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

Scaled data based on original data using

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

Test Report Prepared for

Cooper Lighting Solutions

Brand: McGRAW-EDISON

Report Number: P641245

Luminaire Tested: GWS-SA5F-740-U-T2R-W

Issue Date: 1/10/2023

Report Generated By 670246102 / DESKTOP-G35701P

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

Scaled Data Report

**Test Information**

| | |
|---|---|
| Test Method: | LM-79-2019 |
| Report Number: | P641245 |
| | TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-11) |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Issue Date: | 1/10/2023 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS |
| Product Line: | McGRAW-EDISON |
| Catalog Number: | GWS-SA5F-740-U-T2R-W |
| Description: | GALLEON WALL SLIM LUMINAIRE. (5) LIGHTSQUARES WITH 16 LEDS EACH AND TYPE II ROADWAY OPTICS |
| Light Source: | (80) 4000K CCT, 70 CRI LEDS |
| Ballast/Driver: | - |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 42559.7 lumens |
| Efficiency: | N/A |
| Efficacy: | 137.2 lumens/watt |
| Luminous Opening: | Rectangular (W 1.5' x L: 1' x H: 0') |
| IES Classification: | Type II - Short |
| BUG Rating: | B3 - U0 - G4 |

| | |
|---|---|
| Input Watts (W): | 310.3 |
| Input Voltage (V): | 120 |
| Input Current (Ain): | NR |
| Voltage Rise (V): | NR |
| Power Factor: | NR |
| Total Harmonic Distortion (THDi): | NR |
| Frequency (hertz): | 0 |
| Stabilization Time: | NR |
| Operation Time: | NR |
| Ambient Temperature (°C): | NR |
| Test Distance: | 28.75 FT |

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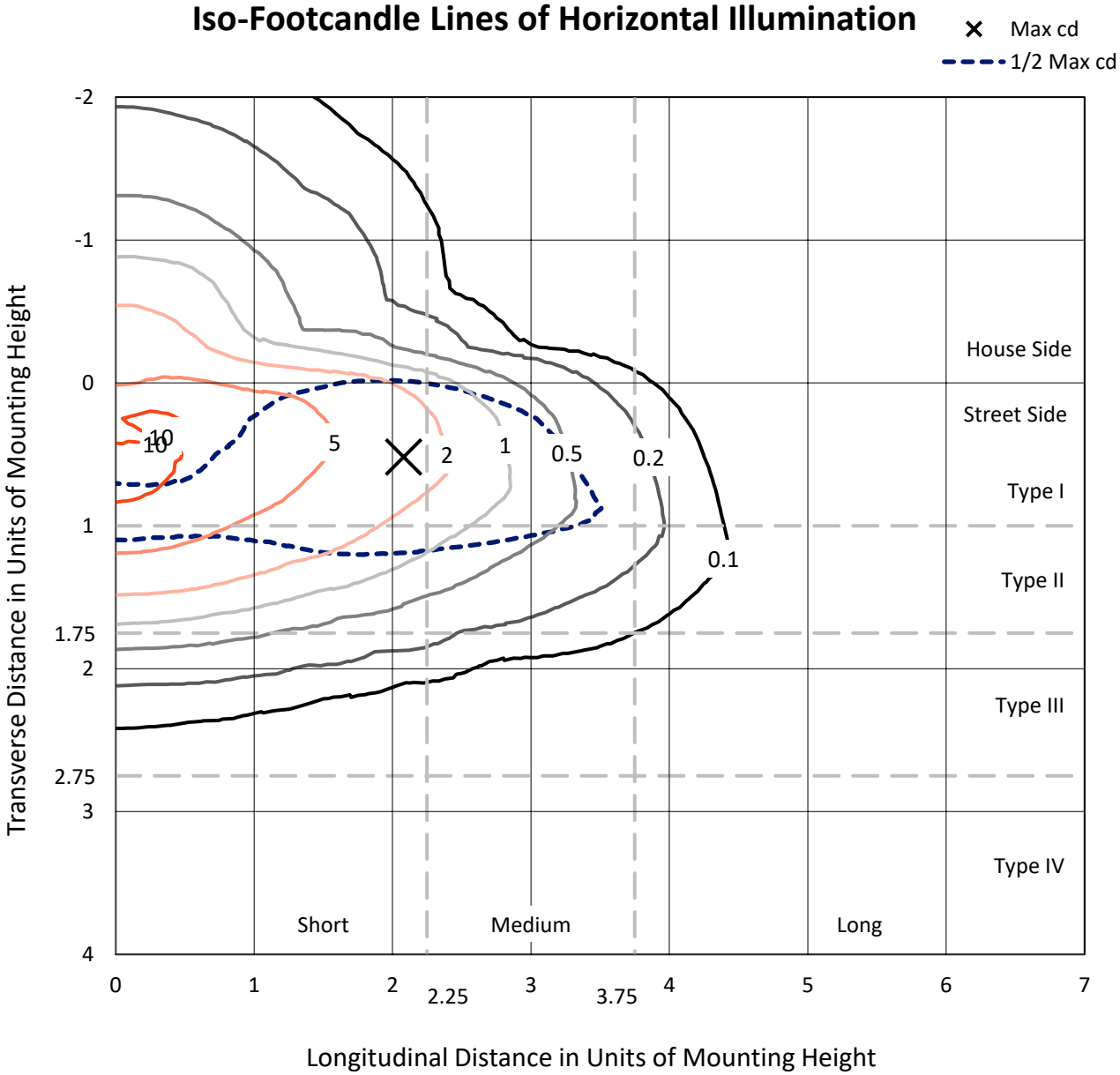
Scaled Data Report

REPORT NUMBER: P641245
CATALOG NUMBER: GWS-SA5F-740-U-T2R-W

## Iso-Footcandle Lines of Horizontal Illumination




Based on 30 foot mounting height. Maximum calculated value = 11.6 fc
Type II - Short - N/A

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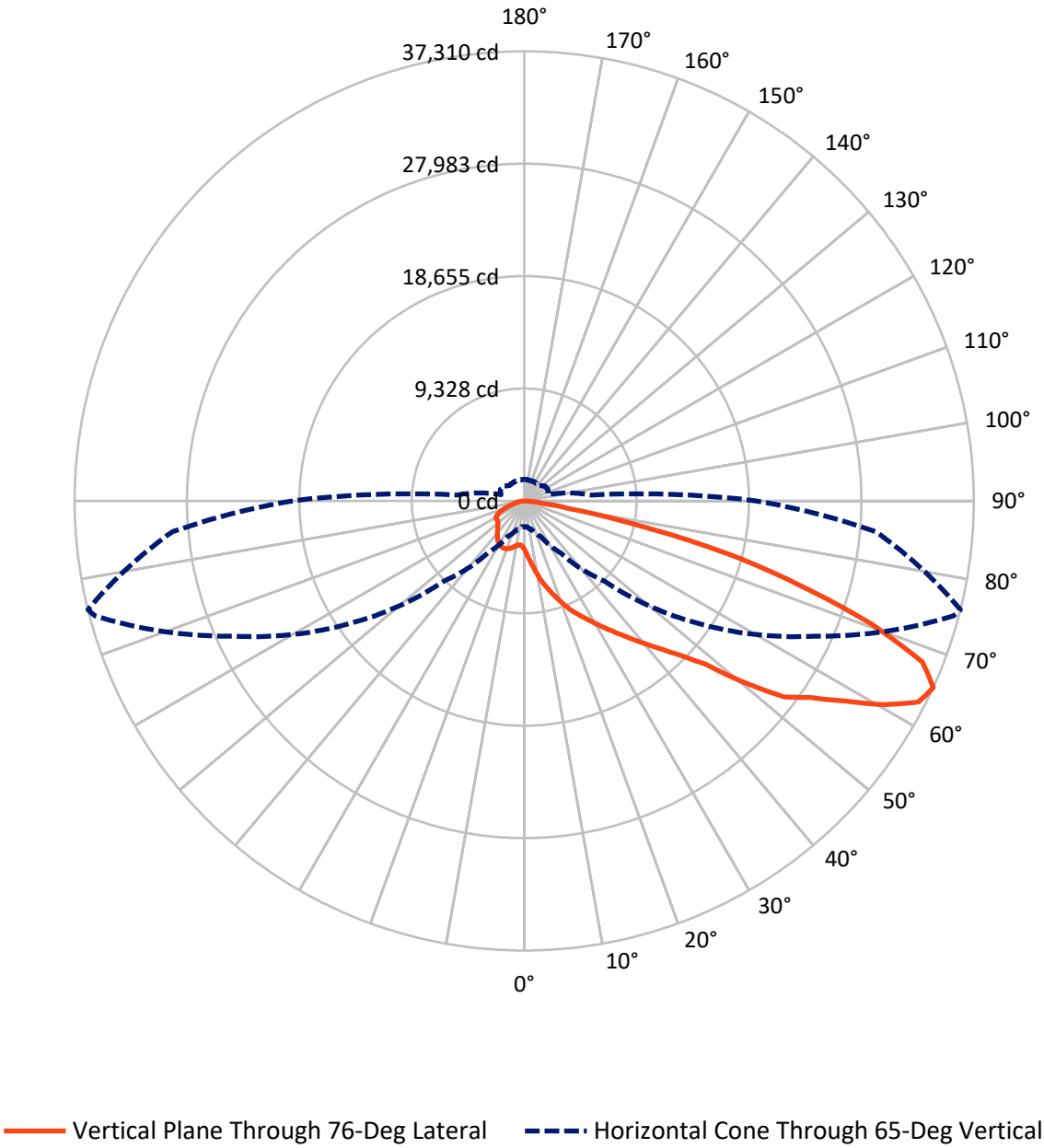
## Luminous Intensity Polar Plot



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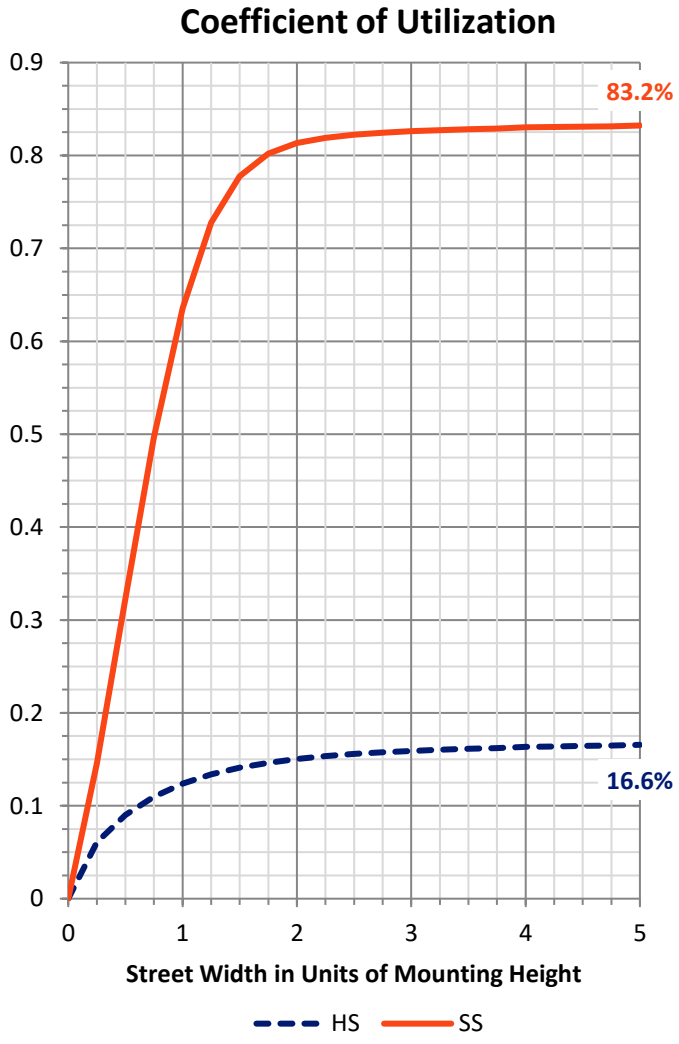
REPORT NUMBER: P641245
CATALOG NUMBER: GWS-SA5F-740-U-T2R-W

**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 7113.9 | 0.0 | 7113.9 |
| | % Fixture | 16.7 | 0.0 | 16.7 |
| **Street Side** | Lumens | 35445.8 | 0.0 | 35445.8 |
| | % Fixture | 83.3 | 0.0 | 83.3 |
| **Total** | Lumens | 42559.7 | 0.0 | 42559.7 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 478.8 | 1.1 |
| 10°-20° | 1823.8 | 4.3 |
| 20°-30° | 3554.2 | 8.4 |
| 30°-40° | 5944.3 | 14.0 |
| 40°-50° | 8511.0 | 20.0 |
| 50°-60° | 10075.9 | 23.7 |
| 60°-70° | 8378.2 | 19.7 |
| 70°-80° | 3428.6 | 8.1 |
| 80°-90° | 365.0 | 0.9 |
| 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° | 42559.7 | 100.0 |
| 0°-180° | 42559.7 | 100.0 |



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Scaled Data Report

REPORT NUMBER: P641245
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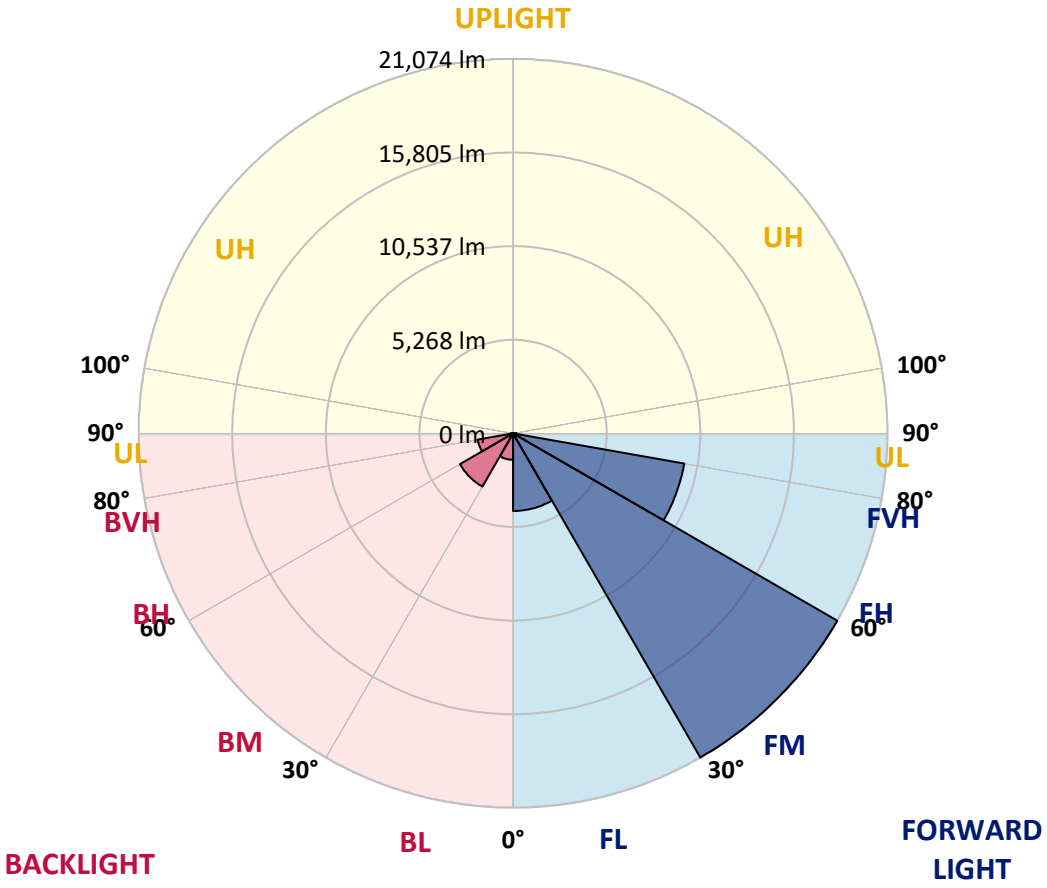
## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 4368.6 | 10.3 | | | |
| FM | (30°-60°) | 21074.0 | 49.5 | | | |
| FH | (60°-80°) | 9785.6 | 23.0 | | | G4/12000 |
| FVH | (80°-90°) | 217.7 | 0.5 | | | G2/225 |
| BL | (0°-30°) | 1488.2 | 3.5 | B3/2500 | | |
| BM | (30°-60°) | 3457.2 | 8.1 | B3/5000 | | |
| BH | (60°-80°) | 2021.1 | 4.7 | B3/2500 | | G3/2500 |
| BVH | (80°-90°) | 147.3 | 0.3 | | | G2/225 |
| UL | (90°-100°) | 0.0 | 0.0 | | U0/0 | |
| UH | (100°-180°) | 0.0 | 0.0 | | U0/0 | |

**BUG Rating: B3-U0-G4**
Type II Short



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Scaled Data Report

REPORT NUMBER: P641245
CATALOG NUMBER: GWS-SA5F-740-U-T2R-W

**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 65° | 75° | 76° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 4030.2 | 4030.2 | 4030.2 | 4030.2 | 4030.2 | 4030.2 | 4030.2 | 4030.2 | 4030.2 | *4030.2* | 4030.2 |
| 2.5° | 5648.9 | 5669.9 | 5601.1 | 5577.1 | 5415.5 | 5197.1 | 5014.6 | 4739.4 | 4485.0 | *4446.1* | 4218.7 |
| 5° | 7174.9 | 7085.1 | 7007.3 | 6956.4 | 6732.0 | 6483.7 | 6097.7 | 5580.1 | 5038.6 | *4972.7* | 4482.0 |
| 7.5° | 8081.4 | 8066.5 | 7970.7 | 7940.8 | 7767.3 | 7518.9 | 7121.0 | 6477.7 | 5690.8 | *5583.1* | 4838.1 |
| 10° | 8808.5 | 8799.5 | 8751.6 | 8778.6 | 8620.0 | 8377.6 | 7991.7 | 7327.4 | 6405.9 | *6298.2* | 5236.0 |
| 12.5° | 9442.8 | 9457.8 | 9448.8 | 9547.5 | 9466.7 | 9278.2 | 8877.3 | 8147.3 | 7121.0 | *7004.3* | 5720.7 |
| 15° | 9906.6 | 9918.5 | 9963.4 | 10178.8 | 10223.7 | 10184.8 | 9777.9 | 8952.1 | 7827.1 | *7659.6* | 6220.4 |
| 17.5° | 10038.2 | 10062.2 | 10169.9 | 10516.9 | 10759.3 | 10920.9 | 10618.7 | 9771.9 | 8521.3 | *8338.8* | 6729.0 |
| 20° | 10214.7 | 10241.7 | 10349.4 | 10711.4 | 11067.5 | 11435.5 | 11381.6 | 10603.7 | 9221.4 | *9071.8* | 7243.7 |
| 22.5° | 11031.6 | 11010.6 | 10962.7 | 11136.3 | 11390.6 | 11848.4 | 11983.0 | 11402.6 | 9945.5 | *9801.8* | 7812.2 |
| 25° | 12605.4 | 12566.5 | 12261.3 | 12102.7 | 12018.9 | 12297.2 | 12536.5 | 12129.6 | 10651.6 | *10436.2* | 8341.7 |
| 27.5° | 14340.7 | 14319.8 | 13930.8 | 13553.8 | 13039.2 | 12919.5 | 13060.2 | 12763.9 | 11336.8 | *11118.3* | 8802.5 |
| 30° | 15983.4 | 15920.5 | 15513.6 | 15040.9 | 14352.7 | 13838.1 | 13631.6 | 13386.3 | 12087.7 | *11860.4* | 9341.1 |
| 32.5° | 17452.4 | 17371.6 | 16892.9 | 16369.3 | 15648.2 | 15040.9 | 14424.5 | 14047.5 | 12937.5 | *12674.2* | 9891.6 |
| 35° | 18658.2 | 18577.4 | 18086.7 | 17530.2 | 16737.3 | 16288.5 | 15444.8 | 14765.6 | 13802.2 | *13535.9* | 10540.9 |
| 37.5° | 19591.7 | 19516.9 | 19005.3 | 18457.8 | 17766.6 | 17410.5 | 16677.5 | 15573.4 | 14798.5 | *14520.3* | 11229.0 |
| 40° | 20115.3 | 20061.5 | 19651.6 | 19217.7 | 18637.3 | 18329.1 | 18000.0 | 16593.7 | 15914.5 | *15636.3* | 12039.9 |
| 42.5° | 20273.9 | 20238.0 | 19950.8 | 19726.4 | 19334.4 | 19101.0 | 19289.5 | 17793.5 | 17105.4 | *16863.0* | 12952.4 |
| 45° | 19876.0 | 19876.0 | 19792.2 | 19905.9 | 19923.8 | 19920.8 | 20582.1 | 19148.9 | 18568.5 | *18302.2* | 14239.0 |
| 47.5° | 18858.7 | 18924.5 | 19047.2 | 19606.7 | 20196.1 | 20689.8 | 22093.1 | 20956.1 | 20450.4 | *20232.0* | 16061.1 |
| 50° | 16997.6 | 17177.2 | 17596.0 | 18688.1 | 19941.8 | 21198.4 | 23523.2 | 23628.0 | 24109.7 | *23723.7* | 18742.0 |
| 52.5° | 14271.9 | 14245.0 | 15313.1 | 16869.0 | 18780.9 | 21219.4 | 24310.1 | 25985.7 | 27281.2 | *27014.9* | 20734.7 |
| 55° | 11342.7 | 11297.9 | 12294.2 | 14439.5 | 17000.6 | 20417.5 | 24782.9 | 27065.8 | 29040.5 | *28801.2* | 22526.9 |
| 57.5° | 8685.8 | 8629.0 | 9514.6 | 11450.4 | 14487.3 | 18715.1 | 24693.1 | 28352.3 | 31461.1 | *31338.4* | 24962.4 |
| 60° | 5978.0 | 5909.2 | 6738.0 | 8431.5 | 11513.3 | 16112.0 | 23699.8 | 29013.6 | 34294.5 | *34336.4* | 27568.4 |
| 62.5° | 3590.4 | 3551.5 | 4152.9 | 5466.4 | 8281.9 | 12886.6 | 21375.0 | 28612.7 | 36550.5 | *36739.0* | 29244.0 |
| 65° | *2166.2* | *2139.3* | *2492.3* | *3261.3* | *5254.0* | *9403.9* | *17790.5* | *26563.1* | *36876.6* | *37310.4* | *29282.9* |
| 67.5° | 1576.8 | 1579.8 | 1681.5 | 1986.7 | 3063.8 | 6073.8 | 13350.4 | 22888.9 | 35177.1 | *35625.9* | 27436.8 |
| 70° | 1370.3 | 1376.3 | 1430.2 | 1499.0 | 1852.1 | 3476.7 | 8679.8 | 18068.8 | 30153.5 | *30500.6* | 23011.6 |
| 72.5° | 1217.8 | 1217.8 | 1253.7 | 1289.6 | 1448.1 | 2118.3 | 4649.6 | 12629.3 | 23798.5 | *23891.3* | 17563.1 |
| 75° | 1071.1 | 1062.2 | 1080.1 | 1098.1 | 1256.6 | 1481.0 | 2262.0 | 8799.5 | 17578.1 | *17362.7* | 11351.7 |
| 77.5° | 852.7 | 843.7 | 846.7 | 864.7 | 1008.3 | 1059.2 | 1145.9 | 5496.3 | 9906.6 | *9350.1* | 5014.6 |
| 80° | 607.4 | 601.4 | 634.3 | 679.2 | 745.0 | 649.3 | 718.1 | 2659.9 | 3928.5 | *3656.2* | 1944.8 |
| 82.5° | 362.0 | 374.0 | 424.9 | 460.8 | 514.6 | 406.9 | 463.8 | 888.6 | 1391.3 | *1355.4* | 789.9 |
| 85° | 50.9 | 53.9 | 152.6 | 176.5 | 221.4 | 158.6 | 245.3 | 400.9 | 556.5 | *595.4* | 278.3 |
| 87.5° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 20.9 | 71.8 | 158.6 | *161.6* | 68.8 |
| 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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Peachtree City, GA 30269

Scaled Data Report

REPORT NUMBER: P641245
CATALOG NUMBER: GWS-SA5F-740-U-T2R-W

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 4030.2 | 4030.2 | 4030.2 | 4030.2 | 4030.2 | 4030.2 | 4030.2 | 4030.2 | 4030.2 | 4030.2 | 4030.2 |
| 2.5° | 4102.1 | 3961.4 | 3761.0 | 3593.4 | 3452.8 | 3339.1 | 3243.3 | 3171.5 | 3150.6 | 3120.7 | 3120.7 |
| 5° | 4251.7 | 3997.3 | 3638.3 | 3384.0 | 3237.4 | 3150.6 | 3090.8 | 3060.8 | 3045.9 | 3027.9 | 3018.9 |
| 7.5° | 4458.1 | 4102.1 | 3617.3 | 3360.0 | 3246.3 | 3192.5 | 3153.6 | 3135.6 | 3123.7 | 3105.7 | 3105.7 |
| 10° | 4742.3 | 4257.6 | 3683.2 | 3443.8 | 3354.1 | 3300.2 | 3255.3 | 3225.4 | 3198.5 | 3171.5 | 3165.6 |
| 12.5° | 5050.5 | 4461.1 | 3802.9 | 3557.5 | 3461.8 | 3395.9 | 3333.1 | 3288.2 | 3255.3 | 3222.4 | 3213.4 |
| 15° | 5391.6 | 4670.5 | 3931.5 | 3668.2 | 3548.5 | 3458.8 | 3384.0 | 3315.2 | 3270.3 | 3222.4 | 3216.4 |
| 17.5° | 5726.7 | 4883.0 | 4039.2 | 3743.0 | 3590.4 | 3479.7 | 3372.0 | 3282.2 | 3225.4 | 3171.5 | 3156.6 |
| 20° | 6127.6 | 5095.4 | 4114.0 | 3764.0 | 3581.4 | 3434.8 | 3306.2 | 3192.5 | 3129.6 | 3066.8 | 3057.8 |
| 22.5° | 6495.7 | 5292.9 | 4149.9 | 3734.0 | 3512.6 | 3339.1 | 3189.5 | 3066.8 | 2998.0 | 2935.2 | 2923.2 |
| 25° | 6851.7 | 5466.4 | 4135.0 | 3662.2 | 3407.9 | 3207.4 | 3051.9 | 2929.2 | 2863.4 | 2797.5 | 2779.6 |
| 27.5° | 7195.8 | 5583.1 | 4075.1 | 3551.5 | 3276.3 | 3060.8 | 2911.2 | 2800.5 | 2743.7 | 2686.8 | 2662.9 |
| 30° | 7533.9 | 5690.8 | 3982.4 | 3407.9 | 3108.7 | 2908.2 | 2785.6 | 2707.8 | 2650.9 | 2591.1 | 2573.1 |
| 32.5° | 7875.0 | 5768.6 | 3841.7 | 3240.4 | 2938.2 | 2773.6 | 2698.8 | 2642.0 | 2582.1 | 2522.3 | 2504.3 |
| 35° | 8219.1 | 5801.5 | 3671.2 | 3048.9 | 2794.5 | 2686.8 | 2659.9 | 2594.1 | 2513.3 | 2441.5 | 2417.5 |
| 37.5° | 8629.0 | 5831.4 | 3458.8 | 2860.4 | 2668.9 | 2644.9 | 2639.0 | 2540.2 | 2444.5 | 2345.7 | 2318.8 |
| 40° | 9122.7 | 5870.3 | 3240.4 | 2689.8 | 2567.2 | 2630.0 | 2606.0 | 2471.4 | 2279.9 | 2184.2 | 2154.3 |
| 42.5° | 9727.0 | 5942.1 | 3013.0 | 2534.2 | 2492.3 | 2573.1 | 2546.2 | 2303.9 | 2175.2 | 2121.3 | 2106.4 |
| 45° | 10615.7 | 6205.4 | 2785.6 | 2411.6 | 2435.5 | 2492.3 | 2450.5 | 2205.1 | 2154.3 | 2118.3 | 2100.4 |
| 47.5° | 12198.5 | 6609.4 | 2588.1 | 2318.8 | 2390.6 | 2420.5 | 2259.0 | 2178.2 | 2139.3 | 2091.4 | 2070.5 |
| 50° | 13844.1 | 6785.9 | 2429.5 | 2262.0 | 2339.8 | 2354.7 | 2154.3 | 2142.3 | 2115.4 | 2064.5 | 2043.5 |
| 52.5° | 14957.1 | 6762.0 | 2333.8 | 2241.0 | 2297.9 | 2241.0 | 2106.4 | 2103.4 | 2085.4 | 2025.6 | 2001.7 |
| 55° | 16213.7 | 6803.8 | 2291.9 | 2247.0 | 2279.9 | 2049.5 | 2046.5 | 2055.5 | 2046.5 | 1980.7 | 1968.7 |
| 57.5° | 17910.2 | 6932.5 | 2270.9 | 2267.9 | 2267.9 | 1956.8 | 1989.7 | 2001.7 | 1983.7 | 1953.8 | 1944.8 |
| 60° | 19540.9 | 6941.5 | 2232.0 | 2291.9 | 2259.0 | 1899.9 | 1923.9 | 1935.8 | 1914.9 | 1908.9 | 1905.9 |
| 62.5° | 20154.2 | 6510.6 | 2145.3 | 2273.9 | 2223.1 | 1837.1 | 1855.1 | 1861.0 | 1840.1 | 1855.1 | 1852.1 |
| 65° | *19241.7* | *5595.1* | *2001.7* | *2187.2* | *2112.4* | *1780.2* | *1768.3* | *1783.2* | *1747.3* | *1786.2* | *1789.2* |
| 67.5° | 17084.4 | 4446.1 | 1783.2 | 2022.6 | 1956.8 | 1717.4 | 1693.5 | 1693.5 | 1633.6 | 1693.5 | 1690.5 |
| 70° | 13775.2 | 3141.6 | 1463.1 | 1759.3 | 1786.2 | 1642.6 | 1630.6 | 1561.8 | 1466.1 | 1555.8 | 1546.9 |
| 72.5° | 10442.1 | 2256.0 | 1151.9 | 1391.3 | 1537.9 | 1537.9 | 1540.9 | 1424.2 | 1313.5 | 1355.4 | 1319.5 |
| 75° | 6615.3 | 1588.8 | 921.5 | 1065.2 | 1205.8 | 1349.4 | 1418.2 | 1202.8 | 1104.1 | 1086.1 | 1068.1 |
| 77.5° | 2980.0 | 1044.2 | 718.1 | 816.8 | 855.7 | 1065.2 | 1295.5 | 1035.2 | 900.6 | 861.7 | 849.7 |
| 80° | 1247.7 | 649.3 | 511.6 | 577.5 | 526.6 | 894.6 | 1143.0 | 804.9 | 661.2 | 607.4 | 568.5 |
| 82.5° | 547.5 | 386.0 | 326.1 | 311.2 | 329.1 | 664.2 | 852.7 | 535.6 | 412.9 | 559.5 | 565.5 |
| 85° | 230.4 | 203.5 | 167.6 | 152.6 | 134.6 | 254.3 | 400.9 | 209.4 | 257.3 | 146.6 | 119.7 |
| 87.5° | 53.9 | 59.8 | 44.9 | 29.9 | 18.0 | 3.0 | 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
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Peachtree City, GA 30269

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

Report Prepared for

Cooper Lighting Solutions

MCGRAW, INVUE, LUMARK AND STREETWORKS

DATA VALID FOR LUMINIAIRES UTIZLIZING SA LIGHT ENGINES

Report Number: SP1-2101-121-2

Luminaire Tested: IFLD-S-SA2A-740-U-T3R-HSS

Test Date: 03/05/2021

Report Generated By controller / USPTCWHP6086842

## Test Information

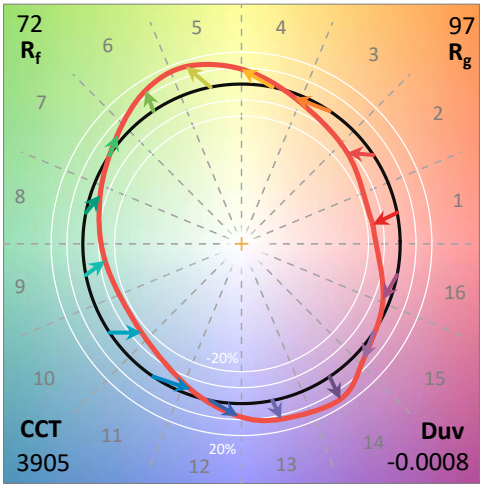
| | |
|---|---|
| Test Method: | LM-79-08 |
| Report Number: | SP1-2101-121-2 |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Photometer: | SP1 |
| Measurement Geometry: | 4π |
| Issue Date: | 03/05/2021 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS (FORMERLY EATON) |
| Product Line: | STREETWORKS |
| 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

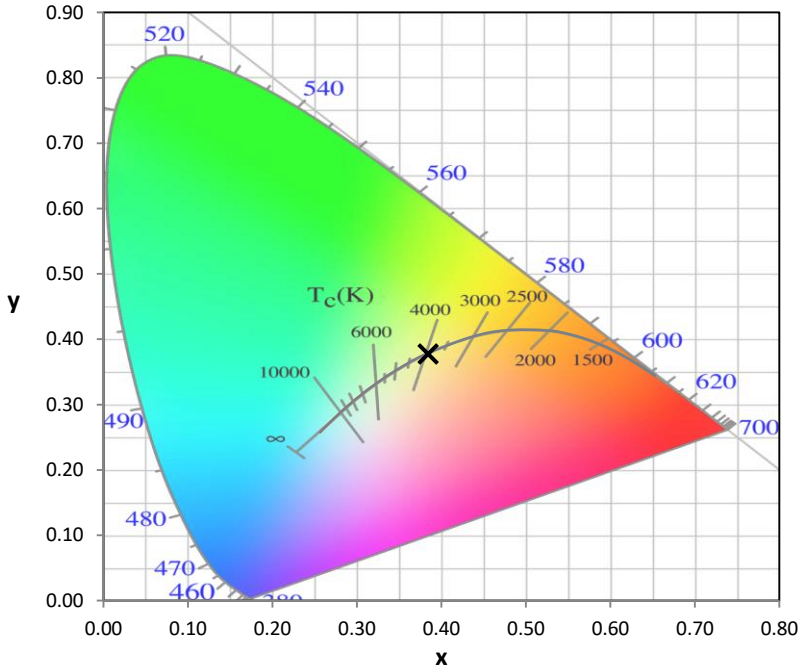
| | |
|---|---|
| Stabilization Time: | 211M |
| Operation Time: | 12H |
| Room Temperature (°C) / RH%: | 24.8/312% |
| Sphere Temperature (°C): | 24.1 |

REPORT NUMBER: SP1-2101-121-2

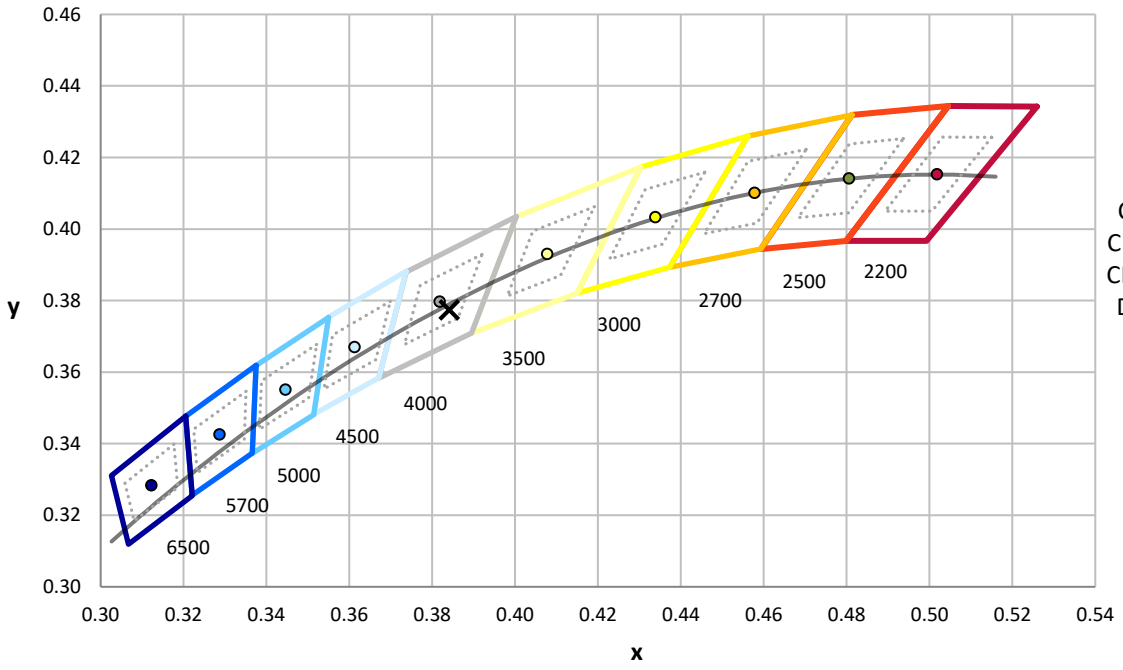
| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 1/31/2021 | 7/31/2021 |
| Power Meter | IN0071 | 12/1/2020 | 12/1/2021 |
| AC Power Source | IN0063 | 12/1/2020 | 12/1/2021 |
| DC Power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

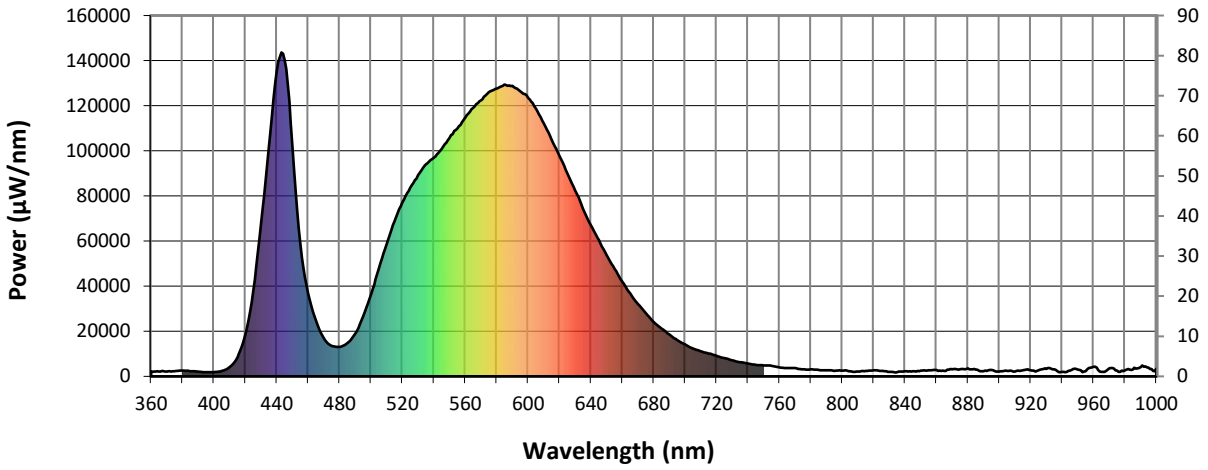



CCT = 3905K
CIE x = 0.3841
CIE y = 0.3774
Duv = -0.0008

Point lies inside the ANSI 4000K 4-step quadrangle

REPORT NUMBER: SP1-2101-121-2

## Photopic Flux vs. Wavelength

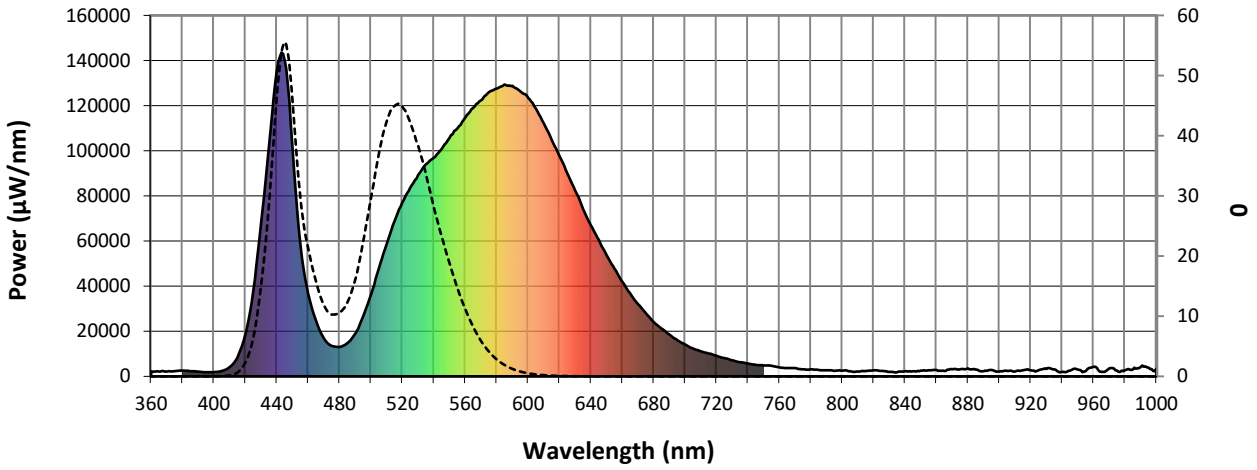



######

| 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 | | | |

REPORT NUMBER: SP1-2101-121-2

## Scotopic Flux vs. Wavelength

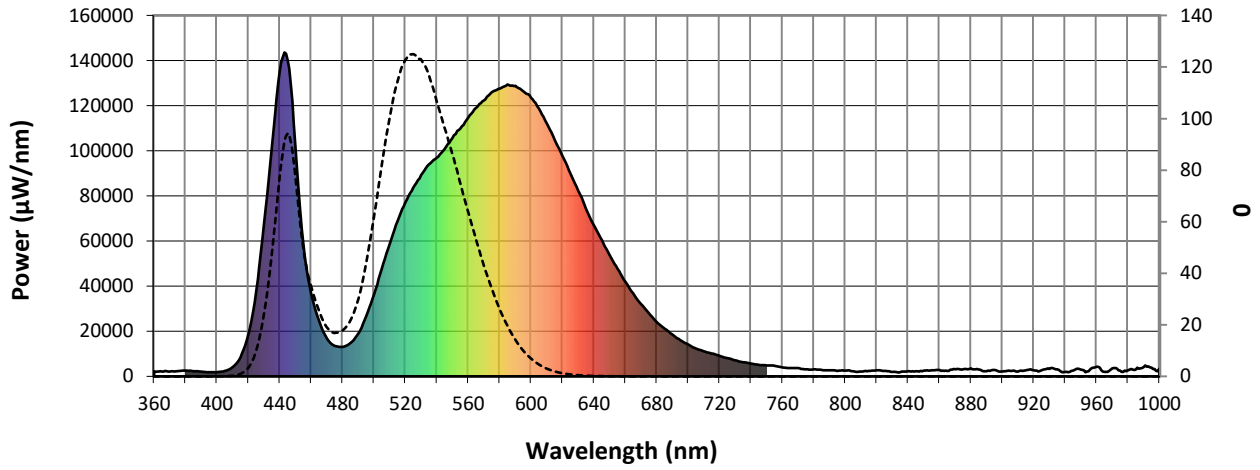



**Scotopic Lumens: 10425.8** **S/P: 1.47**

| 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 | | | |

REPORT NUMBER: SP1-2101-121-2

## 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 | | | |

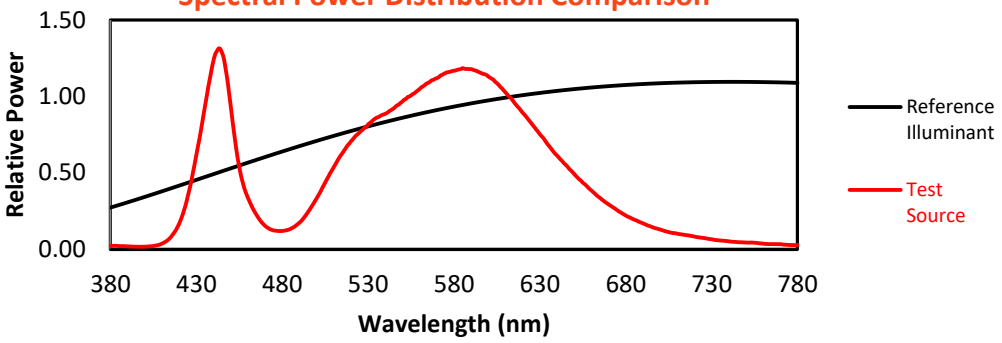
REPORT NUMBER: SP1-2101-121-2

# TM-30-18

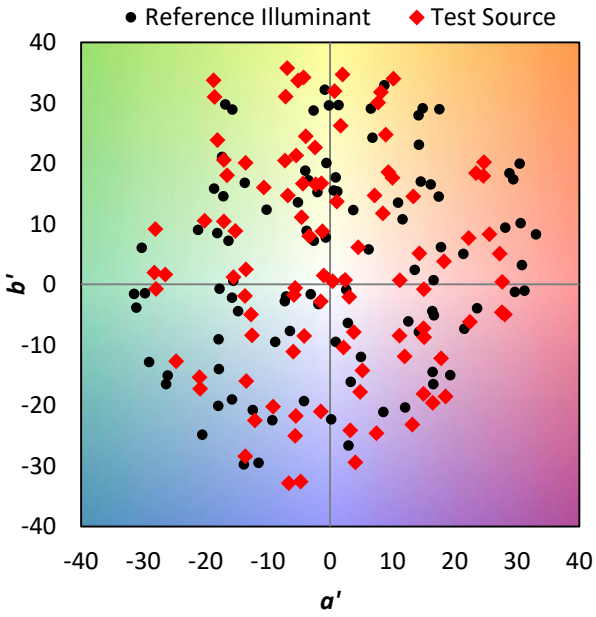
## Summary

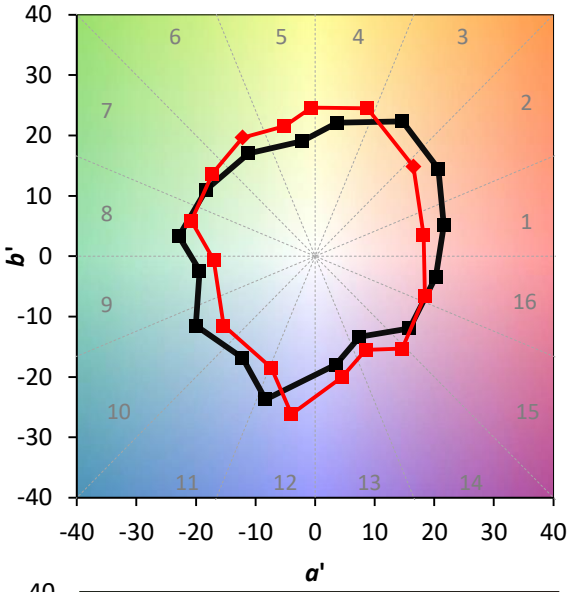
$R_f$ = 71.7
$R_g$ = 96.9
CIE $R_a$ = 71.2
$R_9$ = -29.7

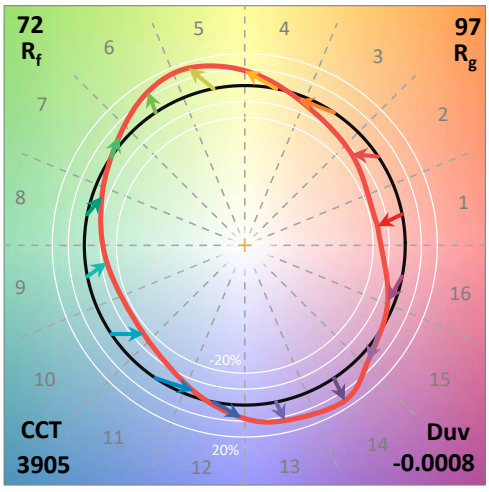
## Spectral Power Distribution Comparison

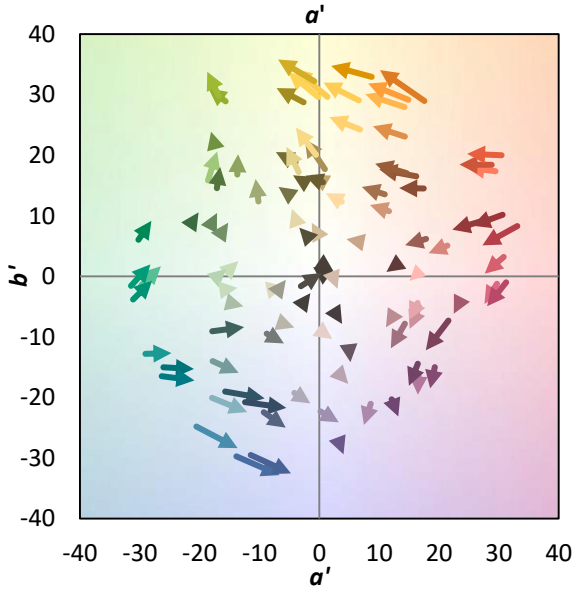



## Color Vector Graphics



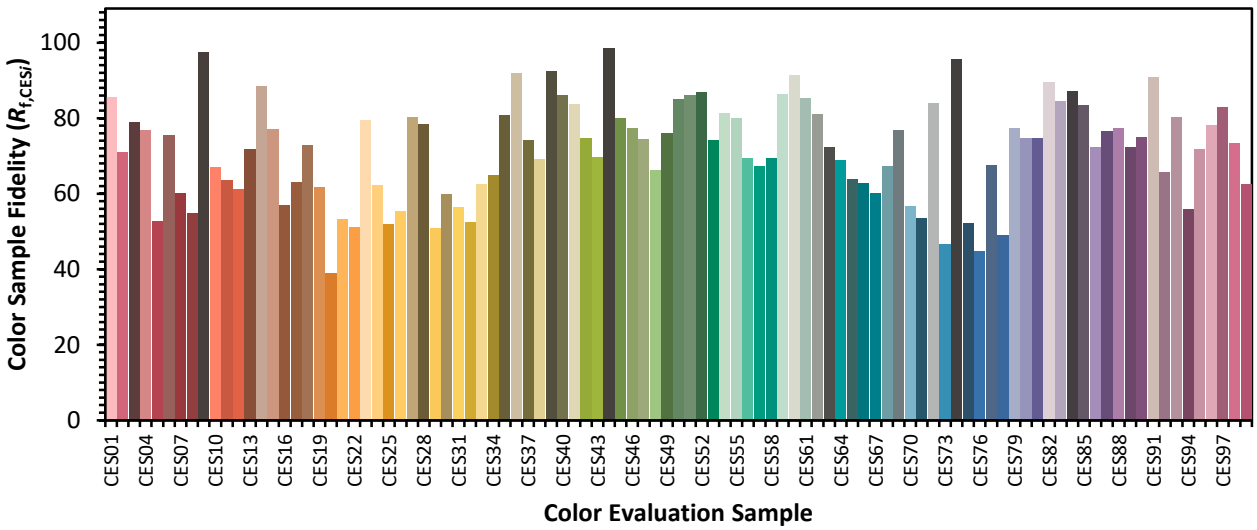



REPORT NUMBER: SP1-2101-121-2

# TM-30-18

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

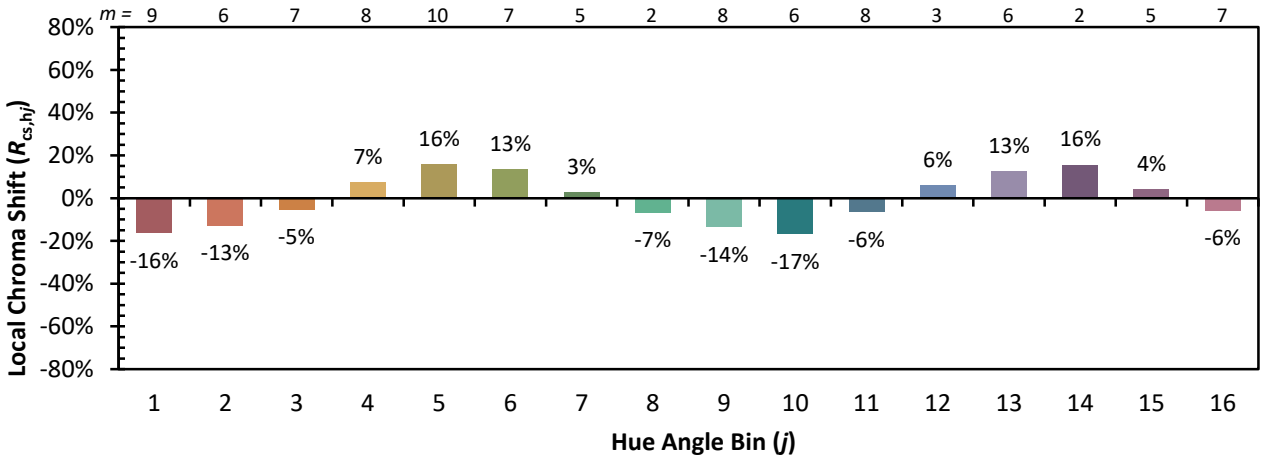
| | | | |
|---|---|---|---|
| CES01 = 85 | CES26 = 55 | CES51 = 86 | CES76 = 45 |
| CES02 = 61 | CES27 = 80 | CES52 = 87 | CES77 = 68 |
| CES03 = 30 | CES28 = 79 | CES53 = 74 | CES78 = 49 |
| CES04 = 70 | CES29 = 51 | CES54 = 81 | CES79 = 77 |
| CES05 = 47 | CES30 = 60 | CES55 = 80 | CES80 = 75 |
| CES06 = 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 | |

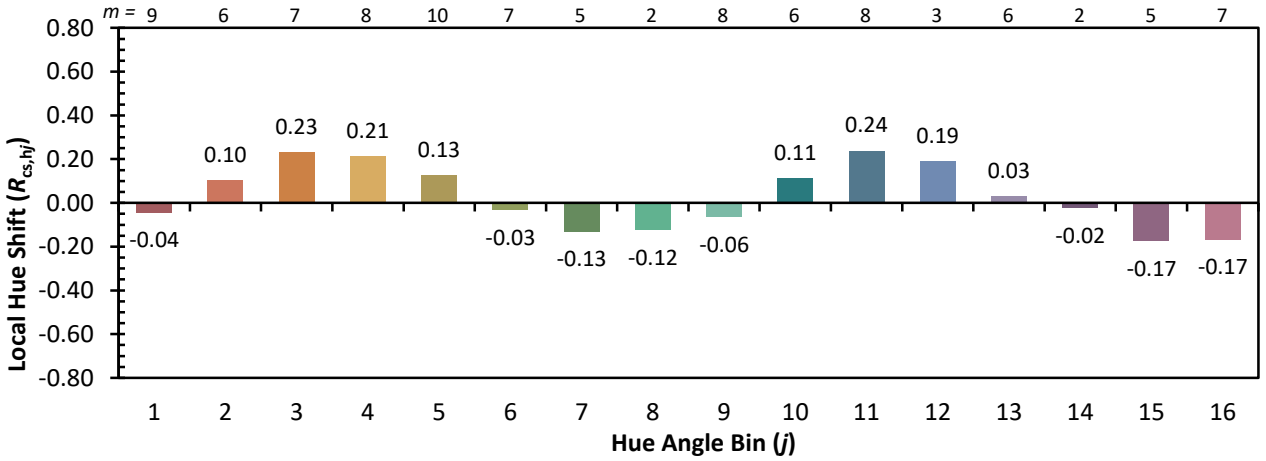


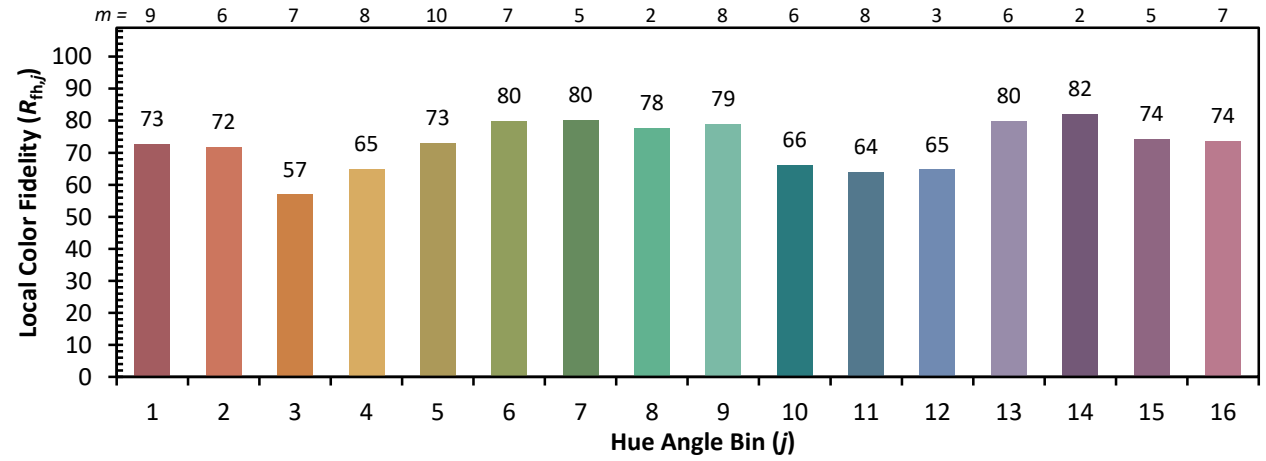
REPORT NUMBER: SP1-2101-121-2

**TM-30-18**

## Color Rendition by Hue-Angle Bin



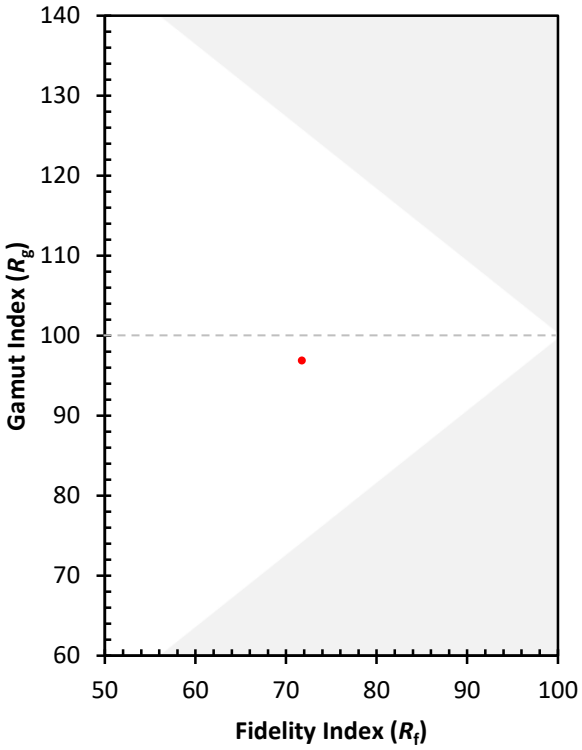



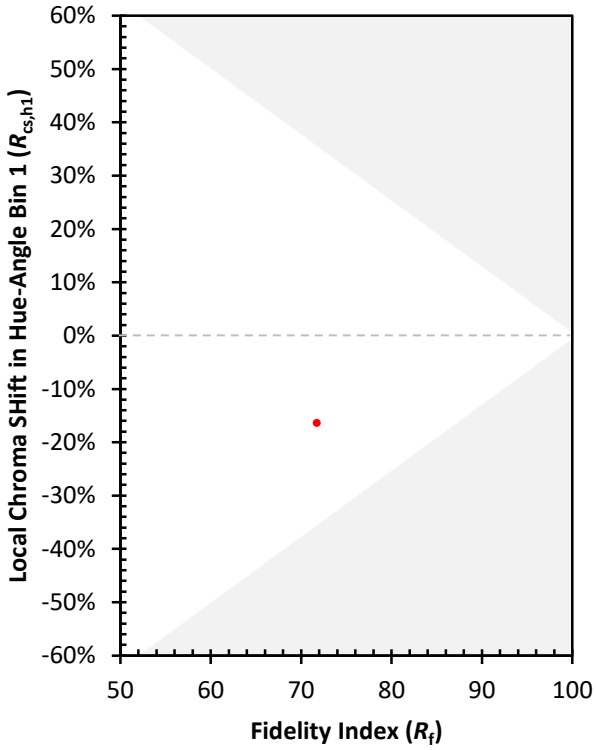



REPORT NUMBER: SP1-2101-121-2

## TM-30-18

### Measure Comparisons




(END OF REPORT)