2 | 1058.0 | 1091.7 | *1101.1* | 1088.6 | 1058.0 | 990.6 | 964.0 | 953.0 |
| 65° | 933.4 | 961.6 | 996.9 | 1043.9 | 1098.0 | *1124.7* | 1098.8 | 1042.4 | 998.5 | 956.9 | 931.1 |
| 67.5° | 902.9 | 908.3 | 960.9 | 1018.9 | 1067.4 | *1080.8* | 1066.7 | 1019.6 | 956.2 | 904.4 | 908.3 |
| 70° | 851.1 | 843.3 | 896.6 | 964.0 | 1010.2 | *1031.4* | 1011.8 | 960.9 | 894.2 | 841.7 | 848.8 |
| 72.5° | 765.7 | 770.4 | 819.8 | 891.1 | 938.9 | *959.3* | 939.7 | 885.6 | 818.2 | 775.1 | 770.4 |
| 75° | 676.4 | 681.9 | 729.7 | 794.7 | 843.3 | *851.9* | 846.4 | 790.8 | 731.2 | 681.1 | 676.4 |
| 77.5° | 574.5 | 580.0 | 619.2 | 690.5 | 719.5 | *732.8* | 721.0 | 694.4 | 617.6 | 579.2 | 572.9 |
| 80° | 461.6 | 460.1 | 494.5 | 555.7 | 591.7 | *606.6* | 591.7 | 557.2 | 493.0 | 463.2 | 453.0 |
| 82.5° | 330.0 | 331.5 | 363.7 | 406.0 | 440.5 | *445.2* | 438.1 | 409.9 | 360.5 | 335.4 | 321.3 |
| 85° | 183.4 | 190.4 | 214.0 | 245.3 | 268.0 | *275.9* | 264.1 | 237.5 | 213.2 | 193.6 | 187.3 |
| 87.5° | 43.9 | 47.8 | 55.6 | 70.5 | 79.2 | *87.0* | 79.2 | 73.7 | 52.5 | 47.8 | 43.9 |
| 90° | 30.1 | 29.1 | 29.1 | 29.1 | 29.1 | *29.1* | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 |
| 92.5° | 34.8 | 34.2 | 34.2 | 33.8 | 33.8 | *33.8* | 33.8 | 33.8 | 33.8 | 33.8 | 33.8 |
| 95° | 39.4 | 39.4 | 39.4 | 38.5 | 38.5 | *38.5* | 38.5 | 38.5 | 38.5 | 38.5 | 38.5 |
| 97.5° | 44.6 | 44.6 | 44.6 | 44.2 | 44.2 | *44.2* | 44.2 | 44.2 | 44.2 | 44.2 | 44.2 |
| 100° | 49.8 | 49.8 | 49.8 | 49.8 | 49.8 | *49.8* | 49.8 | 49.8 | 49.8 | 49.8 | 49.8 |
| 102.5° | 55.9 | 55.9 | 55.9 | 55.9 | 55.9 | *55.9* | 55.9 | 56.4 | 55.9 | 55.9 | 55.9 |
| 105° | 62.0 | 62.0 | 62.0 | 62.0 | 62.0 | *62.0* | 62.0 | 62.9 | 62.0 | 62.0 | 62.0 |
| 107.5° | 68.6 | 68.6 | 69.0 | 69.0 | 69.0 | *69.0* | 69.0 | 69.5 | 69.0 | 69.0 | 69.0 |
| 110° | 75.1 | 75.1 | 76.1 | 76.1 | 76.1 | *76.1* | 76.1 | 76.1 | 76.1 | 76.1 | 76.1 |

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Scaled Data Report

REPORT NUMBER: P821492
CATALOG NUMBER: TT-D2-735-12VDC-MQ-UPL

**CANDELA DISTRIBUTION (continued):**

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 65° | 75° | 85° | 90° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 112.5° | 83.1 | 83.1 | 84.0 | 84.0 | 84.0 | *84.0* | 84.6 | 84.6 | 84.0 | 84.0 | 84.0 |
| 115° | 91.1 | 91.1 | 92.0 | 92.0 | 92.0 | *92.0* | 93.0 | 93.0 | 92.0 | 92.0 | 92.0 |
| 117.5° | 100.5 | 100.5 | 101.0 | 101.4 | 101.4 | *101.4* | 102.4 | 102.4 | 101.4 | 101.4 | 101.4 |
| 120° | 109.9 | 109.9 | 109.9 | 110.8 | 110.8 | *110.8* | 111.8 | 111.8 | 110.8 | 110.8 | 110.8 |
| 122.5° | 120.7 | 120.7 | 121.2 | 121.6 | 121.6 | *121.6* | 122.6 | 122.6 | 122.1 | 122.1 | 121.6 |
| 125° | 131.5 | 131.5 | 132.4 | 132.4 | 132.4 | *132.4* | 133.4 | 133.4 | 133.4 | 133.4 | 132.4 |
| 127.5° | 143.2 | 143.2 | 144.2 | 144.2 | 144.2 | *144.2* | 145.1 | 145.1 | 145.1 | 145.1 | 144.2 |
| 130° | 155.0 | 155.0 | 155.9 | 155.9 | 155.9 | *155.9* | 156.8 | 156.8 | 156.8 | 156.8 | 155.9 |
| 132.5° | 167.2 | 167.2 | 167.6 | 167.6 | 167.6 | *168.1* | 168.6 | 168.6 | 168.6 | 168.6 | 168.1 |
| 135° | 179.4 | 179.4 | 179.4 | 179.4 | 179.4 | *180.3* | 180.3 | 180.3 | 180.3 | 180.3 | 180.3 |
| 137.5° | 191.2 | 190.6 | 191.2 | 190.6 | 191.2 | *191.6* | 191.6 | 191.6 | 191.6 | 191.6 | 191.6 |
| 140° | 202.9 | 201.9 | 202.9 | 201.9 | 202.9 | *202.9* | 202.9 | 202.9 | 202.9 | 202.9 | 202.9 |
| 142.5° | 213.7 | 213.2 | 213.7 | 212.7 | 213.7 | *213.7* | 213.7 | 213.7 | 213.7 | 213.7 | 213.7 |
| 145° | 224.5 | 224.5 | 224.5 | 223.5 | 224.5 | *224.5* | 224.5 | 224.5 | 224.5 | 224.5 | 224.5 |
| 147.5° | 235.8 | 235.3 | 235.8 | 234.8 | 235.8 | *235.8* | 235.8 | 235.8 | 235.8 | 235.8 | 235.8 |
| 150° | 247.0 | 246.1 | 247.0 | 246.1 | 247.0 | *247.0* | 247.0 | 247.0 | 247.0 | 247.0 | 247.0 |
| 152.5° | 256.0 | 255.5 | 256.4 | 255.5 | 256.0 | *256.0* | 256.4 | 256.0 | 256.0 | 256.0 | 256.0 |
| 155° | 264.9 | 264.9 | 265.8 | 264.9 | 264.9 | *264.9* | 265.8 | 264.9 | 264.9 | 264.9 | 264.9 |
| 157.5° | 272.4 | 272.4 | 273.3 | 272.4 | 272.4 | *272.4* | 273.3 | 272.4 | 272.4 | 272.4 | 272.4 |
| 160° | 279.9 | 279.9 | 280.8 | 279.9 | 279.9 | *279.9* | 280.8 | 279.9 | 279.9 | 279.9 | 279.9 |
| 162.5° | 286.0 | 286.0 | 286.9 | 286.0 | 286.0 | *286.0* | 286.9 | 286.0 | 286.0 | 286.0 | 286.0 |
| 165° | 292.1 | 292.1 | 293.0 | 292.1 | 292.1 | *292.1* | 293.0 | 292.1 | 292.1 | 292.1 | 292.1 |
| 167.5° | 295.8 | 295.8 | 296.8 | 295.8 | 295.8 | *295.8* | 296.8 | 295.8 | 295.8 | 295.8 | 295.8 |
| 170° | 299.6 | 299.6 | 300.5 | 299.6 | 299.6 | *299.6* | 300.5 | 299.6 | 299.6 | 299.6 | 299.6 |
| 172.5° | 302.0 | 302.0 | 302.8 | 302.0 | 302.4 | *302.0* | 302.8 | 302.0 | 302.0 | 302.0 | 302.0 |
| 175° | 304.3 | 304.3 | 305.2 | 304.3 | 305.2 | *304.3* | 305.2 | 304.3 | 304.3 | 304.3 | 304.3 |
| 177.5° | 305.2 | 305.2 | 305.7 | 305.2 | 305.7 | *305.2* | 305.7 | 305.2 | 305.2 | 305.2 | 305.2 |
| 180° | 306.2 | 306.2 | 306.2 | 306.2 | 306.2 | *306.2* | 306.2 | 306.2 | 306.2 | 306.2 | 306.2 |

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: SP1-2407-176-4

Test Date: 09/24/2024

Luminaire Tested: MEM2-HTN-VA-30-735-U-WQ

Data in this report applies to families of products including MEM2-HTN-VA-30-735-U-WQ

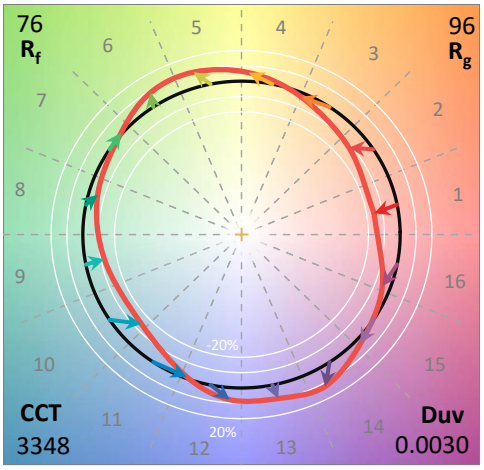
Report Generated By FNC07603 / LDUCLS01DT446
Version: v7.04

## Test Information

| | |
|---|---|
| Test Method: | LM-79-2019 |
| Report Number: | SP1-2407-176-4 |
| 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-30-735-U-WQ** |
| Description: | EPIC MODERN VISUAL COMFORT 30W WAVESTREAM WIDE |

## Spectral Parameters

| | | | | | |
|---|---|---|---|---|---|
| CCT (K): | 3348 | CRI (Ra): | 73.4 | | |
| CIE u': | 0.2384 | R1: | 70.8 | R9: | -19.2 |
| CIE v': | 0.5184 | R2: | 79.9 | R10: | 52.5 |
| Duv: | 0.0030 | R3: | 87.6 | R11: | 68.0 |
| CIE x: | 0.4177 | R4: | 72.6 | R12: | 42.6 |
| CIE y: | 0.4036 | R5: | 69.3 | R13: | 72.0 |
| CIE z: | 0.1787 | R6: | 71.3 | R14: | 92.6 |
| Peak Wavelength (nm): | 593 | R7: | 82.1 | R15: | 63.8 |
| Dominant Wavelength (nm): | 580 | R8: | 53.3 | | |
| Purity: | 46.5223 | | | | |
| Rf: | 75.8 | | | | |
| Rg: | 95.8 | | | | |




## Test Conditions

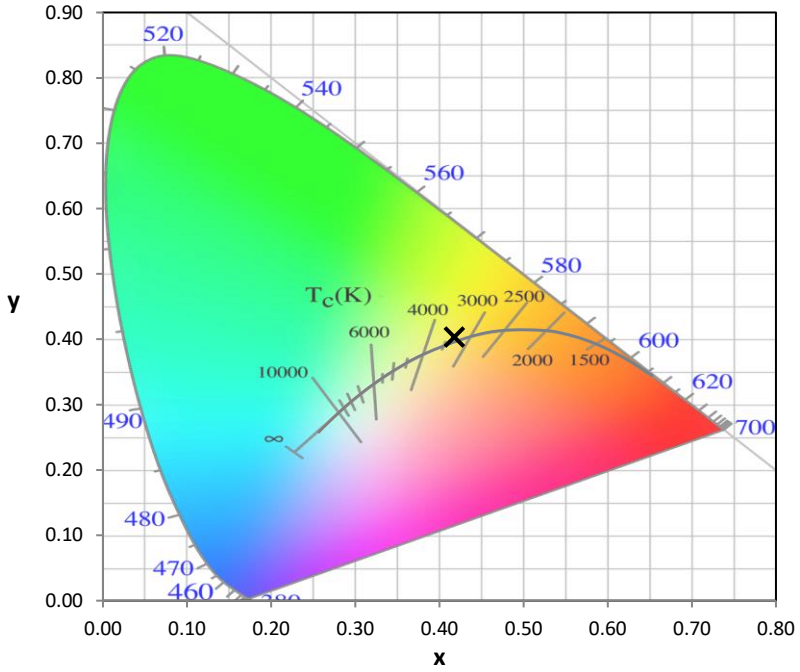
| | |
|---|---|
| Stabilization Time: | 30M |
| Operation Time: | 1H 30M |
| Sphere Temperature (°C): | 25.2 |

REPORT NUMBER: SP1-2407-176-4

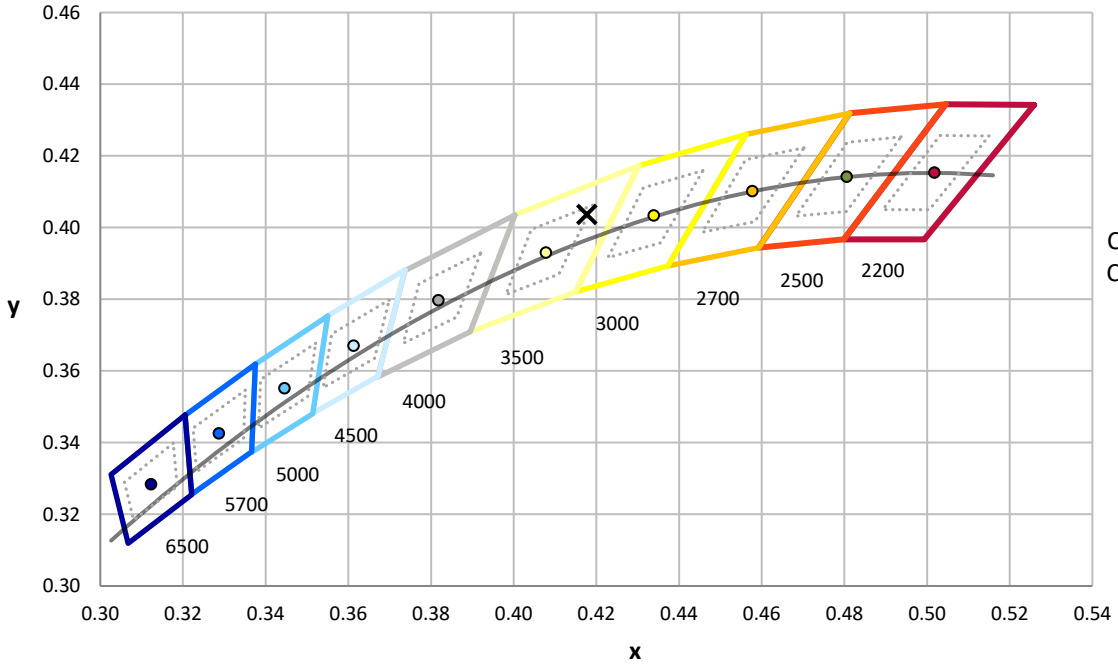
| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 6/18/2024 | 12/18/2024 |
| Power Meter | INXT2011004 | 2/8/2024 | 2/8/2025 |
| AC Power Source | IN0063 | 10/24/2023 | 10/24/2024 |
| DC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

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## CIE 1931 Chromaticity Diagram




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

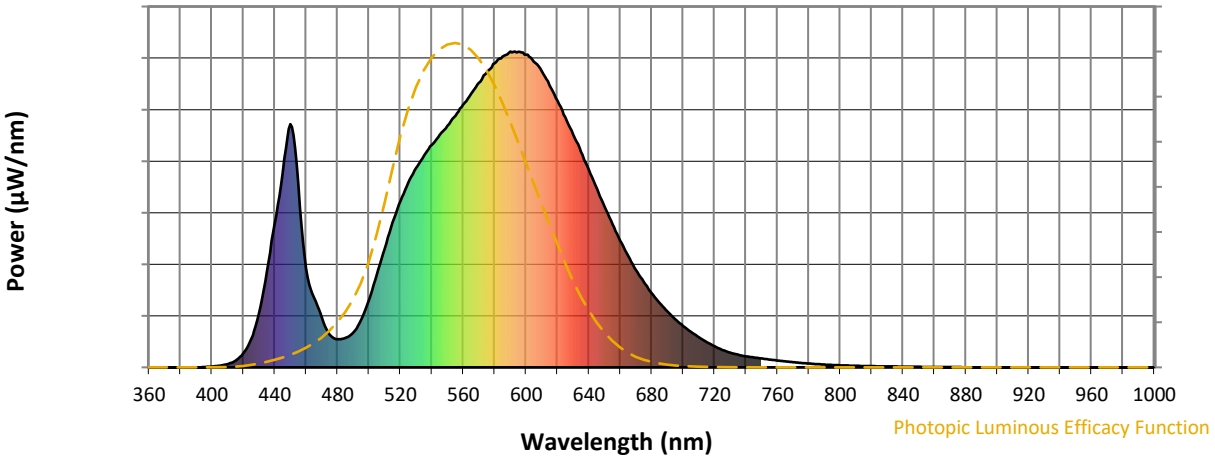



CCT = 3348K
CIE x = 0.4177
CIE y = 0.4036
Duv = 0.0030

Point lies inside the ANSI 3500K 4-step quadrangle

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## Photopic Flux vs. Wavelength

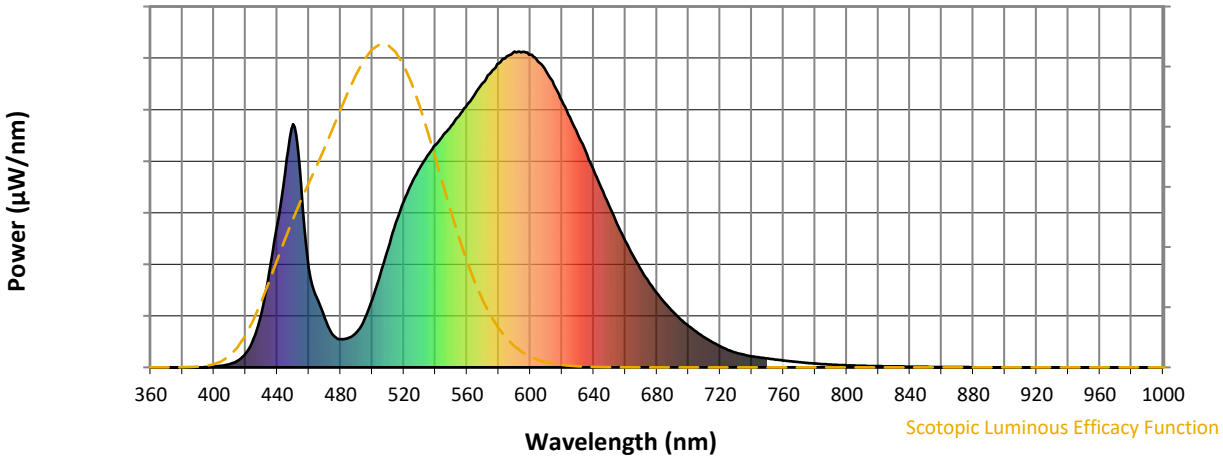



## Photopic Lumens: NR

| λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 360 | 0 | NR | 490 | 110 | NR | 620 | 844 | NR | 750 | 28 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 150 | NR | 625 | 792 | NR | 755 | 25 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 214 | NR | 630 | 737 | NR | 760 | 22 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 293 | NR | 635 | 683 | NR | 765 | 19 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 376 | NR | 640 | 625 | NR | 770 | 16 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 458 | NR | 645 | 566 | NR | 775 | 14 | NR | 905 | 0 | NR |
| 390 | 0 | NR | 520 | 526 | NR | 650 | 509 | NR | 780 | 12 | NR | 910 | 0 | NR |
| 395 | 1 | NR | 525 | 584 | NR | 655 | 453 | NR | 785 | 10 | NR | 915 | 0 | NR |
| 400 | 3 | NR | 530 | 631 | NR | 660 | 401 | NR | 790 | 9 | NR | 920 | 0 | NR |
| 405 | 5 | NR | 535 | 671 | NR | 665 | 353 | NR | 795 | 8 | NR | 925 | 0 | NR |
| 410 | 10 | NR | 540 | 704 | NR | 670 | 308 | NR | 800 | 7 | NR | 930 | 0 | NR |
| 415 | 21 | NR | 545 | 737 | NR | 675 | 269 | NR | 805 | 6 | NR | 935 | 0 | NR |
| 420 | 44 | NR | 550 | 766 | NR | 680 | 235 | NR | 810 | 5 | NR | 940 | 0 | NR |
| 425 | 90 | NR | 555 | 797 | NR | 685 | 204 | NR | 815 | 4 | NR | 945 | 0 | NR |
| 430 | 171 | NR | 560 | 832 | NR | 690 | 177 | NR | 820 | 4 | NR | 950 | 0 | NR |
| 435 | 305 | NR | 565 | 866 | NR | 695 | 152 | NR | 825 | 3 | NR | 955 | 0 | NR |
| 440 | 455 | NR | 570 | 901 | NR | 700 | 131 | NR | 830 | 3 | NR | 960 | 0 | NR |
| 445 | 615 | NR | 575 | 933 | NR | 705 | 112 | NR | 835 | 3 | NR | 965 | 0 | NR |
| 450 | 771 | NR | 580 | 963 | NR | 710 | 96 | NR | 840 | 2 | NR | 970 | 0 | NR |
| 455 | 579 | NR | 585 | 984 | NR | 715 | 80 | NR | 845 | 2 | NR | 975 | 0 | NR |
| 460 | 313 | NR | 590 | 1000 | NR | 720 | 67 | NR | 850 | 2 | NR | 980 | 0 | NR |
| 465 | 221 | NR | 595 | 999 | NR | 725 | 55 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 156 | NR | 600 | 990 | NR | 730 | 46 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 103 | NR | 605 | 968 | NR | 735 | 40 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 89 | NR | 610 | 937 | NR | 740 | 35 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 93 | NR | 615 | 893 | NR | 745 | 31 | NR | 875 | 1 | NR | | | |

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## Scotopic Flux vs. Wavelength

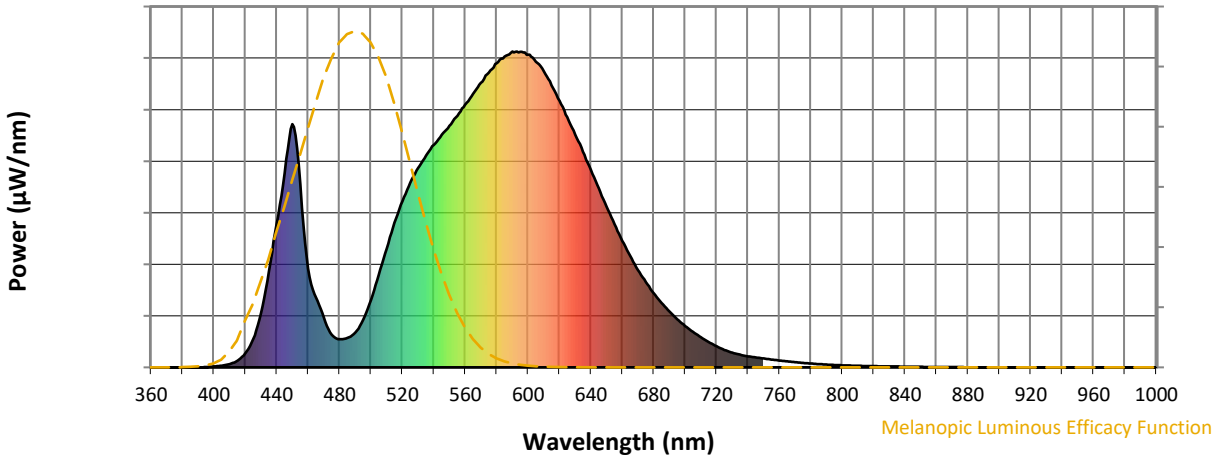



**Scotopic Lumens: NR** **S/P: 1.31**

| 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 | 844 | NR | 750 | 28 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 150 | NR | 625 | 792 | NR | 755 | 25 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 214 | NR | 630 | 737 | NR | 760 | 22 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 293 | NR | 635 | 683 | NR | 765 | 19 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 376 | NR | 640 | 625 | NR | 770 | 16 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 458 | NR | 645 | 566 | NR | 775 | 14 | NR | 905 | 0 | NR |
| 390 | 0 | NR | 520 | 526 | NR | 650 | 509 | NR | 780 | 12 | NR | 910 | 0 | NR |
| 395 | 1 | NR | 525 | 584 | NR | 655 | 453 | NR | 785 | 10 | NR | 915 | 0 | NR |
| 400 | 3 | NR | 530 | 631 | NR | 660 | 401 | NR | 790 | 9 | NR | 920 | 0 | NR |
| 405 | 5 | NR | 535 | 671 | NR | 665 | 353 | NR | 795 | 8 | NR | 925 | 0 | NR |
| 410 | 10 | NR | 540 | 704 | NR | 670 | 308 | NR | 800 | 7 | NR | 930 | 0 | NR |
| 415 | 21 | NR | 545 | 737 | NR | 675 | 269 | NR | 805 | 6 | NR | 935 | 0 | NR |
| 420 | 44 | NR | 550 | 766 | NR | 680 | 235 | NR | 810 | 5 | NR | 940 | 0 | NR |
| 425 | 90 | NR | 555 | 797 | NR | 685 | 204 | NR | 815 | 4 | NR | 945 | 0 | NR |
| 430 | 171 | NR | 560 | 832 | NR | 690 | 177 | NR | 820 | 4 | NR | 950 | 0 | NR |
| 435 | 305 | NR | 565 | 866 | NR | 695 | 152 | NR | 825 | 3 | NR | 955 | 0 | NR |
| 440 | 455 | NR | 570 | 901 | NR | 700 | 131 | NR | 830 | 3 | NR | 960 | 0 | NR |
| 445 | 615 | NR | 575 | 933 | NR | 705 | 112 | NR | 835 | 3 | NR | 965 | 0 | NR |
| 450 | 771 | NR | 580 | 963 | NR | 710 | 96 | NR | 840 | 2 | NR | 970 | 0 | NR |
| 455 | 579 | NR | 585 | 984 | NR | 715 | 80 | NR | 845 | 2 | NR | 975 | 0 | NR |
| 460 | 313 | NR | 590 | 1000 | NR | 720 | 67 | NR | 850 | 2 | NR | 980 | 0 | NR |
| 465 | 221 | NR | 595 | 999 | NR | 725 | 55 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 156 | NR | 600 | 990 | NR | 730 | 46 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 103 | NR | 605 | 968 | NR | 735 | 40 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 89 | NR | 610 | 937 | NR | 740 | 35 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 93 | NR | 615 | 893 | NR | 745 | 31 | NR | 875 | 1 | NR | | | |

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## Melanopic Flux vs. Wavelength




**Melanopic Lumens: NR** **M/P: 2.4**

| 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 | 844 | NR | 750 | 28 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 150 | NR | 625 | 792 | NR | 755 | 25 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 214 | NR | 630 | 737 | NR | 760 | 22 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 293 | NR | 635 | 683 | NR | 765 | 19 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 376 | NR | 640 | 625 | NR | 770 | 16 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 458 | NR | 645 | 566 | NR | 775 | 14 | NR | 905 | 0 | NR |
| 390 | 0 | NR | 520 | 526 | NR | 650 | 509 | NR | 780 | 12 | NR | 910 | 0 | NR |
| 395 | 1 | NR | 525 | 584 | NR | 655 | 453 | NR | 785 | 10 | NR | 915 | 0 | NR |
| 400 | 3 | NR | 530 | 631 | NR | 660 | 401 | NR | 790 | 9 | NR | 920 | 0 | NR |
| 405 | 5 | NR | 535 | 671 | NR | 665 | 353 | NR | 795 | 8 | NR | 925 | 0 | NR |
| 410 | 10 | NR | 540 | 704 | NR | 670 | 308 | NR | 800 | 7 | NR | 930 | 0 | NR |
| 415 | 21 | NR | 545 | 737 | NR | 675 | 269 | NR | 805 | 6 | NR | 935 | 0 | NR |
| 420 | 44 | NR | 550 | 766 | NR | 680 | 235 | NR | 810 | 5 | NR | 940 | 0 | NR |
| 425 | 90 | NR | 555 | 797 | NR | 685 | 204 | NR | 815 | 4 | NR | 945 | 0 | NR |
| 430 | 171 | NR | 560 | 832 | NR | 690 | 177 | NR | 820 | 4 | NR | 950 | 0 | NR |
| 435 | 305 | NR | 565 | 866 | NR | 695 | 152 | NR | 825 | 3 | NR | 955 | 0 | NR |
| 440 | 455 | NR | 570 | 901 | NR | 700 | 131 | NR | 830 | 3 | NR | 960 | 0 | NR |
| 445 | 615 | NR | 575 | 933 | NR | 705 | 112 | NR | 835 | 3 | NR | 965 | 0 | NR |
| 450 | 771 | NR | 580 | 963 | NR | 710 | 96 | NR | 840 | 2 | NR | 970 | 0 | NR |
| 455 | 579 | NR | 585 | 984 | NR | 715 | 80 | NR | 845 | 2 | NR | 975 | 0 | NR |
| 460 | 313 | NR | 590 | 1000 | NR | 720 | 67 | NR | 850 | 2 | NR | 980 | 0 | NR |
| 465 | 221 | NR | 595 | 999 | NR | 725 | 55 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 156 | NR | 600 | 990 | NR | 730 | 46 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 103 | NR | 605 | 968 | NR | 735 | 40 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 89 | NR | 610 | 937 | NR | 740 | 35 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 93 | NR | 615 | 893 | NR | 745 | 31 | NR | 875 | 1 | NR | | | |

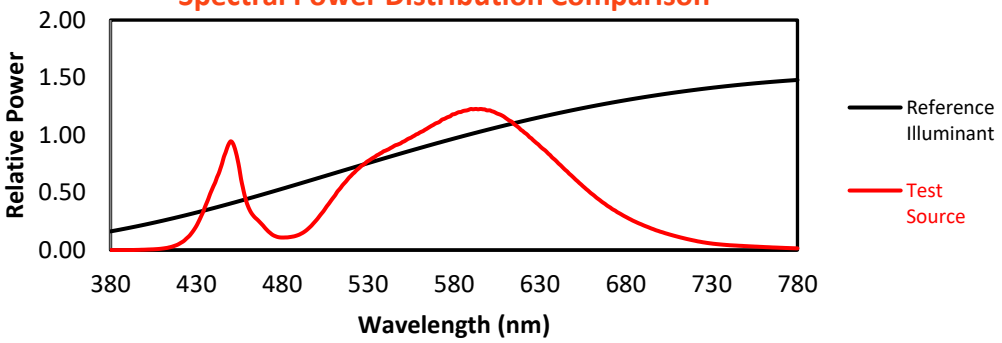
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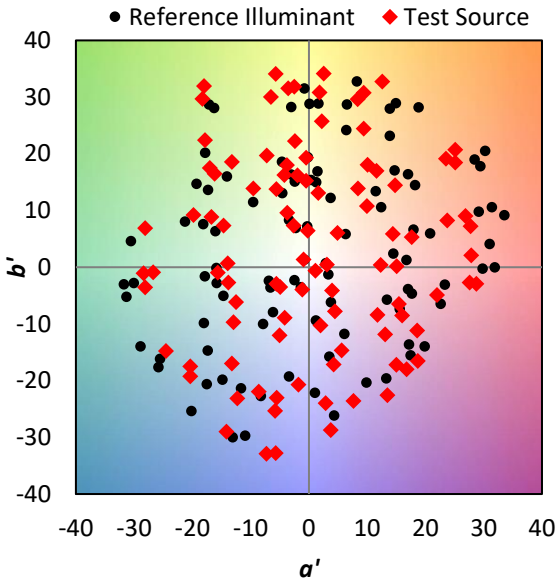
## Summary

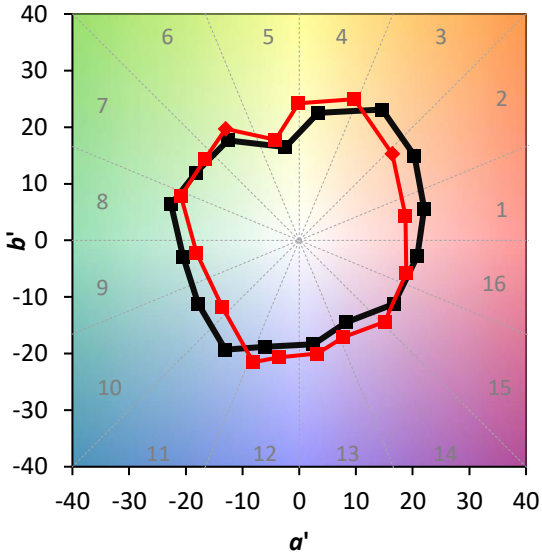
$R_f$ = 75.8
$R_g$ = 95.8
CIE $R_a$ = 73.4
$R_9$ = -19.2

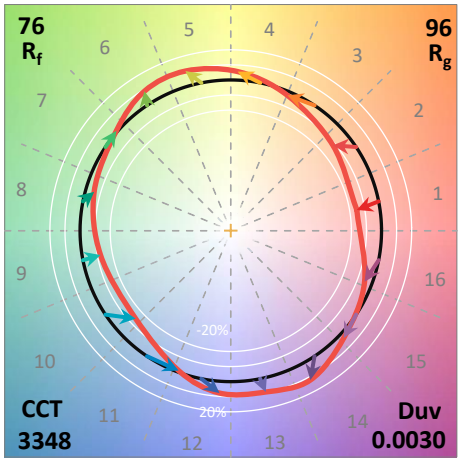
## Spectral Power Distribution Comparison

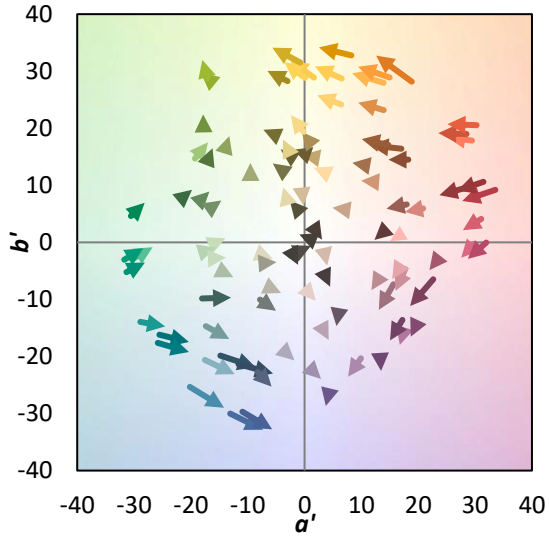



## Color Vector Graphics



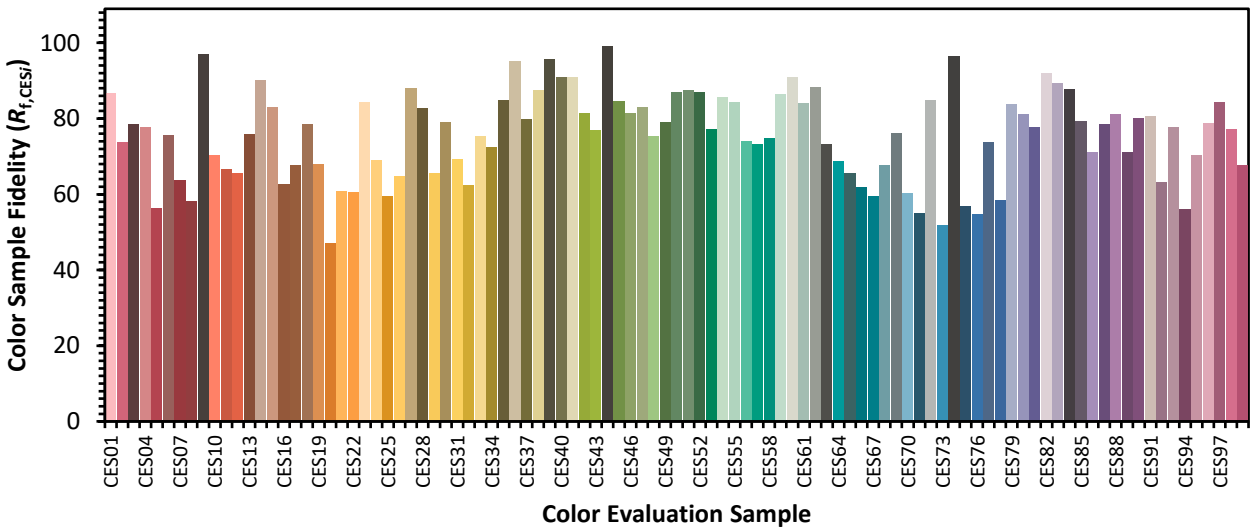



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**Individual Sample Fidelity Index ($R_{f,i}$)**

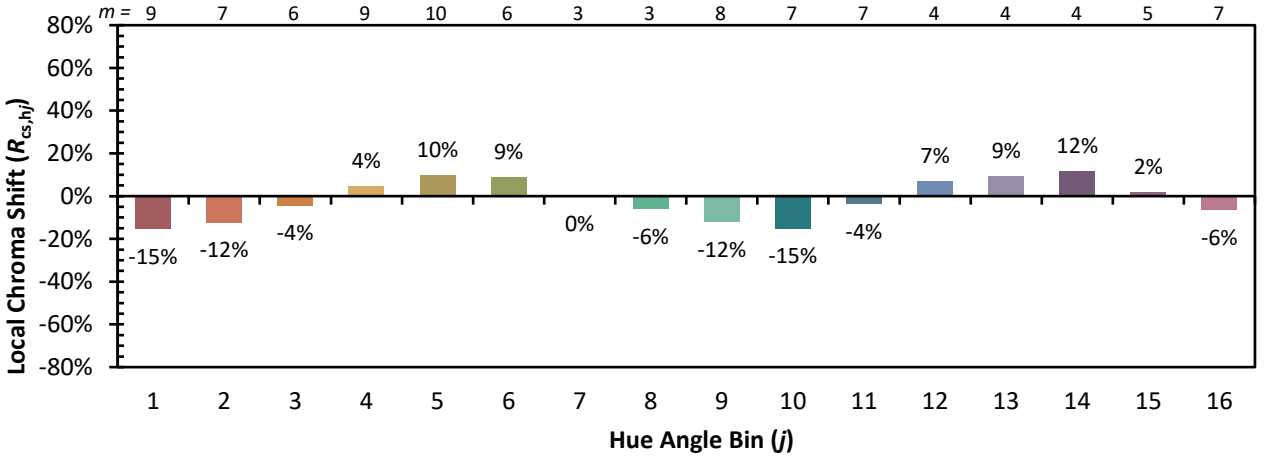
| | | | |
|---|---|---|---|
| CES01 = 86 | CES26 = 65 | CES51 = 88 | CES76 = 55 |
| CES02 = 62 | CES27 = 88 | CES52 = 87 | CES77 = 74 |
| CES03 = 31 | CES28 = 83 | CES53 = 77 | CES78 = 58 |
| CES04 = 70 | CES29 = 66 | CES54 = 86 | CES79 = 84 |
| CES05 = 48 | CES30 = 79 | CES55 = 84 | CES80 = 81 |
| CES06 = 51 | CES31 = 69 | CES56 = 74 | CES81 = 78 |
| CES07 = 41 | CES32 = 62 | CES57 = 73 | CES82 = 92 |
| CES08 = 40 | CES33 = 75 | CES58 = 75 | CES83 = 89 |
| CES09 = 29 | CES34 = 73 | CES59 = 87 | CES84 = 88 |
| CES10 = 75 | CES35 = 85 | CES60 = 91 | CES85 = 79 |
| CES11 = 58 | CES36 = 95 | CES61 = 84 | CES86 = 71 |
| CES12 = 64 | CES37 = 80 | CES62 = 88 | CES87 = 79 |
| CES13 = 43 | CES38 = 88 | CES63 = 73 | CES88 = 81 |
| CES14 = 74 | CES39 = 96 | CES64 = 69 | CES89 = 71 |
| CES15 = 71 | CES40 = 91 | CES65 = 66 | CES90 = 80 |
| CES16 = 47 | CES41 = 91 | CES66 = 62 | CES91 = 81 |
| CES17 = 50 | CES42 = 81 | CES67 = 60 | CES92 = 63 |
| CES18 = 56 | CES43 = 77 | CES68 = 68 | CES93 = 78 |
| CES19 = 72 | CES44 = 99 | CES69 = 76 | CES94 = 56 |
| CES20 = 65 | CES45 = 85 | CES70 = 60 | CES95 = 70 |
| CES21 = 87 | CES46 = 82 | CES71 = 55 | CES96 = 79 |
| CES22 = 79 | CES47 = 83 | CES72 = 85 | CES97 = 84 |
| CES23 = 92 | CES48 = 75 | CES73 = 52 | CES98 = 77 |
| CES24 = 91 | CES49 = 79 | CES74 = 96 | CES99 = 68 |
| CES25 = 72 | CES50 = 87 | CES75 = 57 | |

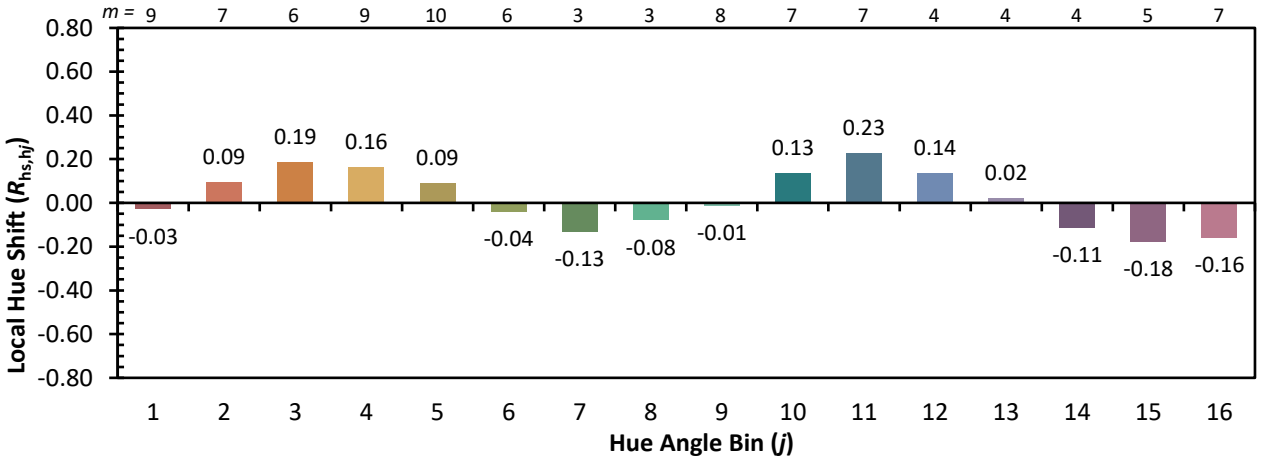


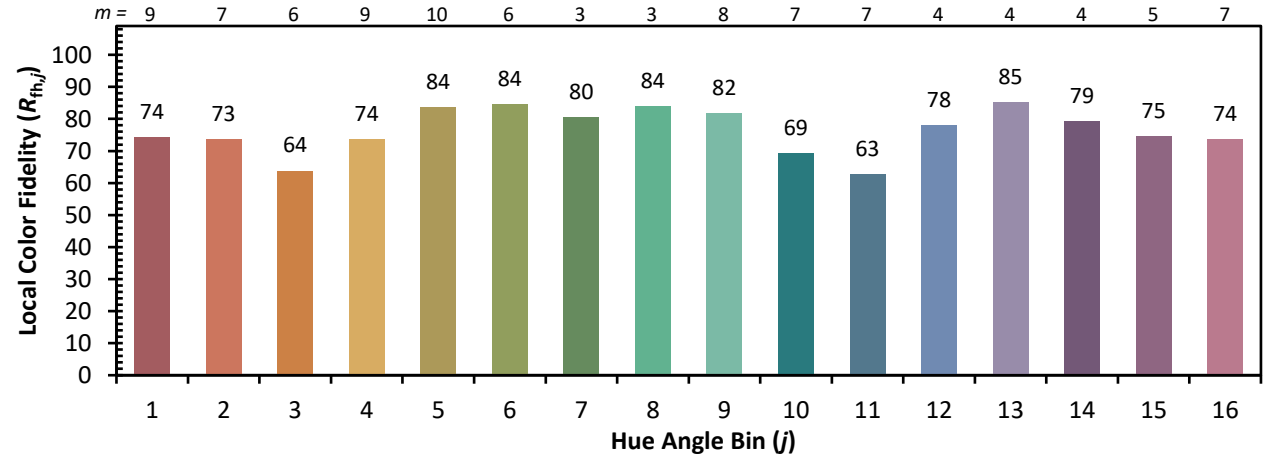
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## Color Rendition by Hue-Angle Bin



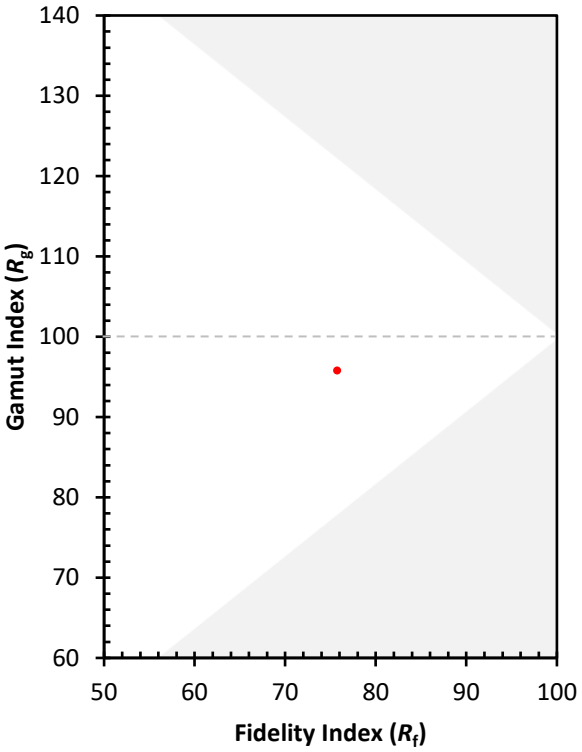



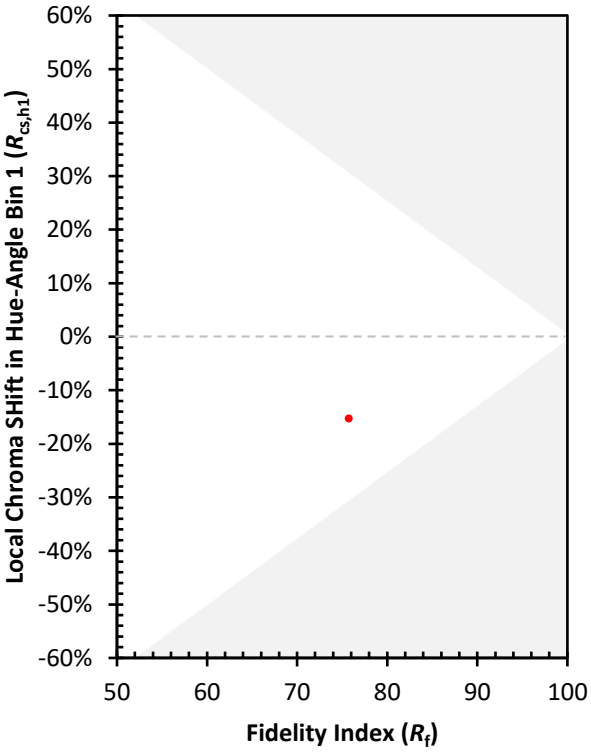



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## Measure Comparisons




(END OF REPORT)