

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: P800678

Luminaire Tested: **ARCH-M-PA2-90-722-24VDC-T4W**

Issue Date: 5/19/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P800678  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1910-568-11)  
Test Lab: INNOVATION CENTER  
Issue Date: 5/19/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: STREETWORKS  
Catalog Number: ARCH-M-PA2-90-722-24VDC-T4W  
Description: ARCHEON-M ROADWAY AND AREA LUMINAIRE  
(2) 70 CRI, 2200K, 600mA LIGHT ENGINES WITH 16 LEDS AND TYPE IV WIDE OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 10694 lumens  
Efficiency: N/A  
Efficacy: 120.2 lumens/watt  
Luminous Opening: Rectangular (W 0.75' x L: 1' x H: 0')  
IES Classification: Type IV - Medium  
BUG Rating: B2 - U0 - G3

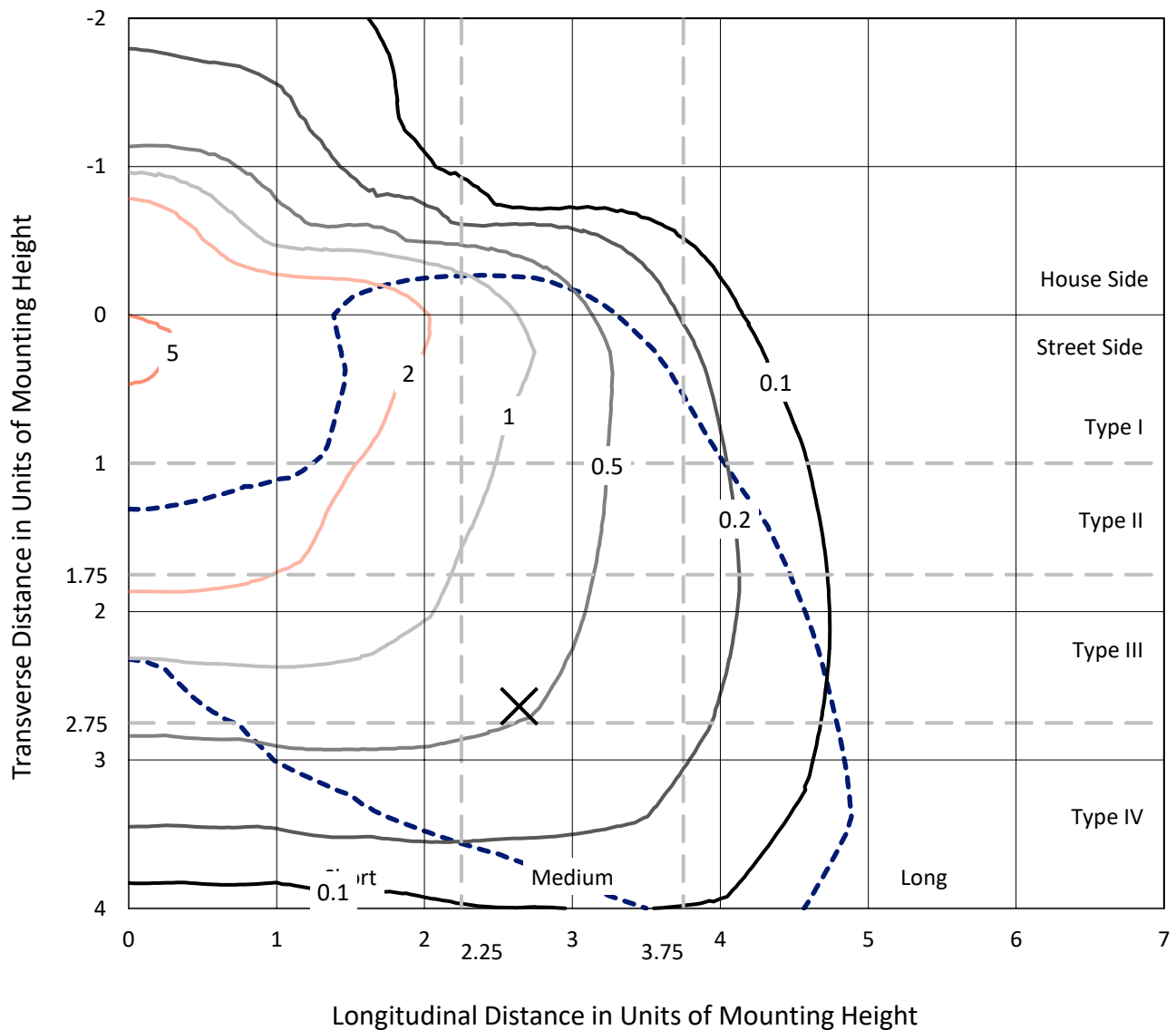
Input Watts (W): 89  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 25 FT

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## Iso-Footcandle Lines of Horizontal Illumination

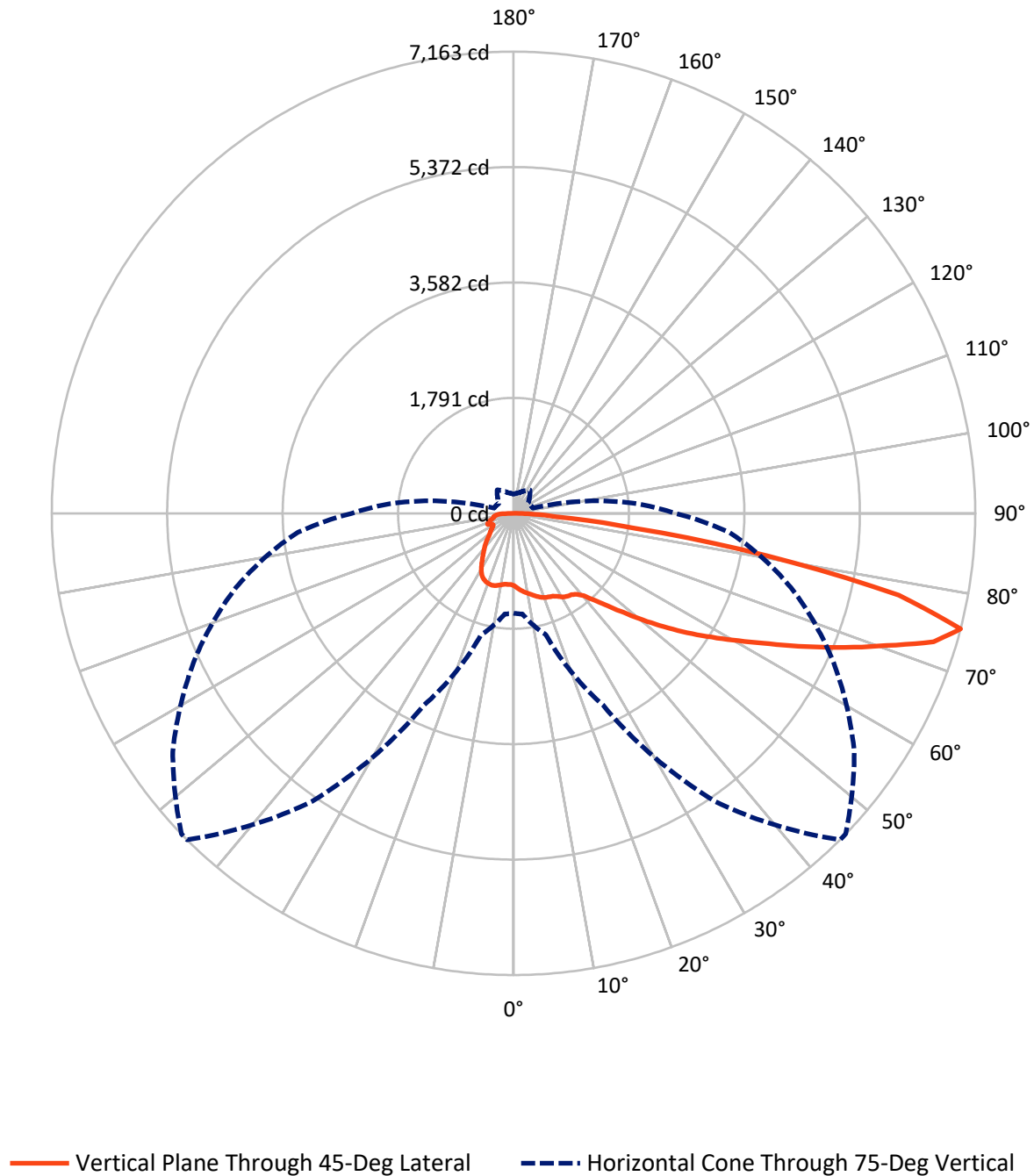
× Max cd  
 - - - 1/2 Max cd



Based on 15 foot mounting height. Maximum calculated value = 5.9 fc  
 Type IV - Medium - N/A

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## Luminous Intensity Polar Plot



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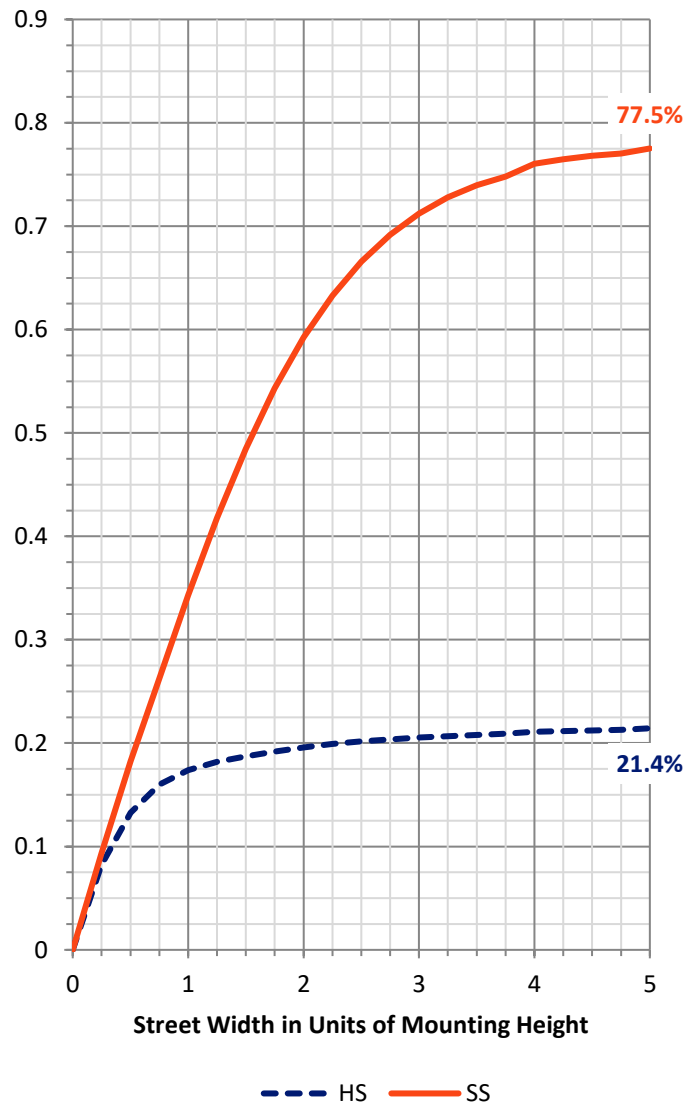
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 2363.3   | 0.0    | 2363.3  |
|                    | % Fixture | 22.1     | 0.0    | 22.1    |
| <b>Street Side</b> | Lumens    | 8330.7   | 0.0    | 8330.7  |
|                    | % Fixture | 77.9     | 0.0    | 77.9    |
| <b>Total</b>       | Lumens    | 10694.0  | 0.0    | 10694.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 111.1   | 1.0       |
| 10°-20°   | 353.5   | 3.3       |
| 20°-30°   | 602.6   | 5.6       |
| 30°-40°   | 844.3   | 7.9       |
| 40°-50°   | 1240.5  | 11.6      |
| 50°-60°   | 1974.2  | 18.5      |
| 60°-70°   | 2808.3  | 26.3      |
| 70°-80°   | 2351.4  | 22.0      |
| 80°-90°   | 408.1   | 3.8       |
| 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°    | 10694.0 | 100.0     |
| 0°-180°   | 10694.0 | 100.0     |

**Coefficient of Utilization**



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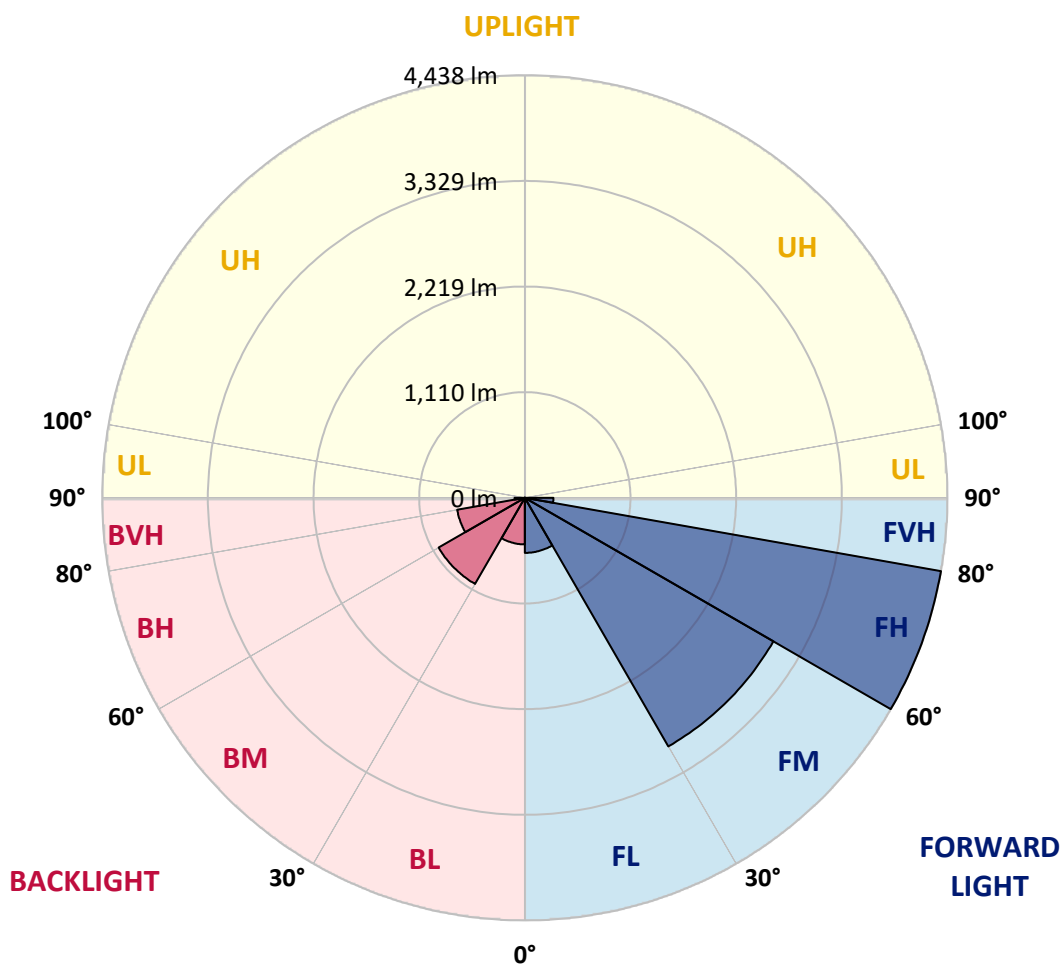
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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 578.1  | 5.4       |                         |      |         |
| FM   | (30°-60°)   | 3014.3 | 28.2      |                         |      |         |
| FH   | (60°-80°)   | 4438.3 | 41.5      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 300.0  | 2.8       |                         |      | G3/500  |
| BL   | (0°-30°)    | 489.1  | 4.6       | B1/500                  |      |         |
| BM   | (30°-60°)   | 1044.7 | 9.8       | B2/2500                 |      |         |
| BH   | (60°-80°)   | 721.4  | 6.7       | B2/1000                 |      | G2/1000 |
| BVH  | (80°-90°)   | 108.1  | 1.0       |                         |      | G2/225  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B2-U0-G3**

Type IV Medium



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 46°    | 55°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1123.1 | 1123.1 | 1123.1 | 1123.1 | 1123.1 | 1123.1 | 1123.1 | 1123.1 | 1123.1 | 1123.1 | 1123.1 |
| 2.5°  | 1187.4 | 1181.7 | 1178.8 | 1178.8 | 1167.4 | 1160.3 | 1158.8 | 1148.8 | 1140.3 | 1131.7 | 1124.5 |
| 5°    | 1256.0 | 1251.7 | 1243.1 | 1236.0 | 1220.3 | 1200.3 | 1197.4 | 1176.0 | 1154.5 | 1134.5 | 1117.4 |
| 7.5°  | 1318.9 | 1310.3 | 1300.3 | 1286.0 | 1260.3 | 1233.1 | 1228.8 | 1198.8 | 1168.8 | 1138.8 | 1116.0 |
| 10°   | 1371.7 | 1363.2 | 1348.9 | 1328.9 | 1296.0 | 1263.1 | 1258.8 | 1227.4 | 1196.0 | 1160.3 | 1127.4 |
| 12.5° | 1421.7 | 1414.6 | 1393.2 | 1366.0 | 1327.4 | 1297.4 | 1293.1 | 1266.0 | 1233.1 | 1193.1 | 1150.3 |
| 15°   | 1464.6 | 1457.5 | 1434.6 | 1403.2 | 1358.9 | 1336.0 | 1330.3 | 1304.6 | 1271.7 | 1228.8 | 1184.5 |
| 17.5° | 1486.0 | 1486.0 | 1461.7 | 1427.5 | 1386.0 | 1368.9 | 1364.6 | 1333.2 | 1303.1 | 1261.7 | 1217.4 |
| 20°   | 1493.2 | 1496.0 | 1478.9 | 1437.5 | 1401.7 | 1394.6 | 1390.3 | 1364.6 | 1330.3 | 1290.3 | 1248.8 |
| 22.5° | 1497.5 | 1503.2 | 1488.9 | 1441.7 | 1411.7 | 1407.5 | 1404.6 | 1387.4 | 1360.3 | 1321.7 | 1280.3 |
| 25°   | 1511.8 | 1511.8 | 1501.8 | 1448.9 | 1424.6 | 1423.2 | 1423.2 | 1413.2 | 1394.6 | 1361.7 | 1320.3 |
| 27.5° | 1533.2 | 1531.8 | 1518.9 | 1464.6 | 1453.2 | 1457.5 | 1456.0 | 1454.6 | 1441.7 | 1408.9 | 1364.6 |
| 30°   | 1568.9 | 1568.9 | 1554.6 | 1496.0 | 1488.9 | 1507.5 | 1508.9 | 1511.8 | 1491.8 | 1440.3 | 1404.6 |
| 32.5° | 1623.2 | 1617.5 | 1603.2 | 1527.5 | 1516.0 | 1533.2 | 1536.1 | 1534.6 | 1517.5 | 1468.9 | 1451.7 |
| 35°   | 1790.4 | 1777.5 | 1726.1 | 1597.5 | 1540.3 | 1550.3 | 1551.8 | 1558.9 | 1561.8 | 1523.2 | 1514.6 |
| 37.5° | 2083.3 | 2066.2 | 1987.6 | 1763.2 | 1617.5 | 1593.2 | 1591.8 | 1610.4 | 1626.1 | 1591.8 | 1591.8 |
| 40°   | 2402.0 | 2387.7 | 2341.9 | 2049.0 | 1760.4 | 1680.4 | 1674.7 | 1691.8 | 1711.8 | 1687.5 | 1694.7 |
| 42.5° | 2676.3 | 2687.7 | 2692.0 | 2351.9 | 1974.7 | 1843.3 | 1827.5 | 1803.3 | 1834.7 | 1813.3 | 1841.8 |
| 45°   | 2882.1 | 2876.3 | 2954.9 | 2662.0 | 2251.9 | 2047.6 | 2026.2 | 1960.4 | 2000.4 | 1999.0 | 2061.9 |
| 47.5° | 3100.7 | 3090.7 | 3123.5 | 2953.5 | 2567.7 | 2297.6 | 2264.8 | 2167.6 | 2227.6 | 2269.1 | 2373.4 |
| 50°   | 3307.9 | 3310.7 | 3322.2 | 3183.6 | 2910.6 | 2602.0 | 2560.6 | 2430.5 | 2516.3 | 2603.4 | 2750.6 |
| 52.5° | 3577.9 | 3557.9 | 3543.6 | 3452.2 | 3295.0 | 2919.2 | 2892.1 | 2743.5 | 2863.5 | 2966.4 | 3162.1 |
| 55°   | 3813.7 | 3800.8 | 3792.3 | 3788.0 | 3616.5 | 3269.3 | 3240.7 | 3086.4 | 3259.3 | 3332.2 | 3620.8 |
| 57.5° | 4065.2 | 4058.0 | 4103.8 | 4176.6 | 4108.0 | 3625.1 | 3595.1 | 3446.5 | 3639.4 | 3690.8 | 4118.0 |
| 60°   | 4249.5 | 4253.8 | 4379.5 | 4565.3 | 4518.1 | 4010.9 | 3975.2 | 3843.7 | 4009.5 | 4055.2 | 4615.3 |
| 62.5° | 4250.9 | 4293.8 | 4585.3 | 4918.2 | 4972.5 | 4455.3 | 4413.8 | 4270.9 | 4389.5 | 4389.5 | 5061.1 |
| 65°   | 3845.1 | 3893.7 | 4548.1 | 5005.4 | 5432.6 | 4984.0 | 4943.9 | 4719.6 | 4763.9 | 4703.9 | 5479.8 |
| 67.5° | 3440.8 | 3497.9 | 4113.8 | 5012.5 | 5755.6 | 5549.8 | 5502.6 | 5168.3 | 5092.5 | 4941.1 | 5772.7 |
| 70°   | 3172.1 | 3212.1 | 3726.5 | 4919.7 | 5949.9 | 6141.3 | 6105.6 | 5594.1 | 5351.2 | 5139.7 | 5711.3 |
| 72.5° | 2670.6 | 2656.3 | 3147.8 | 4478.1 | 6058.5 | 6812.9 | 6782.9 | 6057.0 | 5575.5 | 5045.4 | 4871.1 |
| 75°   | 1550.3 | 1567.5 | 1953.3 | 3280.7 | 5461.2 | 7163.0 | 7160.1 | 6452.8 | 5476.9 | 4456.7 | 3356.5 |
| 77.5° | 447.2  | 460.1  | 641.6  | 1441.7 | 3453.6 | 6109.9 | 6305.7 | 5901.3 | 4629.6 | 3176.4 | 1740.4 |
| 80°   | 195.8  | 205.8  | 278.6  | 480.1  | 1487.5 | 3990.9 | 4162.3 | 3990.9 | 2792.0 | 1457.5 | 683.0  |
| 82.5° | 115.7  | 122.9  | 181.5  | 297.2  | 713.0  | 1899.0 | 2130.5 | 1860.4 | 1204.6 | 618.7  | 282.9  |
| 85°   | 65.7   | 68.6   | 104.3  | 188.6  | 448.7  | 664.4  | 745.9  | 698.7  | 587.3  | 351.5  | 148.6  |
| 87.5° | 30.0   | 31.4   | 51.4   | 88.6   | 251.5  | 224.3  | 232.9  | 308.6  | 340.1  | 214.3  | 74.3   |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

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CATALOG NUMBER: ARCH-M-PA2-90-722-24VDC-T4W

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1123.1 | 1123.1 | 1123.1 | 1123.1 | 1123.1 | 1123.1 | 1123.1 | 1123.1 | 1123.1 | 1123.1 | 1123.1 |
| 2.5°  | 1121.7 | 1117.4 | 1108.8 | 1106.0 | 1101.7 | 1103.1 | 1104.5 | 1104.5 | 1106.0 | 1101.7 | 1101.7 |
| 5°    | 1110.2 | 1103.1 | 1094.5 | 1094.5 | 1094.5 | 1106.0 | 1116.0 | 1121.7 | 1124.5 | 1124.5 | 1121.7 |
| 7.5°  | 1106.0 | 1097.4 | 1087.4 | 1090.2 | 1093.1 | 1107.4 | 1126.0 | 1144.5 | 1150.3 | 1150.3 | 1147.4 |
| 10°   | 1114.5 | 1106.0 | 1098.8 | 1103.1 | 1110.2 | 1121.7 | 1136.0 | 1153.1 | 1167.4 | 1168.8 | 1167.4 |
| 12.5° | 1134.5 | 1124.5 | 1117.4 | 1126.0 | 1134.5 | 1141.7 | 1148.8 | 1156.0 | 1174.5 | 1177.4 | 1177.4 |
| 15°   | 1167.4 | 1157.4 | 1148.8 | 1156.0 | 1158.8 | 1158.8 | 1158.8 | 1158.8 | 1177.4 | 1180.3 | 1180.3 |
| 17.5° | 1200.3 | 1191.7 | 1183.1 | 1184.5 | 1176.0 | 1164.5 | 1160.3 | 1158.8 | 1168.8 | 1177.4 | 1178.8 |
| 20°   | 1231.7 | 1224.6 | 1216.0 | 1201.7 | 1180.3 | 1158.8 | 1151.7 | 1151.7 | 1157.4 | 1170.3 | 1170.3 |
| 22.5° | 1266.0 | 1257.4 | 1243.1 | 1210.3 | 1174.5 | 1144.5 | 1137.4 | 1141.7 | 1148.8 | 1166.0 | 1164.5 |
| 25°   | 1304.6 | 1293.1 | 1268.9 | 1207.4 | 1156.0 | 1120.2 | 1121.7 | 1134.5 | 1147.4 | 1166.0 | 1166.0 |
| 27.5° | 1347.4 | 1331.7 | 1283.1 | 1184.5 | 1114.5 | 1080.2 | 1093.1 | 1123.1 | 1141.7 | 1161.7 | 1164.5 |
| 30°   | 1394.6 | 1380.3 | 1294.6 | 1144.5 | 1047.4 | 1015.9 | 1047.4 | 1096.0 | 1124.5 | 1143.1 | 1147.4 |
| 32.5° | 1451.7 | 1440.3 | 1304.6 | 1093.1 | 960.2  | 933.1  | 978.8  | 1038.8 | 1084.5 | 1106.0 | 1110.2 |
| 35°   | 1523.2 | 1511.8 | 1317.4 | 1034.5 | 878.8  | 850.2  | 891.6  | 953.1  | 1013.1 | 1040.2 | 1048.8 |
| 37.5° | 1616.1 | 1598.9 | 1328.9 | 971.6  | 810.2  | 777.3  | 797.3  | 853.0  | 907.3  | 944.5  | 954.5  |
| 40°   | 1734.7 | 1707.5 | 1338.9 | 900.2  | 750.2  | 713.0  | 720.2  | 747.3  | 778.7  | 811.6  | 824.5  |
| 42.5° | 1901.8 | 1847.5 | 1340.3 | 824.5  | 688.7  | 654.4  | 651.6  | 660.1  | 660.1  | 660.1  | 664.4  |
| 45°   | 2134.8 | 2031.9 | 1343.2 | 753.0  | 625.9  | 590.1  | 581.6  | 578.7  | 557.3  | 515.8  | 513.0  |
| 47.5° | 2429.1 | 2273.4 | 1356.0 | 693.0  | 560.1  | 528.7  | 517.3  | 505.8  | 465.8  | 423.0  | 414.4  |
| 50°   | 2806.3 | 2553.4 | 1381.7 | 635.9  | 504.4  | 483.0  | 468.7  | 441.5  | 397.2  | 364.4  | 355.8  |
| 52.5° | 3240.7 | 2886.3 | 1406.0 | 575.8  | 463.0  | 448.7  | 431.5  | 398.7  | 351.5  | 331.5  | 328.6  |
| 55°   | 3739.4 | 3257.9 | 1454.6 | 523.0  | 427.2  | 417.2  | 401.5  | 370.1  | 334.4  | 320.1  | 318.6  |
| 57.5° | 4249.5 | 3673.7 | 1523.2 | 475.8  | 392.9  | 387.2  | 387.2  | 360.1  | 337.2  | 331.5  | 331.5  |
| 60°   | 4741.0 | 4030.9 | 1470.3 | 431.5  | 361.5  | 364.4  | 391.5  | 384.4  | 367.2  | 374.4  | 378.7  |
| 62.5° | 5122.6 | 4240.9 | 1193.1 | 395.8  | 338.6  | 364.4  | 434.4  | 434.4  | 414.4  | 411.5  | 411.5  |
| 65°   | 5285.4 | 4238.1 | 838.8  | 368.7  | 330.1  | 400.1  | 484.4  | 461.5  | 408.7  | 388.7  | 384.4  |
| 67.5° | 5244.0 | 4052.3 | 578.7  | 350.1  | 327.2  | 437.2  | 507.3  | 443.0  | 382.9  | 365.8  | 352.9  |
| 70°   | 4879.6 | 3659.4 | 445.8  | 332.9  | 322.9  | 421.5  | 500.1  | 421.5  | 362.9  | 347.2  | 335.8  |
| 72.5° | 3936.6 | 2934.9 | 370.1  | 315.8  | 305.8  | 390.1  | 475.8  | 401.5  | 347.2  | 330.1  | 318.6  |
| 75°   | 2510.6 | 1846.1 | 312.9  | 292.9  | 272.9  | 350.1  | 443.0  | 381.5  | 330.1  | 307.2  | 298.6  |
| 77.5° | 1207.4 | 795.9  | 272.9  | 265.8  | 245.8  | 324.4  | 410.1  | 355.8  | 307.2  | 288.6  | 282.9  |
| 80°   | 488.7  | 364.4  | 237.2  | 238.6  | 225.8  | 308.6  | 387.2  | 331.5  | 284.3  | 264.3  | 254.3  |
| 82.5° | 254.3  | 211.5  | 200.0  | 205.8  | 205.8  | 294.4  | 370.1  | 311.5  | 264.3  | 255.8  | 222.9  |
| 85°   | 137.2  | 131.5  | 154.3  | 165.8  | 178.6  | 265.8  | 344.4  | 290.1  | 241.5  | 207.2  | 200.0  |
| 87.5° | 67.2   | 85.7   | 87.2   | 100.0  | 124.3  | 212.9  | 290.1  | 242.9  | 201.5  | 167.2  | 164.3  |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



LM-79-08: Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

STREETWORKS

Report Number: SP1-2101-121-4

Luminaire Tested: IFLD-S-SA2B-722-U-T3R

Test Date: 03/03/2021

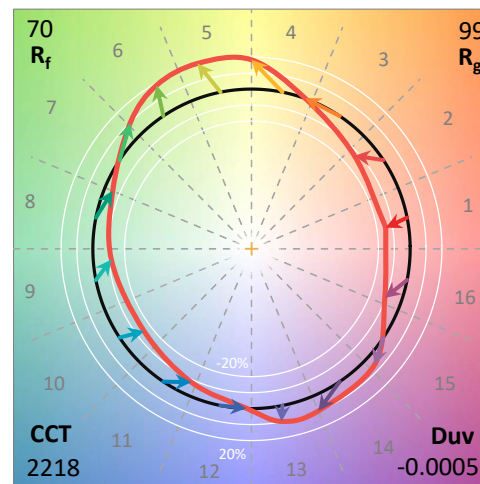
### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2101-121-4  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 03/03/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: STREETWORKS  
 Catalog Number: **IFLD-S-SA2B-722-U-T3R**  
 Description: STREETWORKS INF FLOOD

PROGRAMMED @ 800mA.

### Spectral Parameters

|                           |         |           |      |      |       |
|---------------------------|---------|-----------|------|------|-------|
| CCT (K):                  | 2218    | CRI (Ra): | 72.2 |      |       |
| CIE u':                   | 0.2889  | R1:       | 69.1 | R9:  | -16.8 |
| CIE v':                   | 0.5350  | R2:       | 83.2 | R10: | 61.9  |
| Duv:                      | -0.0005 | R3:       | 95.4 | R11: | 60.1  |
| CIE x:                    | 0.5026  | R4:       | 66.4 | R12: | 51.2  |
| CIE y:                    | 0.4136  | R5:       | 66.2 | R13: | 71.3  |
| CIE z:                    | 0.0839  | R6:       | 76.7 | R14: | 97.1  |
| Peak Wavelength (nm):     | 606     | R7:       | 76.7 |      |       |
| Dominant Wavelength (nm): | 587     | R8:       | 43.9 |      |       |
| Purity:                   | 75.3    |           |      |      |       |
| Rf:                       | 70      |           |      |      |       |
| Rg:                       | 99.3    |           |      |      |       |



### Test Conditions

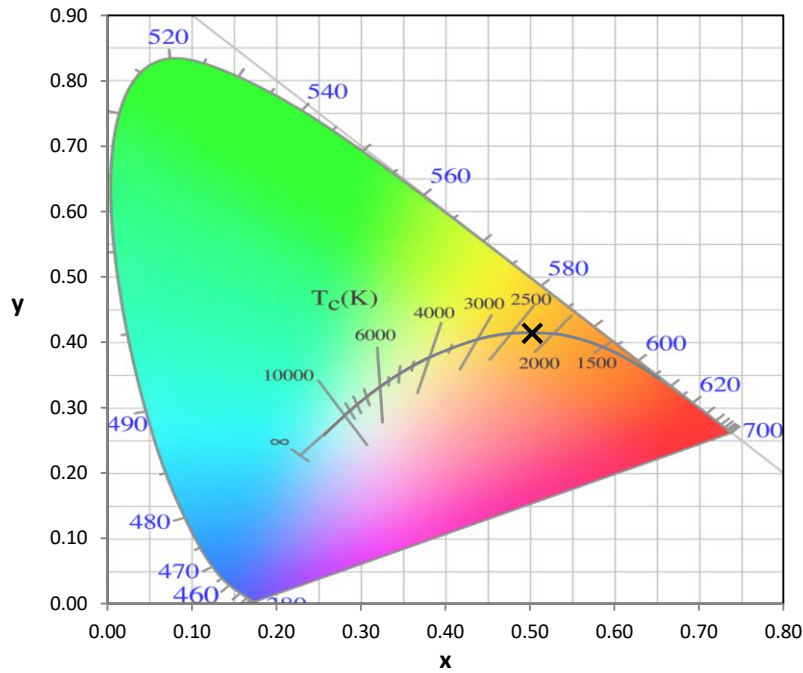
Stabilization Time: 95M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.3/31%  
 Sphere Temperature (°C): 24.8

REPORT NUMBER: SP1-2101-121-4

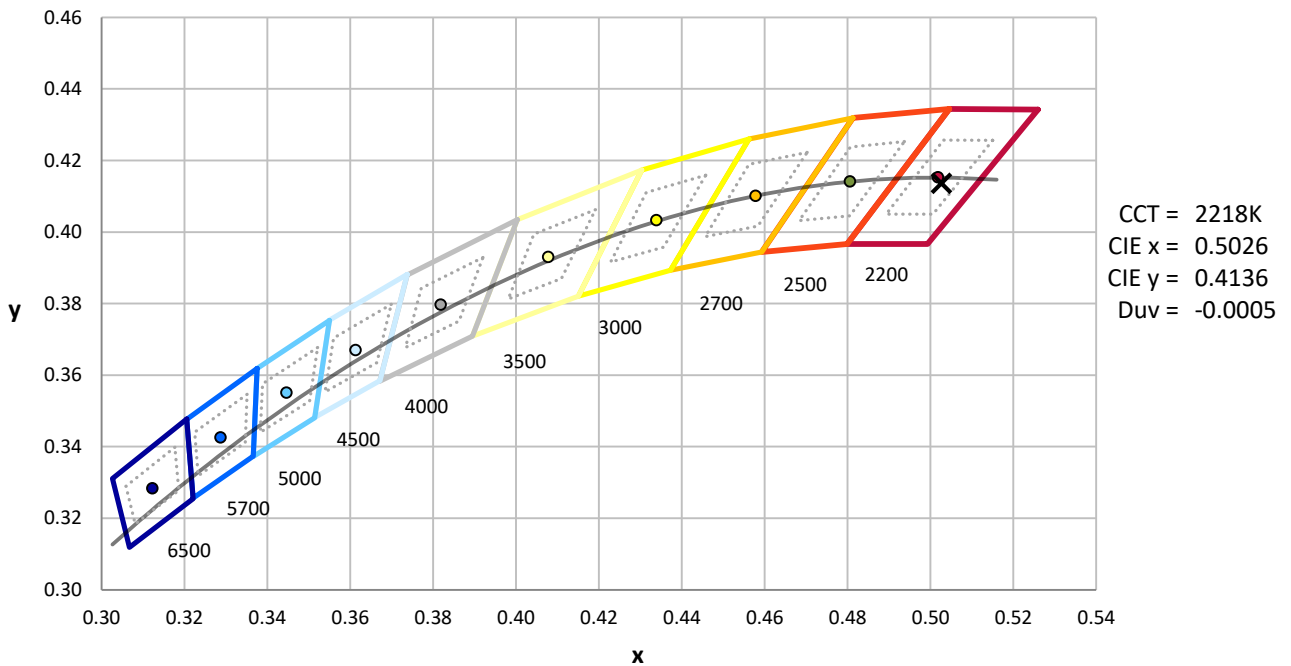
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date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

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**CIE 1931 Chromaticity Diagram**



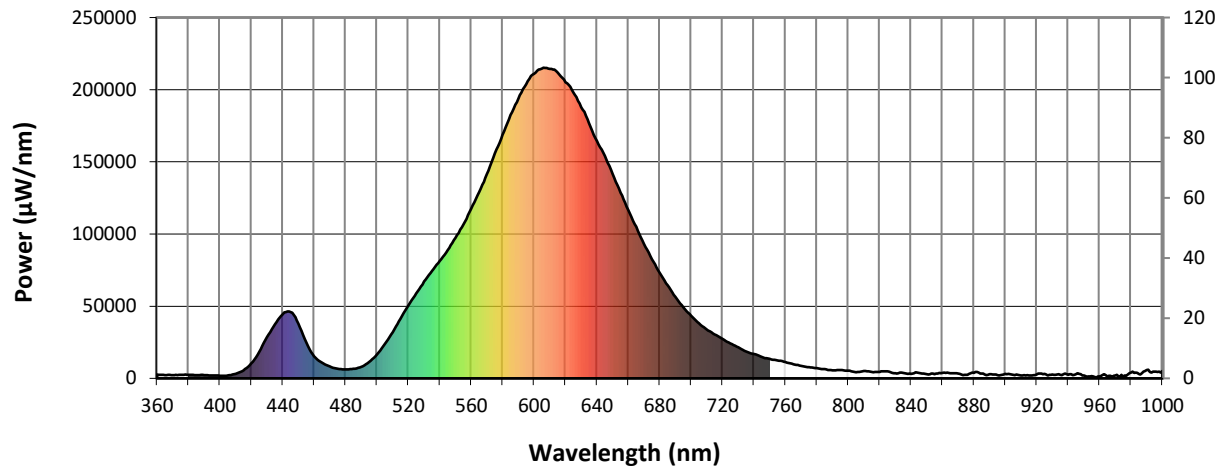
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 2200K 4-step quadrangle

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### Photopic Flux vs. Wavelength

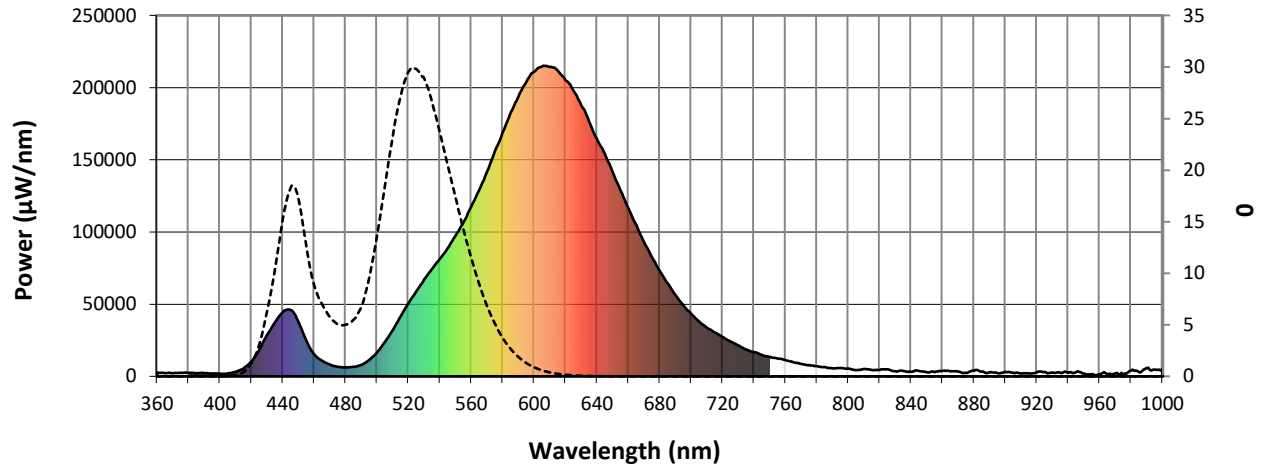


#####

| 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       | 2623             | 0.0              | 490       | 7941             | 1.1              | 620       | 205150           | 53.4             | 750       | 13431            | 0.0              | 880       | 3867             | 0.0              |
| 365       | 2260             | 0.0              | 495       | 11299            | 2.0              | 625       | 198277           | 43.7             | 755       | 12426            | 0.0              | 885       | 3345             | 0.0              |
| 370       | 2306             | 0.0              | 500       | 16633            | 3.7              | 630       | 187878           | 34.0             | 760       | 11385            | 0.0              | 890       | 2956             | 0.0              |
| 375       | 2437             | 0.0              | 505       | 23672            | 6.6              | 635       | 176836           | 26.6             | 765       | 9797             | 0.0              | 895       | 2272             | 0.0              |
| 380       | 2473             | 0.0              | 510       | 32025            | 11.0             | 640       | 164455           | 19.7             | 770       | 8562             | 0.0              | 900       | 3003             | 0.0              |
| 385       | 2203             | 0.0              | 515       | 41295            | 17.1             | 645       | 154086           | 14.8             | 775       | 7810             | 0.0              | 905       | 2480             | 0.0              |
| 390       | 2262             | 0.0              | 520       | 50628            | 24.6             | 650       | 141592           | 10.3             | 780       | 7052             | 0.0              | 910       | 2068             | 0.0              |
| 395       | 2028             | 0.0              | 525       | 58836            | 31.6             | 655       | 128604           | 7.4              | 785       | 6345             | 0.0              | 915       | 2064             | 0.0              |
| 400       | 1806             | 0.0              | 530       | 67109            | 39.5             | 660       | 116713           | 4.9              | 790       | 5524             | 0.0              | 920       | 2581             | 0.0              |
| 405       | 1945             | 0.0              | 535       | 74404            | 46.1             | 665       | 104993           | 3.3              | 795       | 5788             | 0.0              | 925       | 3137             | 0.0              |
| 410       | 3199             | 0.0              | 540       | 81280            | 53.0             | 670       | 93149            | 2.0              | 800       | 5282             | 0.0              | 930       | 2747             | 0.0              |
| 415       | 5572             | 0.0              | 545       | 88806            | 59.1             | 675       | 82543            | 1.4              | 805       | 4258             | 0.0              | 935       | 2471             | 0.0              |
| 420       | 10322            | 0.0              | 550       | 97367            | 66.2             | 680       | 73089            | 0.8              | 810       | 5156             | 0.0              | 940       | 2339             | 0.0              |
| 425       | 18494            | 0.1              | 555       | 106598           | 72.8             | 685       | 64438            | 0.6              | 815       | 4391             | 0.0              | 945       | 2917             | 0.0              |
| 430       | 28541            | 0.2              | 560       | 117615           | 79.9             | 690       | 56546            | 0.3              | 820       | 4383             | 0.0              | 950       | 1966             | 0.0              |
| 435       | 37453            | 0.4              | 565       | 129103           | 85.8             | 695       | 49328            | 0.2              | 825       | 4881             | 0.0              | 955       | 1580             | 0.0              |
| 440       | 44455            | 0.7              | 570       | 141415           | 92.0             | 700       | 43493            | 0.1              | 830       | 3588             | 0.0              | 960       | 1318             | 0.0              |
| 445       | 45934            | 1.0              | 575       | 155854           | 97.0             | 705       | 38035            | 0.1              | 835       | 3835             | 0.0              | 965       | 1419             | 0.0              |
| 450       | 37926            | 1.0              | 580       | 168613           | 100.2            | 710       | 33716            | 0.0              | 840       | 3014             | 0.0              | 970       | 1917             | 0.0              |
| 455       | 24793            | 0.8              | 585       | 182390           | 101.3            | 715       | 30449            | 0.0              | 845       | 3765             | 0.0              | 975       | 1210             | 0.0              |
| 460       | 15340            | 0.6              | 590       | 194054           | 100.3            | 720       | 27240            | 0.0              | 850       | 2906             | 0.0              | 980       | 3915             | 0.0              |
| 465       | 10883            | 0.6              | 595       | 203639           | 96.5             | 725       | 24231            | 0.0              | 855       | 2947             | 0.0              | 985       | 3180             | 0.0              |
| 470       | 8138             | 0.5              | 600       | 211043           | 91.0             | 730       | 21490            | 0.0              | 860       | 3864             | 0.0              | 990       | 5676             | 0.0              |
| 475       | 6653             | 0.5              | 605       | 214591           | 83.1             | 735       | 18548            | 0.0              | 865       | 3546             | 0.0              | 995       | 4736             | 0.0              |
| 480       | 6220             | 0.6              | 610       | 214337           | 73.6             | 740       | 16963            | 0.0              | 870       | 3253             | 0.0              | 1000      | 5113             | 0.0              |
| 485       | 6613             | 0.8              | 615       | 211915           | 64.0             | 745       | 14922            | 0.0              | 875       | 2450             | 0.0              |           |                  |                  |

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### Scotopic Flux vs. Wavelength



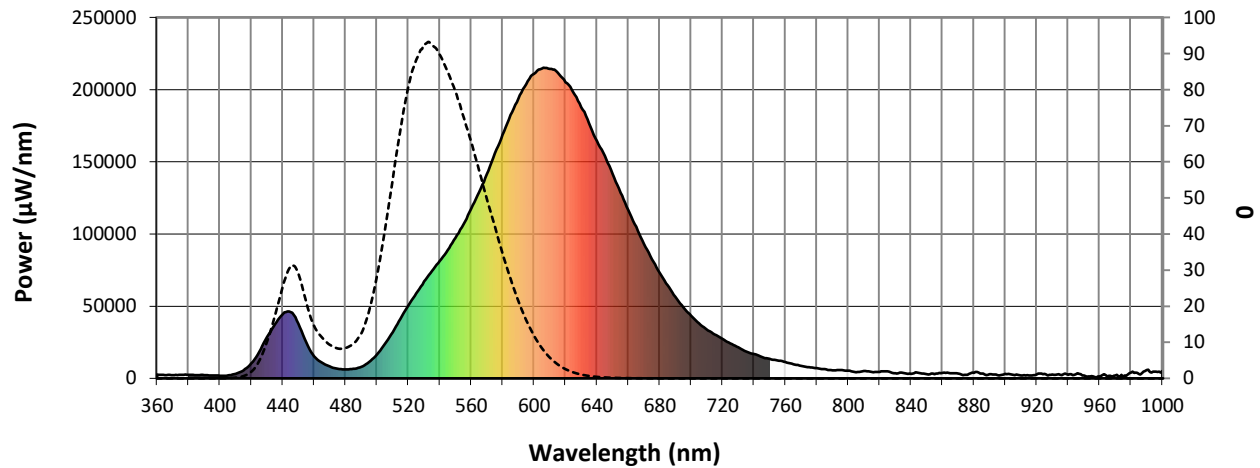
Scotopic Lumens: 7290.1

S/P: 0.84

| 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       | 2623             | 0.0              | 490       | 7941             | 12.2             | 620       | 205150           | 2.6              | 750       | 13431            | 0.0              | 880       | 3867             | 0.0              |
| 365       | 2260             | 0.0              | 495       | 11299            | 18.3             | 625       | 198277           | 1.7              | 755       | 12426            | 0.0              | 885       | 3345             | 0.0              |
| 370       | 2306             | 0.0              | 500       | 16633            | 27.8             | 630       | 187878           | 1.1              | 760       | 11385            | 0.0              | 890       | 2956             | 0.0              |
| 375       | 2437             | 0.0              | 505       | 23672            | 40.2             | 635       | 176836           | 0.7              | 765       | 9797             | 0.0              | 895       | 2272             | 0.0              |
| 380       | 2473             | 0.0              | 510       | 32025            | 54.3             | 640       | 164455           | 0.4              | 770       | 8562             | 0.0              | 900       | 3003             | 0.0              |
| 385       | 2203             | 0.0              | 515       | 41295            | 68.4             | 645       | 154086           | 0.3              | 775       | 7810             | 0.0              | 905       | 2480             | 0.0              |
| 390       | 2262             | 0.0              | 520       | 50628            | 80.5             | 650       | 141592           | 0.2              | 780       | 7052             | 0.0              | 910       | 2068             | 0.0              |
| 395       | 2028             | 0.0              | 525       | 58836            | 88.0             | 655       | 128604           | 0.1              | 785       | 6345             | 0.0              | 915       | 2064             | 0.0              |
| 400       | 1806             | 0.0              | 530       | 67109            | 92.5             | 660       | 116713           | 0.1              | 790       | 5524             | 0.0              | 920       | 2581             | 0.0              |
| 405       | 1945             | 0.1              | 535       | 74404            | 92.7             | 665       | 104993           | 0.0              | 795       | 5788             | 0.0              | 925       | 3137             | 0.0              |
| 410       | 3199             | 0.2              | 540       | 81280            | 89.8             | 670       | 93149            | 0.0              | 800       | 5282             | 0.0              | 930       | 2747             | 0.0              |
| 415       | 5572             | 0.6              | 545       | 88806            | 85.1             | 675       | 82543            | 0.0              | 805       | 4258             | 0.0              | 935       | 2471             | 0.0              |
| 420       | 10322            | 1.7              | 550       | 97367            | 79.6             | 680       | 73089            | 0.0              | 810       | 5156             | 0.0              | 940       | 2339             | 0.0              |
| 425       | 18494            | 4.5              | 555       | 106598           | 72.8             | 685       | 64438            | 0.0              | 815       | 4391             | 0.0              | 945       | 2917             | 0.0              |
| 430       | 28541            | 9.7              | 560       | 117615           | 65.7             | 690       | 56546            | 0.0              | 820       | 4383             | 0.0              | 950       | 1966             | 0.0              |
| 435       | 37453            | 16.7             | 565       | 129103           | 57.9             | 695       | 49328            | 0.0              | 825       | 4881             | 0.0              | 955       | 1580             | 0.0              |
| 440       | 44455            | 24.8             | 570       | 141415           | 49.9             | 700       | 43493            | 0.0              | 830       | 3588             | 0.0              | 960       | 1318             | 0.0              |
| 445       | 45934            | 30.8             | 575       | 155854           | 42.4             | 705       | 38035            | 0.0              | 835       | 3835             | 0.0              | 965       | 1419             | 0.0              |
| 450       | 37926            | 29.4             | 580       | 168613           | 34.7             | 710       | 33716            | 0.0              | 840       | 3014             | 0.0              | 970       | 1917             | 0.0              |
| 455       | 24793            | 21.7             | 585       | 182390           | 27.9             | 715       | 30449            | 0.0              | 845       | 3765             | 0.0              | 975       | 1210             | 0.0              |
| 460       | 15340            | 14.8             | 590       | 194054           | 21.6             | 720       | 27240            | 0.0              | 850       | 2906             | 0.0              | 980       | 3915             | 0.0              |
| 465       | 10883            | 11.5             | 595       | 203639           | 16.2             | 725       | 24231            | 0.0              | 855       | 2947             | 0.0              | 985       | 3180             | 0.0              |
| 470       | 8138             | 9.4              | 600       | 211043           | 11.9             | 730       | 21490            | 0.0              | 860       | 3864             | 0.0              | 990       | 5676             | 0.0              |
| 475       | 6653             | 8.3              | 605       | 214591           | 8.4              | 735       | 18548            | 0.0              | 865       | 3546             | 0.0              | 995       | 4736             | 0.0              |
| 480       | 6220             | 8.4              | 610       | 214337           | 5.8              | 740       | 16963            | 0.0              | 870       | 3253             | 0.0              | 1000      | 5113             | 0.0              |
| 485       | 6613             | 9.6              | 615       | 211915           | 3.9              | 745       | 14922            | 0.0              | 875       | 2450             | 0.0              |           |                  |                  |

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### Melanopic Flux vs. Wavelength



**Melanopic Lumens: 2276.7**

**M/P: 0.26**

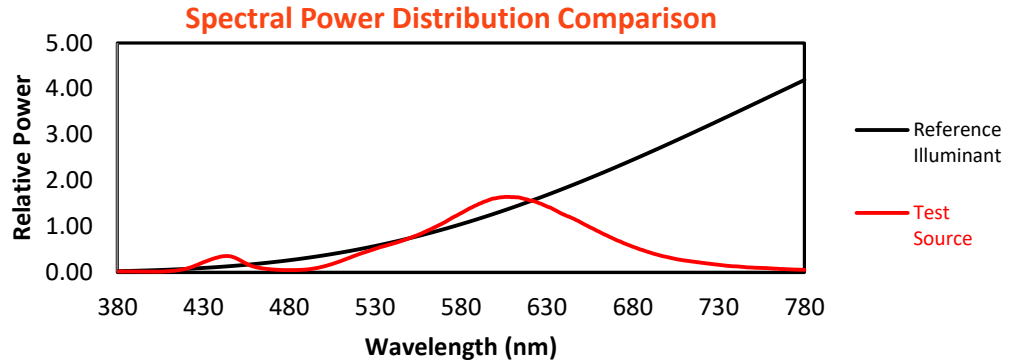
| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 2623             | 0.0              | 490       | 7941             | 6.6              | 620       | 205150           | 0.2              | 750       | 13431            | 0.0              | 880       | 3867             | 0.0              |
| 365       | 2260             | 0.0              | 495       | 11299            | 9.3              | 625       | 198277           | 0.1              | 755       | 12426            | 0.0              | 885       | 3345             | 0.0              |
| 370       | 2306             | 0.0              | 500       | 16633            | 13.4             | 630       | 187878           | 0.1              | 760       | 11385            | 0.0              | 890       | 2956             | 0.0              |
| 375       | 2437             | 0.0              | 505       | 23672            | 18.2             | 635       | 176836           | 0.0              | 765       | 9797             | 0.0              | 895       | 2272             | 0.0              |
| 380       | 2473             | 0.0              | 510       | 32025            | 23.0             | 640       | 164455           | 0.0              | 770       | 8562             | 0.0              | 900       | 3003             | 0.0              |
| 385       | 2203             | 0.0              | 515       | 41295            | 27.0             | 645       | 154086           | 0.0              | 775       | 7810             | 0.0              | 905       | 2480             | 0.0              |
| 390       | 2262             | 0.0              | 520       | 50628            | 29.5             | 650       | 141592           | 0.0              | 780       | 7052             | 0.0              | 910       | 2068             | 0.0              |
| 395       | 2028             | 0.0              | 525       | 58836            | 29.8             | 655       | 128604           | 0.0              | 785       | 6345             | 0.0              | 915       | 2064             | 0.0              |
| 400       | 1806             | 0.0              | 530       | 67109            | 29.0             | 660       | 116713           | 0.0              | 790       | 5524             | 0.0              | 920       | 2581             | 0.0              |
| 405       | 1945             | 0.0              | 535       | 74404            | 26.8             | 665       | 104993           | 0.0              | 795       | 5788             | 0.0              | 925       | 3137             | 0.0              |
| 410       | 3199             | 0.1              | 540       | 81280            | 23.8             | 670       | 93149            | 0.0              | 800       | 5282             | 0.0              | 930       | 2747             | 0.0              |
| 415       | 5572             | 0.4              | 545       | 88806            | 20.6             | 675       | 82543            | 0.0              | 805       | 4258             | 0.0              | 935       | 2471             | 0.0              |
| 420       | 10322            | 1.2              | 550       | 97367            | 17.5             | 680       | 73089            | 0.0              | 810       | 5156             | 0.0              | 940       | 2339             | 0.0              |
| 425       | 18494            | 2.9              | 555       | 106598           | 14.4             | 685       | 64438            | 0.0              | 815       | 4391             | 0.0              | 945       | 2917             | 0.0              |
| 430       | 28541            | 6.0              | 560       | 117615           | 11.6             | 690       | 56546            | 0.0              | 820       | 4383             | 0.0              | 950       | 1966             | 0.0              |
| 435       | 37453            | 10.0             | 565       | 129103           | 9.1              | 695       | 49328            | 0.0              | 825       | 4881             | 0.0              | 955       | 1580             | 0.0              |
| 440       | 44455            | 14.9             | 570       | 141415           | 6.9              | 700       | 43493            | 0.0              | 830       | 3588             | 0.0              | 960       | 1318             | 0.0              |
| 445       | 45934            | 18.1             | 575       | 155854           | 5.2              | 705       | 38035            | 0.0              | 835       | 3835             | 0.0              | 965       | 1419             | 0.0              |
| 450       | 37926            | 17.5             | 580       | 168613           | 3.8              | 710       | 33716            | 0.0              | 840       | 3014             | 0.0              | 970       | 1917             | 0.0              |
| 455       | 24793            | 13.0             | 585       | 182390           | 2.7              | 715       | 30449            | 0.0              | 845       | 3765             | 0.0              | 975       | 1210             | 0.0              |
| 460       | 15340            | 9.0              | 590       | 194054           | 1.9              | 720       | 27240            | 0.0              | 850       | 2906             | 0.0              | 980       | 3915             | 0.0              |
| 465       | 10883            | 7.1              | 595       | 203639           | 1.3              | 725       | 24231            | 0.0              | 855       | 2947             | 0.0              | 985       | 3180             | 0.0              |
| 470       | 8138             | 5.8              | 600       | 211043           | 0.9              | 730       | 21490            | 0.0              | 860       | 3864             | 0.0              | 990       | 5676             | 0.0              |
| 475       | 6653             | 5.1              | 605       | 214591           | 0.6              | 735       | 18548            | 0.0              | 865       | 3546             | 0.0              | 995       | 4736             | 0.0              |
| 480       | 6220             | 5.0              | 610       | 214337           | 0.4              | 740       | 16963            | 0.0              | 870       | 3253             | 0.0              | 1000      | 5113             | 0.0              |
| 485       | 6613             | 5.5              | 615       | 211915           | 0.3              | 745       | 14922            | 0.0              | 875       | 2450             | 0.0              |           |                  |                  |

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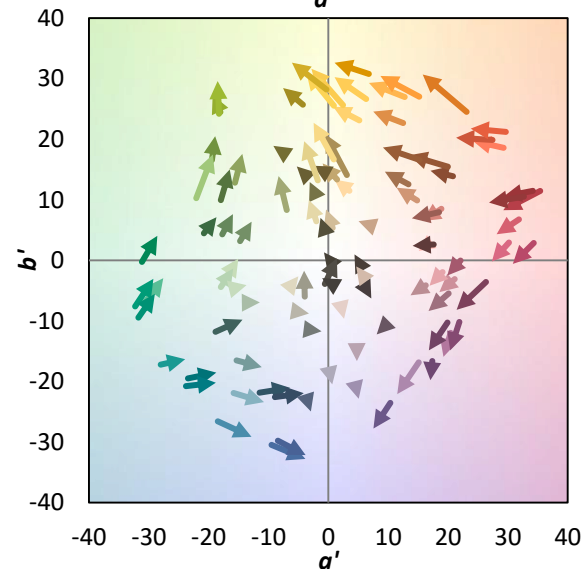
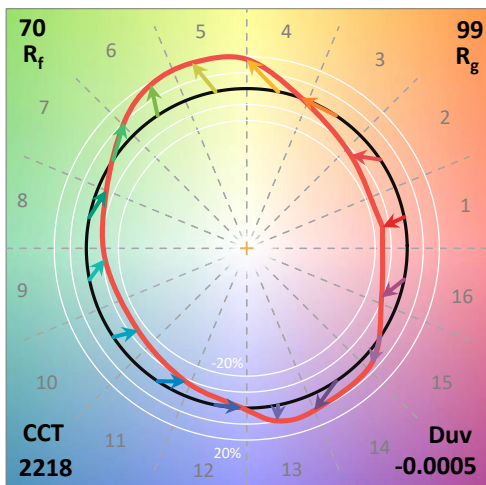
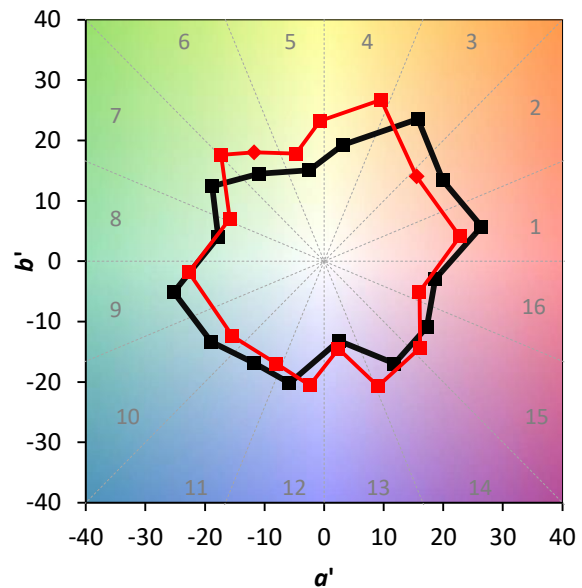
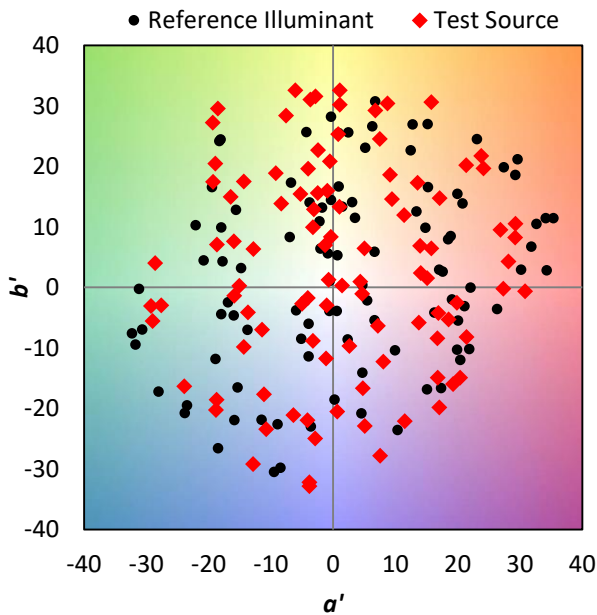
TM-30-18

### Summary

$R_f = 70$   
 $R_g = 99.3$   
 CIE  $R_a = 72.2$   
 $R_g = -16.8$



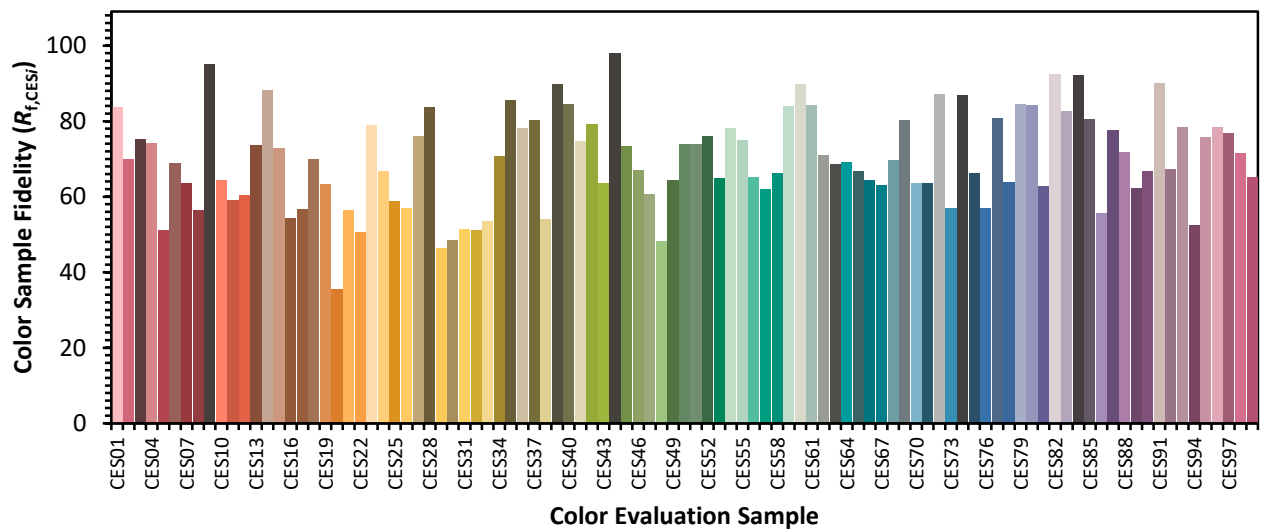
### Color Vector Graphics



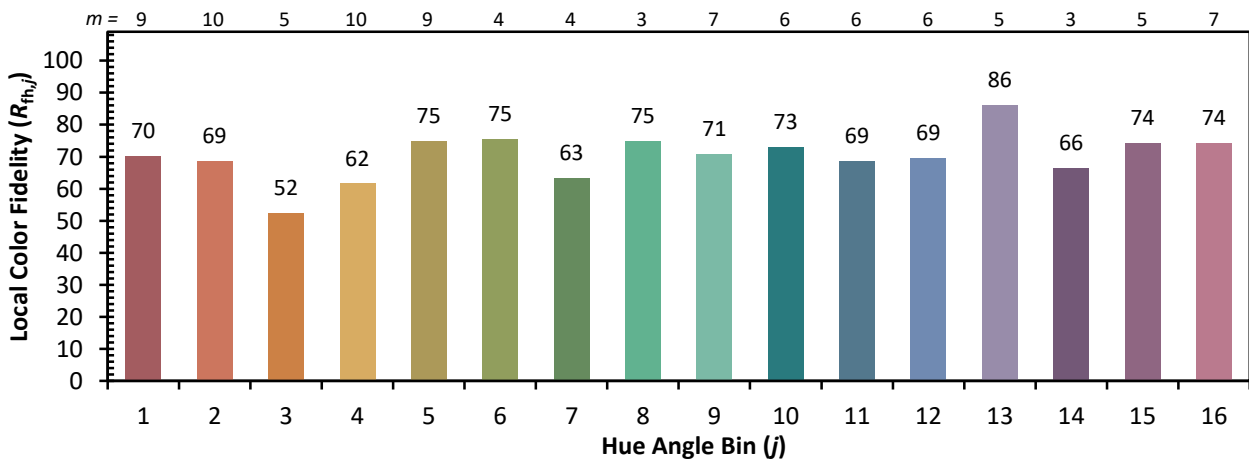
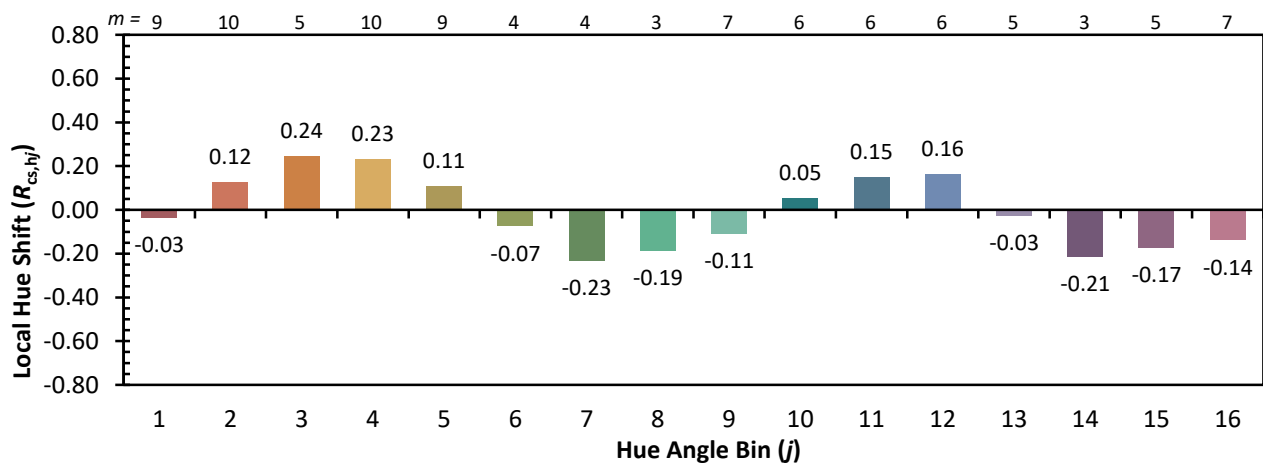
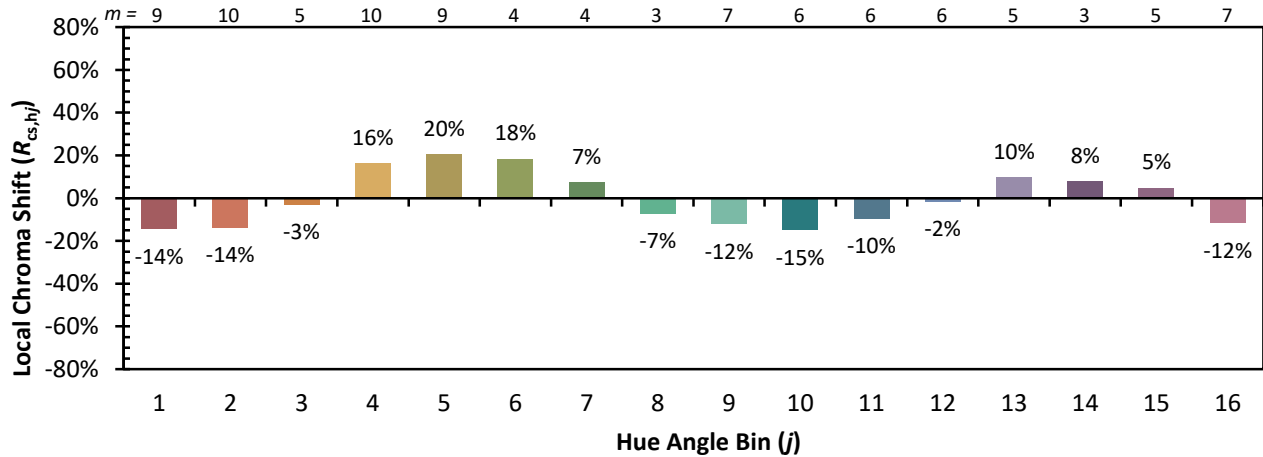


Individual Sample Fidelity Index ( $R_{f,i}$ )

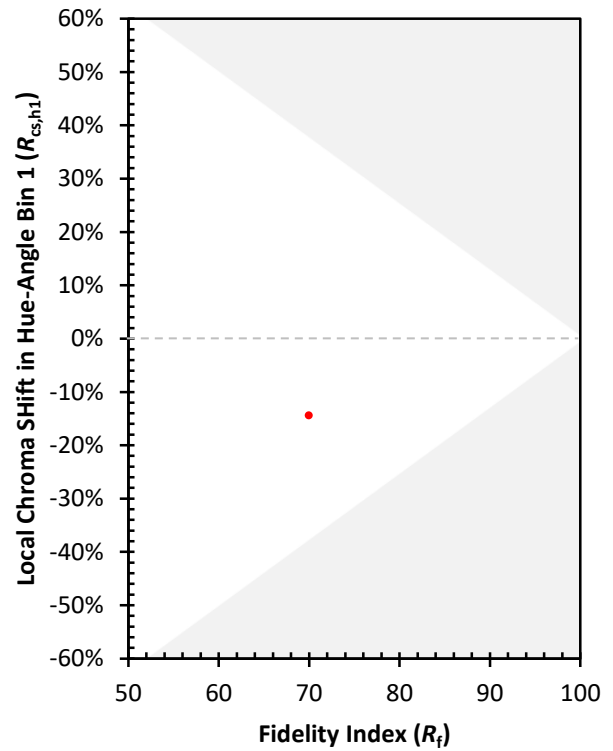
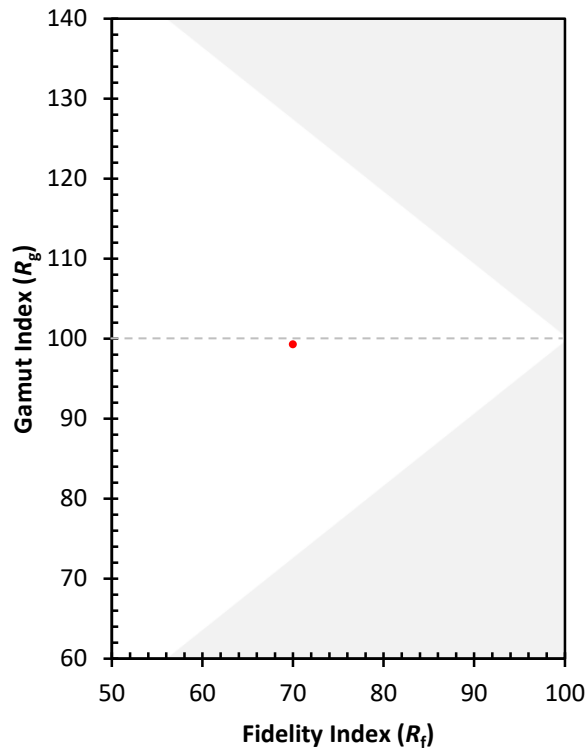
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 87 | CES26 = 57 | CES51 = 74 | CES76 = 57 |
| CES02 = 65 | CES27 = 76 | CES52 = 76 | CES77 = 81 |
| CES03 = 32 | CES28 = 84 | CES53 = 65 | CES78 = 64 |
| CES04 = 72 | CES29 = 46 | CES54 = 78 | CES79 = 85 |
| CES05 = 52 | CES30 = 48 | CES55 = 75 | CES80 = 84 |
| CES06 = 52 | CES31 = 52 | CES56 = 65 | CES81 = 63 |
| CES07 = 44 | CES32 = 51 | CES57 = 62 | CES82 = 92 |
| CES08 = 43 | CES33 = 54 | CES58 = 66 | CES83 = 83 |
| CES09 = 29 | CES34 = 71 | CES59 = 84 | CES84 = 92 |
| CES10 = 79 | CES35 = 86 | CES60 = 90 | CES85 = 81 |
| CES11 = 62 | CES36 = 78 | CES61 = 84 | CES86 = 56 |
| CES12 = 68 | CES37 = 80 | CES62 = 71 | CES87 = 78 |
| CES13 = 45 | CES38 = 54 | CES63 = 68 | CES88 = 72 |
| CES14 = 75 | CES39 = 90 | CES64 = 69 | CES89 = 62 |
| CES15 = 72 | CES40 = 85 | CES65 = 67 | CES90 = 67 |
| CES16 = 49 | CES41 = 75 | CES66 = 64 | CES91 = 90 |
| CES17 = 51 | CES42 = 79 | CES67 = 63 | CES92 = 67 |
| CES18 = 57 | CES43 = 64 | CES68 = 70 | CES93 = 78 |
| CES19 = 74 | CES44 = 98 | CES69 = 80 | CES94 = 52 |
| CES20 = 68 | CES45 = 73 | CES70 = 64 | CES95 = 76 |
| CES21 = 89 | CES46 = 67 | CES71 = 64 | CES96 = 78 |
| CES22 = 81 | CES47 = 61 | CES72 = 87 | CES97 = 77 |
| CES23 = 92 | CES48 = 48 | CES73 = 57 | CES98 = 72 |
| CES24 = 92 | CES49 = 64 | CES74 = 87 | CES99 = 65 |
| CES25 = 74 | CES50 = 74 | CES75 = 66 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)