

Signify Classified - Internal  
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: STREETWORKS

Report Number: P880067

Luminaire Tested: **MEM2-HSN-VA-60-830-U-MQ**

Issue Date: 10/01/2024



**Test Information**

Test Method: LM-79-08  
Report Number: P880067  
Test Lab: INNOVATION CENTER(G3)  
Issue Date: 10/01/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: STREETWORKS  
Catalog Number: MEM2-HSN-VA-60-830-U-MQ  
Description: EPIC MODERN SHORT HOUSING 60W 80CRI 3000K VISUAL COMFORT FIXTURE w/  
TYPE V MEDIUM DISTRIBUTION OPTIC  
Light Source: (1) 3000K CCT, 80 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

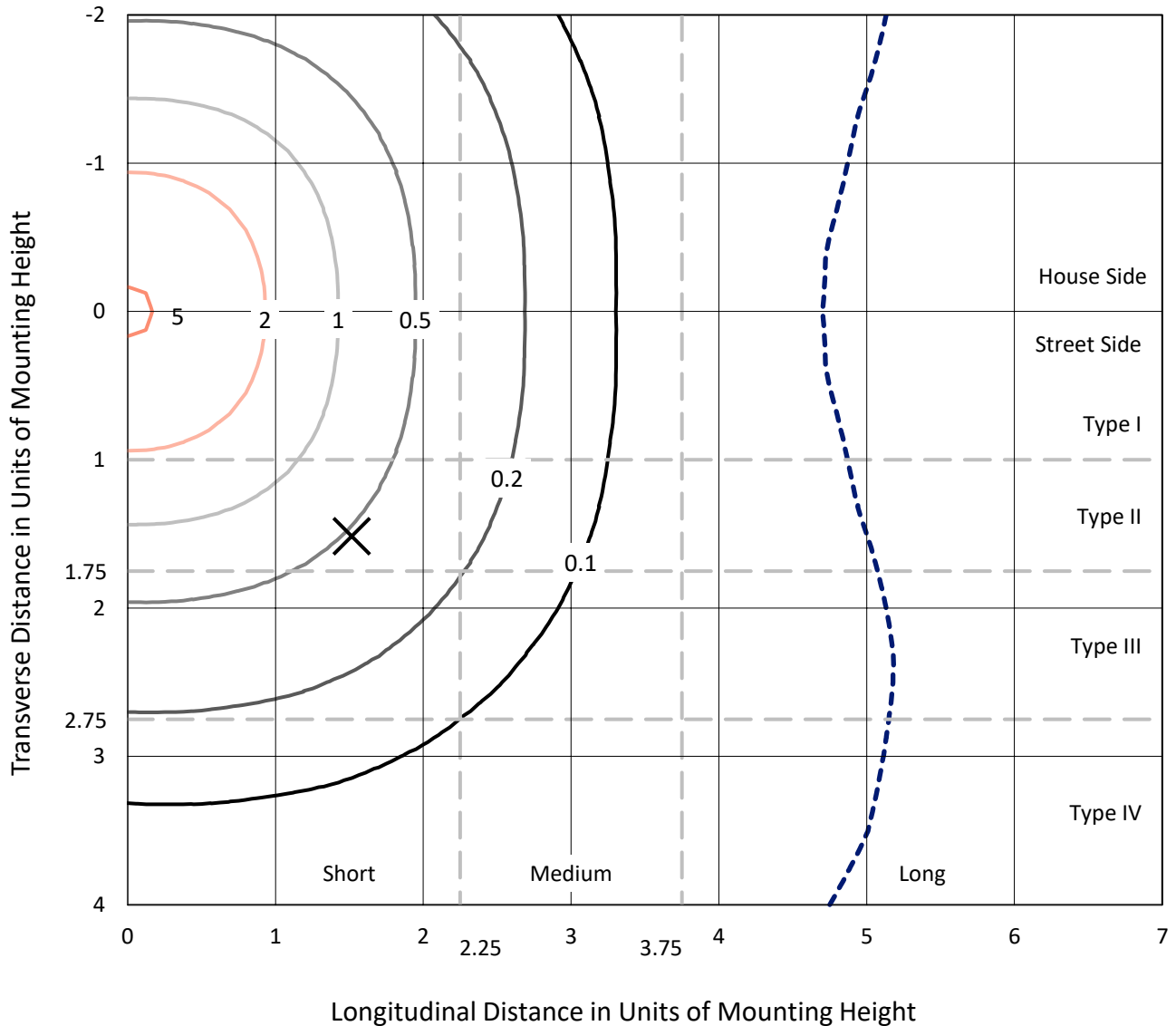
Lumens per Lamp: N/A  
Luminaire Lumens: 6374.4 lumens  
Efficiency: N/A  
Efficacy: 108.0 lumens/watt  
Luminous Opening: Circular (Dia: 1.12' x H: 0')  
IES Classification: Type V - Short  
BUG Rating: B3 - U0 - G2

Input Watts (W): 59  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.99  
Total Harmonic Distortion (THDi): 9%  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT

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 CATALOG NUMBER: MEM2-HSN-VA-60-830-U-MQ

### Iso-Footcandle Lines of Horizontal Illumination

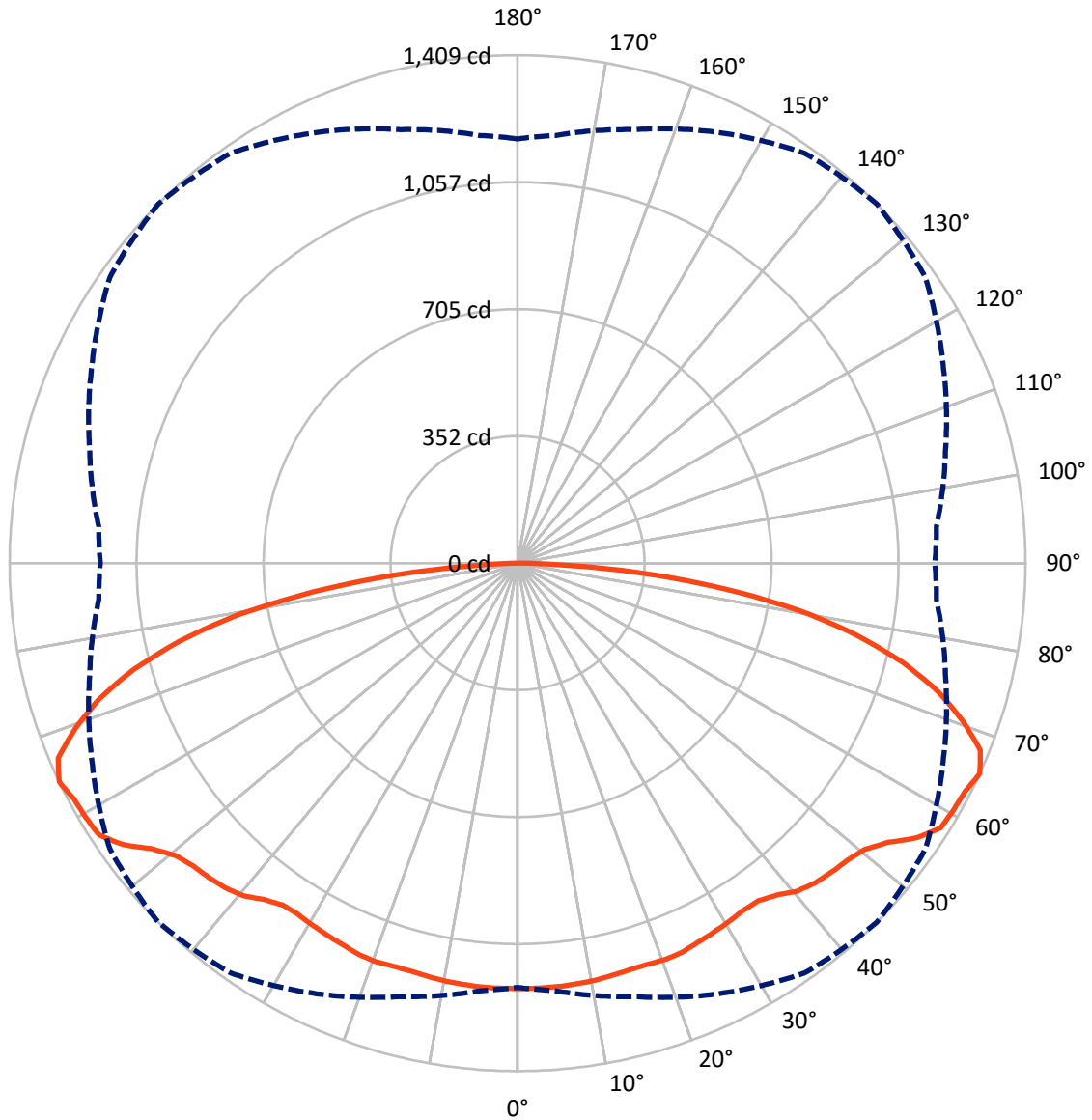
× Max cd  
 - - - 1/2 Max cd



Based on 15 foot mounting height. Maximum calculated value = 5.2 fc  
 Type V - Short - N/A

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### Luminous Intensity Polar Plot



— Vertical Plane Through 45-Deg Lateral      - - - Horizontal Cone Through 65-Deg Vertical

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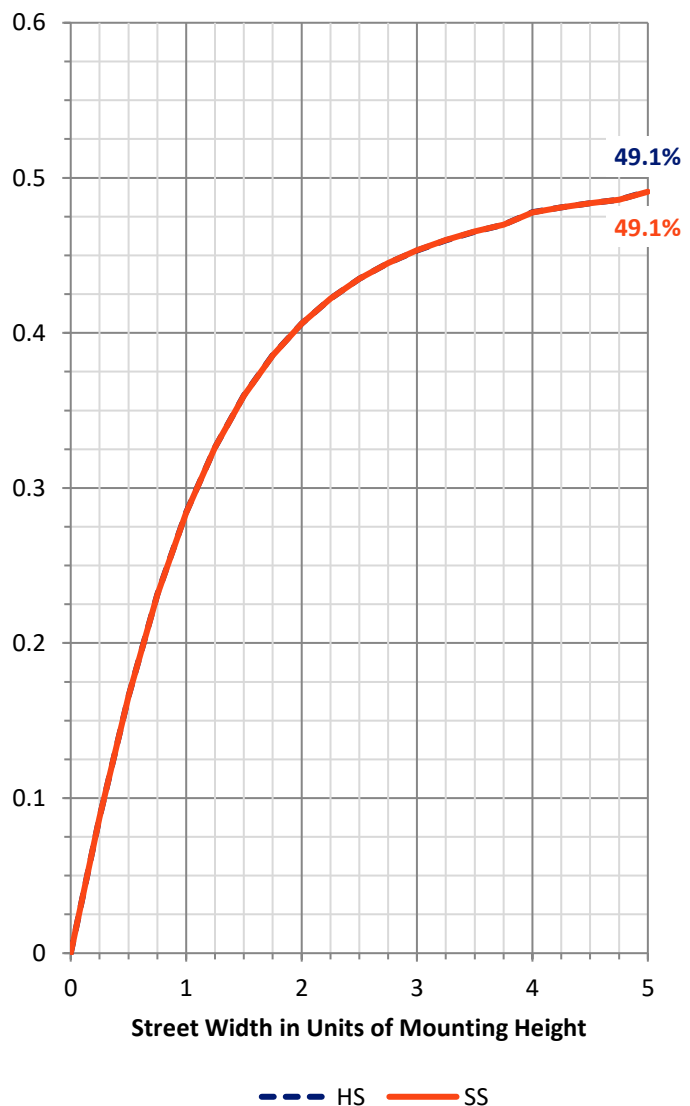
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 3187.2   | 0.0    | 3187.2 |
|                    | % Fixture | 50.0     | 0.0    | 50.0   |
| <b>Street Side</b> | Lumens    | 3187.2   | 0.0    | 3187.2 |
|                    | % Fixture | 50.0     | 0.0    | 50.0   |
| <b>Total</b>       | Lumens    | 6374.4   | 0.0    | 6374.4 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**Coefficient of Utilization**

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 112.5  | 1.8       |
| 10°-20°   | 331.8  | 5.2       |
| 20°-30°   | 537.3  | 8.4       |
| 30°-40°   | 722.1  | 11.3      |
| 40°-50°   | 921.6  | 14.5      |
| 50°-60°   | 1133.7 | 17.8      |
| 60°-70°   | 1262.5 | 19.8      |
| 70°-80°   | 1024.8 | 16.1      |
| 80°-90°   | 328.0  | 5.1       |
| 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°    | 6374.4 | 100.0     |
| 0°-180°   | 6374.4 | 100.0     |



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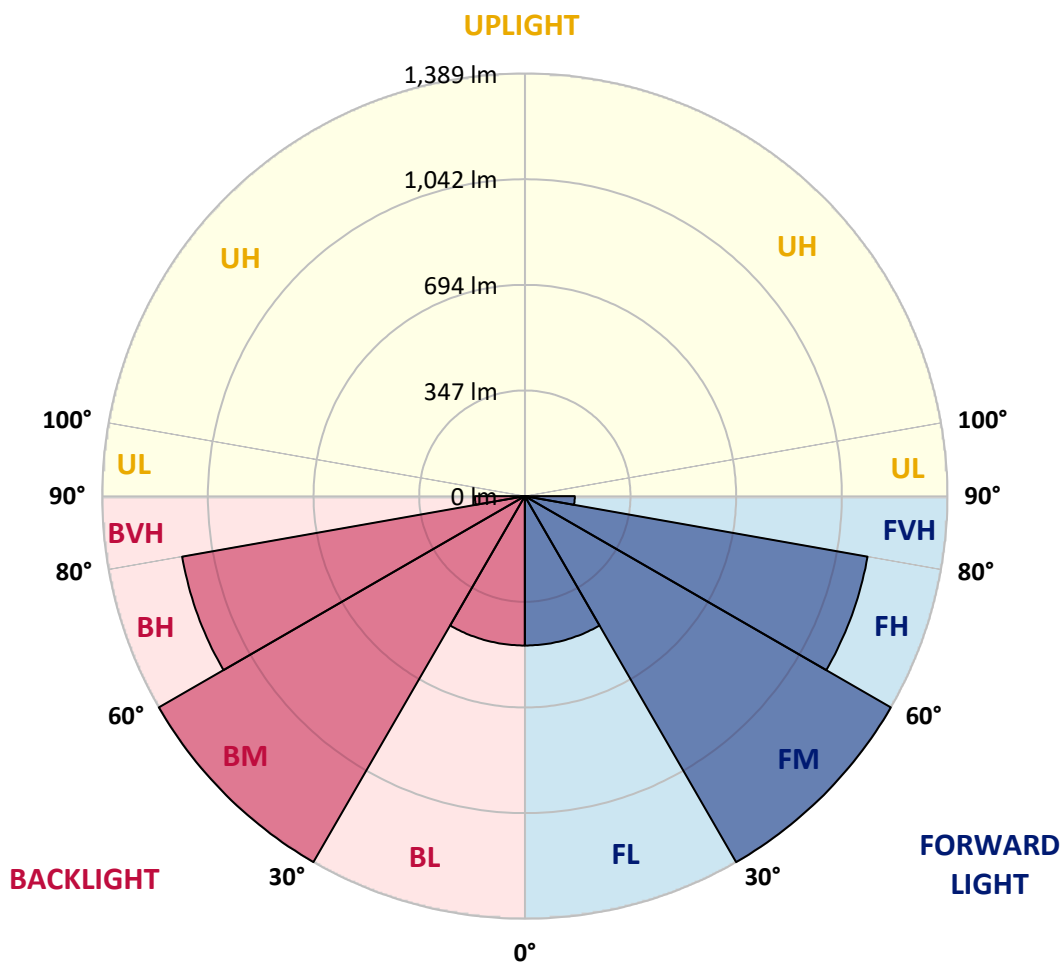
CATALOG NUMBER: MEM2-HSN-VA-60-830-U-MQ

**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|--------|-----------|-------------------------|------|---------|
|                |        |           | B                       | U    | G       |
| FL (0°-30°)    | 490.9  | 7.7       |                         |      |         |
| FM (30°-60°)   | 1388.7 | 21.8      |                         |      |         |
| FH (60°-80°)   | 1143.6 | 17.9      |                         |      | G1/1800 |
| FVH (80°-90°)  | 164.0  | 2.6       |                         |      | G2/225  |
| BL (0°-30°)    | 490.9  | 7.7       | B1/500                  |      |         |
| BM (30°-60°)   | 1388.7 | 21.8      | B2/2500                 |      |         |
| BH (60°-80°)   | 1143.6 | 17.9      | B3/2500                 |      | G1/1800 |
| BVH (80°-90°)  | 164.0  | 2.6       |                         |      | 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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CATALOG NUMBER: MEM2-HSN-VA-60-830-U-MQ

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 75°    | 85°    | 90°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1180.5 | 1180.5 | 1180.5 | 1180.5 | 1180.5 | 1180.5 | 1180.5 | 1180.5 | 1180.5 | 1180.5 | 1180.5 |
| 2.5°  | 1180.5 | 1180.5 | 1180.5 | 1180.5 | 1180.5 | 1180.5 | 1180.5 | 1180.5 | 1180.5 | 1180.5 | 1180.5 |
| 5°    | 1180.5 | 1180.5 | 1180.5 | 1180.5 | 1180.5 | 1180.5 | 1180.5 | 1180.5 | 1178.8 | 1180.5 | 1180.5 |
| 7.5°  | 1178.8 | 1178.8 | 1178.8 | 1178.8 | 1178.8 | 1178.8 | 1178.8 | 1178.8 | 1178.8 | 1178.8 | 1178.8 |
| 10°   | 1177.0 | 1177.0 | 1177.0 | 1177.0 | 1177.0 | 1177.0 | 1177.0 | 1177.0 | 1177.0 | 1177.0 | 1177.0 |
| 12.5° | 1173.5 | 1173.5 | 1173.5 | 1173.5 | 1173.5 | 1173.5 | 1173.5 | 1173.5 | 1173.5 | 1173.5 | 1173.5 |
| 15°   | 1168.3 | 1170.0 | 1170.0 | 1170.0 | 1170.0 | 1170.0 | 1170.0 | 1170.0 | 1170.0 | 1168.3 | 1168.3 |
| 17.5° | 1166.5 | 1166.5 | 1166.5 | 1168.3 | 1170.0 | 1170.0 | 1170.0 | 1168.3 | 1166.5 | 1164.8 | 1164.8 |
| 20°   | 1168.3 | 1168.3 | 1168.3 | 1170.0 | 1171.8 | 1171.8 | 1171.8 | 1170.0 | 1166.5 | 1166.5 | 1166.5 |
| 22.5° | 1166.5 | 1168.3 | 1168.3 | 1170.0 | 1171.8 | 1171.8 | 1170.0 | 1168.3 | 1166.5 | 1164.8 | 1164.8 |
| 25°   | 1161.3 | 1161.3 | 1163.1 | 1164.8 | 1164.8 | 1164.8 | 1164.8 | 1161.3 | 1159.6 | 1157.8 | 1157.8 |
| 27.5° | 1154.3 | 1156.1 | 1156.1 | 1157.8 | 1159.6 | 1159.6 | 1157.8 | 1154.3 | 1152.6 | 1150.8 | 1150.8 |
| 30°   | 1145.6 | 1145.6 | 1147.3 | 1150.8 | 1152.6 | 1154.3 | 1150.8 | 1147.3 | 1142.1 | 1140.4 | 1140.4 |
| 32.5° | 1136.9 | 1138.6 | 1142.1 | 1145.6 | 1147.3 | 1149.1 | 1145.6 | 1142.1 | 1136.9 | 1133.4 | 1131.6 |
| 35°   | 1133.4 | 1133.4 | 1138.6 | 1145.6 | 1150.8 | 1150.8 | 1147.3 | 1140.4 | 1133.4 | 1126.4 | 1126.4 |
| 37.5° | 1138.6 | 1140.4 | 1147.3 | 1159.6 | 1168.3 | 1168.3 | 1166.5 | 1154.3 | 1142.1 | 1131.6 | 1129.9 |
| 40°   | 1150.8 | 1152.6 | 1164.8 | 1180.5 | 1194.5 | 1196.2 | 1189.2 | 1173.5 | 1156.1 | 1143.8 | 1140.4 |
| 42.5° | 1157.8 | 1161.3 | 1175.3 | 1194.5 | 1206.7 | 1212.0 | 1203.2 | 1187.5 | 1164.8 | 1149.1 | 1147.3 |
| 45°   | 1161.3 | 1164.8 | 1180.5 | 1201.5 | 1217.2 | 1222.4 | 1213.7 | 1192.7 | 1168.3 | 1150.8 | 1149.1 |
| 47.5° | 1163.1 | 1166.5 | 1182.3 | 1208.5 | 1225.9 | 1231.2 | 1224.2 | 1199.7 | 1170.0 | 1152.6 | 1150.8 |
| 50°   | 1164.8 | 1171.8 | 1191.0 | 1218.9 | 1245.1 | 1248.6 | 1238.1 | 1208.5 | 1177.0 | 1156.1 | 1150.8 |
| 52.5° | 1177.0 | 1182.3 | 1210.2 | 1250.4 | 1276.6 | 1287.0 | 1271.3 | 1241.6 | 1194.5 | 1163.1 | 1159.6 |
| 55°   | 1206.7 | 1208.5 | 1241.6 | 1292.3 | 1330.7 | 1344.7 | 1320.2 | 1280.1 | 1222.4 | 1191.0 | 1189.2 |
| 57.5° | 1215.4 | 1225.9 | 1262.6 | 1320.2 | 1367.4 | 1384.8 | 1363.9 | 1302.8 | 1250.4 | 1208.5 | 1198.0 |
| 60°   | 1206.7 | 1215.4 | 1259.1 | 1325.5 | 1376.1 | 1390.1 | 1374.4 | 1316.7 | 1239.9 | 1192.7 | 1184.0 |
| 62.5° | 1198.0 | 1208.5 | 1253.9 | 1329.0 | 1377.9 | 1393.6 | 1367.4 | 1318.5 | 1234.7 | 1187.5 | 1178.8 |
| 65°   | 1177.0 | 1191.0 | 1245.1 | 1318.5 | 1388.3 | 1409.3 | 1381.3 | 1302.8 | 1229.4 | 1166.5 | 1157.8 |
| 67.5° | 1136.9 | 1143.8 | 1203.2 | 1288.8 | 1363.9 | 1384.8 | 1355.2 | 1273.1 | 1185.8 | 1124.6 | 1117.6 |
| 70°   | 1061.8 | 1077.5 | 1133.4 | 1227.7 | 1299.3 | 1309.7 | 1287.0 | 1205.0 | 1119.4 | 1054.8 | 1046.1 |
| 72.5° | 962.2  | 984.9  | 1046.1 | 1142.1 | 1199.7 | 1220.7 | 1191.0 | 1124.6 | 1035.6 | 962.2  | 950.0  |
| 75°   | 857.4  | 869.7  | 932.5  | 1026.8 | 1086.2 | 1105.4 | 1079.2 | 1014.6 | 908.1  | 857.4  | 845.2  |
| 77.5° | 742.2  | 750.9  | 806.8  | 890.6  | 946.5  | 962.2  | 936.0  | 883.6  | 787.6  | 740.4  | 735.2  |
| 80°   | 581.5  | 599.0  | 651.4  | 723.0  | 764.9  | 789.3  | 761.4  | 710.8  | 640.9  | 585.0  | 576.3  |
| 82.5° | 415.6  | 427.9  | 475.0  | 523.9  | 564.1  | 571.0  | 558.8  | 509.9  | 457.5  | 413.9  | 403.4  |
| 85°   | 227.0  | 232.3  | 261.9  | 312.6  | 328.3  | 340.5  | 323.1  | 286.4  | 260.2  | 232.3  | 223.5  |
| 87.5° | 59.4   | 61.1   | 69.9   | 82.1   | 89.1   | 90.8   | 89.1   | 78.6   | 64.6   | 50.6   | 55.9   |
| 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



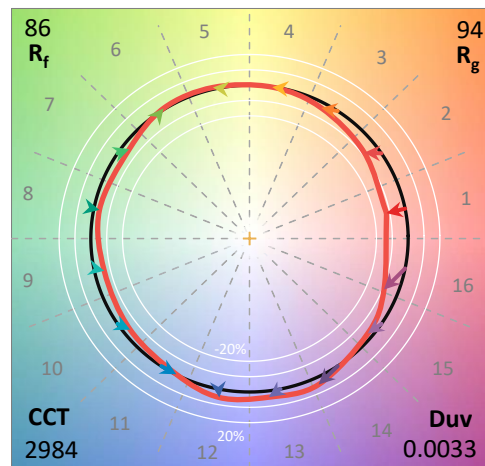
**Test Information**

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  
 CIE u': 0.2500  
 CIE v': 0.5264  
 Duv: 0.0033  
 CIE x: 0.4431  
 CIE y: 0.4147  
 CIE z: 0.1422  
 Peak Wavelength (nm): 601  
 Dominant Wavelength (nm): 581  
 Purity: 57.4798  
 Rf: 85.8  
 Rg: 94.1

|           |      |      |      |
|-----------|------|------|------|
| CRI (Ra): | 81.8 |      |      |
| R1:       | 79.4 | R9:  | -1.1 |
| R2:       | 89.9 | R10: | 78.4 |
| R3:       | 96.6 | R11: | 80.8 |
| R4:       | 80.6 | R12: | 72.8 |
| R5:       | 80.1 | R13: | 81.7 |
| R6:       | 88.9 | R14: | 98.5 |
| R7:       | 82.6 | R15: | 70.2 |
| R8:       | 56.0 |      |      |



**Test Conditions**

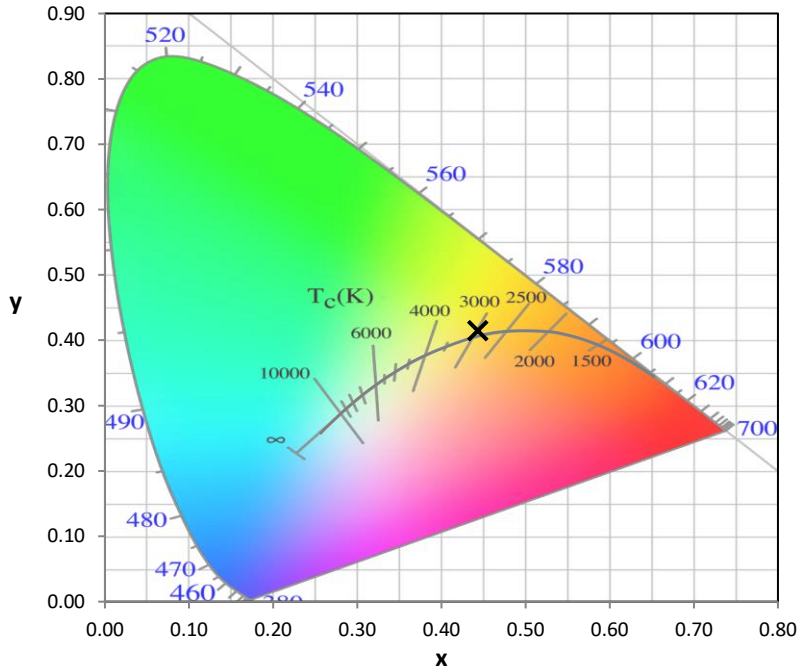
Stabilization Time: 29M  
 Operation Time: 1H 29M  
 Sphere Temperature (°C): 25.2

REPORT NUMBER: SP1-2407-176-7

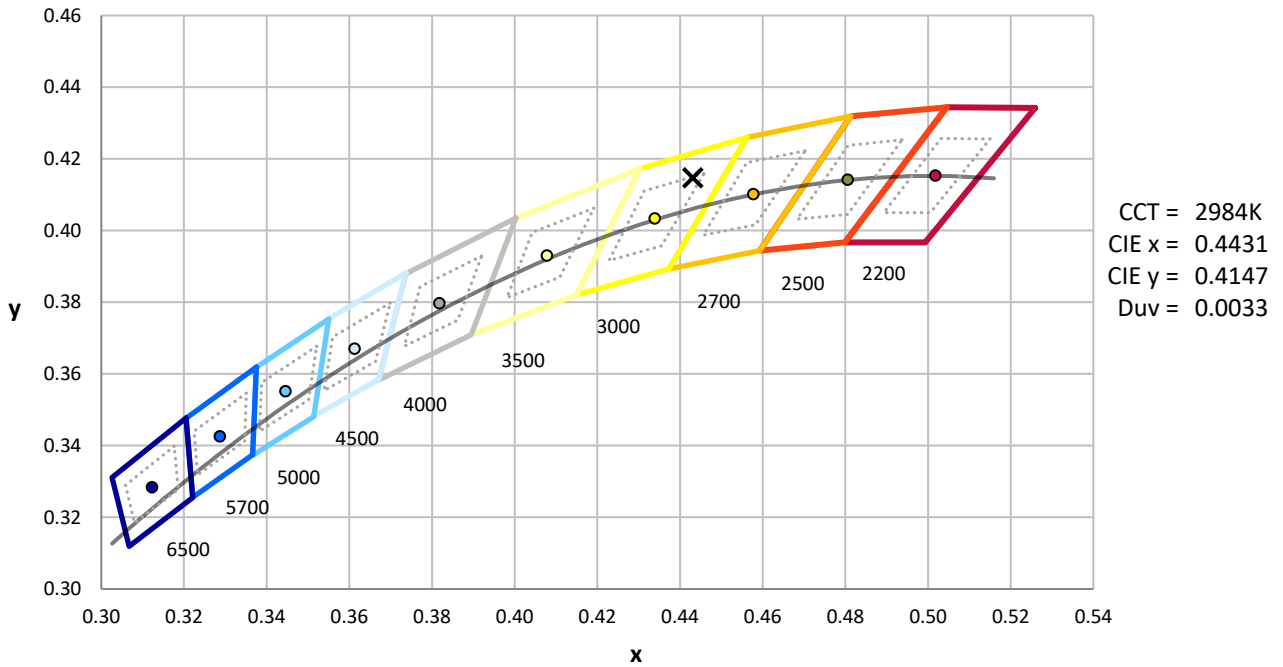
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| 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**



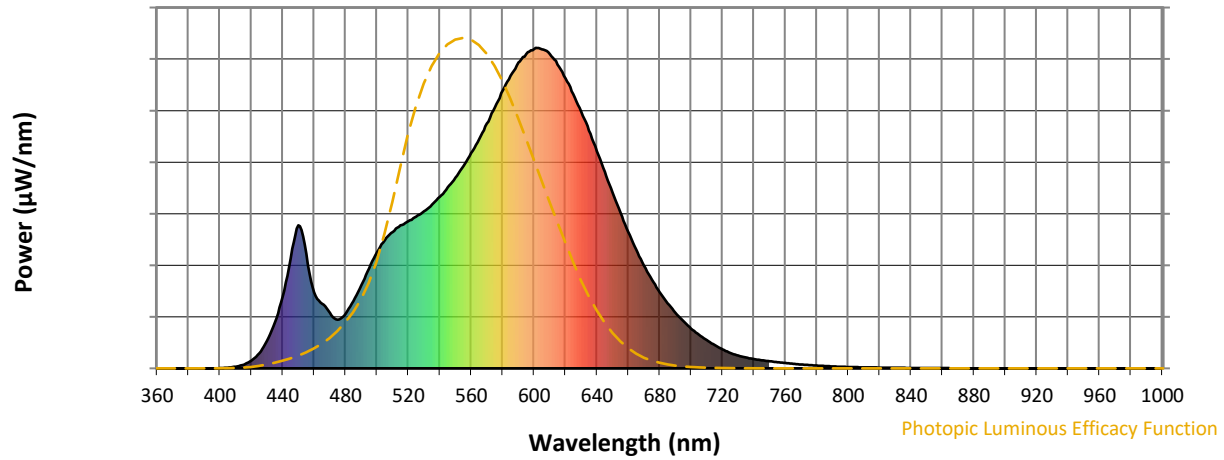
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 3000K 4-step quadrangle

REPORT NUMBER: SP1-2407-176-7

**Photopic Flux vs. Wavelength**

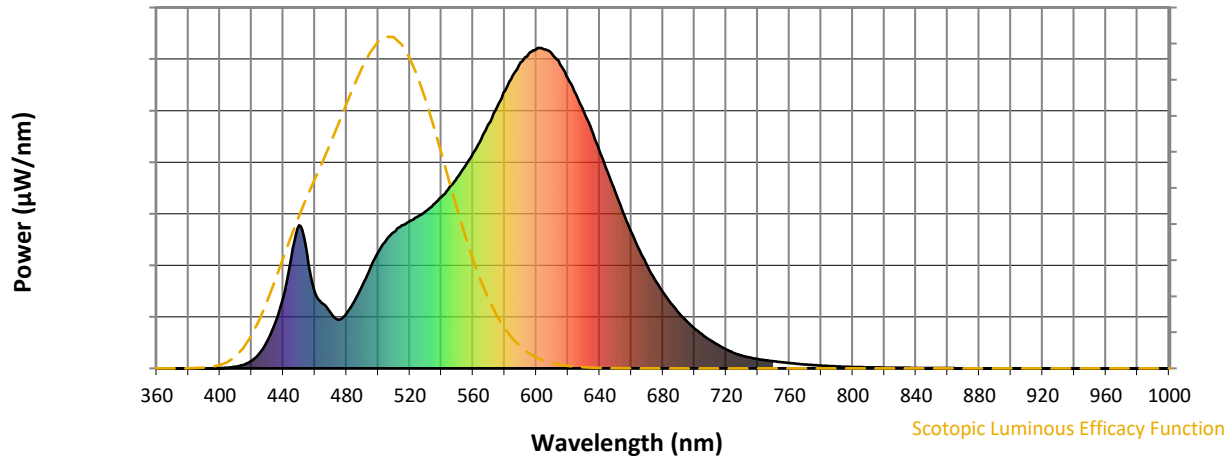


**Photopic Lumens: NR**

| $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /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**



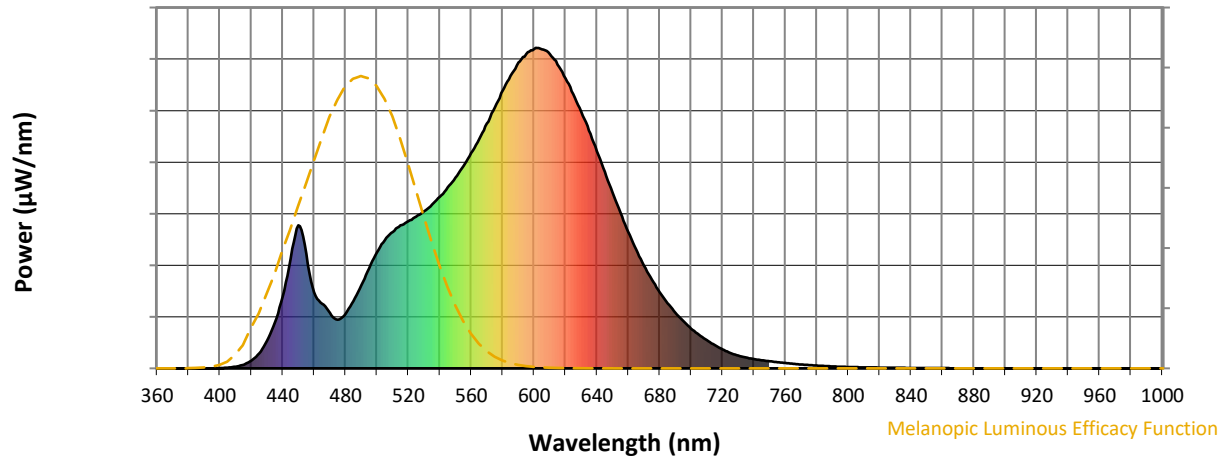
**Scotopic Lumens: NR**

**S/P: 1.32**

| λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /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

**Melanopic Flux vs. Wavelength**



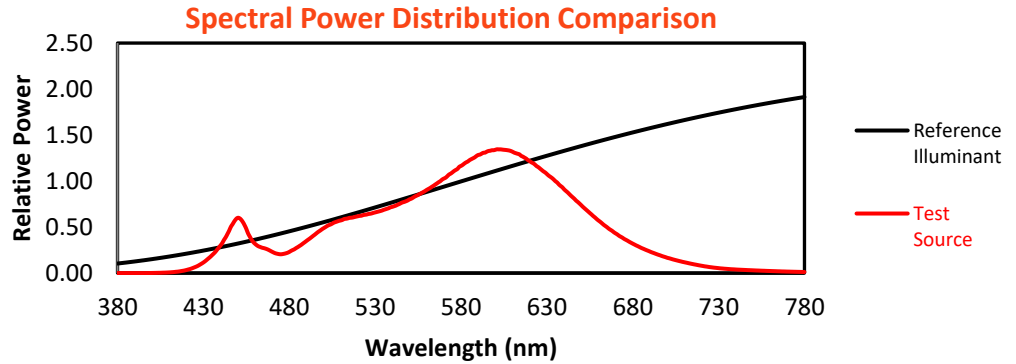
**Melanopic Lumens: NR**

**M/P: 2.51**

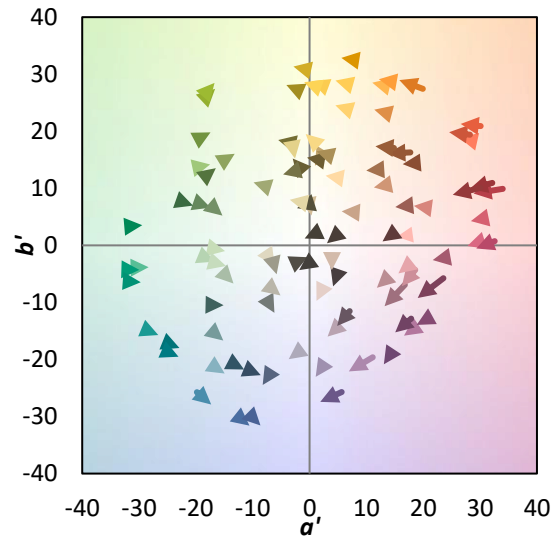
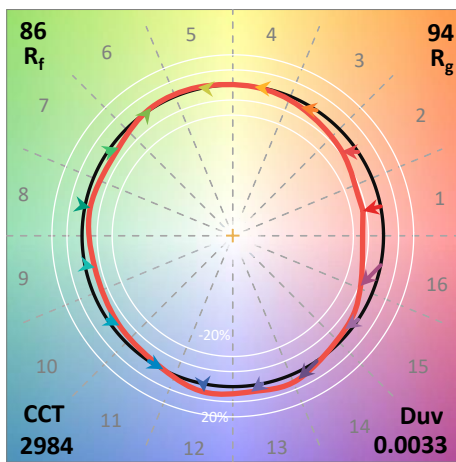
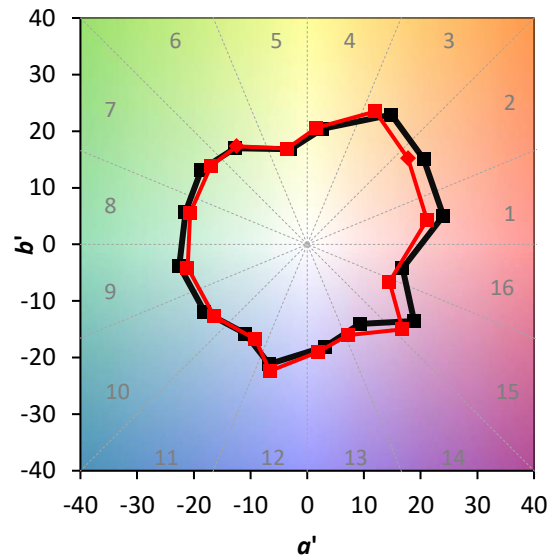
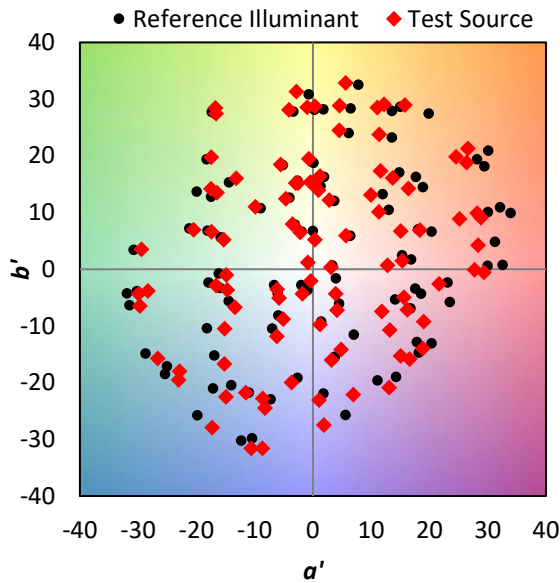
| λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 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            |        |                          |               |

**Summary**

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

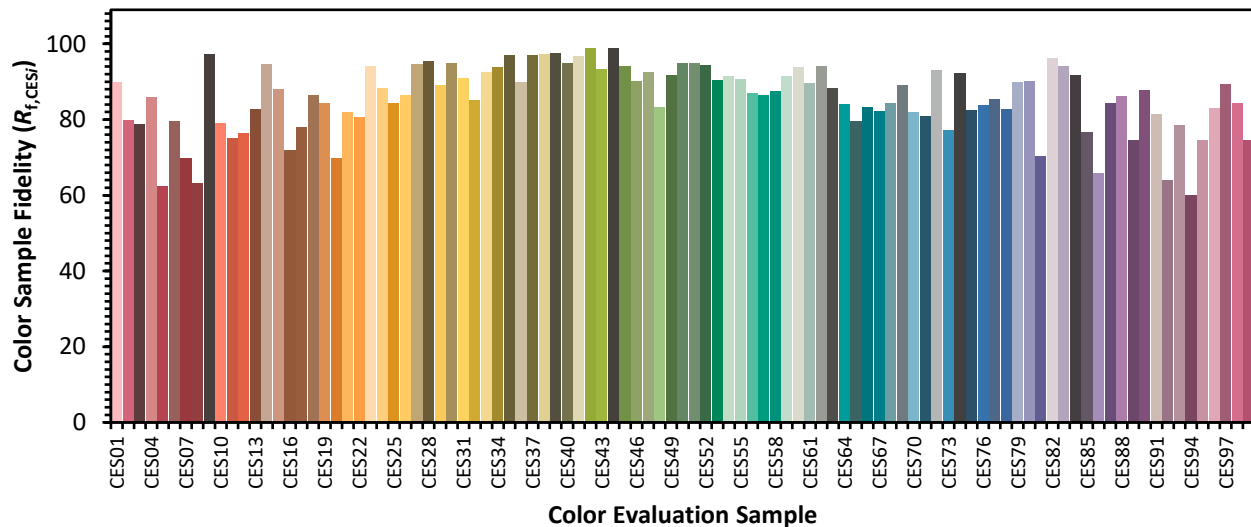


**Color Vector Graphics**



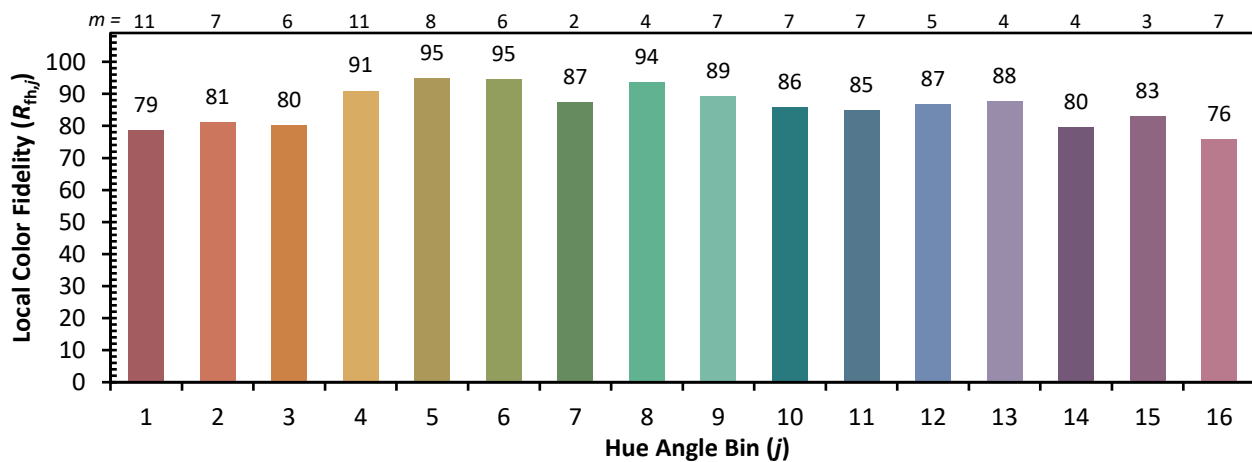
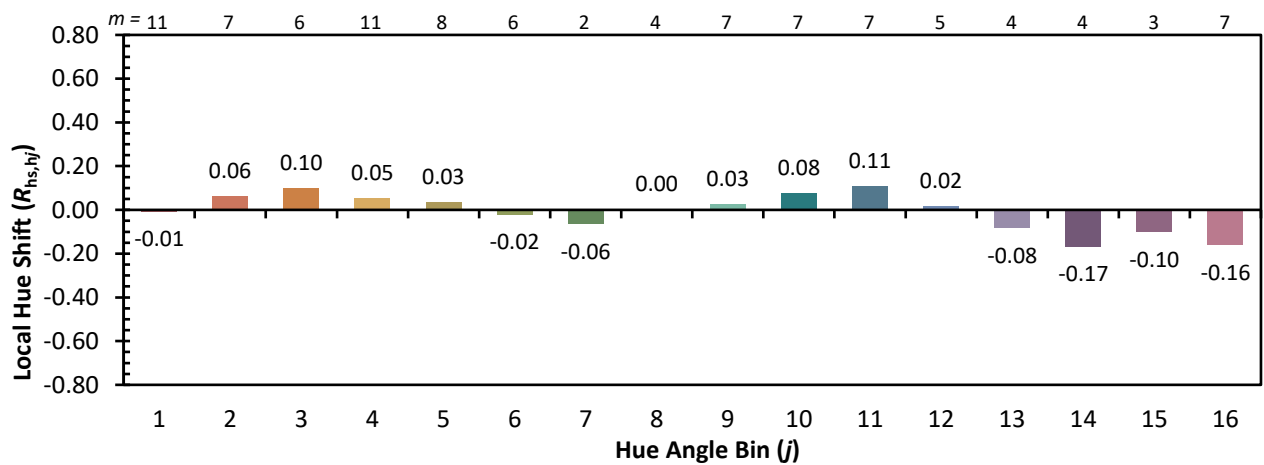
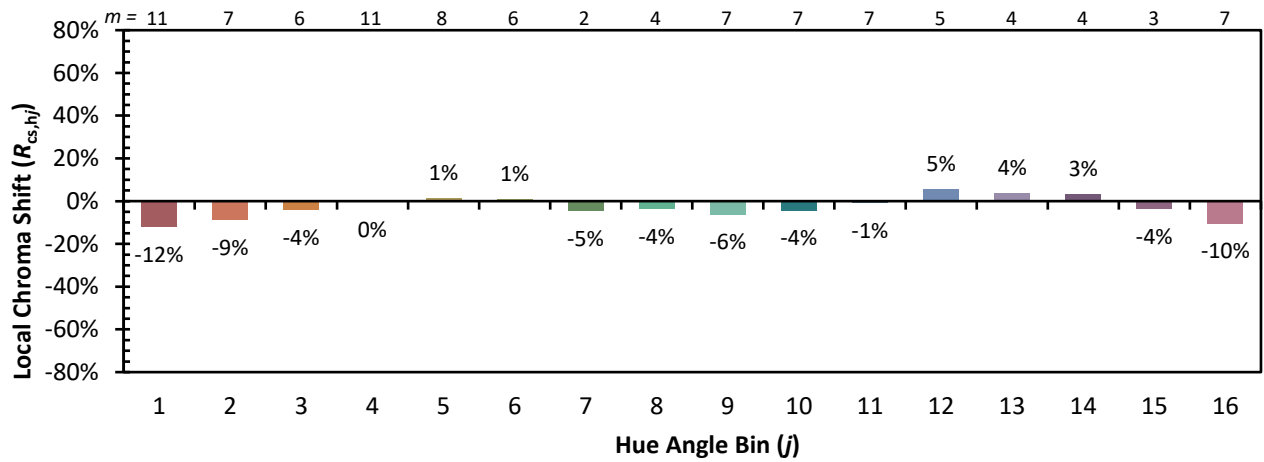
Individual Sample Fidelity Index ( $R_{f,i}$ )

|            |            |            |            |
|------------|------------|------------|------------|
| 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 |            |

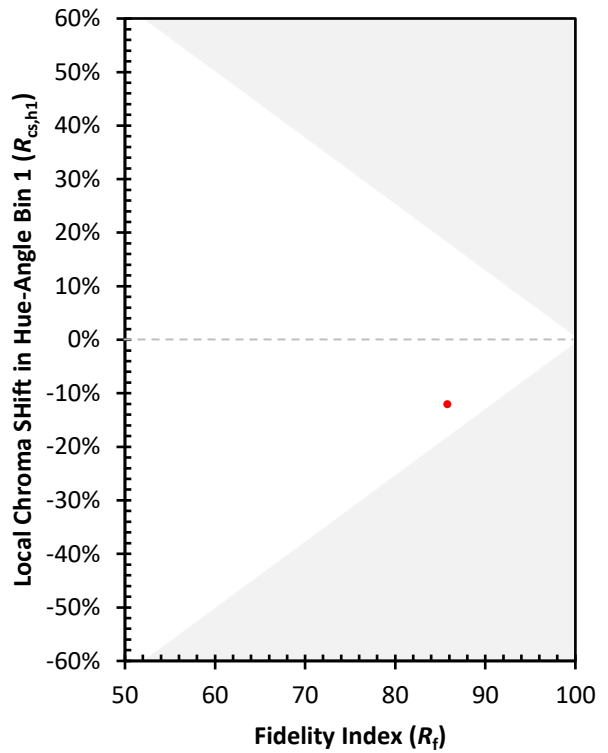
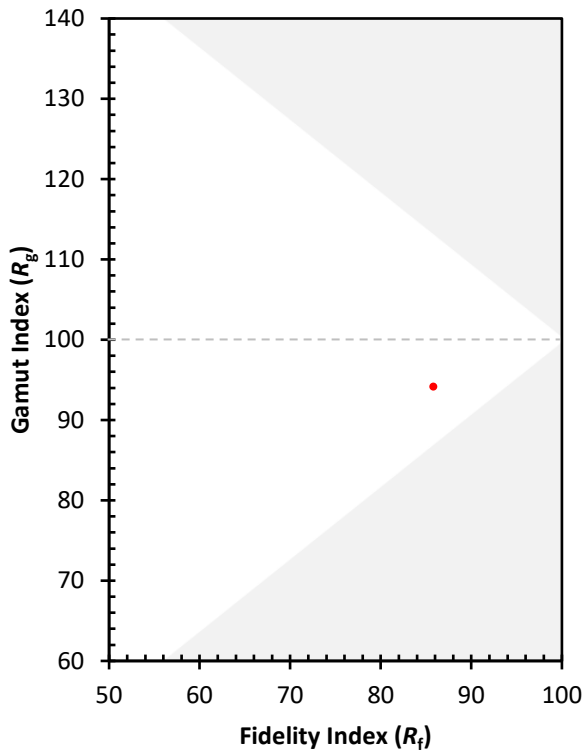




Color Rendition by Hue-Angle Bin



Measure Comparisons



(END OF REPORT)