

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: P348828

Luminaire Tested: **ARCH-N-PA1-19-750-24VDC-T3-HSS**

Issue Date: 3/3/2020



**Test Information**

Test Method: LM-79-08  
Report Number: P348828  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-15)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: STREETWORKS  
Catalog Number: ARCH-N-PA1-19-750-24VDC-T3-HSS  
Description: ARCHEON ROADWAY AND AREA LUMINAIRE  
(1) 70 CRI, 5000K, 370mA LIGHT ENGINE WITH 16 LEDS AND  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 2117 lumens  
Efficiency: N/A  
Efficacy: 111.4 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.75' x H: 0')  
IES Classification: Type III - Short  
BUG Rating: B0 - U0 - G1

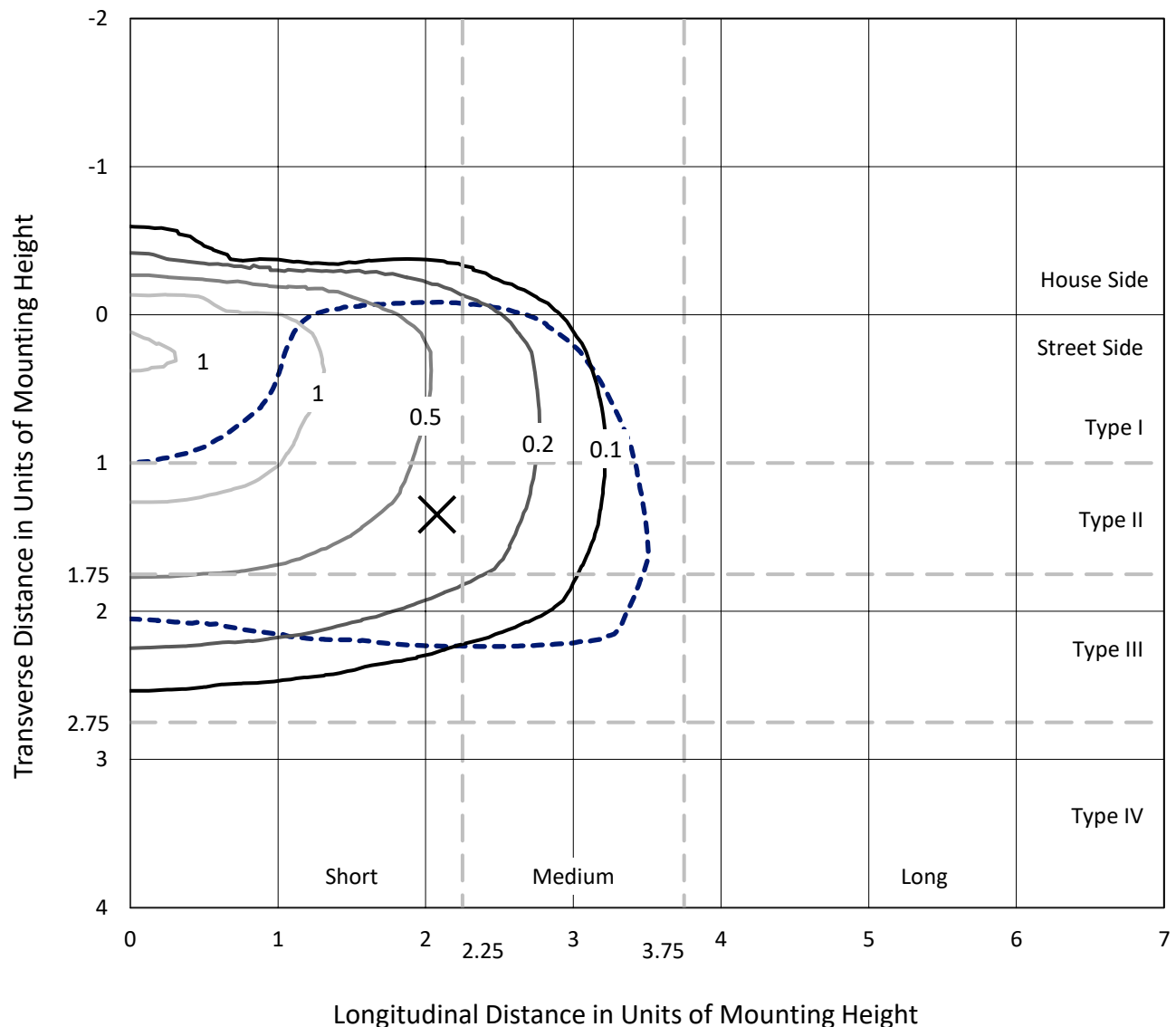
Input Watts (W): 19  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 25 FT

REPORT NUMBER: P348828

CATALOG NUMBER: ARCH-N-PA1-19-750-24VDC-T3-HSS

## Iso-Footcandle Lines of Horizontal Illumination

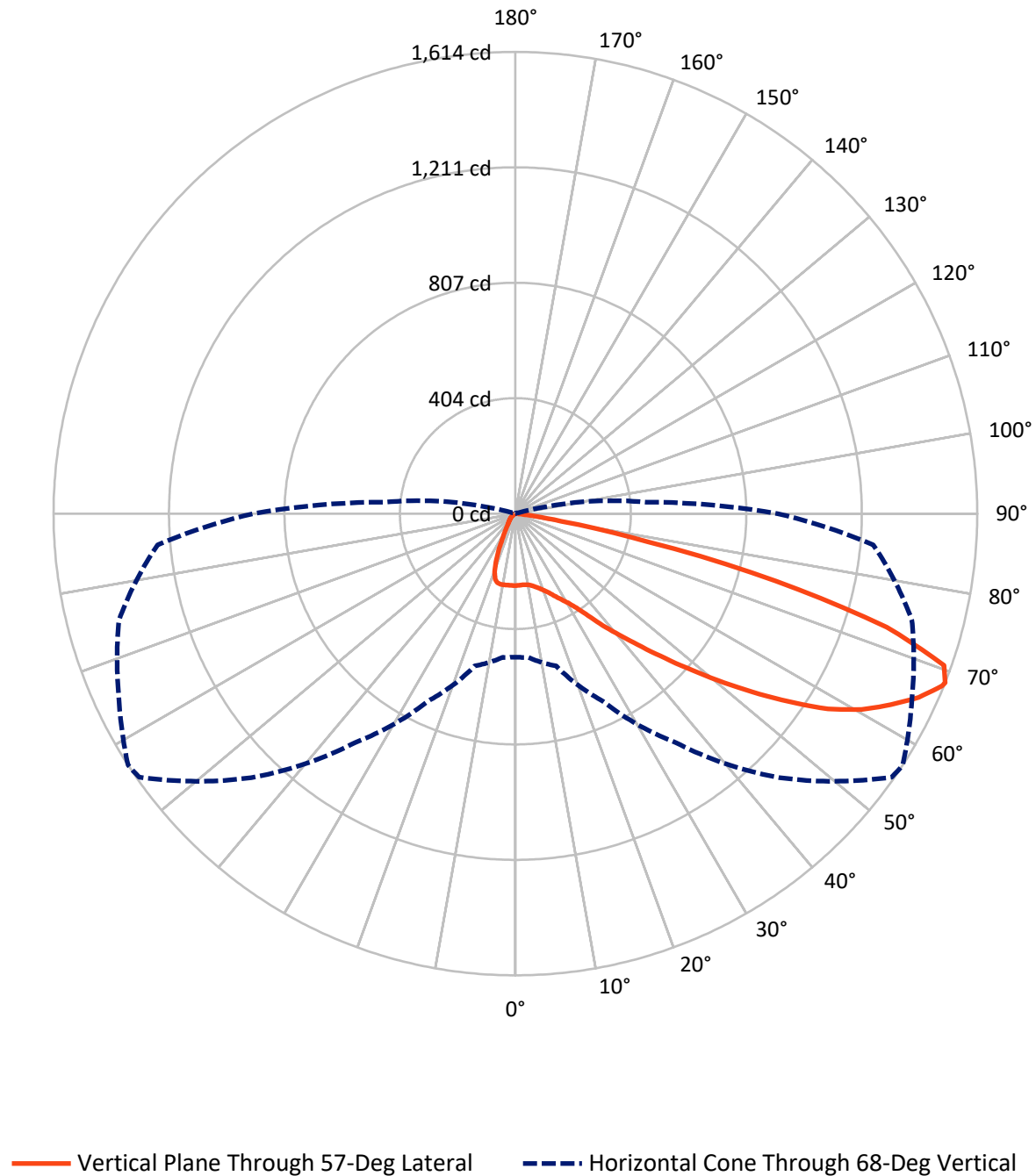
× Max cd  
 - - - 1/2 Max cd



Based on 15 foot mounting height. Maximum calculated value = 1.4 fc  
 Type III - Short - N/A

REPORT NUMBER: P348828  
CATALOG NUMBER: ARCH-N-PA1-19-750-24VDC-T3-HSS

## Luminous Intensity Polar Plot



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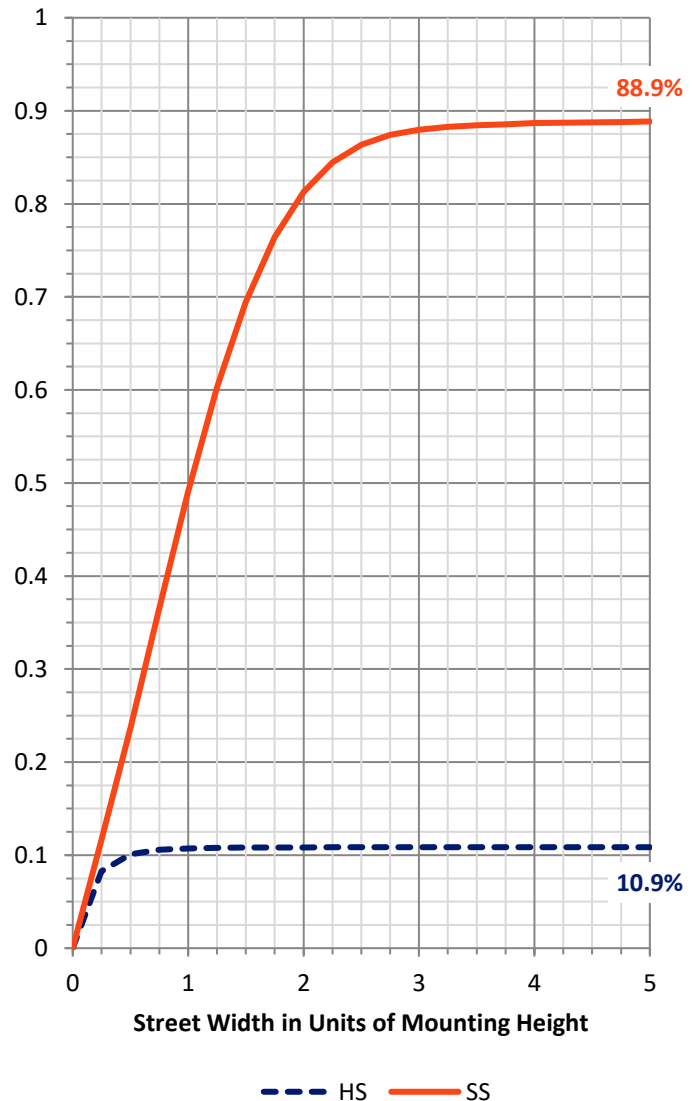
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 232.1    | 0.0    | 232.1  |
|                    | % Fixture | 11.0     | 0.0    | 11.0   |
| <b>Street Side</b> | Lumens    | 1884.8   | 0.0    | 1884.8 |
|                    | % Fixture | 89.0     | 0.0    | 89.0   |
| <b>Total</b>       | Lumens    | 2117.0   | 0.0    | 2117.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**Coefficient of Utilization**

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 23.5   | 1.1       |
| 10°-20°   | 65.2   | 3.1       |
| 20°-30°   | 112.5  | 5.3       |
| 30°-40°   | 194.2  | 9.2       |
| 40°-50°   | 332.2  | 15.7      |
| 50°-60°   | 531.6  | 25.1      |
| 60°-70°   | 614.2  | 29.0      |
| 70°-80°   | 234.7  | 11.1      |
| 80°-90°   | 8.8    | 0.4       |
| 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°    | 2117.0 | 100.0     |
| 0°-180°   | 2117.0 | 100.0     |



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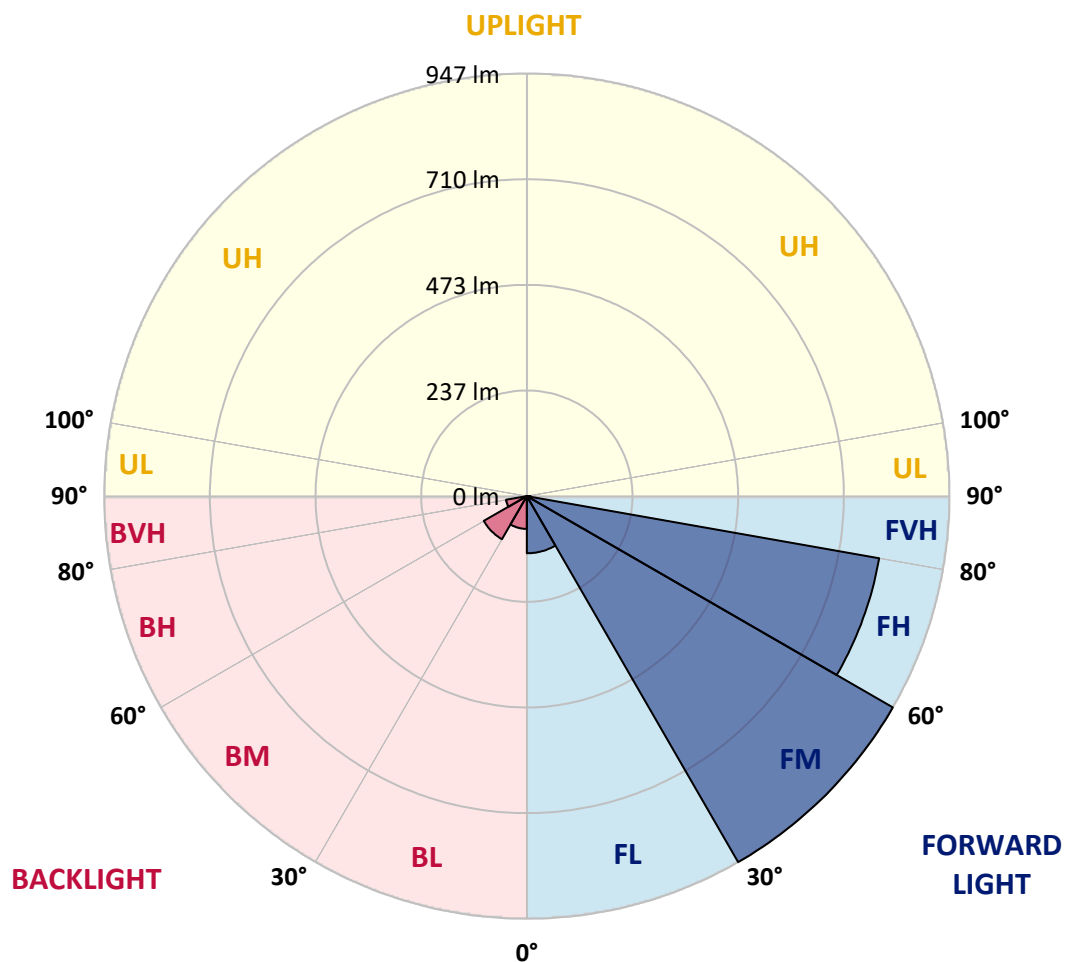
CATALOG NUMBER: ARCH-N-PA1-19-750-24VDC-T3-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 128.0  | 6.0       |                         |      |         |
| FM   | (30°-60°)   | 946.7  | 44.7      |                         |      |         |
| FH   | (60°-80°)   | 801.6  | 37.9      |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 8.6    | 0.4       |                         |      | G0/10   |
| BL   | (0°-30°)    | 73.4   | 3.5       | B0/110                  |      |         |
| BM   | (30°-60°)   | 111.3  | 5.3       | B0/220                  |      |         |
| BH   | (60°-80°)   | 47.3   | 2.2       | B0/110                  |      | G0/110  |
| BVH  | (80°-90°)   | 0.2    | 0.0       |                         |      | G0/10   |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B0-U0-G1**

Type III Short





REPORT NUMBER: P348828

CATALOG NUMBER: ARCH-N-PA1-19-750-24VDC-T3-HSS

**CANDELA DISTRIBUTION (FULL):**

|       | 0°    | 5°    | 15°    | 25°    | 35°    | 45°    | 55°    | 57°    | 65°    | 75°    | 85°    |
|-------|-------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 251.6 | 251.6 | 251.6  | 251.6  | 251.6  | 251.6  | 251.6  | 251.6  | 251.6  | 251.6  | 251.6  |
| 2.5°  | 245.6 | 246.8 | 247.6  | 248.1  | 248.7  | 250.0  | 250.4  | 251.0  | 251.3  | 251.3  | 252.0  |
| 5°    | 235.9 | 237.1 | 238.8  | 240.2  | 243.0  | 246.7  | 249.3  | 250.3  | 252.1  | 253.7  | 254.6  |
| 7.5°  | 226.9 | 228.3 | 230.3  | 233.6  | 238.4  | 244.2  | 249.7  | 251.1  | 254.6  | 258.0  | 259.7  |
| 10°   | 221.1 | 222.2 | 224.8  | 229.5  | 235.8  | 243.9  | 251.6  | 253.3  | 259.3  | 265.0  | 268.2  |
| 12.5° | 219.1 | 220.1 | 222.8  | 228.1  | 235.9  | 245.4  | 256.0  | 258.5  | 267.3  | 275.6  | 280.1  |
| 15°   | 222.0 | 222.2 | 225.1  | 230.1  | 237.8  | 249.2  | 263.3  | 266.3  | 277.4  | 288.2  | 293.8  |
| 17.5° | 233.2 | 232.3 | 233.8  | 236.0  | 242.1  | 254.1  | 271.0  | 275.5  | 290.3  | 303.0  | 308.3  |
| 20°   | 261.3 | 261.3 | 257.9  | 251.9  | 252.0  | 261.7  | 281.4  | 286.5  | 304.6  | 319.3  | 324.1  |
| 22.5° | 309.2 | 308.3 | 301.5  | 286.8  | 273.3  | 274.8  | 294.1  | 300.7  | 321.8  | 337.5  | 339.1  |
| 25°   | 366.9 | 365.8 | 355.3  | 334.5  | 311.1  | 296.0  | 311.3  | 318.9  | 342.3  | 356.3  | 353.0  |
| 27.5° | 427.9 | 427.0 | 416.6  | 390.9  | 357.6  | 329.8  | 331.8  | 339.0  | 363.3  | 377.0  | 366.5  |
| 30°   | 487.1 | 487.4 | 477.1  | 450.7  | 412.9  | 373.0  | 357.9  | 362.1  | 383.6  | 397.5  | 382.5  |
| 32.5° | 543.4 | 543.8 | 534.8  | 505.3  | 470.1  | 423.1  | 393.9  | 392.8  | 407.2  | 420.9  | 403.7  |
| 35°   | 593.5 | 594.5 | 588.4  | 565.5  | 528.1  | 479.0  | 440.6  | 438.0  | 440.7  | 456.3  | 436.2  |
| 37.5° | 641.9 | 642.5 | 637.8  | 618.5  | 587.3  | 540.3  | 499.7  | 496.0  | 490.2  | 502.1  | 479.2  |
| 40°   | 694.8 | 693.3 | 688.0  | 670.5  | 643.7  | 608.1  | 563.2  | 556.8  | 546.7  | 557.3  | 535.6  |
| 42.5° | 744.1 | 742.4 | 743.3  | 723.4  | 700.8  | 677.8  | 637.1  | 626.1  | 620.2  | 632.4  | 604.9  |
| 45°   | 805.6 | 804.7 | 807.7  | 790.5  | 772.2  | 755.5  | 721.9  | 709.9  | 707.3  | 721.6  | 688.7  |
| 47.5° | 866.4 | 868.6 | 877.9  | 870.6  | 863.2  | 848.5  | 811.7  | 806.3  | 807.9  | 825.2  | 777.1  |
| 50°   | 917.0 | 919.6 | 945.2  | 953.6  | 964.3  | 955.7  | 918.8  | 915.5  | 921.8  | 937.5  | 872.2  |
| 52.5° | 953.7 | 959.0 | 990.7  | 1029.4 | 1068.5 | 1074.3 | 1037.6 | 1034.6 | 1043.1 | 1045.5 | 945.7  |
| 55°   | 979.1 | 983.8 | 1019.7 | 1090.6 | 1170.1 | 1195.1 | 1172.3 | 1160.7 | 1159.1 | 1135.4 | 1022.9 |
| 57.5° | 983.6 | 983.1 | 1034.8 | 1130.1 | 1249.8 | 1314.3 | 1299.9 | 1288.5 | 1255.7 | 1218.4 | 1111.5 |
| 60°   | 958.2 | 961.1 | 1021.0 | 1143.9 | 1299.8 | 1404.5 | 1405.6 | 1390.8 | 1339.7 | 1299.2 | 1197.4 |
| 62.5° | 879.9 | 891.7 | 952.3  | 1107.9 | 1299.2 | 1440.9 | 1483.1 | 1471.8 | 1410.6 | 1365.4 | 1284.5 |
| 65°   | 753.0 | 757.2 | 814.9  | 984.8  | 1211.4 | 1425.6 | 1552.9 | 1548.7 | 1474.6 | 1429.7 | 1329.2 |
| 67.5° | 549.9 | 540.7 | 601.4  | 775.5  | 1025.6 | 1337.0 | 1602.9 | 1608.2 | 1523.9 | 1442.9 | 1281.6 |
| 68°   | 501.8 | 504.5 | 551.8  | 723.7  | 977.0  | 1305.6 | 1606.2 | 1614.3 | 1528.9 | 1434.3 | 1255.6 |
| 70°   | 299.1 | 304.3 | 346.5  | 498.3  | 743.3  | 1128.3 | 1570.6 | 1589.1 | 1499.6 | 1345.5 | 1086.0 |
| 72.5° | 76.4  | 82.6  | 122.4  | 223.0  | 424.5  | 795.0  | 1325.8 | 1357.2 | 1302.0 | 1091.5 | 733.1  |
| 75°   | 31.4  | 33.0  | 43.7   | 73.5   | 158.2  | 358.2  | 873.9  | 941.0  | 902.6  | 653.5  | 331.3  |
| 77.5° | 21.7  | 22.8  | 28.1   | 40.7   | 68.5   | 121.4  | 428.4  | 476.9  | 429.6  | 223.0  | 72.3   |
| 80°   | 15.6  | 16.5  | 20.1   | 27.1   | 39.3   | 43.3   | 139.6  | 161.5  | 128.2  | 48.9   | 17.9   |
| 82.5° | 9.3   | 10.0  | 15.0   | 19.3   | 23.9   | 20.7   | 34.7   | 39.4   | 37.1   | 24.3   | 8.0    |
| 85°   | 4.6   | 5.4   | 10.1   | 13.8   | 12.9   | 8.7    | 10.6   | 11.8   | 14.6   | 14.8   | 4.3    |
| 87.5° | 0.3   | 0.6   | 5.9    | 8.3    | 3.6    | 2.0    | 3.1    | 3.8    | 5.2    | 7.3    | 1.8    |
| 90°   | 0.0   | 0.0   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



REPORT NUMBER: P348828

CATALOG NUMBER: ARCH-N-PA1-19-750-24VDC-T3-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°   | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 251.6  | 251.6 | 251.6 | 251.6 | 251.6 | 251.6 | 251.6 | 251.6 | 251.6 | 251.6 | 251.6 |
| 2.5°  | 252.3  | 252.4 | 251.7 | 251.4 | 251.6 | 250.4 | 249.9 | 250.1 | 250.1 | 250.4 | 249.9 |
| 5°    | 254.8  | 254.8 | 253.6 | 252.0 | 251.1 | 248.8 | 247.3 | 246.9 | 246.6 | 246.4 | 245.9 |
| 7.5°  | 260.2  | 259.6 | 257.5 | 254.0 | 251.0 | 245.9 | 242.1 | 240.1 | 239.1 | 238.7 | 238.4 |
| 10°   | 268.9  | 267.8 | 264.3 | 257.8 | 250.9 | 241.9 | 233.6 | 227.7 | 222.8 | 220.8 | 219.6 |
| 12.5° | 280.6  | 279.0 | 273.1 | 262.3 | 250.2 | 233.7 | 215.7 | 198.4 | 182.3 | 175.7 | 172.4 |
| 15°   | 294.1  | 291.8 | 282.5 | 266.1 | 246.0 | 215.2 | 176.1 | 145.7 | 123.4 | 115.0 | 111.4 |
| 17.5° | 307.8  | 304.8 | 290.7 | 268.5 | 233.7 | 176.9 | 123.5 | 93.3  | 78.4  | 74.4  | 73.0  |
| 20°   | 321.6  | 317.2 | 297.8 | 266.7 | 205.9 | 127.5 | 81.5  | 68.2  | 63.9  | 62.7  | 62.3  |
| 22.5° | 334.7  | 327.9 | 304.2 | 259.7 | 163.1 | 85.6  | 64.5  | 60.3  | 58.9  | 58.2  | 58.0  |
| 25°   | 346.2  | 336.6 | 309.8 | 238.0 | 115.4 | 64.7  | 58.1  | 56.7  | 54.9  | 53.6  | 53.7  |
| 27.5° | 356.9  | 345.4 | 313.2 | 202.4 | 77.0  | 55.3  | 53.8  | 51.9  | 48.5  | 46.6  | 46.6  |
| 30°   | 369.8  | 357.0 | 315.7 | 155.8 | 56.7  | 48.8  | 47.6  | 44.7  | 40.2  | 37.7  | 37.7  |
| 32.5° | 389.2  | 374.6 | 314.1 | 109.3 | 46.9  | 42.9  | 40.1  | 36.1  | 31.2  | 28.8  | 28.7  |
| 35°   | 418.9  | 401.8 | 302.7 | 71.7  | 41.4  | 37.3  | 32.8  | 27.9  | 23.6  | 21.6  | 21.5  |
| 37.5° | 459.0  | 438.2 | 277.1 | 51.3  | 37.1  | 32.1  | 26.7  | 21.3  | 18.1  | 16.8  | 16.7  |
| 40°   | 510.9  | 480.6 | 240.4 | 41.5  | 33.1  | 27.1  | 20.6  | 16.5  | 14.3  | 13.3  | 13.4  |
| 42.5° | 573.3  | 525.9 | 196.5 | 35.8  | 29.2  | 22.3  | 16.1  | 13.0  | 11.6  | 10.9  | 10.7  |
| 45°   | 642.6  | 570.7 | 150.5 | 31.9  | 25.3  | 18.0  | 12.6  | 10.3  | 9.2   | 8.8   | 8.8   |
| 47.5° | 718.7  | 614.2 | 110.1 | 28.5  | 21.1  | 13.9  | 10.1  | 8.4   | 7.5   | 7.2   | 7.1   |
| 50°   | 787.9  | 644.5 | 79.4  | 24.9  | 17.3  | 11.0  | 8.2   | 7.0   | 6.4   | 6.0   | 6.0   |
| 52.5° | 845.6  | 654.0 | 58.5  | 21.0  | 14.0  | 8.8   | 6.8   | 6.0   | 5.4   | 5.1   | 5.1   |
| 55°   | 896.3  | 650.1 | 43.4  | 17.3  | 11.3  | 7.2   | 5.8   | 5.1   | 4.6   | 4.3   | 4.3   |
| 57.5° | 945.0  | 637.4 | 32.4  | 14.1  | 9.1   | 5.8   | 4.9   | 4.3   | 3.8   | 3.6   | 3.6   |
| 60°   | 984.7  | 616.4 | 24.1  | 11.4  | 7.3   | 4.7   | 4.1   | 3.5   | 3.1   | 2.8   | 2.8   |
| 62.5° | 1016.9 | 593.2 | 17.7  | 9.4   | 5.8   | 3.7   | 3.2   | 2.9   | 2.3   | 2.0   | 2.0   |
| 65°   | 1017.1 | 554.7 | 13.3  | 7.8   | 4.5   | 2.9   | 2.4   | 2.3   | 1.5   | 1.2   | 1.1   |
| 67.5° | 943.6  | 478.2 | 10.2  | 6.7   | 3.5   | 2.2   | 1.8   | 1.9   | 0.8   | 0.5   | 0.4   |
| 68°   | 916.8  | 458.8 | 9.6   | 6.6   | 3.3   | 2.1   | 1.7   | 1.9   | 0.7   | 0.4   | 0.3   |
| 70°   | 773.0  | 365.0 | 7.7   | 6.4   | 2.9   | 1.6   | 1.4   | 1.9   | 0.6   | 0.3   | 0.2   |
| 72.5° | 494.4  | 211.8 | 5.7   | 5.1   | 2.2   | 1.2   | 0.9   | 1.7   | 0.6   | 0.2   | 0.1   |
| 75°   | 210.4  | 65.7  | 3.9   | 3.6   | 1.3   | 0.9   | 0.6   | 1.1   | 0.4   | 0.1   | 0.0   |
| 77.5° | 44.3   | 14.8  | 2.3   | 2.2   | 0.9   | 0.6   | 0.4   | 0.3   | 0.1   | 0.0   | 0.0   |
| 80°   | 11.4   | 4.3   | 1.2   | 1.1   | 0.5   | 0.3   | 0.2   | 0.0   | 0.0   | 0.0   | 0.0   |
| 82.5° | 3.6    | 1.7   | 0.7   | 0.5   | 0.2   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 85°   | 1.8    | 1.0   | 0.4   | 0.2   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 87.5° | 1.0    | 0.3   | 0.1   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 90°   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |



Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

STREETWORKS

Report Number: SP1-2101-121-8

Luminaire Tested: IFLD-S-SA2E-750-U-T2

Test Date: 03/05/2021

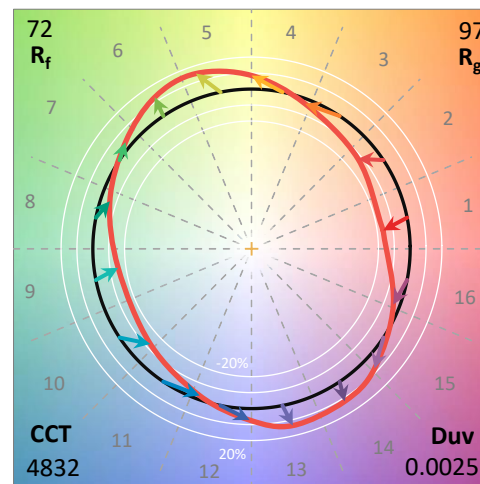
### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2101-121-8  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 03/05/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: STREETWORKS  
 Catalog Number: **IFLD-S-SA2E-750-U-T2**  
 Description: STREETWORKS INF FLOOD

PROGRAMMED @ 615mA.

### Spectral Parameters

|                           |        |           |      |      |       |
|---------------------------|--------|-----------|------|------|-------|
| CCT (K):                  | 4832   | CRI (Ra): | 71.7 |      |       |
| CIE u':                   | 0.2115 | R1:       | 69.5 | R9:  | -27.7 |
| CIE v':                   | 0.4900 | R2:       | 75.7 | R10: | 42.9  |
| Duv:                      | 0.0025 | R3:       | 80.8 | R11: | 71.2  |
| CIE x:                    | 0.3506 | R4:       | 73.2 | R12: | 44.6  |
| CIE y:                    | 0.3611 | R5:       | 70.3 | R13: | 69.8  |
| CIE z:                    | 0.2884 | R6:       | 67.3 | R14: | 89.2  |
| Peak Wavelength (nm):     | 444    | R7:       | 79.9 |      |       |
| Dominant Wavelength (nm): | 572    | R8:       | 57.2 |      |       |
| Purity:                   | 13.7   |           |      |      |       |
| Rf:                       | 72.3   |           |      |      |       |
| Rg:                       | 96.7   |           |      |      |       |



### Test Conditions

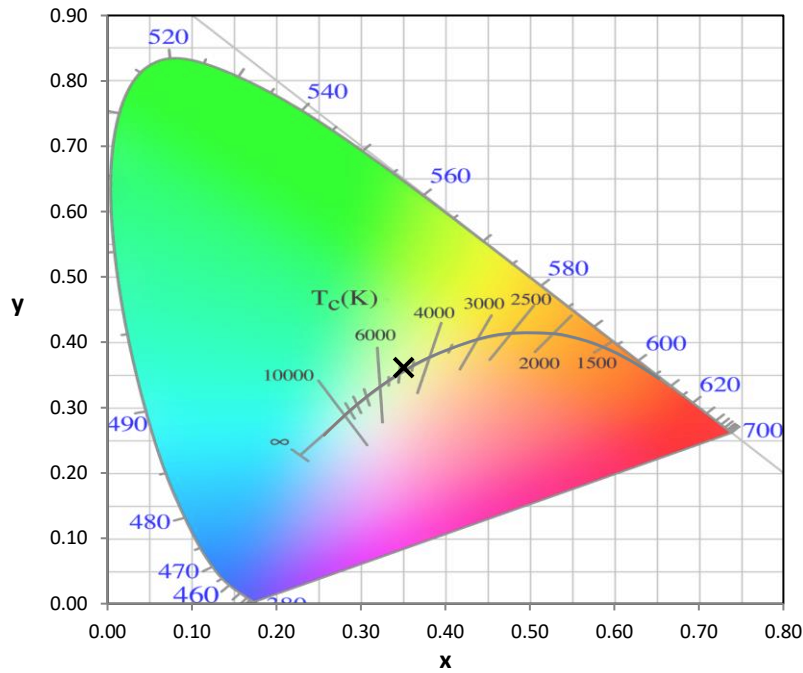
Stabilization Time: 47M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.9/31%  
 Sphere Temperature (°C): 24.4

REPORT NUMBER: SP1-2101-121-8

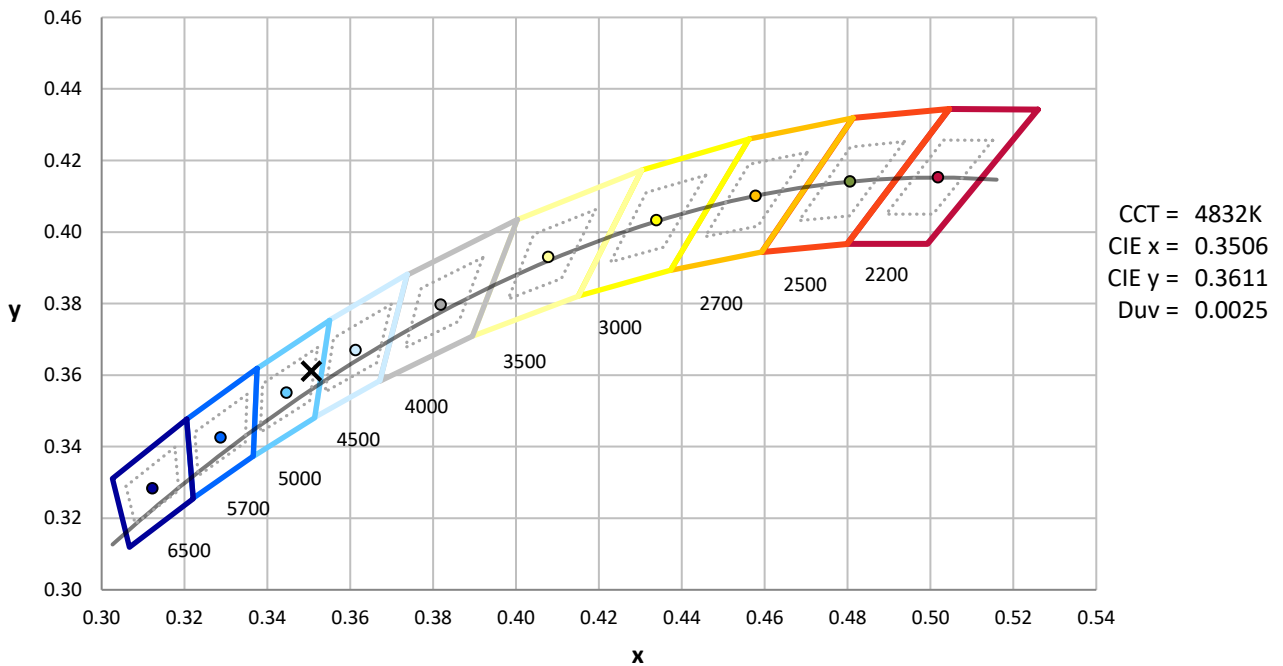
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| 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: SP1-2101-121-8

**CIE 1931 Chromaticity Diagram**



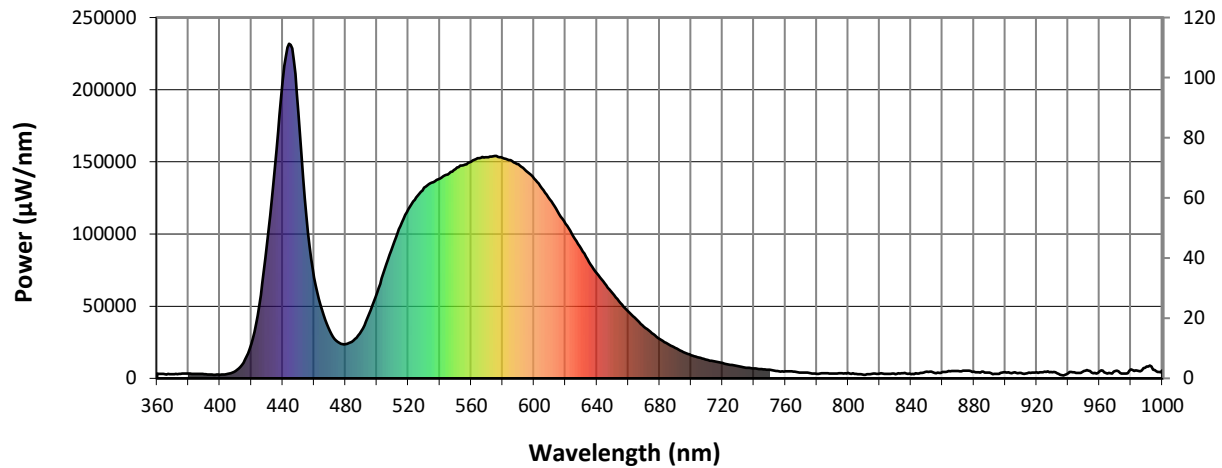
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 5000K 4-step quadrangle

REPORT NUMBER: SP1-2101-121-8

### Photopic Flux vs. Wavelength

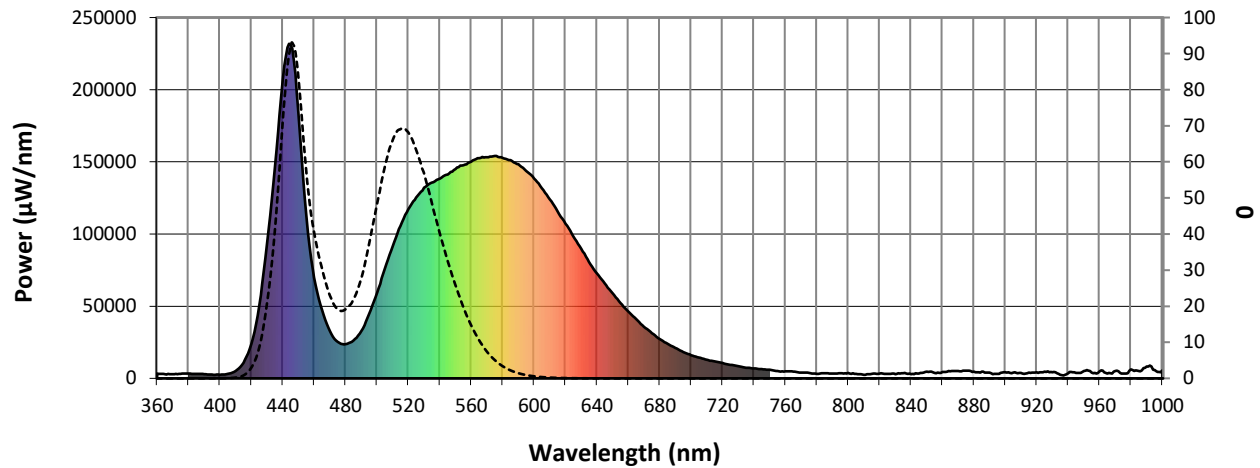


#####

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 3353             | 0.0              | 490       | 32805            | 4.7              | 620       | 107081           | 27.9             | 750       | 5910             | 0.0              | 880       | 4619             | 0.0              |
| 365       | 2862             | 0.0              | 495       | 44523            | 8.1              | 625       | 98536            | 21.7             | 755       | 5030             | 0.0              | 885       | 4614             | 0.0              |
| 370       | 2810             | 0.0              | 500       | 59272            | 13.1             | 630       | 89745            | 16.2             | 760       | 4853             | 0.0              | 890       | 3959             | 0.0              |
| 375       | 3214             | 0.0              | 505       | 75789            | 21.2             | 635       | 80639            | 12.1             | 765       | 4704             | 0.0              | 895       | 3106             | 0.0              |
| 380       | 3349             | 0.0              | 510       | 91523            | 31.4             | 640       | 72702            | 8.7              | 770       | 3920             | 0.0              | 900       | 4270             | 0.0              |
| 385       | 3025             | 0.0              | 515       | 105611           | 43.7             | 645       | 65679            | 6.3              | 775       | 3859             | 0.0              | 905       | 3918             | 0.0              |
| 390       | 2882             | 0.0              | 520       | 117273           | 56.9             | 650       | 59001            | 4.3              | 780       | 3115             | 0.0              | 910       | 3872             | 0.0              |
| 395       | 2575             | 0.0              | 525       | 125211           | 67.2             | 655       | 52143            | 3.0              | 785       | 3474             | 0.0              | 915       | 3970             | 0.0              |
| 400       | 2553             | 0.0              | 530       | 132145           | 77.8             | 660       | 46377            | 1.9              | 790       | 3401             | 0.0              | 920       | 4123             | 0.0              |
| 405       | 3040             | 0.0              | 535       | 135784           | 84.2             | 665       | 41029            | 1.3              | 795       | 3536             | 0.0              | 925       | 4692             | 0.0              |
| 410       | 5218             | 0.0              | 540       | 138313           | 90.1             | 670       | 35613            | 0.8              | 800       | 3687             | 0.0              | 930       | 4313             | 0.0              |
| 415       | 10898            | 0.0              | 545       | 141311           | 94.1             | 675       | 31345            | 0.5              | 805       | 3213             | 0.0              | 935       | 2374             | 0.0              |
| 420       | 23692            | 0.1              | 550       | 144916           | 98.5             | 680       | 27204            | 0.3              | 810       | 2541             | 0.0              | 940       | 3564             | 0.0              |
| 425       | 50574            | 0.3              | 555       | 147753           | 100.9            | 685       | 23938            | 0.2              | 815       | 3033             | 0.0              | 945       | 3888             | 0.0              |
| 430       | 93101            | 0.7              | 560       | 150201           | 102.1            | 690       | 21157            | 0.1              | 820       | 3270             | 0.0              | 950       | 5143             | 0.0              |
| 435       | 146856           | 1.7              | 565       | 152596           | 101.5            | 695       | 18244            | 0.1              | 825       | 3208             | 0.0              | 955       | 3966             | 0.0              |
| 440       | 206284           | 3.2              | 570       | 153241           | 99.6             | 700       | 16063            | 0.0              | 830       | 2991             | 0.0              | 960       | 4927             | 0.0              |
| 445       | 230963           | 4.8              | 575       | 154079           | 95.9             | 705       | 14433            | 0.0              | 835       | 3477             | 0.0              | 965       | 3279             | 0.0              |
| 450       | 184279           | 4.8              | 580       | 152658           | 90.7             | 710       | 12921            | 0.0              | 840       | 2982             | 0.0              | 970       | 5201             | 0.0              |
| 455       | 112612           | 3.8              | 585       | 151127           | 84.0             | 715       | 11715            | 0.0              | 845       | 3443             | 0.0              | 975       | 3421             | 0.0              |
| 460       | 69904            | 2.9              | 590       | 148249           | 76.6             | 720       | 10565            | 0.0              | 850       | 4753             | 0.0              | 980       | 6148             | 0.0              |
| 465       | 47480            | 2.4              | 595       | 143567           | 68.1             | 725       | 9312             | 0.0              | 855       | 3744             | 0.0              | 985       | 5069             | 0.0              |
| 470       | 32573            | 2.0              | 600       | 138422           | 59.7             | 730       | 8354             | 0.0              | 860       | 4355             | 0.0              | 990       | 8231             | 0.0              |
| 475       | 25178            | 2.0              | 605       | 131783           | 51.0             | 735       | 7425             | 0.0              | 865       | 4984             | 0.0              | 995       | 5852             | 0.0              |
| 480       | 23726            | 2.3              | 610       | 124021           | 42.6             | 740       | 6965             | 0.0              | 870       | 5065             | 0.0              | 1000      | 5471             | 0.0              |
| 485       | 26206            | 3.1              | 615       | 115646           | 34.9             | 745       | 6343             | 0.0              | 875       | 5430             | 0.0              |           |                  |                  |

REPORT NUMBER: SP1-2101-121-8

### Scotopic Flux vs. Wavelength



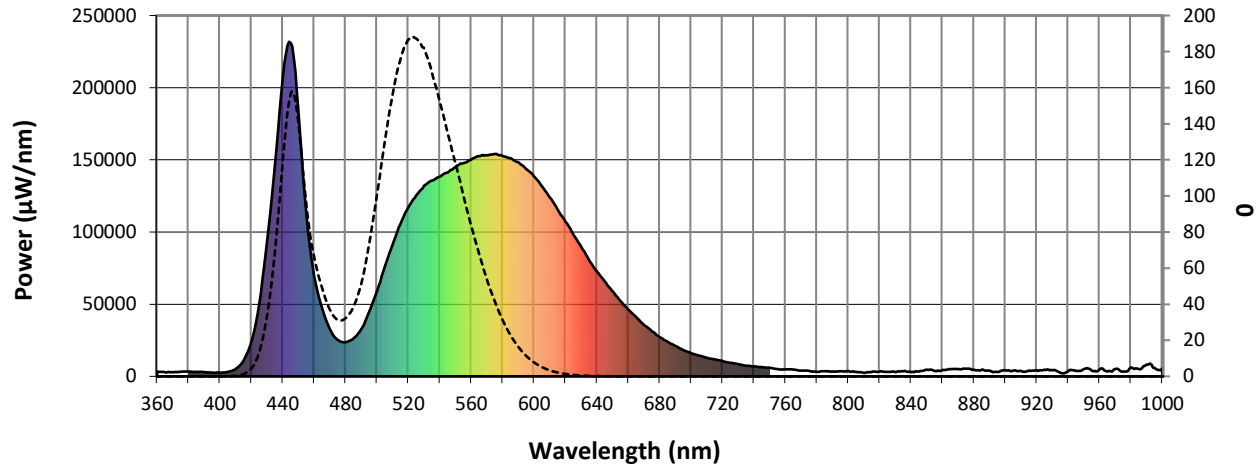
Scotopic Lumens: 15745.7

S/P: 1.71

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 3353             | 0.0              | 490       | 32805            | 50.5             | 620       | 107081           | 1.3              | 750       | 5910             | 0.0              | 880       | 4619             | 0.0              |
| 365       | 2862             | 0.0              | 495       | 44523            | 72.0             | 625       | 98536            | 0.8              | 755       | 5030             | 0.0              | 885       | 4614             | 0.0              |
| 370       | 2810             | 0.0              | 500       | 59272            | 99.1             | 630       | 89745            | 0.5              | 760       | 4853             | 0.0              | 890       | 3959             | 0.0              |
| 375       | 3214             | 0.0              | 505       | 75789            | 128.8            | 635       | 80639            | 0.3              | 765       | 4704             | 0.0              | 895       | 3106             | 0.0              |
| 380       | 3349             | 0.0              | 510       | 91523            | 155.1            | 640       | 72702            | 0.2              | 770       | 3920             | 0.0              | 900       | 4270             | 0.0              |
| 385       | 3025             | 0.0              | 515       | 105611           | 175.1            | 645       | 65679            | 0.1              | 775       | 3859             | 0.0              | 905       | 3918             | 0.0              |
| 390       | 2882             | 0.0              | 520       | 117273           | 186.4            | 650       | 59001            | 0.1              | 780       | 3115             | 0.0              | 910       | 3872             | 0.0              |
| 395       | 2575             | 0.0              | 525       | 125211           | 187.3            | 655       | 52143            | 0.0              | 785       | 3474             | 0.0              | 915       | 3970             | 0.0              |
| 400       | 2553             | 0.0              | 530       | 132145           | 182.2            | 660       | 46377            | 0.0              | 790       | 3401             | 0.0              | 920       | 4123             | 0.0              |
| 405       | 3040             | 0.1              | 535       | 135784           | 169.2            | 665       | 41029            | 0.0              | 795       | 3536             | 0.0              | 925       | 4692             | 0.0              |
| 410       | 5218             | 0.3              | 540       | 138313           | 152.8            | 670       | 35613            | 0.0              | 800       | 3687             | 0.0              | 930       | 4313             | 0.0              |
| 415       | 10898            | 1.1              | 545       | 141311           | 135.5            | 675       | 31345            | 0.0              | 805       | 3213             | 0.0              | 935       | 2374             | 0.0              |
| 420       | 23692            | 3.9              | 550       | 144916           | 118.5            | 680       | 27204            | 0.0              | 810       | 2541             | 0.0              | 940       | 3564             | 0.0              |
| 425       | 50574            | 12.4             | 555       | 147753           | 101.0            | 685       | 23938            | 0.0              | 815       | 3033             | 0.0              | 945       | 3888             | 0.0              |
| 430       | 93101            | 31.7             | 560       | 150201           | 84.0             | 690       | 21157            | 0.0              | 820       | 3270             | 0.0              | 950       | 5143             | 0.0              |
| 435       | 146856           | 65.7             | 565       | 152596           | 68.5             | 695       | 18244            | 0.0              | 825       | 3208             | 0.0              | 955       | 3966             | 0.0              |
| 440       | 206284           | 115.3            | 570       | 153241           | 54.1             | 700       | 16063            | 0.0              | 830       | 2991             | 0.0              | 960       | 4927             | 0.0              |
| 445       | 230963           | 154.7            | 575       | 154079           | 42.0             | 705       | 14433            | 0.0              | 835       | 3477             | 0.0              | 965       | 3279             | 0.0              |
| 450       | 184279           | 142.8            | 580       | 152658           | 31.5             | 710       | 12921            | 0.0              | 840       | 2982             | 0.0              | 970       | 5201             | 0.0              |
| 455       | 112612           | 98.4             | 585       | 151127           | 23.1             | 715       | 11715            | 0.0              | 845       | 3443             | 0.0              | 975       | 3421             | 0.0              |
| 460       | 69904            | 67.5             | 590       | 148249           | 16.5             | 720       | 10565            | 0.0              | 850       | 4753             | 0.0              | 980       | 6148             | 0.0              |
| 465       | 47480            | 50.1             | 595       | 143567           | 11.4             | 725       | 9312             | 0.0              | 855       | 3744             | 0.0              | 985       | 5069             | 0.0              |
| 470       | 32573            | 37.5             | 600       | 138422           | 7.8              | 730       | 8354             | 0.0              | 860       | 4355             | 0.0              | 990       | 8231             | 0.0              |
| 475       | 25178            | 31.5             | 605       | 131783           | 5.2              | 735       | 7425             | 0.0              | 865       | 4984             | 0.0              | 995       | 5852             | 0.0              |
| 480       | 23726            | 32.0             | 610       | 124021           | 3.4              | 740       | 6965             | 0.0              | 870       | 5065             | 0.0              | 1000      | 5471             | 0.0              |
| 485       | 26206            | 38.0             | 615       | 115646           | 2.1              | 745       | 6343             | 0.0              | 875       | 5430             | 0.0              |           |                  |                  |

REPORT NUMBER: SP1-2101-121-8

### Melanopic Flux vs. Wavelength



**Melanopic Lumens: 6193.8**

**M/P: 0.67**

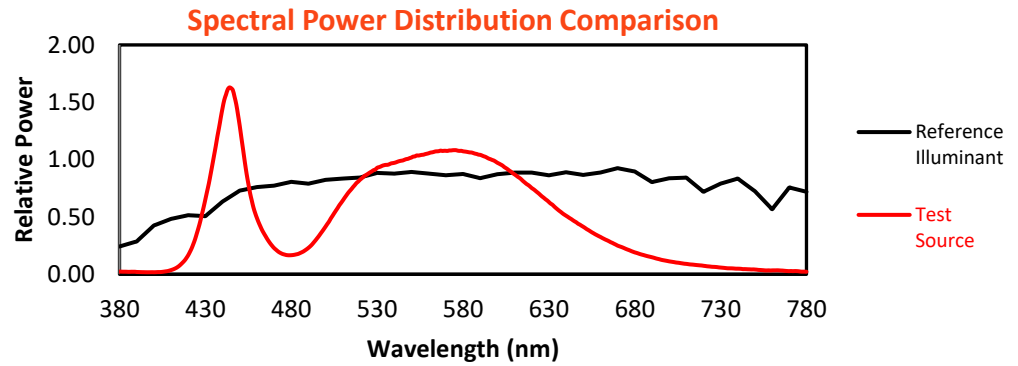
| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 3353             | 0.0              | 490       | 32805            | 27.3             | 620       | 107081           | 0.1              | 750       | 5910             | 0.0              | 880       | 4619             | 0.0              |
| 365       | 2862             | 0.0              | 495       | 44523            | 36.8             | 625       | 98536            | 0.1              | 755       | 5030             | 0.0              | 885       | 4614             | 0.0              |
| 370       | 2810             | 0.0              | 500       | 59272            | 47.6             | 630       | 89745            | 0.0              | 760       | 4853             | 0.0              | 890       | 3959             | 0.0              |
| 375       | 3214             | 0.0              | 505       | 75789            | 58.2             | 635       | 80639            | 0.0              | 765       | 4704             | 0.0              | 895       | 3106             | 0.0              |
| 380       | 3349             | 0.0              | 510       | 91523            | 65.7             | 640       | 72702            | 0.0              | 770       | 3920             | 0.0              | 900       | 4270             | 0.0              |
| 385       | 3025             | 0.0              | 515       | 105611           | 69.0             | 645       | 65679            | 0.0              | 775       | 3859             | 0.0              | 905       | 3918             | 0.0              |
| 390       | 2882             | 0.0              | 520       | 117273           | 68.3             | 650       | 59001            | 0.0              | 780       | 3115             | 0.0              | 910       | 3872             | 0.0              |
| 395       | 2575             | 0.0              | 525       | 125211           | 63.5             | 655       | 52143            | 0.0              | 785       | 3474             | 0.0              | 915       | 3970             | 0.0              |
| 400       | 2553             | 0.0              | 530       | 132145           | 57.1             | 660       | 46377            | 0.0              | 790       | 3401             | 0.0              | 920       | 4123             | 0.0              |
| 405       | 3040             | 0.1              | 535       | 135784           | 48.9             | 665       | 41029            | 0.0              | 795       | 3536             | 0.0              | 925       | 4692             | 0.0              |
| 410       | 5218             | 0.2              | 540       | 138313           | 40.5             | 670       | 35613            | 0.0              | 800       | 3687             | 0.0              | 930       | 4313             | 0.0              |
| 415       | 10898            | 0.7              | 545       | 141311           | 32.8             | 675       | 31345            | 0.0              | 805       | 3213             | 0.0              | 935       | 2374             | 0.0              |
| 420       | 23692            | 2.7              | 550       | 144916           | 26.0             | 680       | 27204            | 0.0              | 810       | 2541             | 0.0              | 940       | 3564             | 0.0              |
| 425       | 50574            | 7.9              | 555       | 147753           | 19.9             | 685       | 23938            | 0.0              | 815       | 3033             | 0.0              | 945       | 3888             | 0.0              |
| 430       | 93101            | 19.7             | 560       | 150201           | 14.8             | 690       | 21157            | 0.0              | 820       | 3270             | 0.0              | 950       | 5143             | 0.0              |
| 435       | 146856           | 39.2             | 565       | 152596           | 10.7             | 695       | 18244            | 0.0              | 825       | 3208             | 0.0              | 955       | 3966             | 0.0              |
| 440       | 206284           | 68.9             | 570       | 153241           | 7.5              | 700       | 16063            | 0.0              | 830       | 2991             | 0.0              | 960       | 4927             | 0.0              |
| 445       | 230963           | 91.1             | 575       | 154079           | 5.1              | 705       | 14433            | 0.0              | 835       | 3477             | 0.0              | 965       | 3279             | 0.0              |
| 450       | 184279           | 84.9             | 580       | 152658           | 3.4              | 710       | 12921            | 0.0              | 840       | 2982             | 0.0              | 970       | 5201             | 0.0              |
| 455       | 112612           | 59.0             | 585       | 151127           | 2.2              | 715       | 11715            | 0.0              | 845       | 3443             | 0.0              | 975       | 3421             | 0.0              |
| 460       | 69904            | 41.2             | 590       | 148249           | 1.5              | 720       | 10565            | 0.0              | 850       | 4753             | 0.0              | 980       | 6148             | 0.0              |
| 465       | 47480            | 31.0             | 595       | 143567           | 0.9              | 725       | 9312             | 0.0              | 855       | 3744             | 0.0              | 985       | 5069             | 0.0              |
| 470       | 32573            | 23.3             | 600       | 138422           | 0.6              | 730       | 8354             | 0.0              | 860       | 4355             | 0.0              | 990       | 8231             | 0.0              |
| 475       | 25178            | 19.2             | 605       | 131783           | 0.4              | 735       | 7425             | 0.0              | 865       | 4984             | 0.0              | 995       | 5852             | 0.0              |
| 480       | 23726            | 19.1             | 610       | 124021           | 0.2              | 740       | 6965             | 0.0              | 870       | 5065             | 0.0              | 1000      | 5471             | 0.0              |
| 485       | 26206            | 21.6             | 615       | 115646           | 0.1              | 745       | 6343             | 0.0              | 875       | 5430             | 0.0              |           |                  |                  |

REPORT NUMBER: SP1-2101-121-8

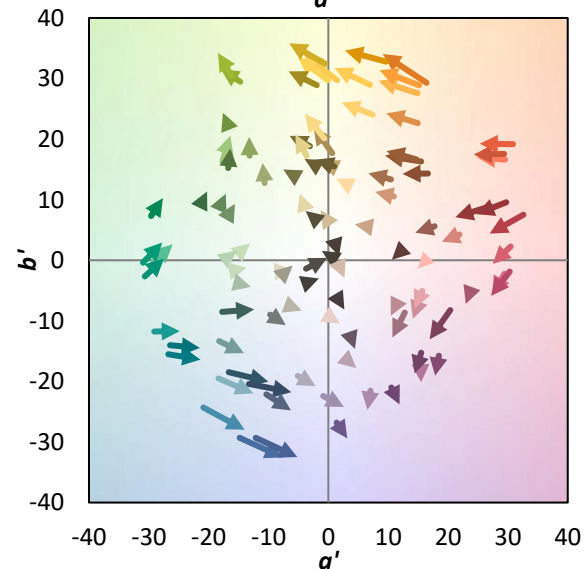
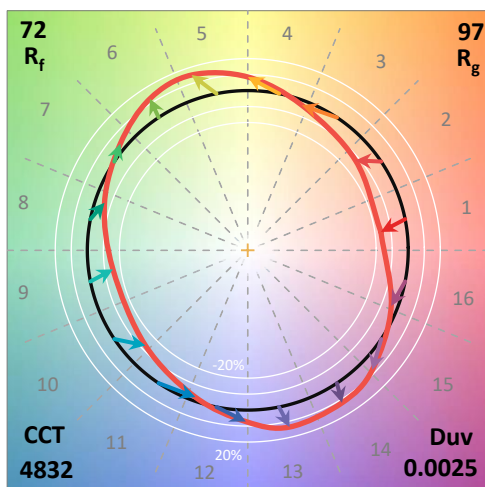
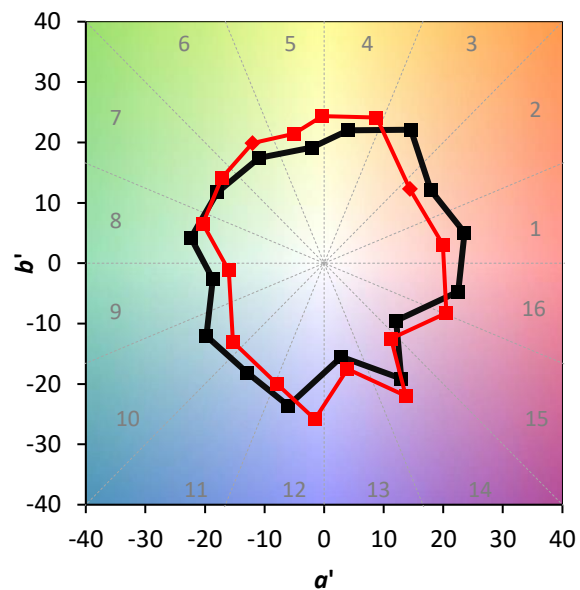
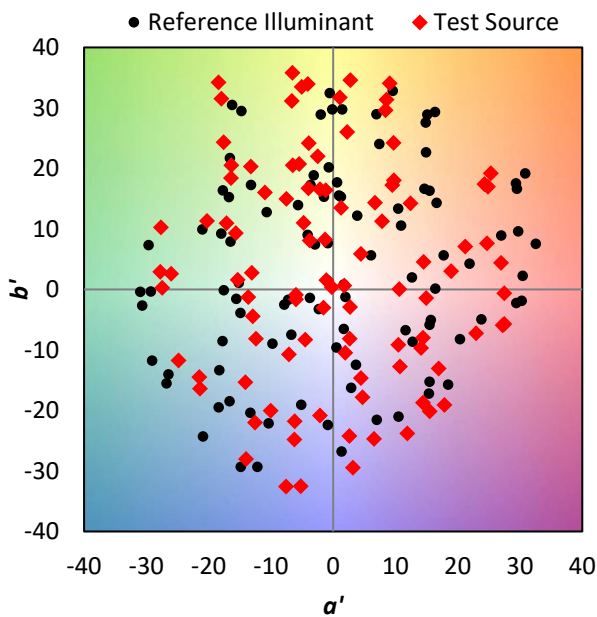
TM-30-18

### Summary

$R_f = 72.3$   
 $R_g = 96.7$   
 $CIE R_a = 71.7$   
 $R_g = -27.7$



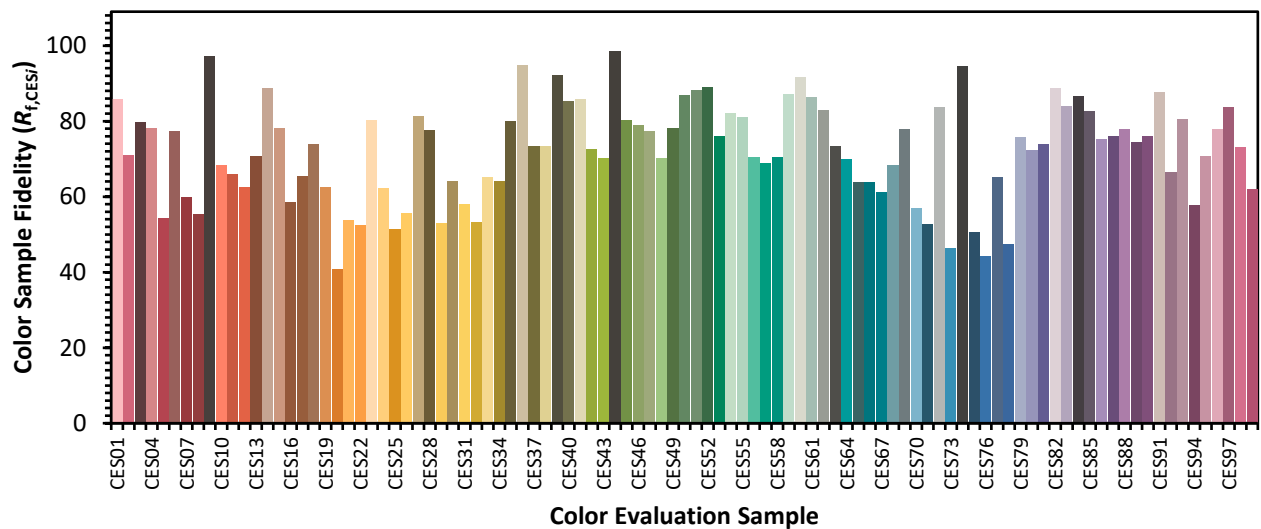
### Color Vector Graphics



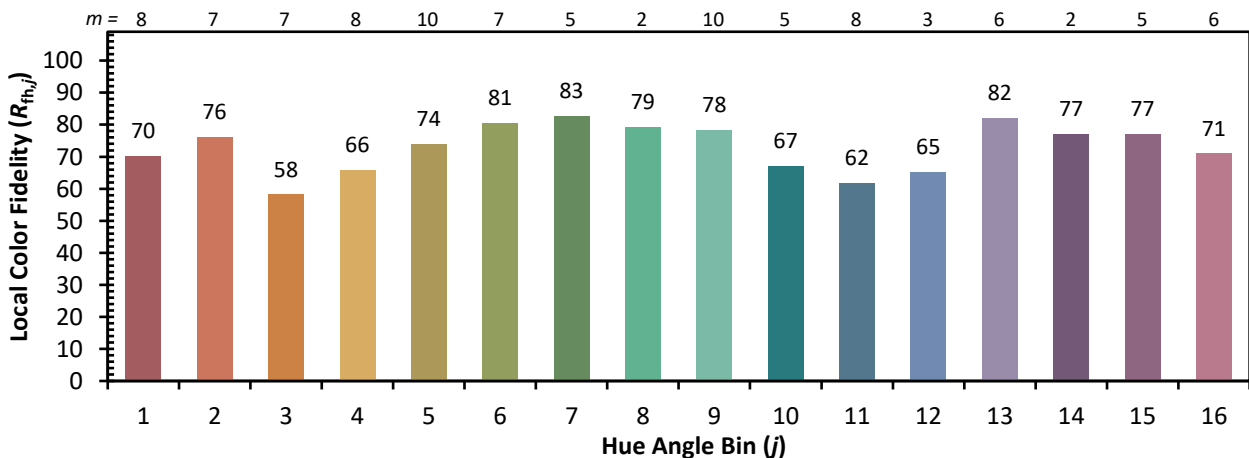
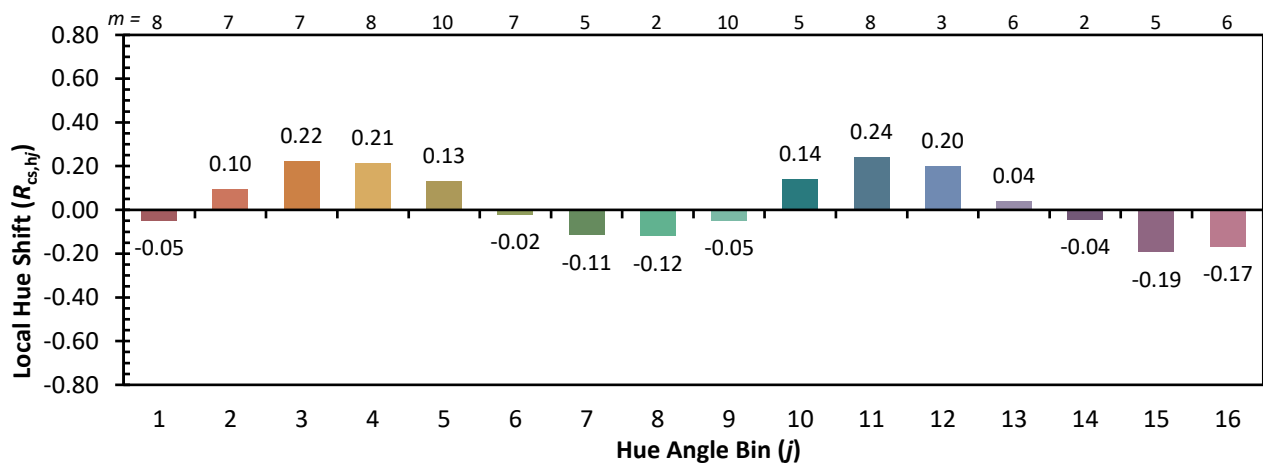
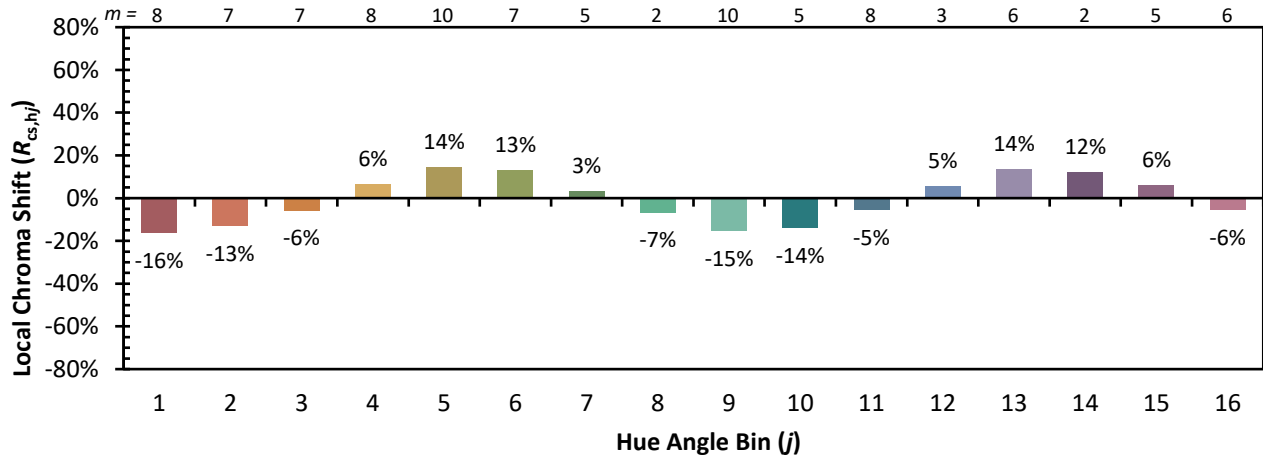


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 56 | CES51 = 88 | CES76 = 44 |
| CES02 = 60 | CES27 = 81 | CES52 = 89 | CES77 = 65 |
| CES03 = 30 | CES28 = 78 | CES53 = 76 | CES78 = 47 |
| CES04 = 69 | CES29 = 53 | CES54 = 82 | CES79 = 76 |
| CES05 = 46 | CES30 = 64 | CES55 = 81 | CES80 = 72 |
| CES06 = 50 | CES31 = 58 | CES56 = 70 | CES81 = 74 |
| CES07 = 39 | CES32 = 53 | CES57 = 69 | CES82 = 89 |
| CES08 = 38 | CES33 = 65 | CES58 = 70 | CES83 = 84 |
| CES09 = 29 | CES34 = 64 | CES59 = 87 | CES84 = 87 |
| CES10 = 73 | CES35 = 80 | CES60 = 92 | CES85 = 83 |
| CES11 = 56 | CES36 = 95 | CES61 = 86 | CES86 = 75 |
| CES12 = 62 | CES37 = 73 | CES62 = 83 | CES87 = 76 |
| CES13 = 42 | CES38 = 73 | CES63 = 73 | CES88 = 78 |
| CES14 = 74 | CES39 = 92 | CES64 = 70 | CES89 = 74 |
| CES15 = 70 | CES40 = 85 | CES65 = 64 | CES90 = 76 |
| CES16 = 46 | CES41 = 86 | CES66 = 64 | CES91 = 88 |
| CES17 = 49 | CES42 = 73 | CES67 = 61 | CES92 = 66 |
| CES18 = 55 | CES43 = 70 | CES68 = 68 | CES93 = 81 |
| CES19 = 71 | CES44 = 98 | CES69 = 78 | CES94 = 58 |
| CES20 = 64 | CES45 = 80 | CES70 = 57 | CES95 = 71 |
| CES21 = 85 | CES46 = 79 | CES71 = 53 | CES96 = 78 |
| CES22 = 77 | CES47 = 77 | CES72 = 84 | CES97 = 84 |
| CES23 = 91 | CES48 = 70 | CES73 = 46 | CES98 = 73 |
| CES24 = 90 | CES49 = 78 | CES74 = 95 | CES99 = 62 |
| CES25 = 71 | CES50 = 87 | CES75 = 50 |            |



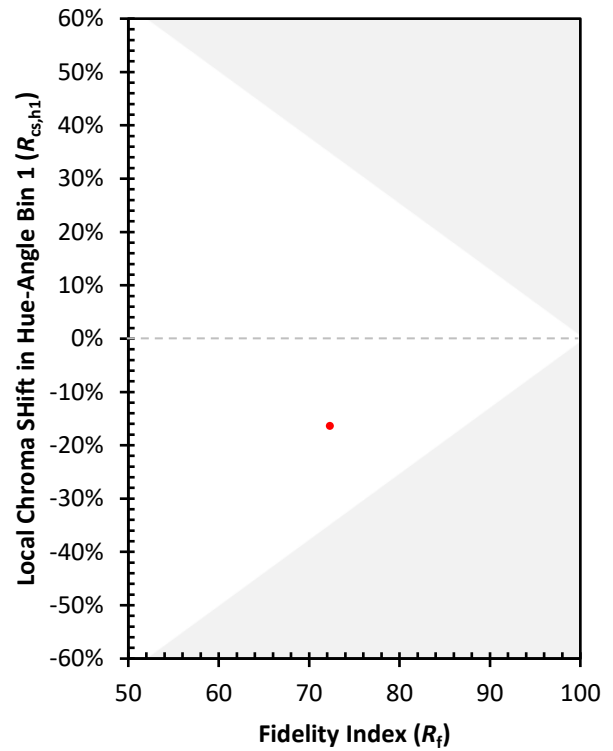
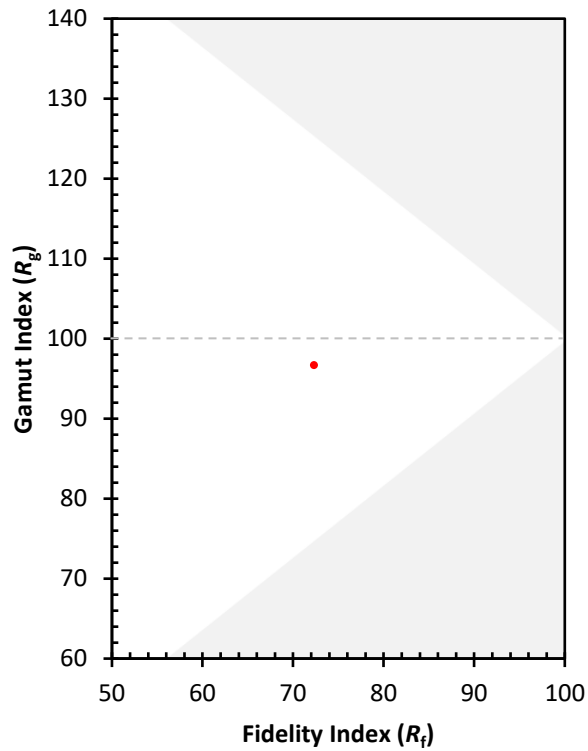
Color Rendition by Hue-Angle Bin



REPORT NUMBER: SP1-2101-121-8

**TM-30-18**

**Measure Comparisons**



(END OF REPORT)