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: P322046

Luminaire Tested: **GLEON-SA2C-827-U-T2-HSS**

Issue Date: 3/3/2020

Report Generated By E0585644

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: | P322046 |
| | TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-13) |
| Test Lab: | INNOVATION CENTER |
| Issue Date: | 3/3/2020 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS (FORMERLY EATON) |
| Product Line: | McGRAW-EDISON |
| Catalog Number: | GLEON-SA2C-827-U-T2-HSS |
| Description: | GALLEON AREA AND ROADWAY LUMINAIRE |
| | (2) 80 CRI, 2700K, 1050mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE II OPTICS WITH HOUSE SIDE SHIELD |
| Light Source: | - |
| Ballast/Driver: | ELECTRONIC DRIVER |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 7568 lumens |
| Efficiency: | N/A |
| Efficacy: | 67.0 lumens/watt |
| Luminous Opening: | Rectangular (W 0.5' x L: 1' x H: 0') |
| IES Classification: | Type II - Medium |
| BUG Rating: | B1 - U0 - G2 |

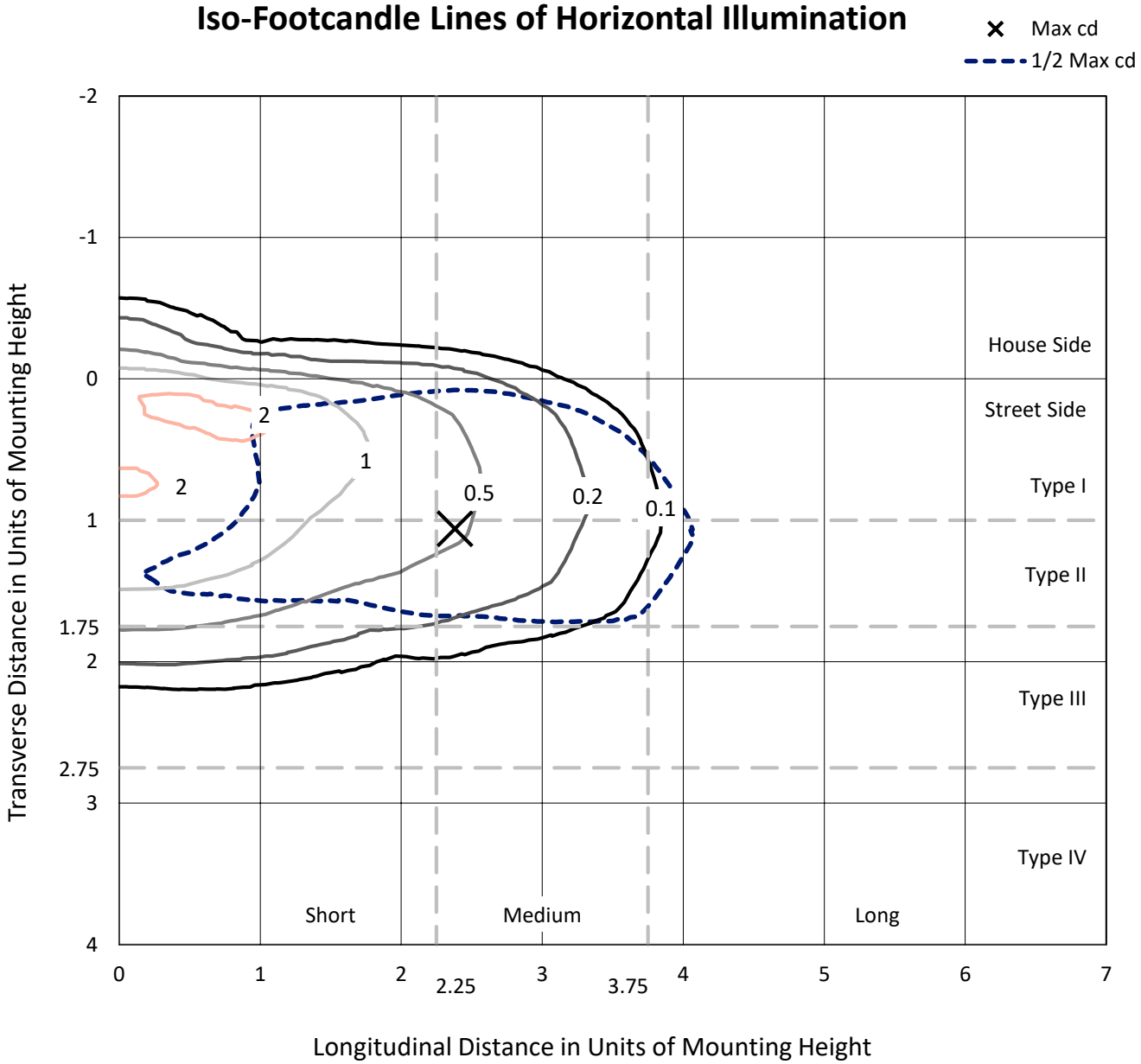
| | |
|---|---|
| Input Watts (W): | 113 |
| Input Voltage (V): | NR |
| Input Current (Ain): | NR |
| Voltage Rise (V): | NR |
| Power Factor: | NR |
| Total Harmonic Distortion (THDi): | NR |
| Frequency (hertz): | 60 |
| Stabilization Time: | NR |
| Operation Time: | NR |
| Ambient Temperature (°C): | NR |
| Test Distance: | 24 FT |

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

Scaled Data Report

REPORT NUMBER: P322046
CATALOG NUMBER: GLEON-SA2C-827-U-T2-HSS

## Iso-Footcandle Lines of Horizontal Illumination



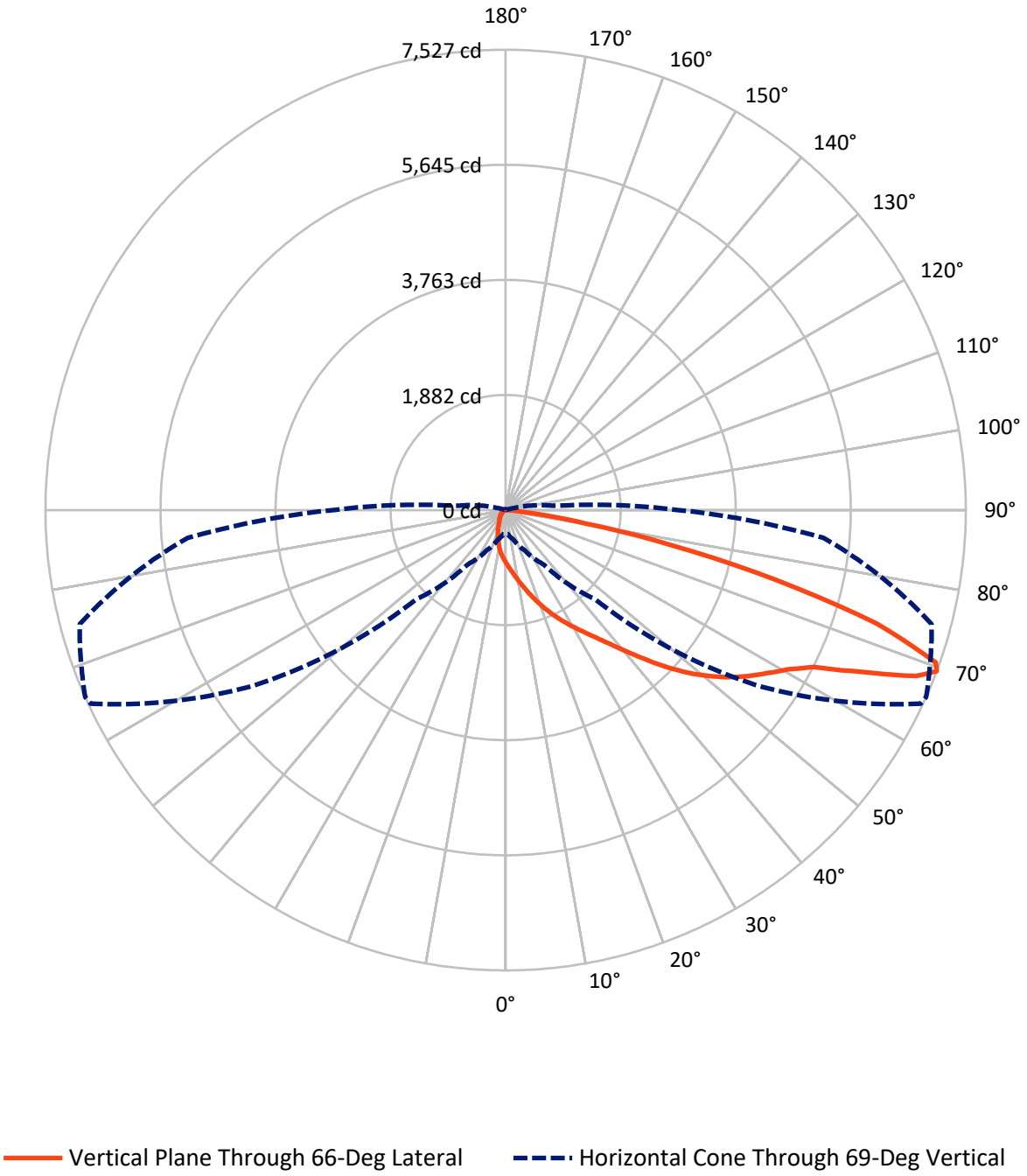

Based on 25 foot mounting height. Maximum calculated value = 2.3 fc
Type II - Medium - N/A

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

Scaled Data Report

REPORT NUMBER: P322046
CATALOG NUMBER: GLEON-SA2C-827-U-T2-HSS

## Luminous Intensity Polar Plot



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

Scaled Data Report

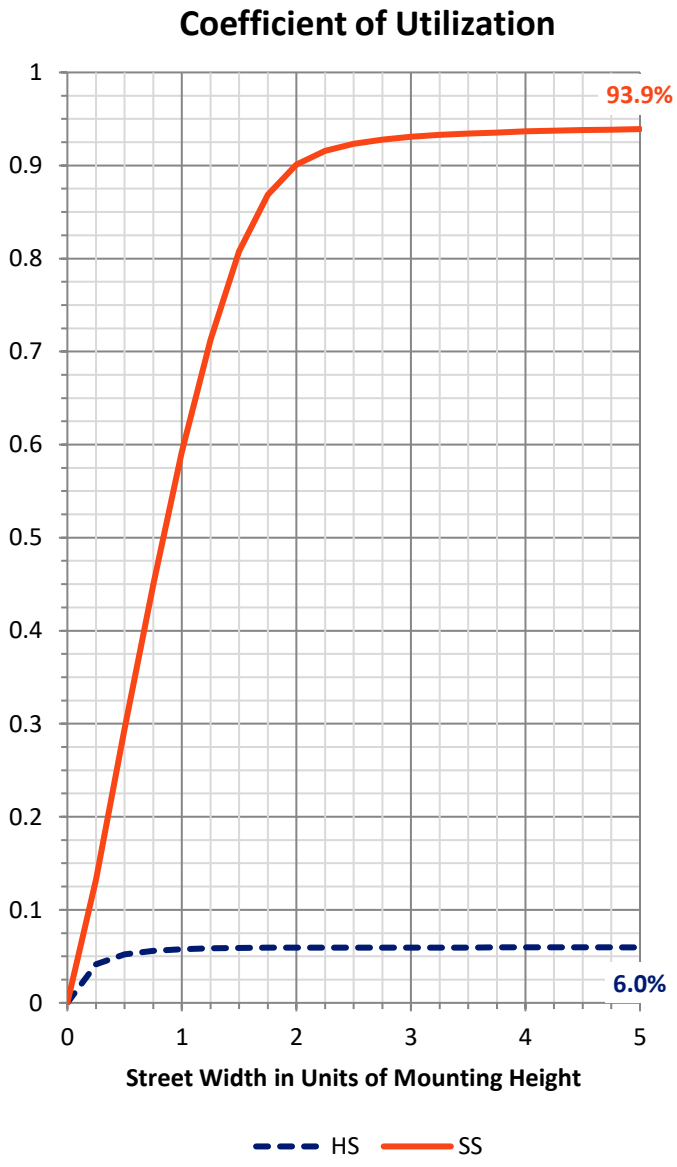
REPORT NUMBER: P322046
CATALOG NUMBER: GLEON-SA2C-827-U-T2-HSS

**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 454.0 | 0.0 | 454.0 |
| | % Fixture | 6.0 | 0.0 | 6.0 |
| **Street Side** | Lumens | 7114.0 | 0.0 | 7114.0 |
| | % Fixture | 94.0 | 0.0 | 94.0 |
| **Total** | Lumens | 7568.0 | 0.0 | 7568.0 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 83.3 | 1.1 |
| 10°-20° | 247.8 | 3.3 |
| 20°-30° | 431.5 | 5.7 |
| 30°-40° | 757.0 | 10.0 |
| 40°-50° | 1267.1 | 16.7 |
| 50°-60° | 1862.5 | 24.6 |
| 60°-70° | 1912.4 | 25.3 |
| 70°-80° | 944.1 | 12.5 |
| 80°-90° | 62.4 | 0.8 |
| 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° | 7568.0 | 100.0 |
| 0°-180° | 7568.0 | 100.0 |



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

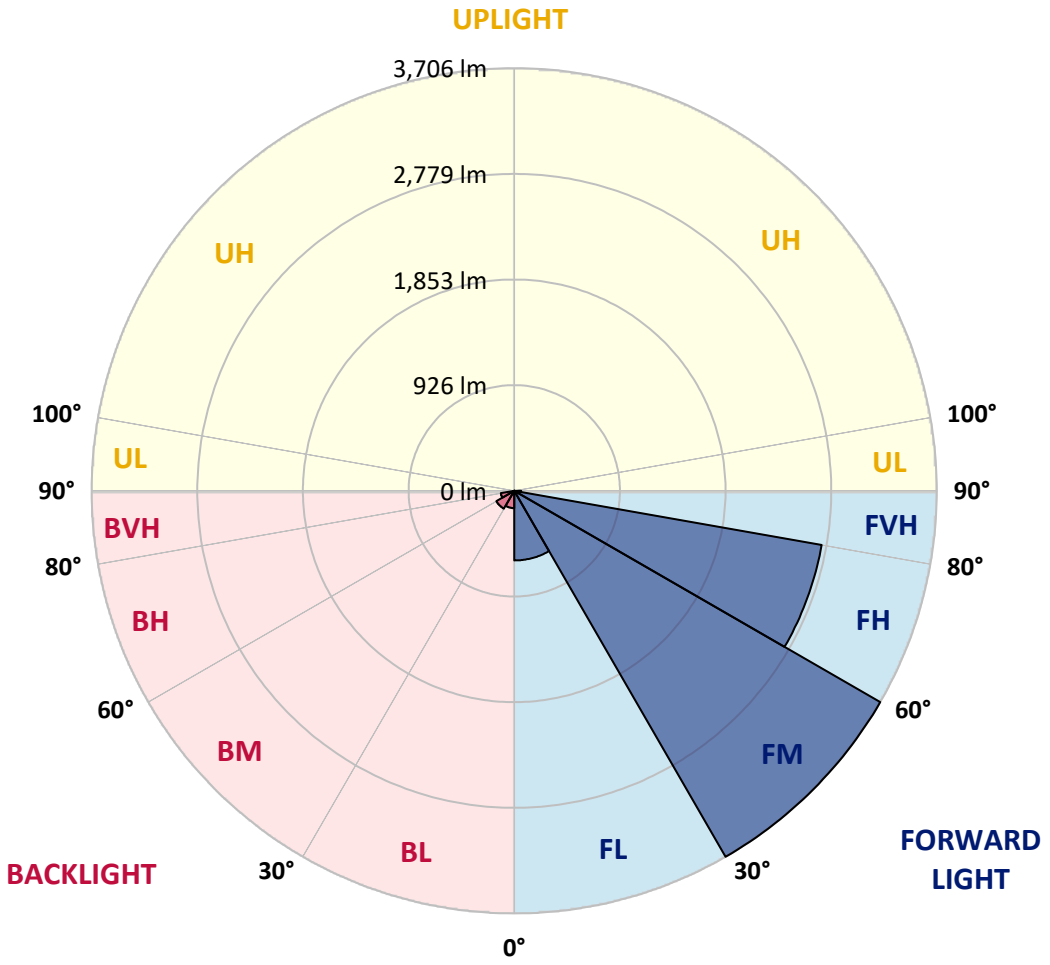
Scaled Data Report

REPORT NUMBER: P322046
CATALOG NUMBER: GLEON-SA2C-827-U-T2-HSS

## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 610.7 | 8.1 | | | |
| FM | (30°-60°) | 3705.7 | 49.0 | | | |
| FH | (60°-80°) | 2736.8 | 36.2 | | | G2/5000 |
| FVH | (80°-90°) | 60.9 | 0.8 | | | G1/100 |
| BL | (0°-30°) | 151.8 | 2.0 | B1/500 | | |
| BM | (30°-60°) | 181.0 | 2.4 | B0/220 | | |
| BH | (60°-80°) | 119.6 | 1.6 | B1/500 | | G1/500 |
| BVH | (80°-90°) | 1.5 | 0.0 | | | G0/10 |
| UL | (90°-100°) | 0.0 | 0.0 | | U0/0 | |
| UH | (100°-180°) | 0.0 | 0.0 | | U0/0 | |

**BUG Rating: B1-U0-G2**
Type II Medium



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

Scaled Data Report

REPORT NUMBER: P322046
CATALOG NUMBER: GLEON-SA2C-827-U-T2-HSS

**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 65° | 66° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 861.3 | 861.3 | 861.3 | 861.3 | 861.3 | 861.3 | 861.3 | 861.3 | *861.3* | 861.3 | 861.3 |
| 2.5° | 1013.7 | 1009.4 | 1007.6 | 999.7 | 986.0 | 975.6 | 955.4 | 932.1 | *927.8* | 905.1 | 877.4 |
| 5° | 1145.2 | 1141.6 | 1139.1 | 1128.0 | 1114.0 | 1087.7 | 1051.1 | 1007.6 | *999.3* | 956.2 | 900.8 |
| 7.5° | 1236.9 | 1243.4 | 1243.4 | 1236.2 | 1218.6 | 1198.8 | 1153.9 | 1094.6 | *1084.1* | 1018.0 | 932.1 |
| 10° | 1290.5 | 1298.4 | 1304.5 | 1310.6 | 1308.1 | 1300.2 | 1257.7 | 1190.9 | *1178.3* | 1090.6 | 968.4 |
| 12.5° | 1295.5 | 1303.4 | 1320.7 | 1346.2 | 1371.0 | 1388.9 | 1362.3 | 1297.6 | *1283.3* | 1174.7 | 1011.5 |
| 15° | 1267.5 | 1275.7 | 1302.3 | 1351.9 | 1412.0 | 1464.4 | 1473.1 | 1415.9 | *1401.2* | 1275.0 | 1065.4 |
| 17.5° | 1218.6 | 1224.0 | 1262.1 | 1330.7 | 1424.9 | 1521.2 | 1573.4 | 1542.8 | *1529.1* | 1389.7 | 1125.5 |
| 20° | 1182.3 | 1186.2 | 1219.6 | 1293.3 | 1417.0 | 1556.8 | 1668.2 | 1677.6 | *1663.2* | 1512.6 | 1190.5 |
| 22.5° | 1244.4 | 1251.6 | 1252.7 | 1287.6 | 1395.4 | 1574.4 | 1751.6 | 1810.2 | *1799.4* | 1643.1 | 1254.5 |
| 25° | 1414.5 | 1422.7 | 1395.4 | 1373.9 | 1413.8 | 1582.3 | 1823.2 | 1946.1 | *1937.5* | 1783.6 | 1318.9 |
| 27.5° | 1639.1 | 1647.8 | 1612.5 | 1548.2 | 1509.7 | 1612.2 | 1886.8 | 2084.1 | *2083.8* | 1932.4 | 1388.2 |
| 30° | 1859.8 | 1868.5 | 1832.5 | 1768.2 | 1679.7 | 1696.6 | 1941.8 | 2228.6 | *2230.8* | 2085.9 | 1461.9 |
| 32.5° | 2091.3 | 2102.1 | 2065.1 | 1982.4 | 1890.0 | 1842.6 | 2019.1 | 2373.9 | *2386.1* | 2263.9 | 1545.0 |
| 35° | 2354.5 | 2355.9 | 2303.8 | 2217.1 | 2110.7 | 2037.8 | 2143.1 | 2536.7 | *2565.8* | 2484.2 | 1650.3 |
| 37.5° | 2612.5 | 2623.0 | 2580.2 | 2443.6 | 2345.8 | 2263.2 | 2327.5 | 2740.2 | *2781.5* | 2753.5 | 1787.9 |
| 40° | 2803.8 | 2825.7 | 2819.6 | 2672.2 | 2579.5 | 2520.5 | 2556.5 | 2982.1 | *3034.5* | 3066.9 | 1961.6 |
| 42.5° | 2923.8 | 2940.4 | 2968.4 | 2879.6 | 2795.5 | 2805.2 | 2826.8 | 3263.9 | *3328.6* | 3424.2 | 2161.1 |
| 45° | 3061.5 | 3069.4 | 3092.8 | 3053.6 | 2996.8 | 3094.6 | 3113.6 | 3581.3 | *3649.2* | 3808.5 | 2382.5 |
| 47.5° | 3229.7 | 3248.4 | 3254.9 | 3219.0 | 3193.1 | 3350.5 | 3390.1 | 3869.9 | *3965.2* | 4220.0 | 2616.9 |
| 50° | 3444.0 | 3449.0 | 3460.1 | 3436.8 | 3410.9 | 3570.5 | 3638.1 | 4173.0 | *4259.6* | 4633.1 | 2848.0 |
| 52.5° | 3653.5 | 3671.5 | 3710.3 | 3695.6 | 3685.2 | 3757.8 | 3859.1 | 4446.1 | *4542.8* | 4977.4 | 3078.8 |
| 55° | 3713.9 | 3729.4 | 3863.5 | 3955.1 | 4040.0 | 3988.6 | 4070.5 | 4690.9 | *4795.5* | 5285.1 | 3300.9 |
| 57.5° | 3472.7 | 3504.0 | 3736.2 | 3974.9 | 4326.8 | 4347.3 | 4361.0 | 4942.2 | *5036.0* | 5520.9 | 3532.0 |
| 60° | 2863.1 | 2869.2 | 3250.2 | 3659.6 | 4279.4 | 4660.4 | 4785.1 | 5212.1 | *5290.9* | 5740.6 | 3808.8 |
| 62.5° | 1821.0 | 1883.2 | 2301.3 | 2879.3 | 3777.5 | 4615.1 | 5298.1 | 5620.5 | *5649.3* | 6004.0 | 4205.7 |
| 65° | 867.4 | 907.6 | 1208.9 | 1779.0 | 2736.2 | 4035.3 | 5652.1 | 6359.2 | *6372.1* | 6526.3 | 4735.9 |
| 67.5° | 480.2 | 499.6 | 643.1 | 957.6 | 1599.6 | 2853.7 | 5509.1 | 7234.1 | *7246.3* | 7059.8 | 5201.0 |
| 69° | *375.6* | *392.2* | *505.0* | *721.8* | *1084.5* | *2051.1* | *4985.3* | *7490.4* | *7526.7* | *7212.5* | *5217.5* |
| 70° | 318.8 | 335.0 | 434.9 | 609.6 | 872.0 | 1584.9 | 4437.5 | 7426.8 | *7465.2* | 7198.2 | 5094.2 |
| 72.5° | 195.2 | 204.5 | 289.7 | 429.2 | 584.5 | 797.3 | 2736.6 | 6280.8 | *6345.9* | 6602.9 | 4378.2 |
| 75° | 131.6 | 136.6 | 181.2 | 296.2 | 418.1 | 410.5 | 1421.7 | 4427.1 | *4568.0* | 5136.3 | 3233.7 |
| 77.5° | 94.2 | 98.9 | 121.5 | 191.6 | 293.0 | 271.0 | 643.8 | 2751.3 | *2781.5* | 3080.6 | 1763.5 |
| 80° | 53.6 | 57.9 | 85.9 | 113.9 | 198.8 | 180.8 | 255.9 | 1314.2 | *1329.3* | 1321.0 | 588.8 |
| 82.5° | 28.0 | 31.6 | 47.1 | 75.1 | 127.6 | 118.3 | 106.4 | 440.0 | *442.1* | 367.7 | 129.0 |
| 85° | 5.4 | 6.5 | 23.4 | 51.4 | 65.8 | 51.4 | 43.5 | 103.2 | *105.3* | 93.1 | 32.0 |
| 87.5° | 0.0 | 0.4 | 9.3 | 11.5 | 12.9 | 13.3 | 14.0 | 20.1 | *21.6* | 29.1 | 8.6 |
| 90° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | *0.0* | 0.0 | 0.0 |

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

Scaled Data Report

REPORT NUMBER: P322046
CATALOG NUMBER: GLEON-SA2C-827-U-T2-HSS

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 861.3 | 861.3 | 861.3 | 861.3 | 861.3 | 861.3 | 861.3 | 861.3 | 861.3 | 861.3 | 861.3 |
| 2.5° | 865.2 | 852.3 | 827.5 | 798.7 | 776.4 | 754.5 | 737.2 | 719.3 | 712.8 | 709.6 | 709.2 |
| 5° | 873.8 | 846.5 | 794.0 | 740.1 | 695.9 | 654.2 | 624.4 | 596.0 | 582.7 | 576.6 | 574.1 |
| 7.5° | 888.2 | 844.4 | 759.9 | 677.6 | 614.0 | 561.8 | 520.5 | 489.6 | 474.1 | 467.7 | 465.1 |
| 10° | 905.1 | 841.5 | 720.0 | 611.4 | 530.2 | 476.3 | 435.3 | 404.8 | 387.9 | 380.7 | 377.1 |
| 12.5° | 924.9 | 836.5 | 674.0 | 544.6 | 458.7 | 404.8 | 355.1 | 317.4 | 298.0 | 289.7 | 285.8 |
| 15° | 949.3 | 831.4 | 625.8 | 481.7 | 395.8 | 330.0 | 275.7 | 250.2 | 246.2 | 244.8 | 245.2 |
| 17.5° | 973.4 | 823.5 | 573.3 | 419.5 | 329.6 | 257.7 | 230.1 | 228.6 | 229.3 | 229.3 | 229.3 |
| 20° | 995.0 | 805.5 | 516.2 | 366.3 | 266.7 | 217.5 | 211.7 | 209.2 | 207.4 | 206.0 | 204.2 |
| 22.5° | 1011.9 | 781.5 | 461.2 | 313.4 | 217.8 | 199.1 | 190.2 | 182.2 | 175.8 | 171.5 | 169.3 |
| 25° | 1023.4 | 749.5 | 410.9 | 262.8 | 195.9 | 181.2 | 165.0 | 151.7 | 141.6 | 135.5 | 133.0 |
| 27.5° | 1032.0 | 715.0 | 365.9 | 220.0 | 180.8 | 160.3 | 139.1 | 123.3 | 112.9 | 107.5 | 105.3 |
| 30° | 1038.1 | 675.8 | 326.4 | 193.4 | 163.9 | 138.4 | 115.7 | 100.3 | 92.7 | 89.9 | 88.4 |
| 32.5° | 1043.9 | 632.3 | 289.0 | 180.8 | 148.1 | 118.3 | 97.1 | 85.2 | 80.5 | 76.9 | 75.8 |
| 35° | 1058.2 | 592.0 | 253.4 | 167.5 | 131.9 | 101.0 | 83.4 | 74.8 | 70.1 | 67.9 | 67.2 |
| 37.5° | 1092.4 | 562.2 | 219.3 | 153.8 | 115.7 | 87.3 | 73.0 | 66.9 | 62.5 | 60.4 | 59.7 |
| 40° | 1147.4 | 547.1 | 190.5 | 139.1 | 99.9 | 76.9 | 66.1 | 60.4 | 55.7 | 52.5 | 51.8 |
| 42.5° | 1228.3 | 549.3 | 170.4 | 124.4 | 87.3 | 68.7 | 59.7 | 52.8 | 47.8 | 44.9 | 44.2 |
| 45° | 1326.4 | 565.1 | 156.4 | 110.0 | 76.9 | 62.2 | 52.5 | 45.3 | 40.6 | 38.1 | 37.4 |
| 47.5° | 1432.8 | 590.6 | 144.9 | 97.1 | 68.7 | 56.1 | 45.3 | 37.7 | 33.8 | 31.6 | 31.3 |
| 50° | 1545.0 | 615.4 | 133.0 | 84.5 | 61.5 | 50.0 | 38.1 | 31.3 | 28.0 | 26.2 | 25.5 |
| 52.5° | 1658.5 | 644.1 | 122.2 | 73.0 | 55.4 | 42.8 | 31.6 | 25.5 | 23.0 | 21.6 | 20.8 |
| 55° | 1780.8 | 665.7 | 111.8 | 64.0 | 49.2 | 36.3 | 26.2 | 21.2 | 19.1 | 17.3 | 16.9 |
| 57.5° | 1924.5 | 699.1 | 101.0 | 55.4 | 42.1 | 30.2 | 21.6 | 16.9 | 15.1 | 13.3 | 12.9 |
| 60° | 2118.6 | 738.3 | 89.5 | 48.9 | 34.5 | 24.8 | 17.6 | 13.7 | 11.5 | 10.1 | 9.7 |
| 62.5° | 2374.6 | 781.8 | 75.1 | 42.8 | 28.0 | 20.1 | 14.0 | 10.8 | 8.3 | 6.5 | 6.5 |
| 65° | 2699.2 | 852.6 | 61.5 | 35.9 | 23.0 | 16.5 | 10.8 | 7.9 | 4.7 | 2.9 | 2.9 |
| 67.5° | 2888.6 | 864.9 | 49.6 | 29.5 | 18.7 | 14.0 | 9.0 | 5.4 | 1.4 | 0.4 | 0.0 |
| 69° | *2827.9* | *794.0* | *42.1* | *25.2* | *16.2* | *13.3* | *8.3* | *4.0* | *0.7* | *0.0* | *0.0* |
| 70° | 2713.6 | 726.1 | 37.0 | 22.3 | 14.7 | 12.6 | 7.9 | 2.9 | 0.7 | 0.0 | 0.0 |
| 72.5° | 2242.3 | 516.9 | 28.0 | 16.5 | 10.8 | 11.1 | 7.2 | 1.8 | 0.7 | 0.0 | 0.0 |
| 75° | 1633.4 | 314.2 | 20.1 | 11.5 | 6.8 | 8.3 | 5.0 | 0.7 | 0.4 | 0.0 | 0.0 |
| 77.5° | 908.7 | 148.1 | 12.6 | 6.5 | 4.3 | 5.0 | 2.5 | 0.0 | 0.0 | 0.0 | 0.0 |
| 80° | 295.1 | 40.3 | 5.8 | 3.6 | 2.5 | 2.9 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| 82.5° | 54.6 | 11.5 | 3.2 | 1.8 | 0.7 | 0.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 85° | 11.9 | 4.7 | 1.8 | 0.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 87.5° | 4.0 | 1.4 | 0.4 | 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 |

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

# LM-79-2019: Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Report Prepared for

Cooper Lighting Solutions

Invue

Report Number: SP1-2407-157-9

Test Date: 10/03/2024

Luminaire Tested: EMM2-HTN-SA1A-827-U-5WQ

Data applicable to all product families utilizing light square engine

Report Generated By FNC07603 / LDUCLS01DT446
Version: v7.04

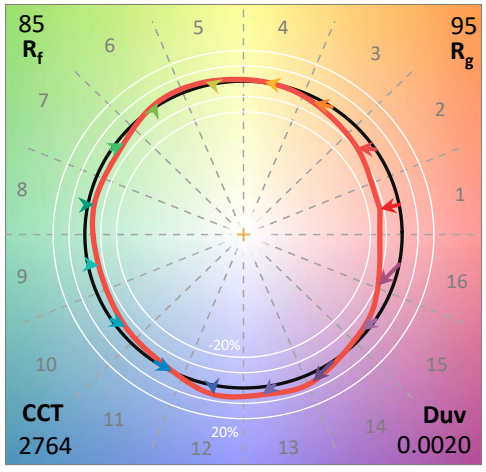
## Test Information

| | |
|---|---|
| Test Method: | LM-79-2019 |
| Report Number: | SP1-2407-157-9 |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Photometer: | SP1 - 76IN SPHERE |
| Measurement Geometry: | 4π |
| Issue Date: | 10/03/2024 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS |
| Product Line: | Invue |
| Catalog Number: | **EMM2-HTN-SA1A-827-U-5WQ** |
| Description: | Epic Modern Light Square 40W 5WQ Optic |

## Spectral Parameters

| | |
|---|---|
| CCT (K): | 2764 |
| CIE u': | 0.2591 |
| CIE v': | 0.5290 |
| Duv: | 0.0020 |
| CIE x: | 0.4581 |
| CIE y: | 0.4156 |
| CIE z: | 0.1263 |
| Peak Wavelength (nm): | 603 |
| Dominant Wavelength (nm): | 583 |
| Purity: | 62.2537 |
| Rf: | 84.7 |
| Rg: | 94.6 |

| | |
|---|---|
| CRI (Ra): | 80.9 |
| R1: | 78.8 |
| R2: | 89.9 |
| R3: | 96.2 |
| R4: | 79.1 |
| R5: | 79.1 |
| R6: | 88.8 |
| R7: | 81.3 |
| R8: | 54.3 |
| R9: | -1.5 |
| R10: | 77.9 |
| R11: | 78.9 |
| R12: | 71.6 |
| R13: | 81.2 |
| R14: | 98.5 |
| R15: | 69.9 |




## Test Conditions

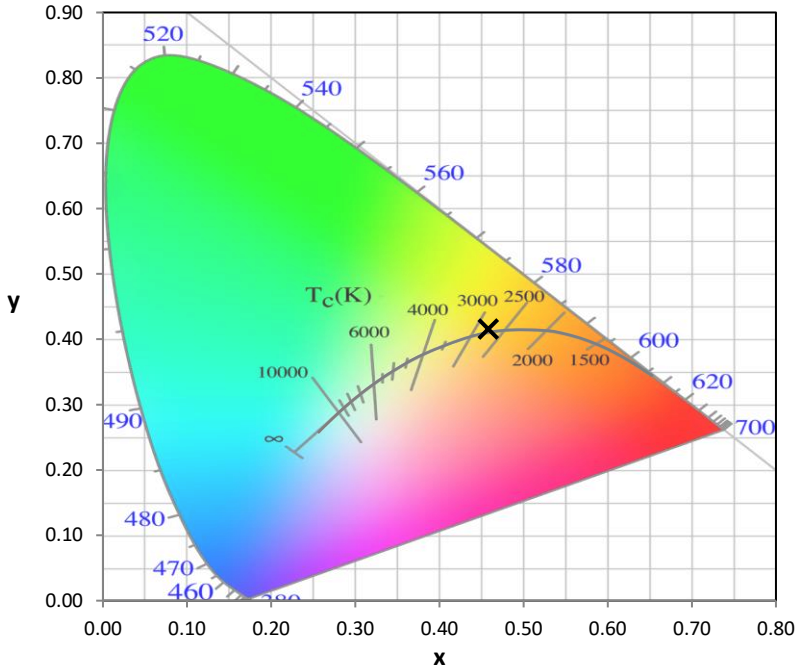
| | |
|---|---|
| Stabilization Time: | 81M |
| Operation Time: | 2H 21M |
| Sphere Temperature (°C): | 25.2 |

REPORT NUMBER: SP1-2407-157-9

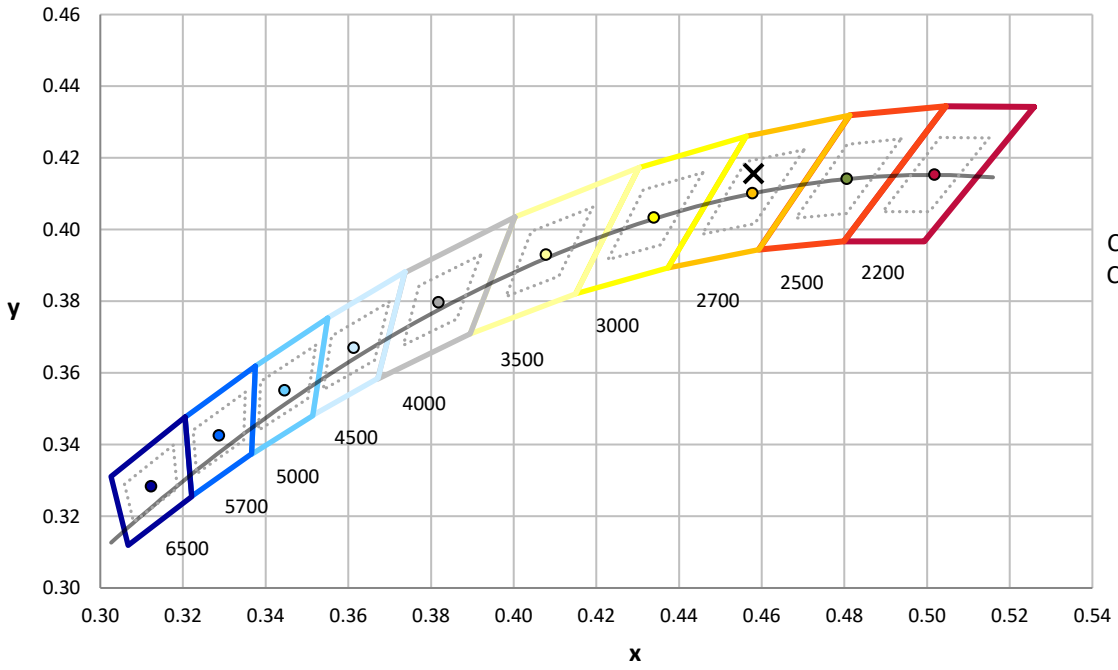
| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 6/18/2024 | 12/18/2024 |
| Power Meter | INXT2011004 | 2/8/2024 | 2/8/2025 |
| AC Power Source | IN0063 | 10/24/2023 | 10/24/2024 |
| DC Power Source | IN0208 | 10/24/2023 | 10/24/2024 |
| Sphere Thermometer | IN0085 | 10/24/2023 | 10/24/2024 |
| Room Thermometer | IN0046 | 10/24/2023 | 10/24/2024 |

REPORT NUMBER: SP1-2407-157-9

## CIE 1931 Chromaticity Diagram




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

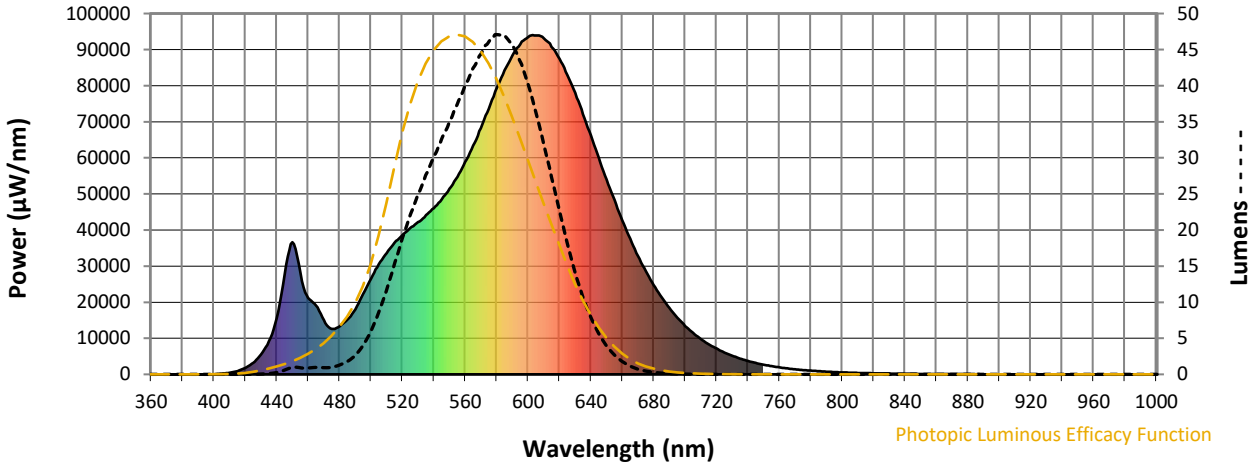



CCT = 2764K
CIE x = 0.4581
CIE y = 0.4156
Duv = 0.0020

Point lies inside the ANSI 2700K 4-step quadrangle

REPORT NUMBER: SP1-2407-157-9

## Photopic Flux vs. Wavelength

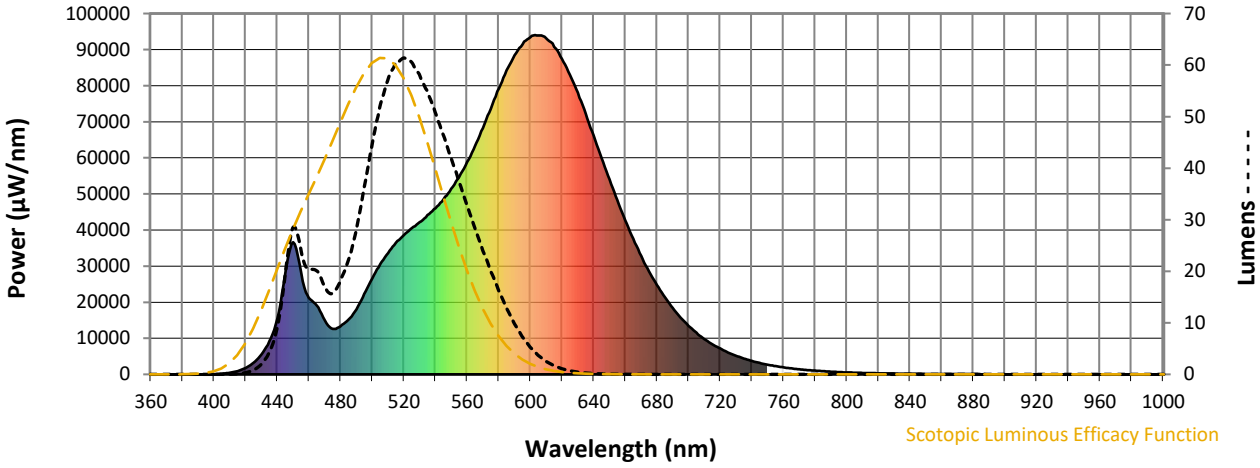



**Photopic Lumens: 4337.9**

| 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 | 0 | 0.0 | 490 | 18018 | 2.6 | 620 | 87426 | 22.8 | 750 | 2680 | 0.0 | 880 | 58 | 0.0 |
| 365 | 0 | 0.0 | 495 | 22295 | 3.9 | 625 | 83013 | 18.2 | 755 | 2287 | 0.0 | 885 | 46 | 0.0 |
| 370 | 0 | 0.0 | 500 | 26478 | 5.8 | 630 | 78077 | 14.1 | 760 | 1944 | 0.0 | 890 | 45 | 0.0 |
| 375 | 0 | 0.0 | 505 | 30524 | 8.5 | 635 | 72080 | 10.7 | 765 | 1653 | 0.0 | 895 | 41 | 0.0 |
| 380 | 0 | 0.0 | 510 | 33611 | 11.5 | 640 | 66249 | 7.9 | 770 | 1413 | 0.0 | 900 | 38 | 0.0 |
| 385 | 0 | 0.0 | 515 | 36490 | 15.2 | 645 | 59973 | 5.7 | 775 | 1198 | 0.0 | 905 | 33 | 0.0 |
| 390 | 0 | 0.0 | 520 | 38610 | 18.7 | 650 | 53972 | 3.9 | 780 | 1025 | 0.0 | 910 | 30 | 0.0 |
| 395 | 0 | 0.0 | 525 | 40511 | 21.9 | 655 | 48369 | 2.7 | 785 | 874 | 0.0 | 915 | 23 | 0.0 |
| 400 | 48 | 0.0 | 530 | 42223 | 24.9 | 660 | 42641 | 1.8 | 790 | 747 | 0.0 | 920 | 24 | 0.0 |
| 405 | 201 | 0.0 | 535 | 44137 | 27.6 | 665 | 37602 | 1.1 | 795 | 639 | 0.0 | 925 | 22 | 0.0 |
| 410 | 457 | 0.0 | 540 | 46032 | 30.0 | 670 | 32798 | 0.7 | 800 | 547 | 0.0 | 930 | 22 | 0.0 |
| 415 | 925 | 0.0 | 545 | 48553 | 32.5 | 675 | 28558 | 0.5 | 805 | 473 | 0.0 | 935 | 17 | 0.0 |
| 420 | 1816 | 0.0 | 550 | 51408 | 34.9 | 680 | 24782 | 0.3 | 810 | 401 | 0.0 | 940 | 13 | 0.0 |
| 425 | 3217 | 0.0 | 555 | 54711 | 37.4 | 685 | 21386 | 0.2 | 815 | 351 | 0.0 | 945 | 6 | 0.0 |
| 430 | 5520 | 0.0 | 560 | 58847 | 40.0 | 690 | 18413 | 0.1 | 820 | 307 | 0.0 | 950 | 10 | 0.0 |
| 435 | 9225 | 0.1 | 565 | 63386 | 42.4 | 695 | 15721 | 0.1 | 825 | 261 | 0.0 | 955 | 11 | 0.0 |
| 440 | 15522 | 0.2 | 570 | 68196 | 44.3 | 700 | 13432 | 0.0 | 830 | 228 | 0.0 | 960 | 8 | 0.0 |
| 445 | 27642 | 0.6 | 575 | 73613 | 46.0 | 705 | 11513 | 0.0 | 835 | 193 | 0.0 | 965 | 12 | 0.0 |
| 450 | 36602 | 0.9 | 580 | 79207 | 47.1 | 710 | 9780 | 0.0 | 840 | 174 | 0.0 | 970 | 3 | 0.0 |
| 455 | 28292 | 0.9 | 585 | 84248 | 47.0 | 715 | 8356 | 0.0 | 845 | 151 | 0.0 | 975 | 8 | 0.0 |
| 460 | 21166 | 0.9 | 590 | 88397 | 45.7 | 720 | 7161 | 0.0 | 850 | 123 | 0.0 | 980 | 2 | 0.0 |
| 465 | 19092 | 1.0 | 595 | 91428 | 43.4 | 725 | 6067 | 0.0 | 855 | 106 | 0.0 | 985 | 13 | 0.0 |
| 470 | 14951 | 0.9 | 600 | 93452 | 40.3 | 730 | 5164 | 0.0 | 860 | 95 | 0.0 | 990 | 16 | 0.0 |
| 475 | 12606 | 1.0 | 605 | 93959 | 36.4 | 735 | 4393 | 0.0 | 865 | 82 | 0.0 | 995 | 20 | 0.0 |
| 480 | 13323 | 1.3 | 610 | 93079 | 32.0 | 740 | 3694 | 0.0 | 870 | 77 | 0.0 | 1000 | 0 | 0.0 |
| 485 | 15164 | 1.8 | 615 | 90707 | 27.3 | 745 | 3157 | 0.0 | 875 | 65 | 0.0 | | | |

REPORT NUMBER: SP1-2407-157-9

## Scotopic Flux vs. Wavelength

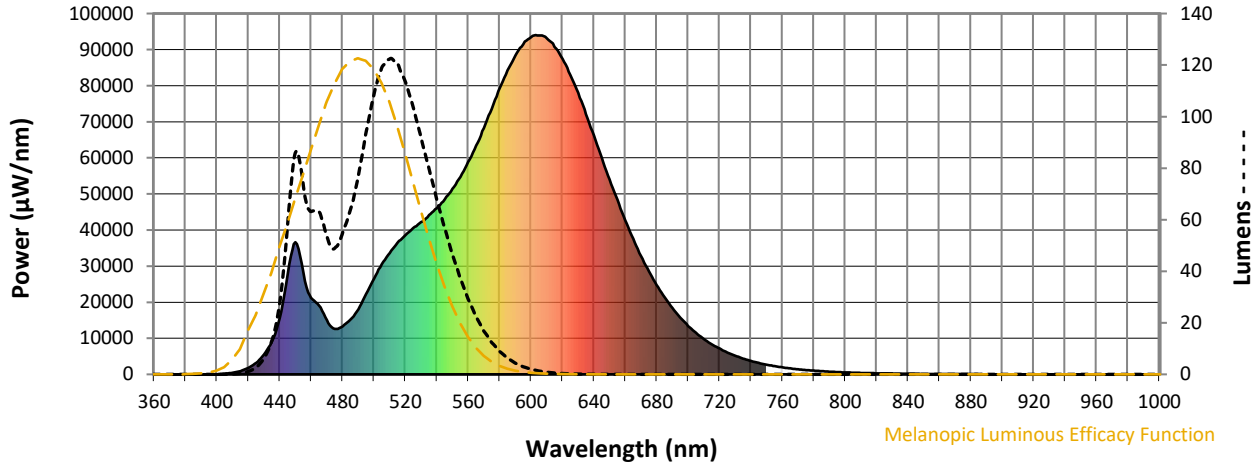



**Scotopic Lumens: 5286.7** **S/P: 1.22**

| 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 | 0 | 0.0 | 490 | 18018 | 75.9 | 620 | 87426 | 0.4 | 750 | 2680 | 0.0 | 880 | 58 | 0.0 |
| 365 | 0 | 0.0 | 495 | 22295 | 93.2 | 625 | 83013 | 0.2 | 755 | 2287 | 0.0 | 885 | 46 | 0.0 |
| 370 | 0 | 0.0 | 500 | 26478 | 107.8 | 630 | 78077 | 0.1 | 760 | 1944 | 0.0 | 890 | 45 | 0.0 |
| 375 | 0 | 0.0 | 505 | 30524 | 118.7 | 635 | 72080 | 0.1 | 765 | 1653 | 0.0 | 895 | 41 | 0.0 |
| 380 | 0 | 0.0 | 510 | 33611 | 122.2 | 640 | 66249 | 0.1 | 770 | 1413 | 0.0 | 900 | 38 | 0.0 |
| 385 | 0 | 0.0 | 515 | 36490 | 120.8 | 645 | 59973 | 0.0 | 775 | 1198 | 0.0 | 905 | 33 | 0.0 |
| 390 | 0 | 0.0 | 520 | 38610 | 113.9 | 650 | 53972 | 0.0 | 780 | 1025 | 0.0 | 910 | 30 | 0.0 |
| 395 | 0 | 0.0 | 525 | 40511 | 104.1 | 655 | 48369 | 0.0 | 785 | 874 | 0.0 | 915 | 23 | 0.0 |
| 400 | 48 | 0.0 | 530 | 42223 | 92.4 | 660 | 42641 | 0.0 | 790 | 747 | 0.0 | 920 | 24 | 0.0 |
| 405 | 201 | 0.0 | 535 | 44137 | 80.5 | 665 | 37602 | 0.0 | 795 | 639 | 0.0 | 925 | 22 | 0.0 |
| 410 | 457 | 0.1 | 540 | 46032 | 68.2 | 670 | 32798 | 0.0 | 800 | 547 | 0.0 | 930 | 22 | 0.0 |
| 415 | 925 | 0.3 | 545 | 48553 | 57.1 | 675 | 28558 | 0.0 | 805 | 473 | 0.0 | 935 | 17 | 0.0 |
| 420 | 1816 | 1.1 | 550 | 51408 | 46.7 | 680 | 24782 | 0.0 | 810 | 401 | 0.0 | 940 | 13 | 0.0 |
| 425 | 3217 | 2.5 | 555 | 54711 | 37.4 | 685 | 21386 | 0.0 | 815 | 351 | 0.0 | 945 | 6 | 0.0 |
| 430 | 5520 | 5.9 | 560 | 58847 | 29.4 | 690 | 18413 | 0.0 | 820 | 307 | 0.0 | 950 | 10 | 0.0 |
| 435 | 9225 | 12.5 | 565 | 63386 | 22.5 | 695 | 15721 | 0.0 | 825 | 261 | 0.0 | 955 | 11 | 0.0 |
| 440 | 15522 | 26.3 | 570 | 68196 | 16.9 | 700 | 13432 | 0.0 | 830 | 228 | 0.0 | 960 | 8 | 0.0 |
| 445 | 27642 | 55.2 | 575 | 73613 | 12.4 | 705 | 11513 | 0.0 | 835 | 193 | 0.0 | 965 | 12 | 0.0 |
| 450 | 36602 | 85.4 | 580 | 79207 | 9.0 | 710 | 9780 | 0.0 | 840 | 174 | 0.0 | 970 | 3 | 0.0 |
| 455 | 28292 | 75.1 | 585 | 84248 | 6.3 | 715 | 8356 | 0.0 | 845 | 151 | 0.0 | 975 | 8 | 0.0 |
| 460 | 21166 | 63.2 | 590 | 88397 | 4.4 | 720 | 7161 | 0.0 | 850 | 123 | 0.0 | 980 | 2 | 0.0 |
| 465 | 19092 | 63.2 | 595 | 91428 | 3.0 | 725 | 6067 | 0.0 | 855 | 106 | 0.0 | 985 | 13 | 0.0 |
| 470 | 14951 | 54.2 | 600 | 93452 | 2.0 | 730 | 5164 | 0.0 | 860 | 95 | 0.0 | 990 | 16 | 0.0 |
| 475 | 12606 | 48.8 | 605 | 93959 | 1.3 | 735 | 4393 | 0.0 | 865 | 82 | 0.0 | 995 | 20 | 0.0 |
| 480 | 13323 | 54.2 | 610 | 93079 | 0.9 | 740 | 3694 | 0.0 | 870 | 77 | 0.0 | 1000 | 0 | 0.0 |
| 485 | 15164 | 63.3 | 615 | 90707 | 0.5 | 745 | 3157 | 0.0 | 875 | 65 | 0.0 | | | |

REPORT NUMBER: SP1-2407-157-9

## Melanopic Flux vs. Wavelength




**Melanopic Lumens: 9797** **M/P: 2.26**

| 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 | 0 | 0.0 | 490 | 18018 | 27.7 | 620 | 87426 | 1.1 | 750 | 2680 | 0.0 | 880 | 58 | 0.0 |
| 365 | 0 | 0.0 | 495 | 22295 | 36.0 | 625 | 83013 | 0.7 | 755 | 2287 | 0.0 | 885 | 46 | 0.0 |
| 370 | 0 | 0.0 | 500 | 26478 | 44.2 | 630 | 78077 | 0.4 | 760 | 1944 | 0.0 | 890 | 45 | 0.0 |
| 375 | 0 | 0.0 | 505 | 30524 | 51.8 | 635 | 72080 | 0.3 | 765 | 1653 | 0.0 | 895 | 41 | 0.0 |
| 380 | 0 | 0.0 | 510 | 33611 | 57.0 | 640 | 66249 | 0.2 | 770 | 1413 | 0.0 | 900 | 38 | 0.0 |
| 385 | 0 | 0.0 | 515 | 36490 | 60.5 | 645 | 59973 | 0.1 | 775 | 1198 | 0.0 | 905 | 33 | 0.0 |
| 390 | 0 | 0.0 | 520 | 38610 | 61.4 | 650 | 53972 | 0.1 | 780 | 1025 | 0.0 | 910 | 30 | 0.0 |
| 395 | 0 | 0.0 | 525 | 40511 | 60.6 | 655 | 48369 | 0.0 | 785 | 874 | 0.0 | 915 | 23 | 0.0 |
| 400 | 48 | 0.0 | 530 | 42223 | 58.2 | 660 | 42641 | 0.0 | 790 | 747 | 0.0 | 920 | 24 | 0.0 |
| 405 | 201 | 0.0 | 535 | 44137 | 55.0 | 665 | 37602 | 0.0 | 795 | 639 | 0.0 | 925 | 22 | 0.0 |
| 410 | 457 | 0.0 | 540 | 46032 | 50.9 | 670 | 32798 | 0.0 | 800 | 547 | 0.0 | 930 | 22 | 0.0 |
| 415 | 925 | 0.1 | 545 | 48553 | 46.6 | 675 | 28558 | 0.0 | 805 | 473 | 0.0 | 935 | 17 | 0.0 |
| 420 | 1816 | 0.3 | 550 | 51408 | 42.0 | 680 | 24782 | 0.0 | 810 | 401 | 0.0 | 940 | 13 | 0.0 |
| 425 | 3217 | 0.8 | 555 | 54711 | 37.4 | 685 | 21386 | 0.0 | 815 | 351 | 0.0 | 945 | 6 | 0.0 |
| 430 | 5520 | 1.9 | 560 | 58847 | 32.9 | 690 | 18413 | 0.0 | 820 | 307 | 0.0 | 950 | 10 | 0.0 |
| 435 | 9225 | 4.1 | 565 | 63386 | 28.4 | 695 | 15721 | 0.0 | 825 | 261 | 0.0 | 955 | 11 | 0.0 |
| 440 | 15522 | 8.7 | 570 | 68196 | 24.1 | 700 | 13432 | 0.0 | 830 | 228 | 0.0 | 960 | 8 | 0.0 |
| 445 | 27642 | 18.5 | 575 | 73613 | 20.0 | 705 | 11513 | 0.0 | 835 | 193 | 0.0 | 965 | 12 | 0.0 |
| 450 | 36602 | 28.3 | 580 | 79207 | 16.3 | 710 | 9780 | 0.0 | 840 | 174 | 0.0 | 970 | 3 | 0.0 |
| 455 | 28292 | 24.7 | 585 | 84248 | 12.9 | 715 | 8356 | 0.0 | 845 | 151 | 0.0 | 975 | 8 | 0.0 |
| 460 | 21166 | 20.4 | 590 | 88397 | 9.8 | 720 | 7161 | 0.0 | 850 | 123 | 0.0 | 980 | 2 | 0.0 |
| 465 | 19092 | 20.1 | 595 | 91428 | 7.3 | 725 | 6067 | 0.0 | 855 | 106 | 0.0 | 985 | 13 | 0.0 |
| 470 | 14951 | 17.2 | 600 | 93452 | 5.3 | 730 | 5164 | 0.0 | 860 | 95 | 0.0 | 990 | 16 | 0.0 |
| 475 | 12606 | 15.7 | 605 | 93959 | 3.7 | 735 | 4393 | 0.0 | 865 | 82 | 0.0 | 995 | 20 | 0.0 |
| 480 | 13323 | 18.0 | 610 | 93079 | 2.5 | 740 | 3694 | 0.0 | 870 | 77 | 0.0 | 1000 | 0 | 0.0 |
| 485 | 15164 | 21.9 | 615 | 90707 | 1.7 | 745 | 3157 | 0.0 | 875 | 65 | 0.0 | | | |

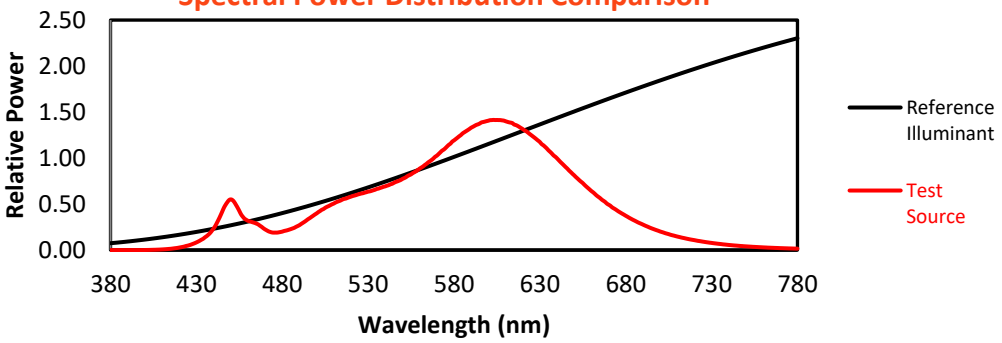
REPORT NUMBER: SP1-2407-157-9

# TM-30-18

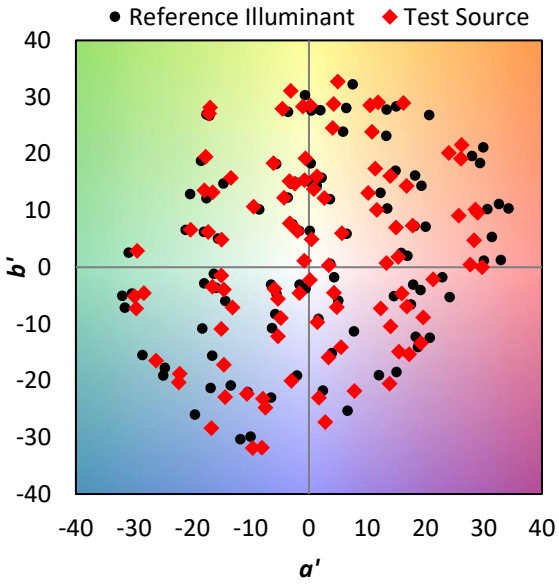
## Summary

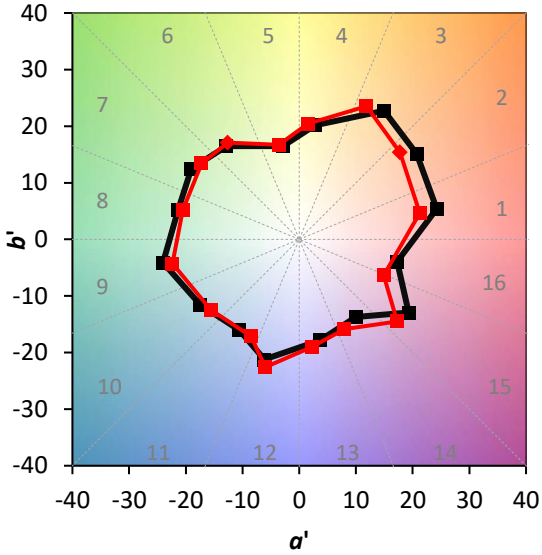
$R_f$ = 84.7
$R_g$ = 94.6
CIE $R_a$ = 80.9
$R_9$ = -1.5

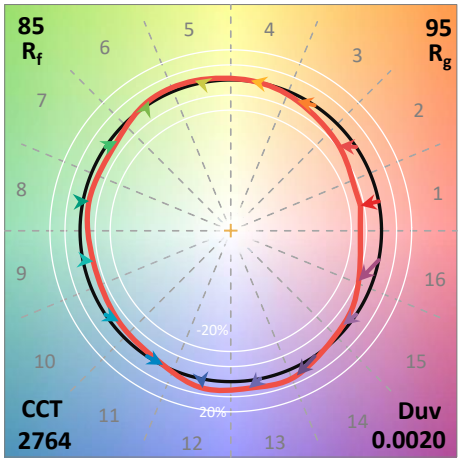
## Spectral Power Distribution Comparison

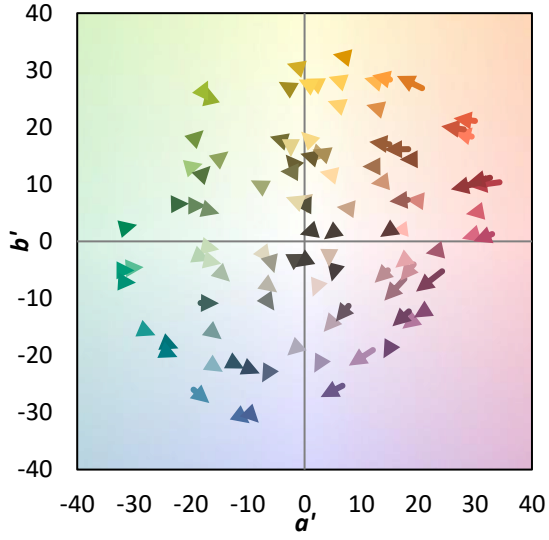



## Color Vector Graphics



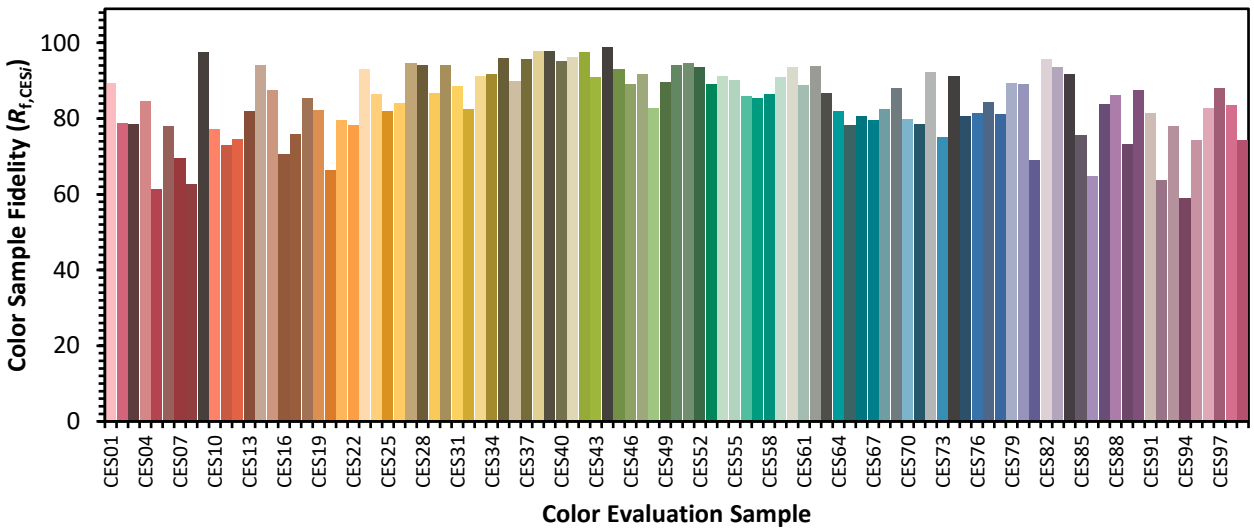



REPORT NUMBER: SP1-2407-157-9

## TM-30-18

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

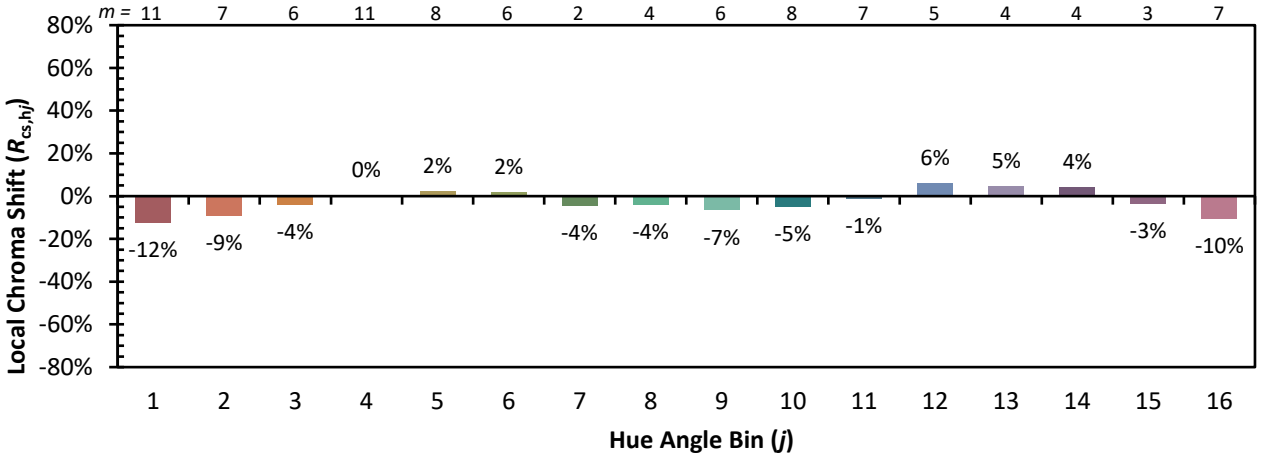
| | | | |
|---|---|---|---|
| CES01 = 86 | CES26 = 84 | CES51 = 95 | CES76 = 81 |
| CES02 = 63 | CES27 = 95 | CES52 = 94 | CES77 = 84 |
| CES03 = 31 | CES28 = 94 | CES53 = 89 | CES78 = 81 |
| CES04 = 71 | CES29 = 87 | CES54 = 91 | CES79 = 89 |
| CES05 = 50 | CES30 = 94 | CES55 = 90 | CES80 = 89 |
| CES06 = 52 | CES31 = 89 | CES56 = 86 | CES81 = 69 |
| CES07 = 43 | CES32 = 82 | CES57 = 85 | CES82 = 96 |
| CES08 = 41 | CES33 = 91 | CES58 = 86 | CES83 = 93 |
| CES09 = 29 | CES34 = 92 | CES59 = 91 | CES84 = 92 |
| CES10 = 77 | CES35 = 96 | CES60 = 94 | CES85 = 76 |
| CES11 = 60 | CES36 = 90 | CES61 = 89 | CES86 = 65 |
| CES12 = 66 | CES37 = 96 | CES62 = 94 | CES87 = 84 |
| CES13 = 44 | CES38 = 98 | CES63 = 87 | CES88 = 86 |
| CES14 = 74 | CES39 = 98 | CES64 = 82 | CES89 = 73 |
| CES15 = 72 | CES40 = 95 | CES65 = 78 | CES90 = 88 |
| CES16 = 48 | CES41 = 96 | CES66 = 81 | CES91 = 82 |
| CES17 = 50 | CES42 = 97 | CES67 = 80 | CES92 = 64 |
| CES18 = 57 | CES43 = 91 | CES68 = 83 | CES93 = 78 |
| CES19 = 73 | CES44 = 99 | CES69 = 88 | CES94 = 59 |
| CES20 = 67 | CES45 = 93 | CES70 = 80 | CES95 = 74 |
| CES21 = 87 | CES46 = 89 | CES71 = 79 | CES96 = 83 |
| CES22 = 79 | CES47 = 92 | CES72 = 92 | CES97 = 88 |
| CES23 = 92 | CES48 = 83 | CES73 = 75 | CES98 = 83 |
| CES24 = 91 | CES49 = 90 | CES74 = 91 | CES99 = 74 |
| CES25 = 72 | CES50 = 94 | CES75 = 81 | |

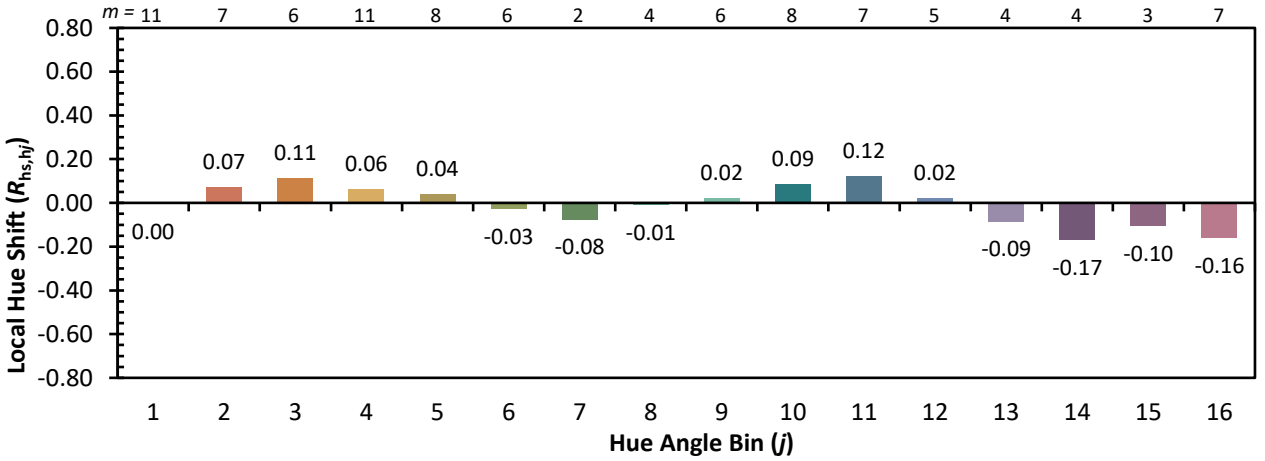


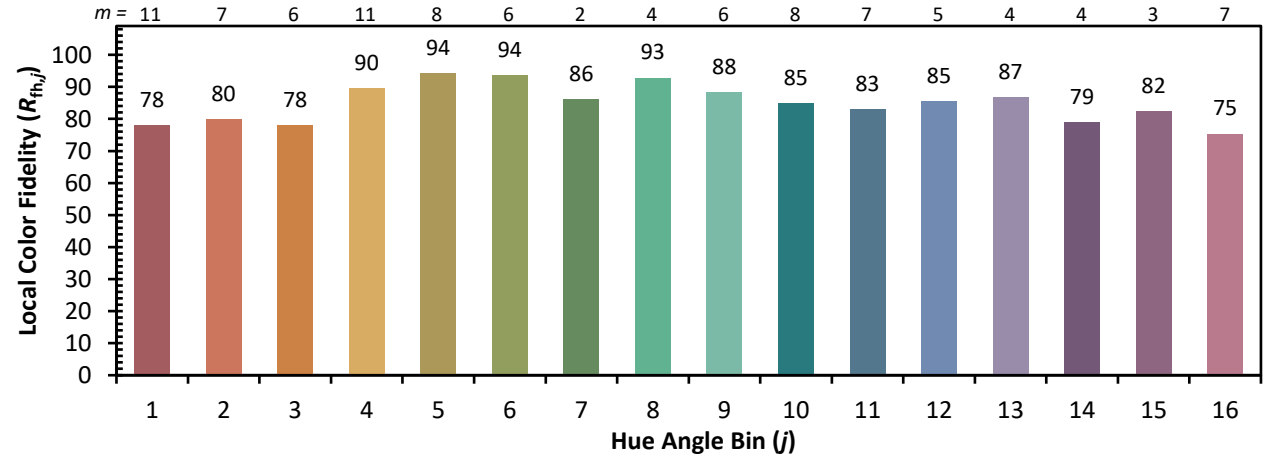
REPORT NUMBER: SP1-2407-157-9

**TM-30-18**

## Color Rendition by Hue-Angle Bin



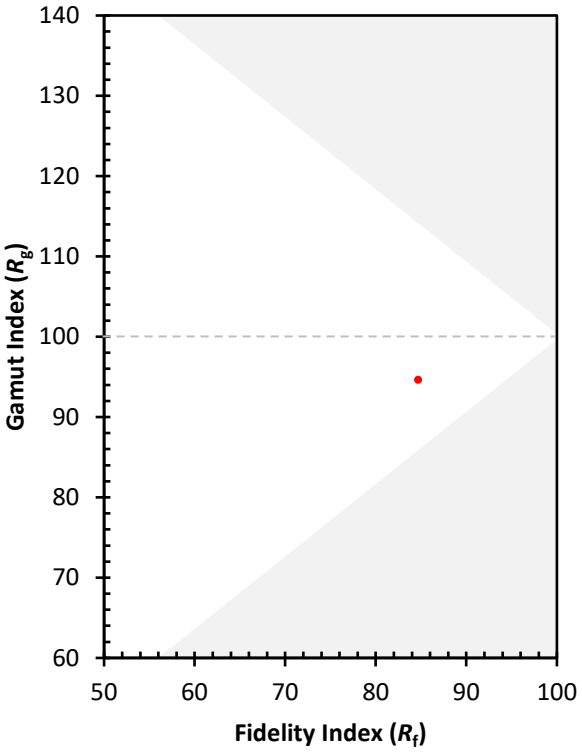



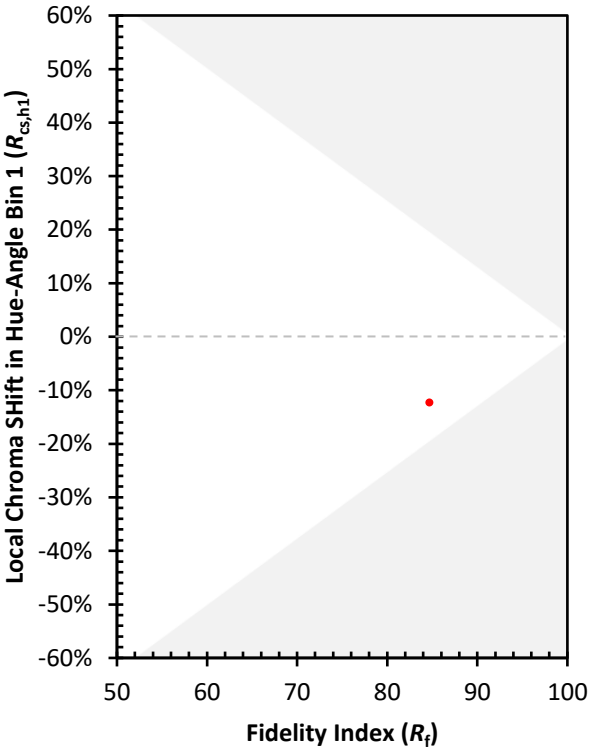



REPORT NUMBER: SP1-2407-157-9

# TM-30-18

## Measure Comparisons




(END OF REPORT)