Cooper Lighting Solutions Photometric Lab
1121 Highway 74 South
Peachtree City, GA 30269

Scaled data based on original data using

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

Test Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

Brand: McGRAW-EDISON

Report Number: P386399

Luminaire Tested: **GPC-SA2A-740-U-T3**

Issue Date: 3/3/2020

Report Generated By 670245982

Cooper Lighting Solutions Photometric Lab
1121 Highway 74 South
Peachtree City, GA 30269

Scaled Data Report

**Test Information**

| | |
|---|---|
| Test Method: | LM-79-08 |
| Report Number: | P386399 |
| | TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-14) |
| Test Lab: | INNOVATION CENTER |
| Issue Date: | 3/3/2020 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS (FORMERLY EATON) |
| Product Line: | McGRAW-EDISON |
| Catalog Number: | GPC-SA2A-740-U-T3 |
| Description: | GALLEON PEDESTRIAN LUMINAIRE |
| | (2) 70 CRI, 4000K, 615mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III OPTICS |
| Light Source: | - |
| Ballast/Driver: | ELECTRONIC DRIVER |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 9729 lumens |
| Efficiency: | N/A |
| Efficacy: | 147.4 lumens/watt |
| Luminous Opening: | Rectangular (W 1' x L: 0.5' x H: 0') |
| IES Classification: | Type III - Short |
| BUG Rating: | B2 - U0 - G2 |

| | |
|---|---|
| Input Watts (W): | 66 |
| Input Voltage (V): | NR |
| Input Current (Ain): | NR |
| Voltage Rise (V): | NR |
| Power Factor: | NR |
| Total Harmonic Distortion (THDi): | NR |
| Frequency (hertz): | 60 |
| Stabilization Time: | NR |
| Operation Time: | NR |
| Ambient Temperature (°C): | NR |
| Test Distance: | 28.75 FT |

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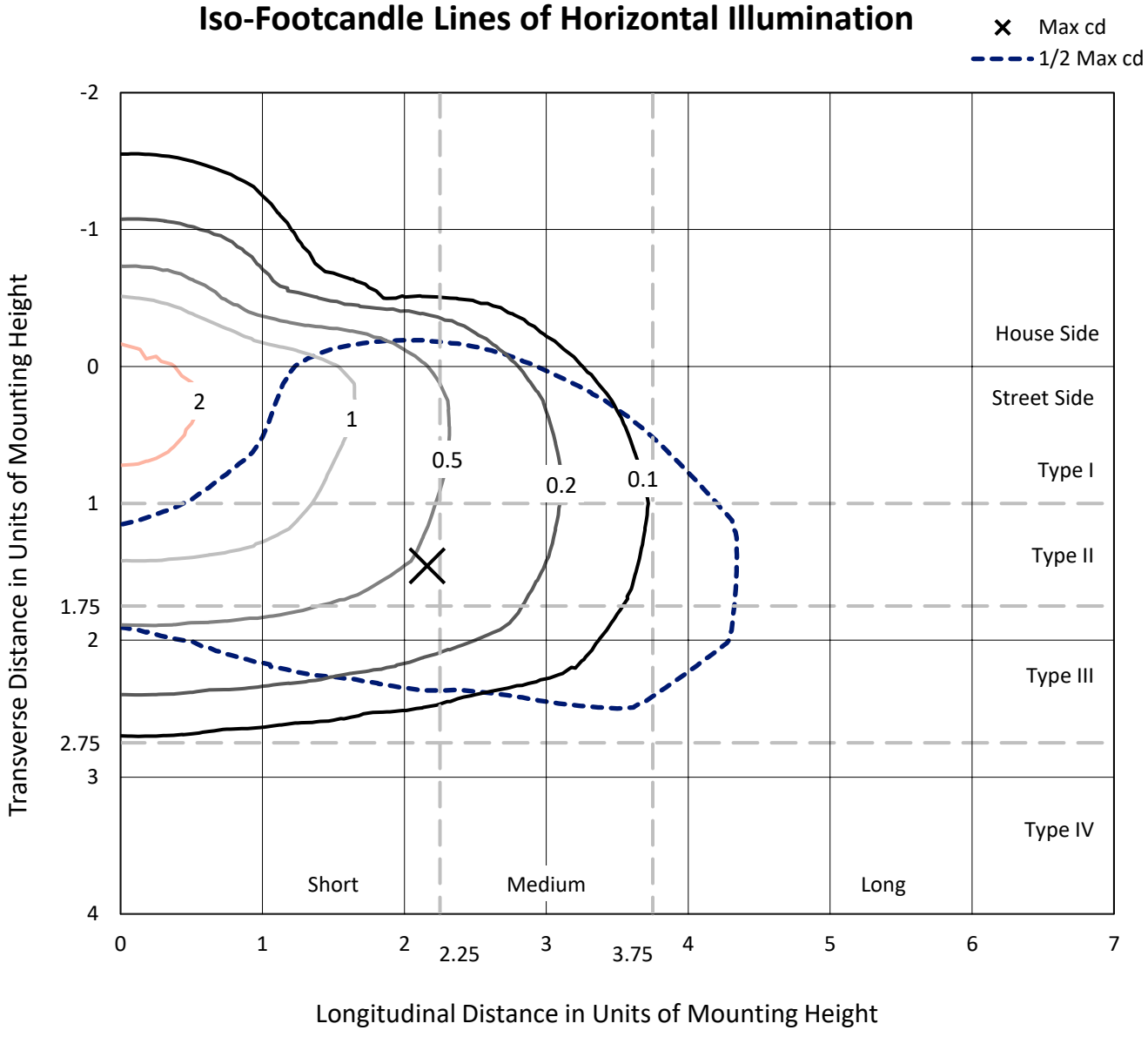
Scaled Data Report

REPORT NUMBER: P386399
CATALOG NUMBER: GPC-SA2A-740-U-T3

## Iso-Footcandle Lines of Horizontal Illumination




Based on 25 foot mounting height. Maximum calculated value = 2.2 fc
Type III - Short - N/A

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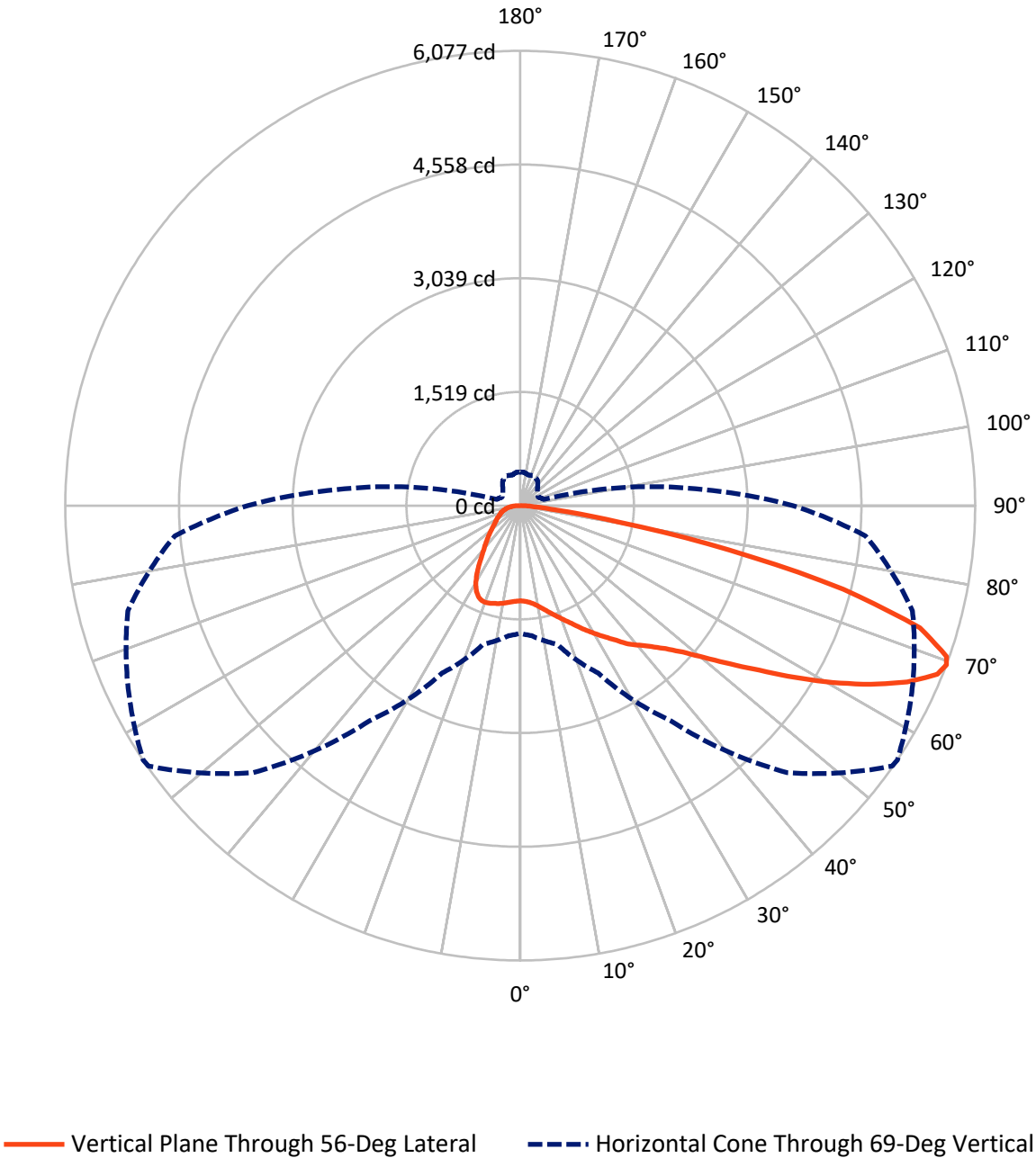
## Luminous Intensity Polar Plot



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REPORT NUMBER: P386399
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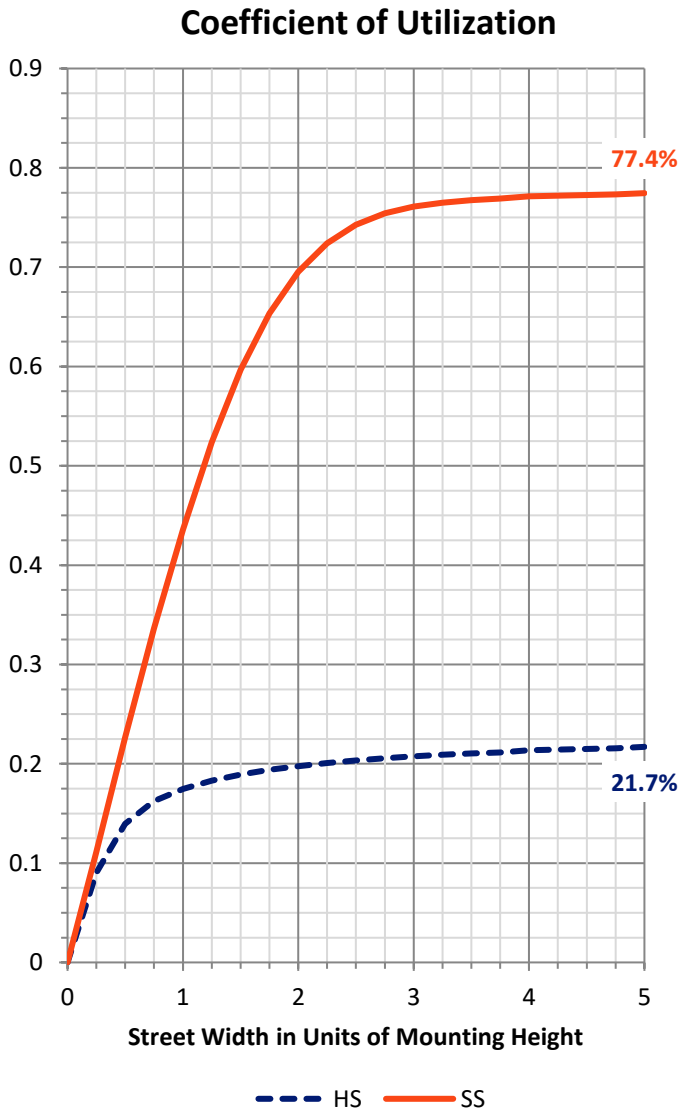
**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 2166.6 | 0.0 | 2166.6 |
| | % Fixture | 22.3 | 0.0 | 22.3 |
| **Street Side** | Lumens | 7562.4 | 0.0 | 7562.4 |
| | % Fixture | 77.7 | 0.0 | 77.7 |
| **Total** | Lumens | 9729.0 | 0.0 | 9729.0 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 124.9 | 1.3 |
| 10°-20° | 401.7 | 4.1 |
| 20°-30° | 701.2 | 7.2 |
| 30°-40° | 1007.3 | 10.4 |
| 40°-50° | 1394.0 | 14.3 |
| 50°-60° | 2042.4 | 21.0 |
| 60°-70° | 2490.1 | 25.6 |
| 70°-80° | 1376.7 | 14.2 |
| 80°-90° | 190.7 | 2.0 |
| 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° | 9729.0 | 100.0 |
| 0°-180° | 9729.0 | 100.0 |



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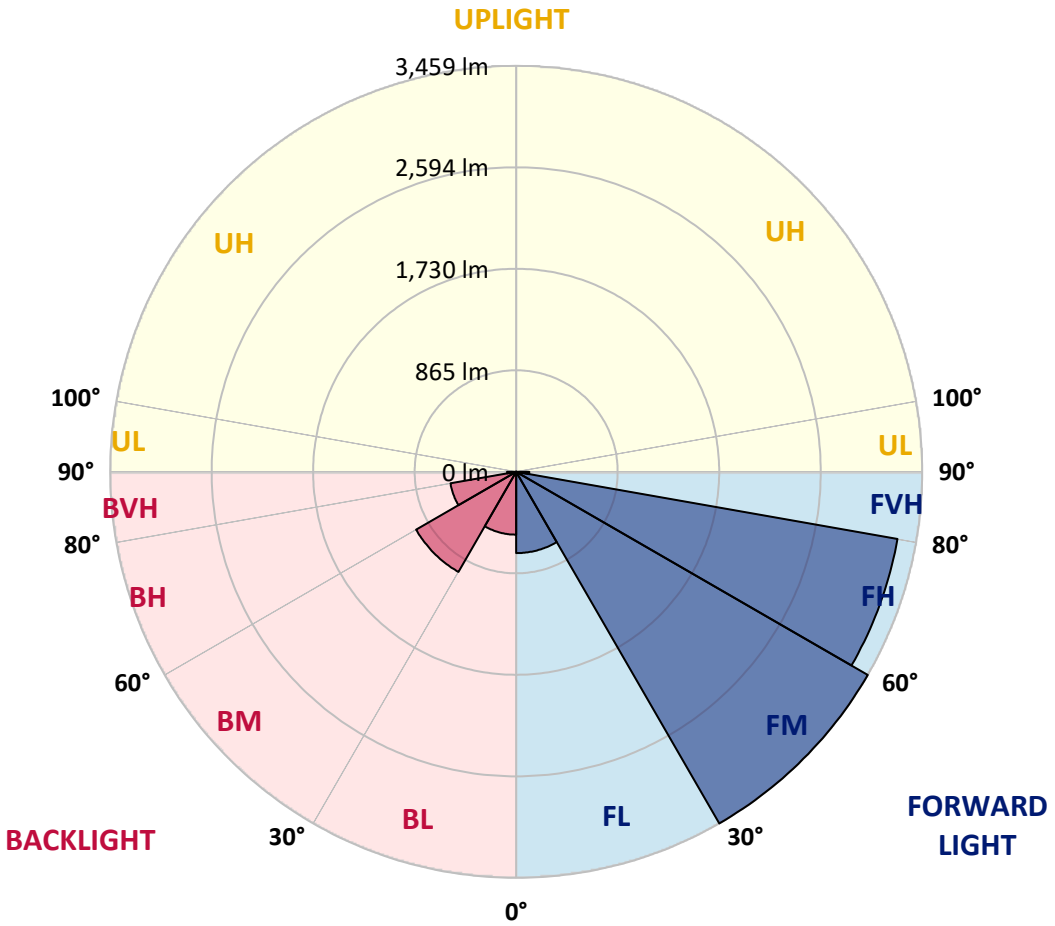
## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 692.4 | 7.1 | | | |
| FM | (30°-60°) | 3459.0 | 35.6 | | | |
| FH | (60°-80°) | 3298.6 | 33.9 | | | G2/5000 |
| FVH | (80°-90°) | 112.3 | 1.2 | | | G2/225 |
| BL | (0°-30°) | 535.4 | 5.5 | B2/1000 | | |
| BM | (30°-60°) | 984.7 | 10.1 | B1/1000 | | |
| BH | (60°-80°) | 568.2 | 5.8 | B2/1000 | | G2/1000 |
| BVH | (80°-90°) | 78.4 | 0.8 | | | G1/100 |
| UL | (90°-100°) | 0.0 | 0.0 | | U0/0 | |
| UH | (100°-180°) | 0.0 | 0.0 | | U0/0 | |

**BUG Rating: B2-U0-G2**
Type III Short



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REPORT NUMBER: P386399
CATALOG NUMBER: GPC-SA2A-740-U-T3

**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 56° | 65° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 1271.9 | 1271.9 | 1271.9 | 1271.9 | 1271.9 | 1271.9 | 1271.9 | *1271.9* | 1271.9 | 1271.9 | 1271.9 |
| 2.5° | 1280.0 | 1281.3 | 1280.3 | 1283.0 | 1280.0 | 1282.0 | 1280.3 | *1280.3* | 1279.3 | 1276.3 | 1272.9 |
| 5° | 1300.1 | 1302.8 | 1301.1 | 1303.8 | 1300.1 | 1300.7 | 1297.7 | *1297.7* | 1294.7 | 1288.3 | 1281.6 |
| 7.5° | 1331.6 | 1334.6 | 1333.3 | 1335.9 | 1330.9 | 1330.9 | 1326.9 | *1326.6* | 1320.5 | 1310.1 | 1302.4 |
| 10° | 1369.1 | 1373.1 | 1371.8 | 1375.8 | 1371.8 | 1373.1 | 1369.1 | *1369.1* | 1361.1 | 1346.3 | 1336.6 |
| 12.5° | 1423.7 | 1428.8 | 1425.1 | 1424.8 | 1423.1 | 1425.8 | 1422.4 | *1421.7* | 1414.4 | 1394.3 | 1380.8 |
| 15° | 1496.8 | 1502.2 | 1494.5 | 1493.8 | 1484.4 | 1483.4 | 1483.4 | *1482.4* | 1477.7 | 1453.6 | 1431.5 |
| 17.5° | 1580.9 | 1582.6 | 1575.9 | 1565.2 | 1553.1 | 1545.4 | 1544.4 | *1547.1* | 1547.1 | 1518.9 | 1483.7 |
| 20° | 1663.4 | 1666.4 | 1661.0 | 1649.0 | 1633.6 | 1622.2 | 1614.1 | *1619.5* | 1619.1 | 1585.6 | 1535.7 |
| 22.5° | 1753.2 | 1760.2 | 1752.2 | 1736.8 | 1718.7 | 1705.9 | 1691.9 | *1696.6* | 1696.9 | 1655.7 | 1586.6 |
| 25° | 1869.5 | 1863.1 | 1858.1 | 1836.3 | 1810.5 | 1797.4 | 1784.4 | *1789.1* | 1787.7 | 1731.1 | 1639.3 |
| 27.5° | 1972.4 | 1973.7 | 1967.0 | 1943.9 | 1914.1 | 1885.3 | 1884.6 | *1887.6* | 1882.6 | 1809.5 | 1688.9 |
| 30° | 2092.0 | 2092.7 | 2083.3 | 2062.6 | 2030.0 | 1992.8 | 1984.1 | *1989.2* | 1978.4 | 1883.9 | 1741.1 |
| 32.5° | 2211.0 | 2214.4 | 2204.0 | 2178.9 | 2152.7 | 2107.5 | 2090.0 | *2093.4* | 2066.6 | 1960.0 | 1795.1 |
| 35° | 2315.3 | 2320.0 | 2316.6 | 2299.8 | 2271.4 | 2232.5 | 2211.7 | *2209.7* | 2176.5 | 2053.2 | 1866.5 |
| 37.5° | 2421.5 | 2425.9 | 2422.2 | 2408.1 | 2396.7 | 2355.5 | 2344.4 | *2344.4* | 2286.8 | 2148.4 | 1957.3 |
| 40° | 2530.8 | 2537.5 | 2533.1 | 2513.7 | 2504.0 | 2485.2 | 2458.7 | *2452.3* | 2390.0 | 2262.6 | 2105.5 |
| 42.5° | 2632.3 | 2641.0 | 2658.5 | 2647.1 | 2627.3 | 2630.0 | 2576.7 | *2573.3* | 2527.8 | 2431.6 | 2291.5 |
| 45° | 2776.4 | 2789.2 | 2818.7 | 2810.0 | 2805.9 | 2791.2 | 2727.8 | *2724.8* | 2707.4 | 2658.8 | 2522.4 |
| 47.5° | 2933.6 | 2951.1 | 3004.3 | 3006.0 | 3049.3 | 3021.4 | 2935.3 | *2924.9* | 2928.9 | 2930.9 | 2804.3 |
| 50° | 3078.4 | 3097.5 | 3185.0 | 3226.2 | 3328.1 | 3334.1 | 3196.4 | *3187.0* | 3202.8 | 3249.0 | 3132.7 |
| 52.5° | 3194.0 | 3218.2 | 3327.4 | 3454.8 | 3629.4 | 3679.0 | 3517.8 | *3510.8* | 3522.5 | 3602.3 | 3504.1 |
| 55° | 3278.8 | 3305.0 | 3424.0 | 3655.9 | 3934.7 | 4022.2 | 3887.8 | *3881.1* | 3888.5 | 3990.0 | 3907.9 |
| 57.5° | 3298.6 | 3305.0 | 3477.6 | 3791.3 | 4192.5 | 4402.6 | 4340.6 | *4327.2* | 4291.0 | 4379.5 | 4353.7 |
| 60° | 3205.8 | 3231.2 | 3433.3 | 3838.9 | 4391.9 | 4777.7 | 4813.9 | *4797.1* | 4695.5 | 4767.9 | 4747.2 |
| 62.5° | 3017.4 | 3063.0 | 3268.1 | 3766.5 | 4470.0 | 5084.0 | 5278.1 | *5257.9* | 5083.0 | 5129.9 | 5030.0 |
| 65° | 2709.7 | 2729.2 | 2944.7 | 3516.8 | 4370.8 | 5280.1 | 5692.0 | *5681.9* | 5461.7 | 5388.3 | 5082.3 |
| 67.5° | 2159.4 | 2195.9 | 2378.9 | 2995.0 | 3964.9 | 5256.9 | 6012.0 | *6011.0* | 5709.1 | 5484.2 | 4897.0 |
| 69° | *1705.9* | *1743.8* | *1918.1* | *2467.1* | *3508.4* | *5045.5* | *6065.7* | *6077.4* | *5778.8* | *5425.9* | *4632.2* |
| 70° | 1360.1 | 1404.0 | 1523.6 | 2078.0 | 3103.2 | 4766.6 | 6021.1 | *6042.2* | 5765.4 | 5329.7 | 4387.9 |
| 72.5° | 578.8 | 614.3 | 699.5 | 1071.2 | 1891.3 | 3559.4 | 5505.3 | *5585.1* | 5454.7 | 4877.9 | 3626.4 |
| 75° | 252.7 | 263.8 | 302.3 | 436.7 | 839.6 | 1937.2 | 4312.8 | *4460.3* | 4664.0 | 4123.1 | 2701.4 |
| 77.5° | 185.0 | 189.7 | 210.8 | 256.4 | 376.7 | 731.6 | 2773.4 | *2859.2* | 3363.6 | 3000.3 | 1657.0 |
| 80° | 143.1 | 146.5 | 162.9 | 188.4 | 246.0 | 295.9 | 1264.9 | *1338.6* | 1891.3 | 1541.1 | 690.1 |
| 82.5° | 114.0 | 116.3 | 127.7 | 138.8 | 169.9 | 179.3 | 420.0 | *465.9* | 698.1 | 425.6 | 182.7 |
| 85° | 105.9 | 108.6 | 112.6 | 101.2 | 108.9 | 105.2 | 181.7 | *190.0* | 210.8 | 167.2 | 76.4 |
| 87.5° | 47.9 | 56.6 | 111.6 | 78.8 | 58.0 | 46.3 | 74.4 | *77.8* | 87.5 | 87.8 | 33.9 |
| 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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Scaled Data Report

REPORT NUMBER: P386399
CATALOG NUMBER: GPC-SA2A-740-U-T3

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 1271.9 | 1271.9 | 1271.9 | 1271.9 | 1271.9 | 1271.9 | 1271.9 | 1271.9 | 1271.9 | 1271.9 | 1271.9 |
| 2.5° | 1274.9 | 1273.9 | 1275.6 | 1271.6 | 1276.6 | 1276.3 | 1274.6 | 1275.3 | 1278.6 | 1278.3 | 1278.6 |
| 5° | 1282.6 | 1282.0 | 1284.0 | 1281.0 | 1287.0 | 1289.0 | 1289.3 | 1292.4 | 1296.1 | 1297.1 | 1297.1 |
| 7.5° | 1302.1 | 1302.1 | 1303.1 | 1299.1 | 1303.1 | 1302.8 | 1301.1 | 1304.1 | 1307.8 | 1308.1 | 1307.8 |
| 10° | 1335.6 | 1335.9 | 1334.3 | 1323.9 | 1320.5 | 1311.5 | 1303.1 | 1303.4 | 1308.1 | 1311.8 | 1312.8 |
| 12.5° | 1377.8 | 1376.5 | 1369.1 | 1350.0 | 1335.9 | 1317.5 | 1308.8 | 1308.5 | 1313.1 | 1316.2 | 1317.2 |
| 15° | 1426.1 | 1422.4 | 1403.3 | 1372.1 | 1347.3 | 1329.2 | 1315.2 | 1311.8 | 1309.1 | 1305.8 | 1306.1 |
| 17.5° | 1471.7 | 1463.3 | 1431.5 | 1388.2 | 1362.1 | 1337.9 | 1310.8 | 1289.0 | 1273.9 | 1265.2 | 1262.5 |
| 20° | 1517.9 | 1501.5 | 1455.6 | 1403.3 | 1370.1 | 1326.2 | 1273.9 | 1229.7 | 1202.2 | 1189.5 | 1187.1 |
| 22.5° | 1560.2 | 1533.7 | 1478.0 | 1419.1 | 1363.8 | 1286.7 | 1204.6 | 1140.2 | 1102.0 | 1084.9 | 1086.2 |
| 25° | 1601.4 | 1564.5 | 1501.5 | 1430.1 | 1331.6 | 1217.0 | 1108.0 | 1028.9 | 984.7 | 965.6 | 964.9 |
| 27.5° | 1637.6 | 1595.7 | 1527.0 | 1421.1 | 1271.6 | 1117.7 | 993.7 | 916.7 | 879.8 | 863.4 | 860.7 |
| 30° | 1679.1 | 1634.9 | 1560.8 | 1386.5 | 1183.8 | 1003.1 | 882.1 | 827.8 | 801.7 | 785.3 | 782.3 |
| 32.5° | 1729.7 | 1688.2 | 1588.6 | 1323.9 | 1071.5 | 883.5 | 795.0 | 757.1 | 733.3 | 714.9 | 711.5 |
| 35° | 1803.5 | 1758.6 | 1595.7 | 1234.0 | 948.2 | 789.0 | 731.0 | 692.1 | 659.9 | 636.1 | 633.8 |
| 37.5° | 1896.0 | 1846.7 | 1579.6 | 1117.7 | 828.5 | 727.6 | 677.7 | 629.8 | 587.9 | 554.3 | 549.0 |
| 40° | 2029.4 | 1955.0 | 1535.0 | 983.7 | 740.4 | 680.4 | 625.7 | 571.1 | 519.2 | 479.9 | 472.2 |
| 42.5° | 2189.6 | 2082.0 | 1466.6 | 850.3 | 675.7 | 632.4 | 574.1 | 506.4 | 456.8 | 429.0 | 425.0 |
| 45° | 2393.4 | 2214.0 | 1371.8 | 733.7 | 612.0 | 584.5 | 518.5 | 456.1 | 425.3 | 404.9 | 401.5 |
| 47.5° | 2626.0 | 2362.2 | 1272.3 | 638.8 | 558.0 | 539.6 | 473.9 | 433.7 | 409.2 | 393.1 | 390.1 |
| 50° | 2911.8 | 2529.4 | 1166.7 | 561.1 | 503.7 | 485.6 | 452.8 | 421.3 | 401.9 | 389.5 | 386.4 |
| 52.5° | 3234.3 | 2718.1 | 1090.6 | 499.7 | 458.8 | 445.8 | 441.7 | 414.6 | 398.8 | 389.5 | 386.4 |
| 55° | 3581.5 | 2910.2 | 1008.5 | 448.1 | 420.0 | 423.6 | 434.4 | 415.3 | 404.5 | 393.1 | 388.8 |
| 57.5° | 3929.0 | 3108.6 | 917.0 | 404.5 | 389.1 | 407.2 | 429.3 | 416.6 | 407.6 | 396.5 | 392.5 |
| 60° | 4203.9 | 3234.3 | 775.2 | 368.0 | 364.7 | 389.1 | 417.3 | 406.5 | 394.8 | 395.1 | 394.5 |
| 62.5° | 4332.2 | 3227.6 | 618.7 | 335.5 | 340.2 | 364.7 | 397.8 | 390.8 | 381.1 | 394.1 | 395.1 |
| 65° | 4260.2 | 3066.7 | 481.6 | 306.0 | 314.0 | 339.2 | 377.7 | 383.1 | 386.4 | 411.6 | 414.9 |
| 67.5° | 3957.9 | 2753.6 | 373.0 | 280.2 | 290.2 | 321.8 | 379.7 | 417.3 | 421.6 | 448.1 | 447.8 |
| 69° | *3645.2* | *2460.1* | *324.1* | *266.8* | *278.5* | *326.1* | *405.9* | *439.1* | *422.6* | *450.8* | *446.8* |
| 70° | 3383.1 | 2227.8 | 298.0 | 257.7 | 273.2 | 333.8 | 423.3 | 438.7 | 417.6 | 441.7 | 435.0 |
| 72.5° | 2605.5 | 1602.7 | 252.7 | 241.0 | 255.1 | 319.4 | 428.3 | 429.0 | 405.9 | 410.6 | 399.2 |
| 75° | 1787.1 | 1012.8 | 220.5 | 218.2 | 227.6 | 287.9 | 412.2 | 409.9 | 375.4 | 368.7 | 359.3 |
| 77.5° | 985.4 | 514.5 | 187.4 | 196.4 | 202.8 | 255.1 | 374.7 | 371.4 | 342.9 | 328.8 | 325.4 |
| 80° | 380.1 | 225.2 | 158.2 | 174.6 | 178.6 | 220.9 | 328.5 | 325.4 | 301.6 | 283.5 | 278.5 |
| 82.5° | 143.4 | 118.0 | 130.7 | 151.2 | 149.8 | 182.3 | 278.2 | 276.5 | 253.4 | 226.9 | 218.9 |
| 85° | 66.4 | 70.7 | 103.6 | 124.7 | 115.0 | 135.1 | 222.5 | 225.6 | 197.4 | 165.9 | 165.9 |
| 87.5° | 28.2 | 39.5 | 73.4 | 94.2 | 77.4 | 91.2 | 163.2 | 155.8 | 143.1 | 99.2 | 93.2 |
| 90° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

Cooper Lighting Solutions Photometric Lab
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Peachtree City, GA 30269

## Test Information

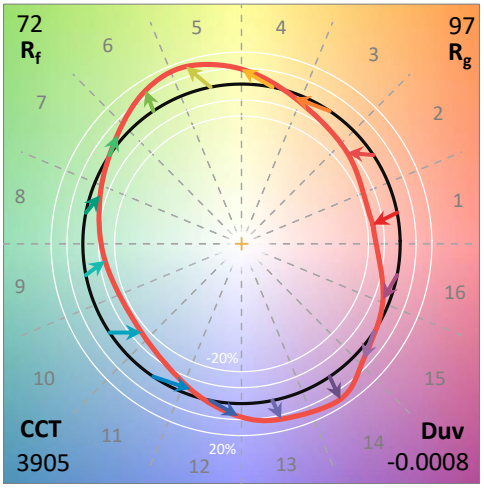
| | |
|---|---|
| Test Method: | LM-79-08 |
| Report Number: | SP1-2101-121-2 |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Photometer: | SP1 |
| Measurement Geometry: | 4π |
| Issue Date: | 03/05/2021 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS (FORMERLY EATON) |
| Product Line: | STREETWORKS |
| Catalog Number: | **IFLD-S-SA2A-740-U-T3R-HSS** |
| Description: | STREETWORKS INF FLOOD |

SHIELD, DRIVER PROGRAMMED @ 615mA.

## Spectral Parameters

| | | | | | |
|---|---|---|---|---|---|
| CCT (K): | 3905 | CRI (Ra): | 71.2 | | |
| CIE u': | 0.2273 | R1: | 68.9 | R9: | -29.7 |
| CIE v': | 0.5024 | R2: | 77.0 | R10: | 46.2 |
| Duv: | -0.0008 | R3: | 84.0 | R11: | 68.8 |
| CIE x: | 0.3841 | R4: | 71.6 | R12: | 45.6 |
| CIE y: | 0.3774 | R5: | 68.9 | R13: | 69.5 |
| CIE z: | 0.2385 | R6: | 68.3 | R14: | 90.7 |
| Peak Wavelength (nm): | 443 | R7: | 78.7 | | |
| Dominant Wavelength (nm): | 579 | R8: | 52.2 | | |
| Purity: | 28.7 | | | | |

| | |
|---|---|
| Rf: | 71.7 |
| Rg: | 96.9 |




## Test Conditions

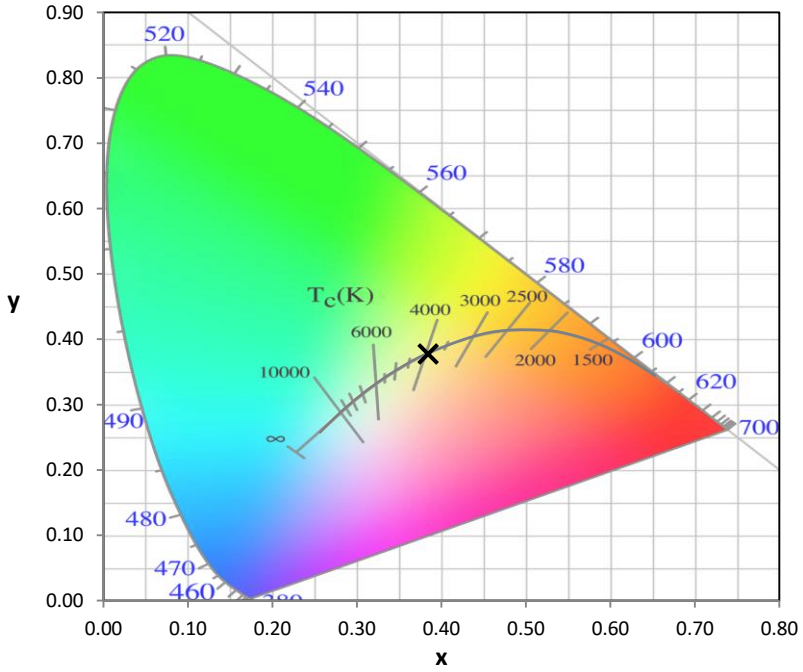
| | |
|---|---|
| Stabilization Time: | 211M |
| Operation Time: | 12H |
| Room Temperature (°C) / RH%: | 24.8/312% |
| Sphere Temperature (°C): | 24.1 |

REPORT NUMBER: SP1-2101-121-2

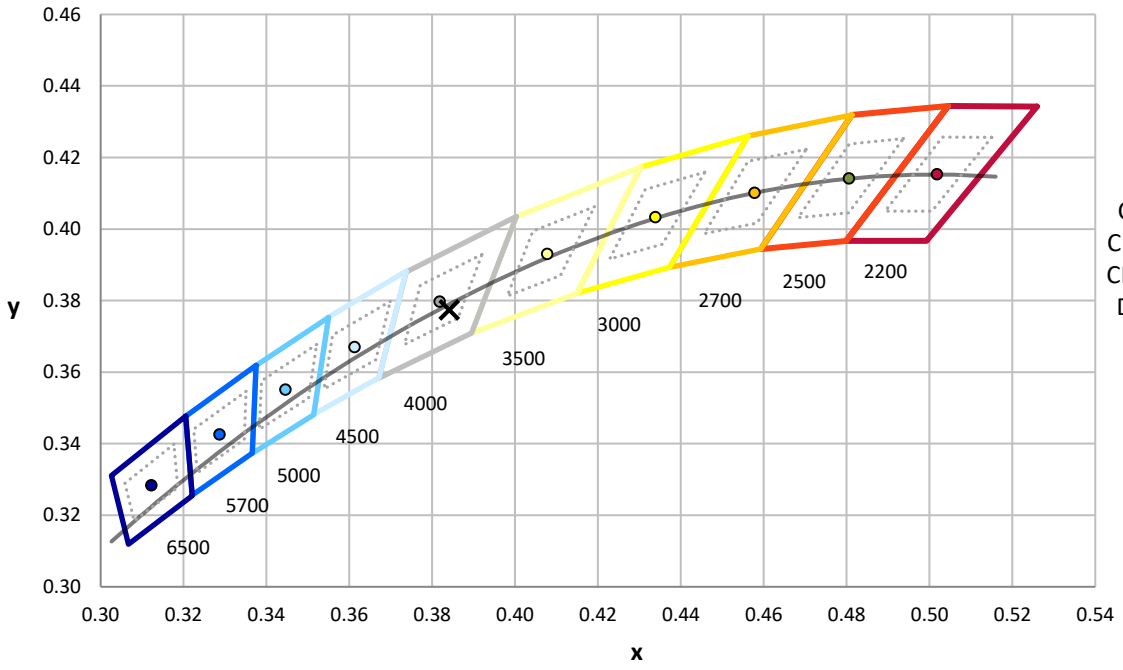
| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 1/31/2021 | 7/31/2021 |
| Power Meter | IN0071 | 12/1/2020 | 12/1/2021 |
| AC Power Source | IN0063 | 12/1/2020 | 12/1/2021 |
| DC Power 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: SP1-2101-121-2

## CIE 1931 Chromaticity Diagram




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




CCT = 3905K
CIE x = 0.3841
CIE y = 0.3774
Duv = -0.0008

Point lies inside the ANSI 4000K 4-step quadrangle

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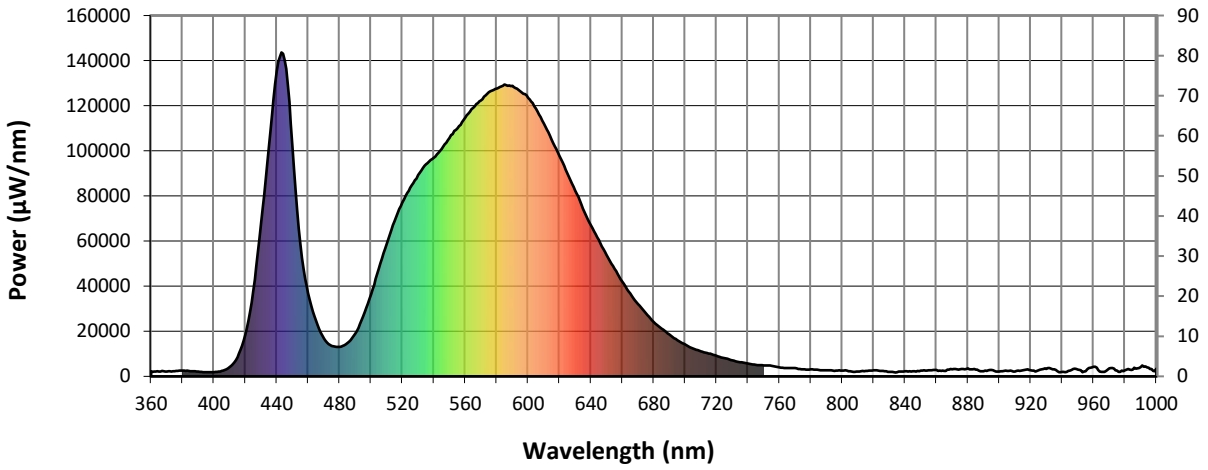
## Photopic Flux vs. Wavelength




######

| λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) | λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) | λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) | λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) | λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 360 | 2304 | 0.0 | 490 | 19043 | 2.7 | 620 | 97577 | 25.4 | 750 | 4830 | 0.0 | 880 | 3505 | 0.0 |
| 365 | 2150 | 0.0 | 495 | 26606 | 4.8 | 625 | 90158 | 19.9 | 755 | 4664 | 0.0 | 885 | 2991 | 0.0 |
| 370 | 2146 | 0.0 | 500 | 36376 | 8.0 | 630 | 82240 | 14.9 | 760 | 4006 | 0.0 | 890 | 2327 | 0.0 |
| 375 | 2332 | 0.0 | 505 | 47714 | 13.3 | 635 | 74361 | 11.2 | 765 | 3715 | 0.0 | 895 | 2775 | 0.0 |
| 380 | 2527 | 0.0 | 510 | 58741 | 20.2 | 640 | 66994 | 8.0 | 770 | 3696 | 0.0 | 900 | 2141 | 0.0 |
| 385 | 2304 | 0.0 | 515 | 68716 | 28.5 | 645 | 60405 | 5.8 | 775 | 3117 | 0.0 | 905 | 2421 | 0.0 |
| 390 | 2064 | 0.0 | 520 | 77136 | 37.4 | 650 | 53806 | 3.9 | 780 | 3062 | 0.0 | 910 | 2200 | 0.0 |
| 395 | 1856 | 0.0 | 525 | 83567 | 44.9 | 655 | 47610 | 2.7 | 785 | 2907 | 0.0 | 915 | 2716 | 0.0 |
| 400 | 1856 | 0.0 | 530 | 89283 | 52.6 | 660 | 42018 | 1.8 | 790 | 2655 | 0.0 | 920 | 2656 | 0.0 |
| 405 | 2374 | 0.0 | 535 | 94097 | 58.4 | 665 | 36742 | 1.2 | 795 | 2467 | 0.0 | 925 | 2671 | 0.0 |
| 410 | 4084 | 0.0 | 540 | 96845 | 63.1 | 670 | 32105 | 0.7 | 800 | 2609 | 0.0 | 930 | 3292 | 0.0 |
| 415 | 8543 | 0.0 | 545 | 100829 | 67.1 | 675 | 27946 | 0.5 | 805 | 2293 | 0.0 | 935 | 3188 | 0.0 |
| 420 | 18394 | 0.1 | 550 | 105648 | 71.8 | 680 | 24146 | 0.3 | 810 | 2188 | 0.0 | 940 | 1997 | 0.0 |
| 425 | 37987 | 0.2 | 555 | 110017 | 75.1 | 685 | 21191 | 0.2 | 815 | 2386 | 0.0 | 945 | 2623 | 0.0 |
| 430 | 67605 | 0.5 | 560 | 114586 | 77.9 | 690 | 18544 | 0.1 | 820 | 2712 | 0.0 | 950 | 2969 | 0.0 |
| 435 | 102160 | 1.2 | 565 | 118987 | 79.1 | 695 | 16058 | 0.1 | 825 | 2473 | 0.0 | 955 | 2277 | 0.0 |
| 440 | 135103 | 2.1 | 570 | 122326 | 79.5 | 700 | 14133 | 0.0 | 830 | 1969 | 0.0 | 960 | 4267 | 0.0 |
| 445 | 140126 | 2.9 | 575 | 125968 | 78.4 | 705 | 12309 | 0.0 | 835 | 1917 | 0.0 | 965 | 2034 | 0.0 |
| 450 | 102339 | 2.7 | 580 | 127613 | 75.8 | 710 | 11142 | 0.0 | 840 | 2248 | 0.0 | 970 | 3586 | 0.0 |
| 455 | 58751 | 2.0 | 585 | 129466 | 71.9 | 715 | 10143 | 0.0 | 845 | 2266 | 0.0 | 975 | 2505 | 0.0 |
| 460 | 36892 | 1.5 | 590 | 128813 | 66.6 | 720 | 9072 | 0.0 | 850 | 2558 | 0.0 | 980 | 2666 | 0.0 |
| 465 | 24637 | 1.3 | 595 | 126387 | 59.9 | 725 | 8130 | 0.0 | 855 | 2767 | 0.0 | 985 | 2934 | 0.0 |
| 470 | 16738 | 1.0 | 600 | 123477 | 53.2 | 730 | 7149 | 0.0 | 860 | 2826 | 0.0 | 990 | 4120 | 0.0 |
| 475 | 13456 | 1.1 | 605 | 118718 | 46.0 | 735 | 6311 | 0.0 | 865 | 2385 | 0.0 | 995 | 3858 | 0.0 |
| 480 | 13081 | 1.2 | 610 | 112091 | 38.5 | 740 | 5711 | 0.0 | 870 | 3194 | 0.0 | 1000 | 3405 | 0.0 |
| 485 | 14734 | 1.7 | 615 | 105039 | 31.7 | 745 | 5111 | 0.0 | 875 | 3189 | 0.0 | | | |

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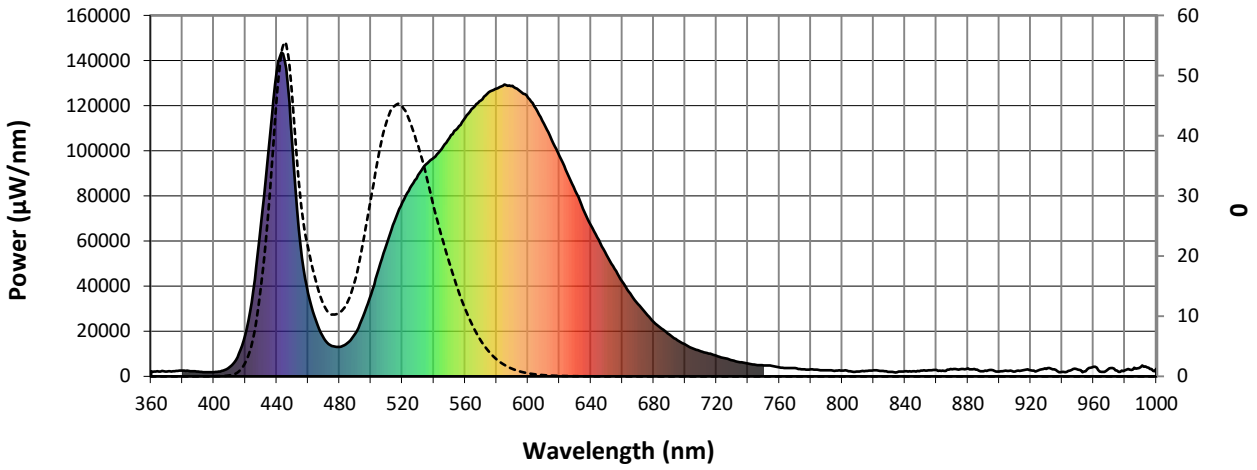
## Scotopic Flux vs. Wavelength




**Scotopic Lumens: 10425.8** **S/P: 1.47**

| λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) | λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) | λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) | λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) | λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 360 | 2304 | 0.0 | 490 | 19043 | 29.3 | 620 | 97577 | 1.2 | 750 | 4830 | 0.0 | 880 | 3505 | 0.0 |
| 365 | 2150 | 0.0 | 495 | 26606 | 43.0 | 625 | 90158 | 0.8 | 755 | 4664 | 0.0 | 885 | 2991 | 0.0 |
| 370 | 2146 | 0.0 | 500 | 36376 | 60.8 | 630 | 82240 | 0.5 | 760 | 4006 | 0.0 | 890 | 2327 | 0.0 |
| 375 | 2332 | 0.0 | 505 | 47714 | 81.1 | 635 | 74361 | 0.3 | 765 | 3715 | 0.0 | 895 | 2775 | 0.0 |
| 380 | 2527 | 0.0 | 510 | 58741 | 99.6 | 640 | 66994 | 0.2 | 770 | 3696 | 0.0 | 900 | 2141 | 0.0 |
| 385 | 2304 | 0.0 | 515 | 68716 | 113.9 | 645 | 60405 | 0.1 | 775 | 3117 | 0.0 | 905 | 2421 | 0.0 |
| 390 | 2064 | 0.0 | 520 | 77136 | 122.6 | 650 | 53806 | 0.1 | 780 | 3062 | 0.0 | 910 | 2200 | 0.0 |
| 395 | 1856 | 0.0 | 525 | 83567 | 125.0 | 655 | 47610 | 0.0 | 785 | 2907 | 0.0 | 915 | 2716 | 0.0 |
| 400 | 1856 | 0.0 | 530 | 89283 | 123.1 | 660 | 42018 | 0.0 | 790 | 2655 | 0.0 | 920 | 2656 | 0.0 |
| 405 | 2374 | 0.1 | 535 | 94097 | 117.3 | 665 | 36742 | 0.0 | 795 | 2467 | 0.0 | 925 | 2671 | 0.0 |
| 410 | 4084 | 0.2 | 540 | 96845 | 107.0 | 670 | 32105 | 0.0 | 800 | 2609 | 0.0 | 930 | 3292 | 0.0 |
| 415 | 8543 | 0.9 | 545 | 100829 | 96.7 | 675 | 27946 | 0.0 | 805 | 2293 | 0.0 | 935 | 3188 | 0.0 |
| 420 | 18394 | 3.0 | 550 | 105648 | 86.4 | 680 | 24146 | 0.0 | 810 | 2188 | 0.0 | 940 | 1997 | 0.0 |
| 425 | 37987 | 9.3 | 555 | 110017 | 75.2 | 685 | 21191 | 0.0 | 815 | 2386 | 0.0 | 945 | 2623 | 0.0 |
| 430 | 67605 | 23.0 | 560 | 114586 | 64.0 | 690 | 18544 | 0.0 | 820 | 2712 | 0.0 | 950 | 2969 | 0.0 |
| 435 | 102160 | 45.7 | 565 | 118987 | 53.4 | 695 | 16058 | 0.0 | 825 | 2473 | 0.0 | 955 | 2277 | 0.0 |
| 440 | 135103 | 75.5 | 570 | 122326 | 43.2 | 700 | 14133 | 0.0 | 830 | 1969 | 0.0 | 960 | 4267 | 0.0 |
| 445 | 140126 | 93.8 | 575 | 125968 | 34.3 | 705 | 12309 | 0.0 | 835 | 1917 | 0.0 | 965 | 2034 | 0.0 |
| 450 | 102339 | 79.3 | 580 | 127613 | 26.3 | 710 | 11142 | 0.0 | 840 | 2248 | 0.0 | 970 | 3586 | 0.0 |
| 455 | 58751 | 51.3 | 585 | 129466 | 19.8 | 715 | 10143 | 0.0 | 845 | 2266 | 0.0 | 975 | 2505 | 0.0 |
| 460 | 36892 | 35.6 | 590 | 128813 | 14.3 | 720 | 9072 | 0.0 | 850 | 2558 | 0.0 | 980 | 2666 | 0.0 |
| 465 | 24637 | 26.0 | 595 | 126387 | 10.1 | 725 | 8130 | 0.0 | 855 | 2767 | 0.0 | 985 | 2934 | 0.0 |
| 470 | 16738 | 19.3 | 600 | 123477 | 7.0 | 730 | 7149 | 0.0 | 860 | 2826 | 0.0 | 990 | 4120 | 0.0 |
| 475 | 13456 | 16.8 | 605 | 118718 | 4.7 | 735 | 6311 | 0.0 | 865 | 2385 | 0.0 | 995 | 3858 | 0.0 |
| 480 | 13081 | 17.7 | 610 | 112091 | 3.0 | 740 | 5711 | 0.0 | 870 | 3194 | 0.0 | 1000 | 3405 | 0.0 |
| 485 | 14734 | 21.4 | 615 | 105039 | 1.9 | 745 | 5111 | 0.0 | 875 | 3189 | 0.0 | | | |

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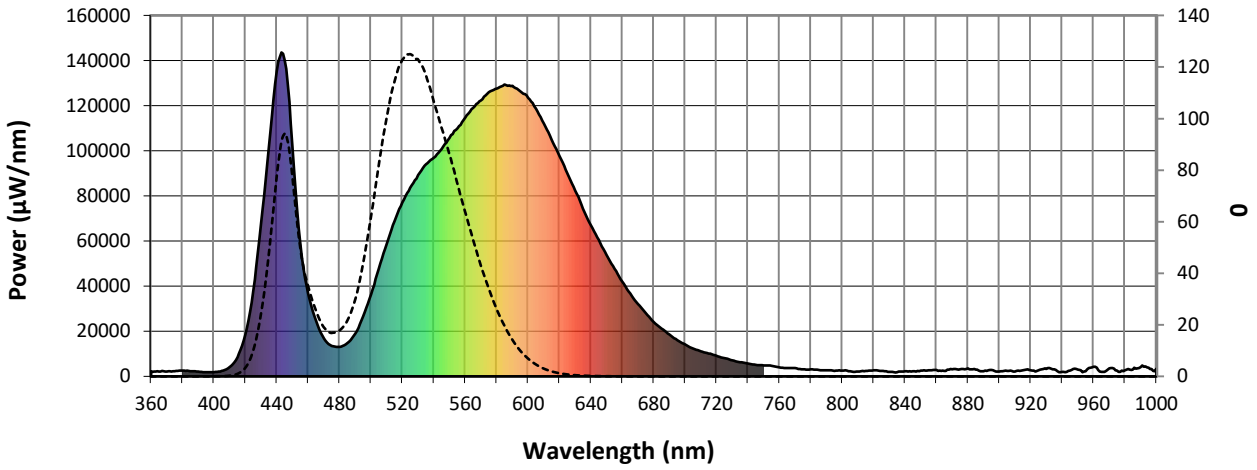
## Melanopic Flux vs. Wavelength




**Melanopic Lumens: 3927.2** **M/P: 0.55**

| λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) | λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) | λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) | λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) | λ (nm) | Power (µW/nm) | Lumens (ϕ/nm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 360 | 2304 | 0.0 | 490 | 19043 | 15.8 | 620 | 97577 | 0.1 | 750 | 4830 | 0.0 | 880 | 3505 | 0.0 |
| 365 | 2150 | 0.0 | 495 | 26606 | 22.0 | 625 | 90158 | 0.0 | 755 | 4664 | 0.0 | 885 | 2991 | 0.0 |
| 370 | 2146 | 0.0 | 500 | 36376 | 29.2 | 630 | 82240 | 0.0 | 760 | 4006 | 0.0 | 890 | 2327 | 0.0 |
| 375 | 2332 | 0.0 | 505 | 47714 | 36.6 | 635 | 74361 | 0.0 | 765 | 3715 | 0.0 | 895 | 2775 | 0.0 |
| 380 | 2527 | 0.0 | 510 | 58741 | 42.2 | 640 | 66994 | 0.0 | 770 | 3696 | 0.0 | 900 | 2141 | 0.0 |
| 385 | 2304 | 0.0 | 515 | 68716 | 44.9 | 645 | 60405 | 0.0 | 775 | 3117 | 0.0 | 905 | 2421 | 0.0 |
| 390 | 2064 | 0.0 | 520 | 77136 | 44.9 | 650 | 53806 | 0.0 | 780 | 3062 | 0.0 | 910 | 2200 | 0.0 |
| 395 | 1856 | 0.0 | 525 | 83567 | 42.4 | 655 | 47610 | 0.0 | 785 | 2907 | 0.0 | 915 | 2716 | 0.0 |
| 400 | 1856 | 0.0 | 530 | 89283 | 38.6 | 660 | 42018 | 0.0 | 790 | 2655 | 0.0 | 920 | 2656 | 0.0 |
| 405 | 2374 | 0.0 | 535 | 94097 | 33.9 | 665 | 36742 | 0.0 | 795 | 2467 | 0.0 | 925 | 2671 | 0.0 |
| 410 | 4084 | 0.2 | 540 | 96845 | 28.3 | 670 | 32105 | 0.0 | 800 | 2609 | 0.0 | 930 | 3292 | 0.0 |
| 415 | 8543 | 0.6 | 545 | 100829 | 23.4 | 675 | 27946 | 0.0 | 805 | 2293 | 0.0 | 935 | 3188 | 0.0 |
| 420 | 18394 | 2.1 | 550 | 105648 | 19.0 | 680 | 24146 | 0.0 | 810 | 2188 | 0.0 | 940 | 1997 | 0.0 |
| 425 | 37987 | 5.9 | 555 | 110017 | 14.8 | 685 | 21191 | 0.0 | 815 | 2386 | 0.0 | 945 | 2623 | 0.0 |
| 430 | 67605 | 14.3 | 560 | 114586 | 11.3 | 690 | 18544 | 0.0 | 820 | 2712 | 0.0 | 950 | 2969 | 0.0 |
| 435 | 102160 | 27.3 | 565 | 118987 | 8.4 | 695 | 16058 | 0.0 | 825 | 2473 | 0.0 | 955 | 2277 | 0.0 |
| 440 | 135103 | 45.1 | 570 | 122326 | 6.0 | 700 | 14133 | 0.0 | 830 | 1969 | 0.0 | 960 | 4267 | 0.0 |
| 445 | 140126 | 55.3 | 575 | 125968 | 4.2 | 705 | 12309 | 0.0 | 835 | 1917 | 0.0 | 965 | 2034 | 0.0 |
| 450 | 102339 | 47.2 | 580 | 127613 | 2.9 | 710 | 11142 | 0.0 | 840 | 2248 | 0.0 | 970 | 3586 | 0.0 |
| 455 | 58751 | 30.8 | 585 | 129466 | 1.9 | 715 | 10143 | 0.0 | 845 | 2266 | 0.0 | 975 | 2505 | 0.0 |
| 460 | 36892 | 21.7 | 590 | 128813 | 1.3 | 720 | 9072 | 0.0 | 850 | 2558 | 0.0 | 980 | 2666 | 0.0 |
| 465 | 24637 | 16.1 | 595 | 126387 | 0.8 | 725 | 8130 | 0.0 | 855 | 2767 | 0.0 | 985 | 2934 | 0.0 |
| 470 | 16738 | 12.0 | 600 | 123477 | 0.5 | 730 | 7149 | 0.0 | 860 | 2826 | 0.0 | 990 | 4120 | 0.0 |
| 475 | 13456 | 10.3 | 605 | 118718 | 0.3 | 735 | 6311 | 0.0 | 865 | 2385 | 0.0 | 995 | 3858 | 0.0 |
| 480 | 13081 | 10.5 | 610 | 112091 | 0.2 | 740 | 5711 | 0.0 | 870 | 3194 | 0.0 | 1000 | 3405 | 0.0 |
| 485 | 14734 | 12.1 | 615 | 105039 | 0.1 | 745 | 5111 | 0.0 | 875 | 3189 | 0.0 | | | |

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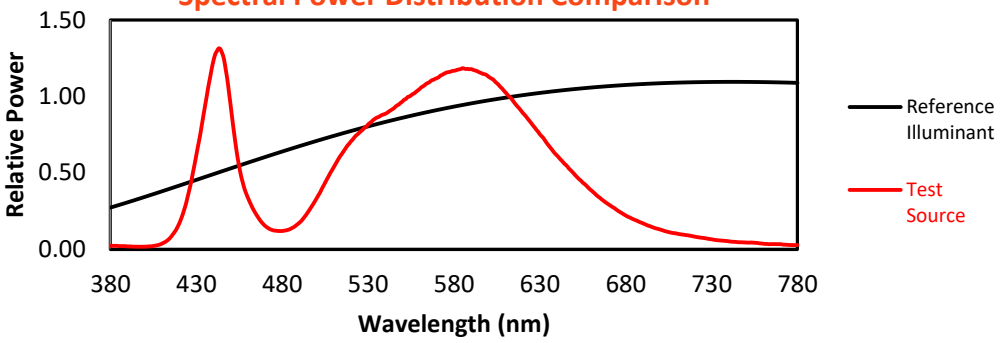
# TM-30-18

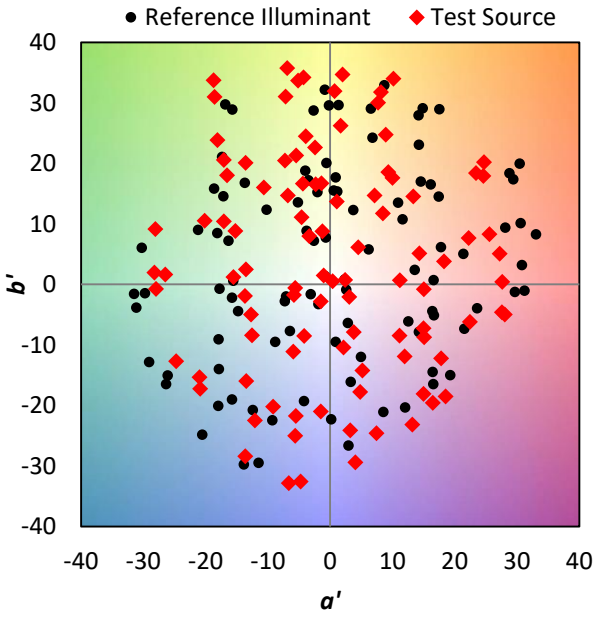
## Summary

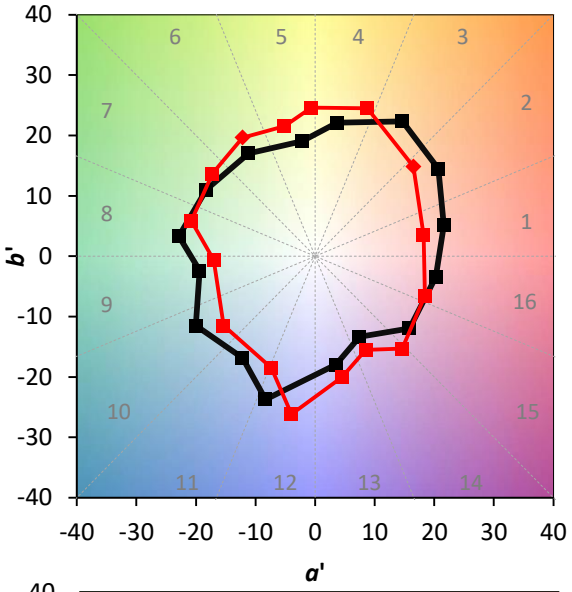
$R_f$ = 71.7
$R_g$ = 96.9
CIE $R_a$ = 71.2
$R_9$ = -29.7

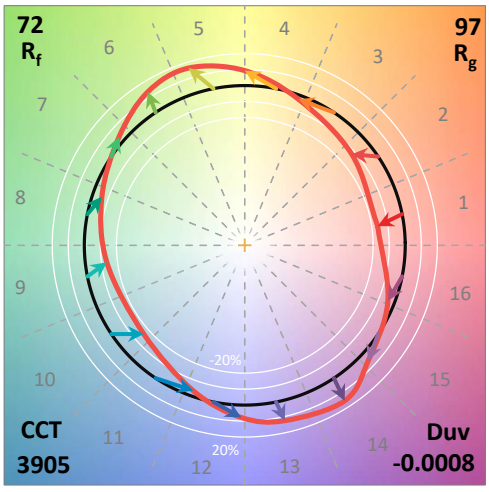
## Spectral Power Distribution Comparison

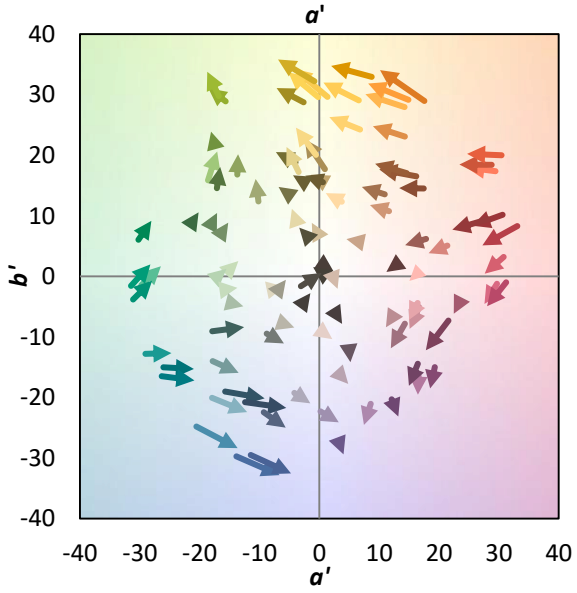



## Color Vector Graphics



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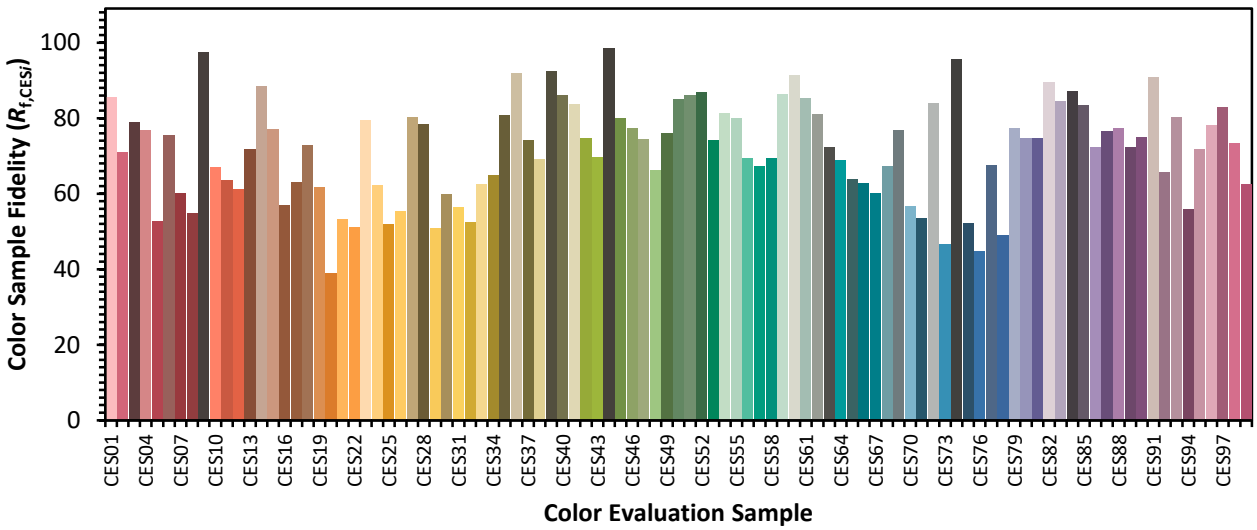
# TM-30-18

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

| | | | |
|---|---|---|---|
| CES01 = 85 | CES26 = 55 | CES51 = 86 | CES76 = 45 |
| CES02 = 61 | CES27 = 80 | CES52 = 87 | CES77 = 68 |
| CES03 = 30 | CES28 = 79 | CES53 = 74 | CES78 = 49 |
| CES04 = 70 | CES29 = 51 | CES54 = 81 | CES79 = 77 |
| CES05 = 47 | CES30 = 60 | CES55 = 80 | CES80 = 75 |
| CES06 = 50 | CES31 = 56 | CES56 = 69 | CES81 = 75 |
| CES07 = 40 | CES32 = 52 | CES57 = 67 | CES82 = 90 |
| CES08 = 39 | CES33 = 62 | CES58 = 69 | CES83 = 85 |
| CES09 = 29 | CES34 = 65 | CES59 = 86 | CES84 = 87 |
| CES10 = 74 | CES35 = 81 | CES60 = 91 | CES85 = 83 |
| CES11 = 57 | CES36 = 92 | CES61 = 85 | CES86 = 72 |
| CES12 = 63 | CES37 = 74 | CES62 = 81 | CES87 = 77 |
| CES13 = 42 | CES38 = 69 | CES63 = 72 | CES88 = 77 |
| CES14 = 74 | CES39 = 92 | CES64 = 69 | CES89 = 72 |
| CES15 = 71 | CES40 = 86 | CES65 = 64 | CES90 = 75 |
| CES16 = 46 | CES41 = 84 | CES66 = 63 | CES91 = 91 |
| CES17 = 49 | CES42 = 75 | CES67 = 60 | CES92 = 66 |
| CES18 = 56 | CES43 = 70 | CES68 = 67 | CES93 = 80 |
| CES19 = 72 | CES44 = 98 | CES69 = 77 | CES94 = 56 |
| CES20 = 65 | CES45 = 80 | CES70 = 57 | CES95 = 72 |
| CES21 = 86 | CES46 = 77 | CES71 = 53 | CES96 = 78 |
| CES22 = 78 | CES47 = 74 | CES72 = 84 | CES97 = 83 |
| CES23 = 92 | CES48 = 66 | CES73 = 47 | CES98 = 73 |
| CES24 = 91 | CES49 = 76 | CES74 = 96 | CES99 = 63 |
| CES25 = 72 | CES50 = 85 | CES75 = 52 | |



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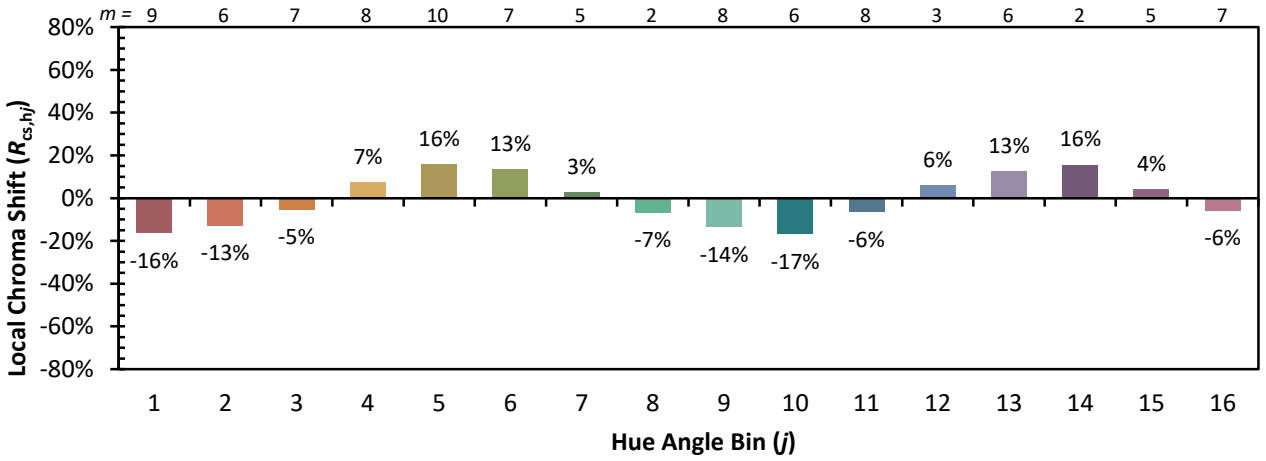
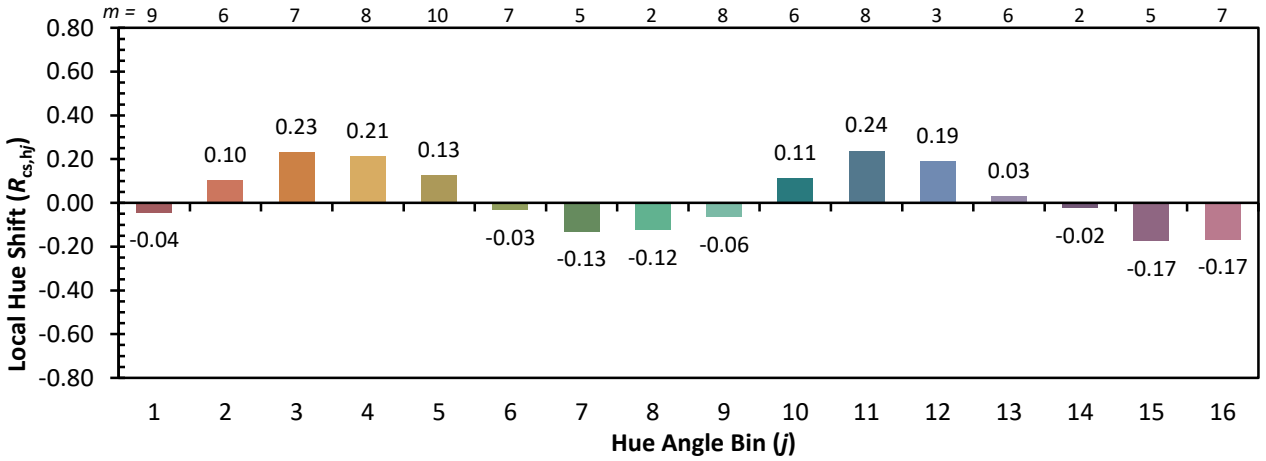
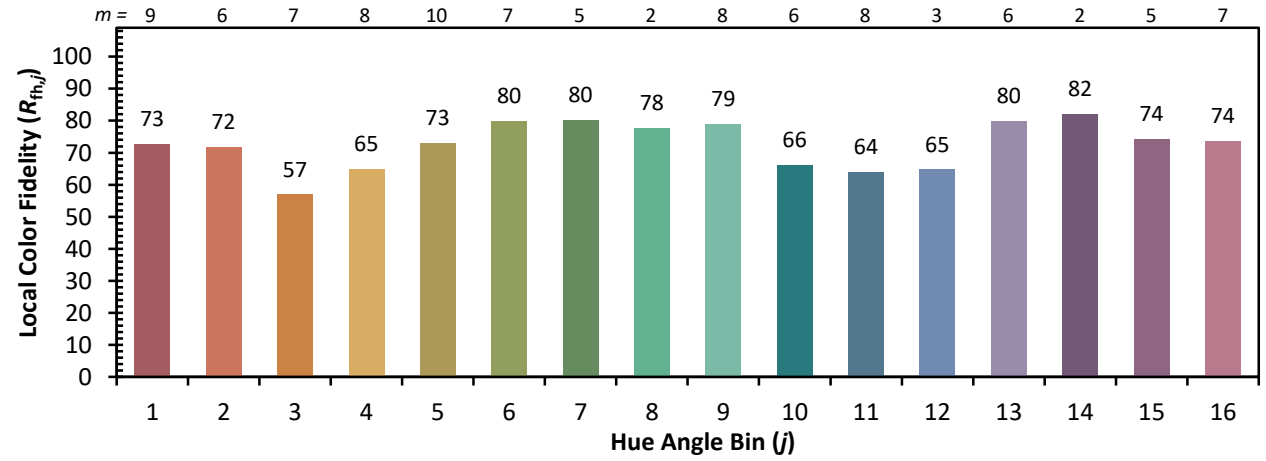
**TM-30-18**

## Color Rendition by Hue-Angle Bin



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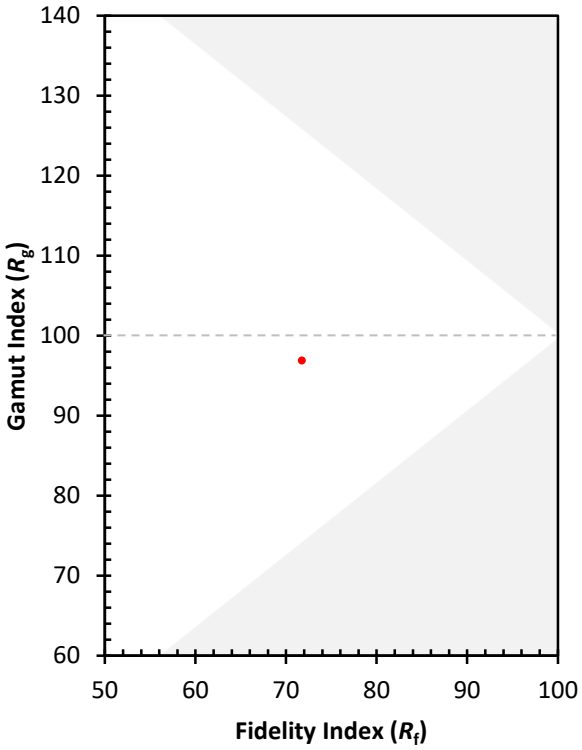
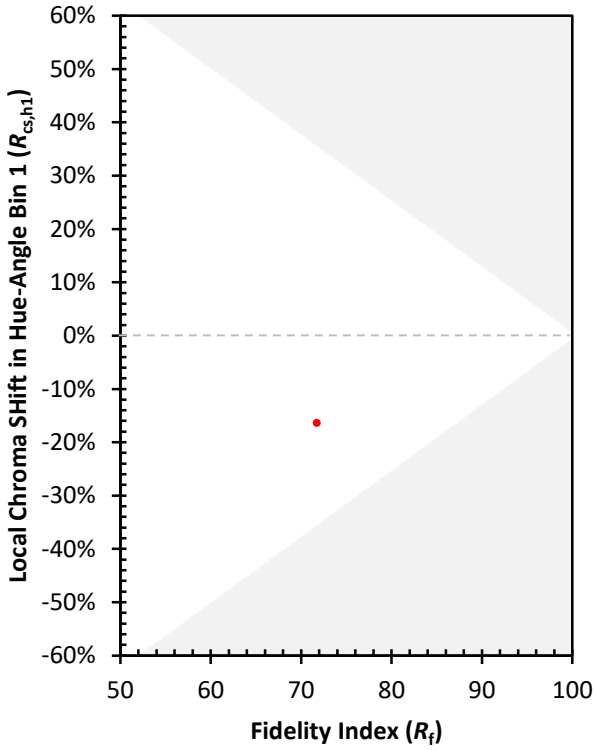
## TM-30-18

### Measure Comparisons




(END OF REPORT)