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: P631352

Luminaire Tested: GWS-SA1F-740-U-T3R-W-HSS

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: | P631352 |
| | TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-18) |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Issue Date: | 1/10/2023 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS |
| Product Line: | McGRAW-EDISON |
| Catalog Number: | GWS-SA1F-740-U-T3R-W-HSS |
| Description: | GALLEON WALL SLIM LUMINAIRE. (1) LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III ROADWAY OPTICS WITH HOUSE SIDE SHIELD |
| Light Source: | (16) 4000K CCT, 70 CRI LEDS |
| Ballast/Driver: | - |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 6595.2 lumens |
| Efficiency: | N/A |
| Efficacy: | 98.1 lumens/watt |
| Luminous Opening: | Rectangular (W 0.5' x L: 0.5' x H: 0') |
| IES Classification: | Type III - Medium |
| BUG Rating: | B1 - U0 - G2 |

| | |
|---|---|
| Input Watts (W): | 67.2 |
| 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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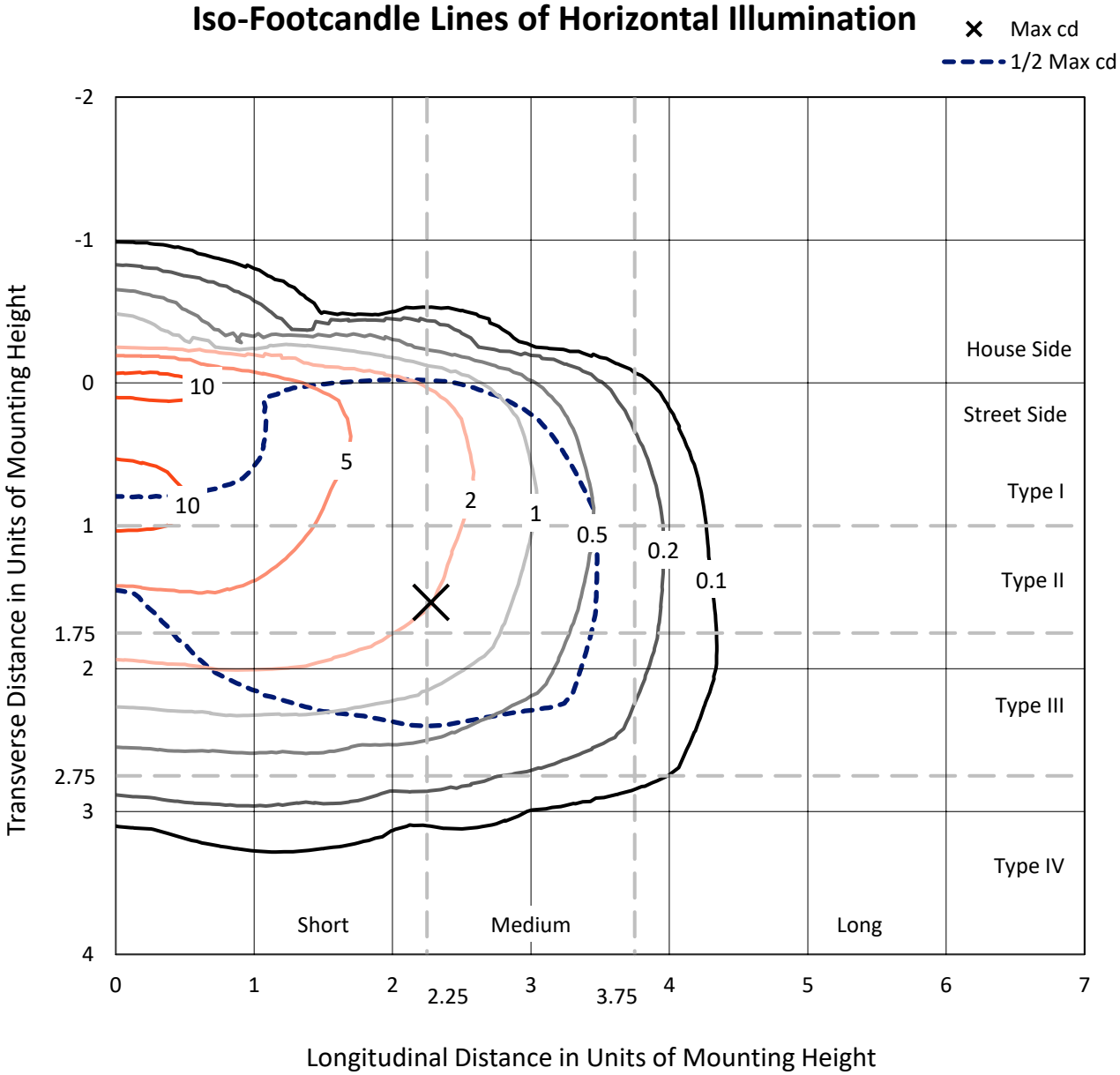
Scaled Data Report

REPORT NUMBER: P631352
CATALOG NUMBER: GWS-SA1F-740-U-T3R-W-HSS

## Iso-Footcandle Lines of Horizontal Illumination




Based on 10 foot mounting height. Maximum calculated value = 12.5 fc
Type III - Medium - N/A

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REPORT NUMBER: P631352
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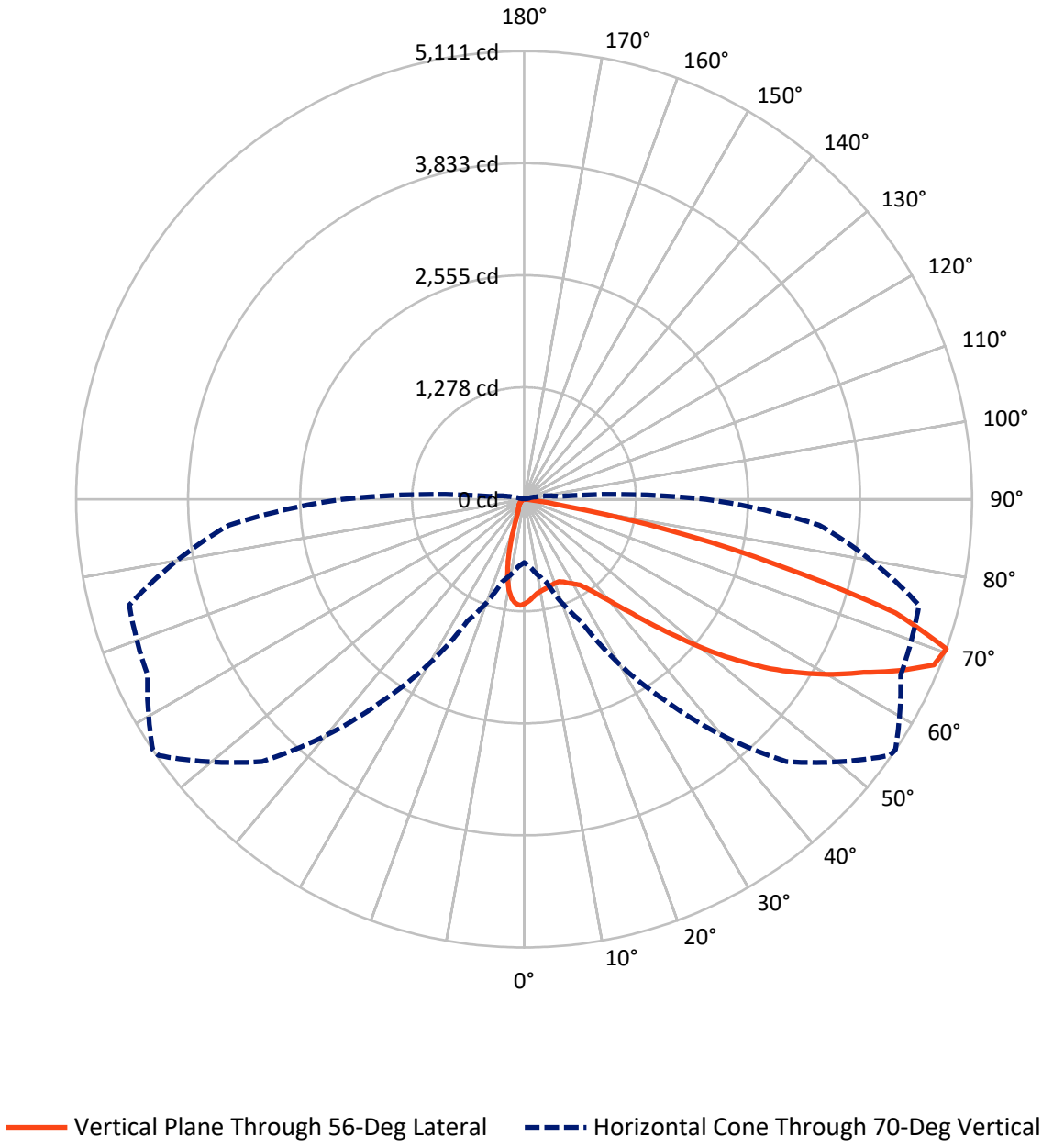
## Luminous Intensity Polar Plot



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Scaled Data Report

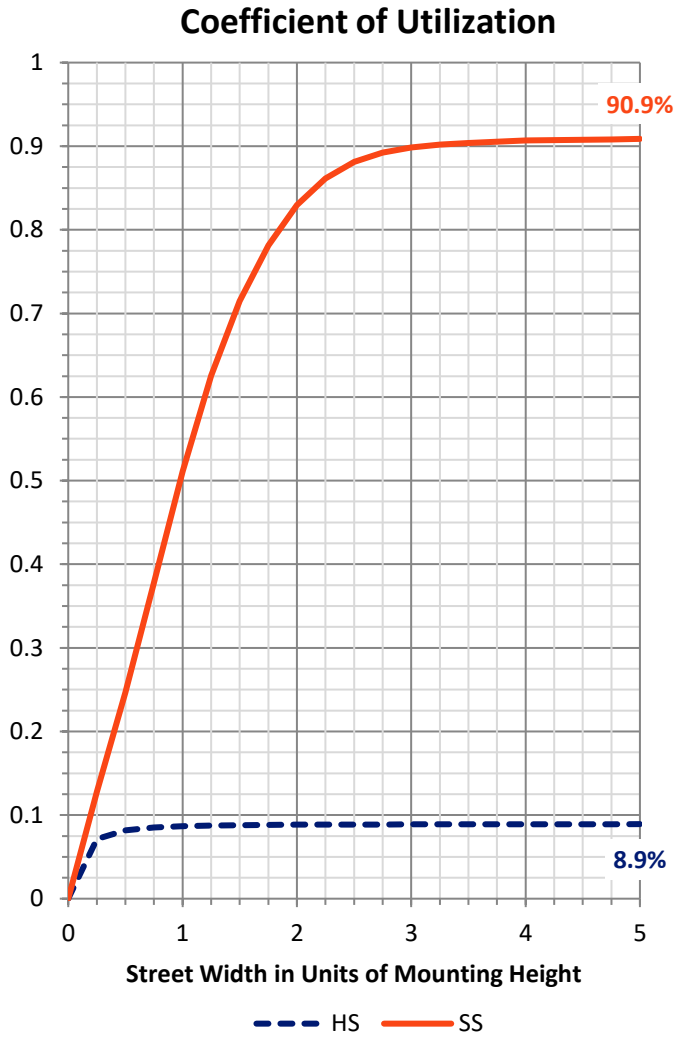
REPORT NUMBER: P631352
CATALOG NUMBER: GWS-SA1F-740-U-T3R-W-HSS

**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 592.4 | 0.0 | 592.4 |
| | % Fixture | 9.0 | 0.0 | 9.0 |
| **Street Side** | Lumens | 6002.8 | 0.0 | 6002.8 |
| | % Fixture | 91.0 | 0.0 | 91.0 |
| **Total** | Lumens | 6595.2 | 0.0 | 6595.2 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 102.1 | 1.5 |
| 10°-20° | 229.6 | 3.5 |
| 20°-30° | 363.7 | 5.5 |
| 30°-40° | 627.3 | 9.5 |
| 40°-50° | 1059.3 | 16.1 |
| 50°-60° | 1556.4 | 23.6 |
| 60°-70° | 1845.2 | 28.0 |
| 70°-80° | 786.9 | 11.9 |
| 80°-90° | 24.7 | 0.4 |
| 90°-100° | 0.0 | 0.0 |
| 100°-110° | 0.0 | 0.0 |
| 110°-120° | 0.0 | 0.0 |
| 120°-130° | 0.0 | 0.0 |
| 130°-140° | 0.0 | 0.0 |
| 140°-150° | 0.0 | 0.0 |
| 150°-160° | 0.0 | 0.0 |
| 160°-170° | 0.0 | 0.0 |
| 170°-180° | 0.0 | 0.0 |
| 0°-90° | 6595.2 | 100.0 |
| 0°-180° | 6595.2 | 100.0 |



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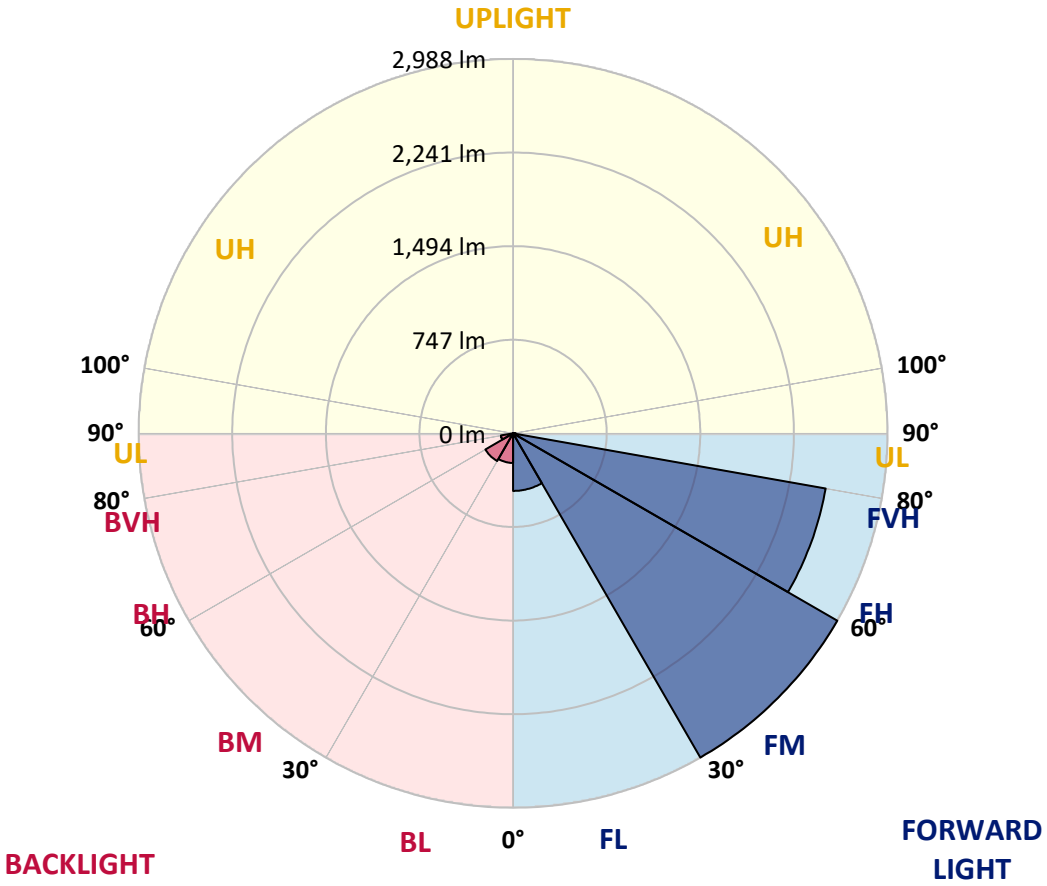
Scaled Data Report

REPORT NUMBER: P631352
CATALOG NUMBER: GWS-SA1F-740-U-T3R-W-HSS

## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 459.6 | 7.0 | | | |
| FM | (30°-60°) | 2987.8 | 45.3 | | | |
| FH | (60°-80°) | 2533.3 | 38.4 | | | G2/5000 |
| FVH | (80°-90°) | 22.2 | 0.3 | | | G1/100 |
| BL | (0°-30°) | 235.9 | 3.6 | B1/500 | | |
| BM | (30°-60°) | 255.1 | 3.9 | B1/1000 | | |
| BH | (60°-80°) | 98.8 | 1.5 | B0/110 | | G0/110 |
| BVH | (80°-90°) | 2.5 | 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 III Medium



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Scaled Data Report

REPORT NUMBER: P631352
CATALOG NUMBER: GWS-SA1F-740-U-T3R-W-HSS

**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 56° | 65° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 1189.2 | 1189.2 | 1189.2 | 1189.2 | 1189.2 | 1189.2 | 1189.2 | 1189.2 | 1189.2 | 1189.2 | 1189.2 |
| 2.5° | 1107.0 | 1105.2 | 1106.4 | 1115.5 | 1132.4 | 1140.3 | 1153.5 | 1156.0 | 1166.8 | 1180.7 | 1186.2 |
| 5° | 1035.2 | 1029.1 | 1032.2 | 1044.8 | 1064.2 | 1085.9 | 1110.7 | 1117.3 | 1144.5 | 1175.3 | 1198.2 |
| 7.5° | 969.3 | 962.7 | 969.9 | 989.9 | 1017.1 | 1040.6 | 1077.4 | 1081.7 | 1125.2 | 1179.5 | 1221.2 |
| 10° | 866.1 | 867.9 | 882.4 | 917.4 | 959.1 | 1008.0 | 1057.5 | 1063.6 | 1117.3 | 1193.4 | 1258.0 |
| 12.5° | 786.9 | 782.7 | 798.4 | 838.3 | 896.9 | 968.1 | 1042.4 | 1050.3 | 1117.9 | 1214.5 | 1305.1 |
| 15° | 750.1 | 748.9 | 755.5 | 784.5 | 841.3 | 925.3 | 1028.5 | 1038.8 | 1125.8 | 1233.9 | 1349.8 |
| 17.5° | 751.3 | 749.5 | 748.9 | 765.8 | 808.1 | 893.2 | 1013.4 | 1026.7 | 1132.4 | 1255.0 | 1396.9 |
| 20° | 803.9 | 795.4 | 780.3 | 772.5 | 797.8 | 872.7 | 1003.2 | 1018.3 | 1142.1 | 1277.4 | 1447.1 |
| 22.5° | 913.8 | 916.8 | 876.3 | 834.1 | 822.0 | 875.1 | 1002.0 | 1019.5 | 1163.2 | 1312.4 | 1508.7 |
| 25° | 1133.6 | 1128.8 | 1053.9 | 959.1 | 893.2 | 902.9 | 1023.1 | 1044.2 | 1204.9 | 1362.5 | 1566.7 |
| 27.5° | 1409.0 | 1413.2 | 1310.6 | 1159.6 | 1021.9 | 960.3 | 1061.7 | 1082.9 | 1253.2 | 1393.9 | 1605.3 |
| 30° | 1709.2 | 1705.0 | 1595.0 | 1427.7 | 1204.3 | 1055.7 | 1100.4 | 1119.1 | 1277.4 | 1410.8 | 1645.2 |
| 32.5° | 1993.0 | 1983.4 | 1874.7 | 1699.5 | 1436.8 | 1206.1 | 1153.5 | 1164.4 | 1309.4 | 1447.7 | 1698.9 |
| 35° | 2235.2 | 2234.6 | 2139.8 | 1953.2 | 1676.0 | 1394.5 | 1244.7 | 1253.8 | 1369.2 | 1506.3 | 1778.0 |
| 37.5° | 2485.3 | 2476.8 | 2370.5 | 2200.2 | 1921.8 | 1601.1 | 1384.3 | 1380.6 | 1463.4 | 1592.6 | 1875.3 |
| 40° | 2690.6 | 2685.2 | 2603.6 | 2440.0 | 2177.2 | 1829.4 | 1553.4 | 1542.5 | 1575.1 | 1712.2 | 2010.6 |
| 42.5° | 2842.8 | 2843.4 | 2818.0 | 2718.4 | 2447.8 | 2093.3 | 1766.0 | 1749.0 | 1748.4 | 1892.8 | 2189.3 |
| 45° | 2958.2 | 2966.0 | 3004.1 | 2989.0 | 2767.3 | 2400.7 | 2038.3 | 2020.8 | 1991.2 | 2127.1 | 2394.1 |
| 47.5° | 3011.9 | 3022.2 | 3136.9 | 3197.3 | 3046.9 | 2705.7 | 2362.7 | 2325.8 | 2267.8 | 2438.8 | 2623.0 |
| 50° | 3006.5 | 3024.6 | 3184.6 | 3368.2 | 3300.6 | 3014.9 | 2716.0 | 2698.5 | 2603.6 | 2768.5 | 2849.4 |
| 52.5° | 2883.3 | 2921.9 | 3187.7 | 3472.1 | 3495.7 | 3300.0 | 3081.4 | 3048.7 | 3002.8 | 3112.8 | 3062.0 |
| 55° | 2548.7 | 2595.8 | 3060.2 | 3505.3 | 3647.9 | 3548.8 | 3438.9 | 3412.3 | 3336.2 | 3437.7 | 3247.4 |
| 57.5° | 2366.9 | 2407.4 | 2792.1 | 3489.0 | 3777.1 | 3778.9 | 3757.2 | 3735.4 | 3672.6 | 3759.0 | 3464.9 |
| 60° | 2257.6 | 2298.0 | 2648.9 | 3429.2 | 3894.3 | 4021.7 | 4056.1 | 4053.7 | 3963.1 | 4124.4 | 3719.7 |
| 62.5° | 2097.5 | 2153.1 | 2499.8 | 3274.0 | 3977.6 | 4260.9 | 4364.8 | 4348.5 | 4247.6 | 4504.9 | 3972.2 |
| 65° | 1774.4 | 1822.7 | 2194.2 | 3017.9 | 3928.7 | 4459.0 | 4699.3 | 4707.8 | 4591.2 | 4863.0 | 4171.5 |
| 67.5° | 1244.1 | 1279.8 | 1648.8 | 2480.4 | 3596.5 | 4524.2 | 5041.8 | 5041.2 | 4842.5 | 5046.6 | 4083.3 |
| 70° | 721.1 | 770.0 | 974.2 | 1533.4 | 2798.1 | 4227.7 | 5093.1 | 5110.6 | 4740.4 | 4663.1 | 3379.1 |
| 72.5° | 279.0 | 319.5 | 552.0 | 814.7 | 1459.1 | 3238.4 | 4381.1 | 4432.4 | 3967.4 | 3597.1 | 2351.8 |
| 75° | 83.3 | 93.0 | 259.7 | 433.6 | 585.8 | 1564.2 | 2966.0 | 2980.5 | 2721.4 | 2243.7 | 1205.5 |
| 77.5° | 62.2 | 68.9 | 113.5 | 219.2 | 205.3 | 474.1 | 1534.6 | 1676.0 | 1444.7 | 801.4 | 332.2 |
| 80° | 42.3 | 50.1 | 80.9 | 106.9 | 76.1 | 126.2 | 431.2 | 473.5 | 440.9 | 180.0 | 83.3 |
| 82.5° | 18.7 | 24.2 | 57.4 | 53.8 | 27.8 | 36.2 | 132.9 | 141.3 | 91.2 | 54.4 | 29.0 |
| 85° | 1.8 | 2.4 | 21.7 | 23.6 | 10.3 | 8.5 | 27.8 | 27.8 | 19.9 | 18.7 | 12.1 |
| 87.5° | 0.0 | 0.0 | 0.6 | 1.2 | 1.2 | 1.8 | 2.4 | 3.0 | 3.6 | 4.8 | 6.0 |
| 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: P631352
CATALOG NUMBER: GWS-SA1F-740-U-T3R-W-HSS

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 1189.2 | 1189.2 | 1189.2 | 1189.2 | 1189.2 | 1189.2 | 1189.2 | 1189.2 | 1189.2 | 1189.2 | 1189.2 |
| 2.5° | 1200.1 | 1192.8 | 1201.9 | 1209.1 | 1210.9 | 1197.6 | 1189.8 | 1178.3 | 1175.9 | 1176.5 | 1173.5 |
| 5° | 1216.4 | 1212.7 | 1219.4 | 1211.5 | 1191.0 | 1152.3 | 1119.1 | 1082.3 | 1062.4 | 1050.9 | 1049.7 |
| 7.5° | 1246.6 | 1244.7 | 1237.5 | 1201.9 | 1137.8 | 1052.1 | 969.3 | 888.4 | 838.3 | 820.2 | 817.1 |
| 10° | 1291.2 | 1287.6 | 1258.0 | 1173.5 | 1037.0 | 872.1 | 733.2 | 617.2 | 546.6 | 526.0 | 500.7 |
| 12.5° | 1342.6 | 1335.3 | 1270.7 | 1112.5 | 884.8 | 656.5 | 483.2 | 353.3 | 292.3 | 274.2 | 274.2 |
| 15° | 1392.1 | 1376.4 | 1263.5 | 1011.6 | 697.6 | 427.0 | 270.0 | 204.1 | 185.4 | 180.6 | 180.6 |
| 17.5° | 1442.8 | 1412.6 | 1235.1 | 873.9 | 482.0 | 252.5 | 180.0 | 167.3 | 164.9 | 165.5 | 166.1 |
| 20° | 1490.6 | 1443.4 | 1185.0 | 708.4 | 307.4 | 176.4 | 161.3 | 158.2 | 157.0 | 158.2 | 157.6 |
| 22.5° | 1542.5 | 1471.8 | 1108.9 | 527.9 | 199.9 | 158.8 | 153.4 | 151.0 | 149.8 | 151.6 | 151.6 |
| 25° | 1593.8 | 1492.4 | 1008.0 | 355.1 | 158.8 | 148.0 | 144.9 | 142.5 | 141.3 | 141.9 | 141.9 |
| 27.5° | 1620.4 | 1484.5 | 875.7 | 226.5 | 142.5 | 137.1 | 134.1 | 131.1 | 129.2 | 128.6 | 129.2 |
| 30° | 1638.5 | 1460.4 | 713.9 | 161.3 | 129.2 | 122.6 | 119.6 | 117.2 | 112.3 | 109.3 | 110.5 |
| 32.5° | 1666.9 | 1436.2 | 538.1 | 135.3 | 118.4 | 108.1 | 103.3 | 97.2 | 90.6 | 87.6 | 87.6 |
| 35° | 1700.7 | 1403.0 | 377.5 | 122.0 | 106.9 | 96.0 | 87.0 | 76.7 | 68.9 | 66.4 | 66.4 |
| 37.5° | 1745.4 | 1371.6 | 251.2 | 112.9 | 97.2 | 85.8 | 73.1 | 61.0 | 52.5 | 51.3 | 50.7 |
| 40° | 1812.5 | 1345.0 | 177.0 | 106.3 | 88.8 | 74.9 | 59.8 | 47.1 | 41.1 | 39.3 | 39.3 |
| 42.5° | 1899.4 | 1317.8 | 140.1 | 99.7 | 81.5 | 64.6 | 47.7 | 37.4 | 32.6 | 31.4 | 30.8 |
| 45° | 2006.9 | 1285.8 | 122.0 | 93.6 | 74.3 | 53.8 | 38.0 | 31.4 | 27.8 | 26.6 | 26.6 |
| 47.5° | 2123.5 | 1242.3 | 113.5 | 85.8 | 65.8 | 43.5 | 32.0 | 27.2 | 25.4 | 24.8 | 24.2 |
| 50° | 2238.2 | 1183.7 | 106.3 | 78.5 | 56.2 | 35.6 | 27.8 | 24.8 | 23.6 | 23.0 | 23.0 |
| 52.5° | 2338.5 | 1115.5 | 97.2 | 70.1 | 45.9 | 30.8 | 24.8 | 23.0 | 21.7 | 20.5 | 19.9 |
| 55° | 2424.3 | 1041.2 | 85.8 | 60.4 | 37.4 | 27.2 | 23.0 | 21.1 | 19.9 | 18.7 | 18.1 |
| 57.5° | 2534.8 | 998.9 | 68.9 | 48.9 | 30.8 | 24.2 | 21.1 | 19.3 | 18.1 | 16.3 | 16.3 |
| 60° | 2657.4 | 968.1 | 51.3 | 38.7 | 26.6 | 22.3 | 19.3 | 17.5 | 16.3 | 14.5 | 14.5 |
| 62.5° | 2755.8 | 922.2 | 40.5 | 31.4 | 23.0 | 19.9 | 17.5 | 15.7 | 14.5 | 12.7 | 12.7 |
| 65° | 2793.3 | 827.4 | 33.2 | 24.8 | 18.7 | 17.5 | 15.7 | 14.5 | 12.7 | 10.9 | 10.9 |
| 67.5° | 2624.2 | 637.8 | 27.8 | 19.9 | 15.7 | 15.1 | 13.9 | 13.3 | 10.9 | 9.7 | 9.1 |
| 70° | *2078.2* | *388.9* | *23.0* | *16.3* | *13.3* | *12.7* | *12.7* | *11.5* | *9.7* | *9.1* | *8.5* |
| 72.5° | 1424.1 | 200.5 | 18.7 | 13.3 | 11.5 | 11.5 | 10.9 | 10.3 | 9.1 | 8.5 | 8.5 |
| 75° | 739.8 | 67.0 | 14.5 | 10.3 | 9.1 | 9.7 | 9.7 | 9.1 | 8.5 | 8.5 | 7.9 |
| 77.5° | 212.0 | 30.2 | 10.9 | 7.9 | 7.2 | 7.2 | 7.9 | 7.9 | 7.9 | 7.2 | 7.2 |
| 80° | 55.0 | 17.5 | 7.9 | 6.0 | 6.0 | 6.0 | 6.0 | 6.6 | 7.2 | 6.6 | 6.6 |
| 82.5° | 22.3 | 9.7 | 5.4 | 4.8 | 4.8 | 4.8 | 4.8 | 5.4 | 6.0 | 6.0 | 6.0 |
| 85° | 13.9 | 4.8 | 4.2 | 4.2 | 4.2 | 3.6 | 3.6 | 4.2 | 4.2 | 4.8 | 4.8 |
| 87.5° | 8.5 | 3.6 | 3.6 | 3.6 | 3.6 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| 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-79-08: 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

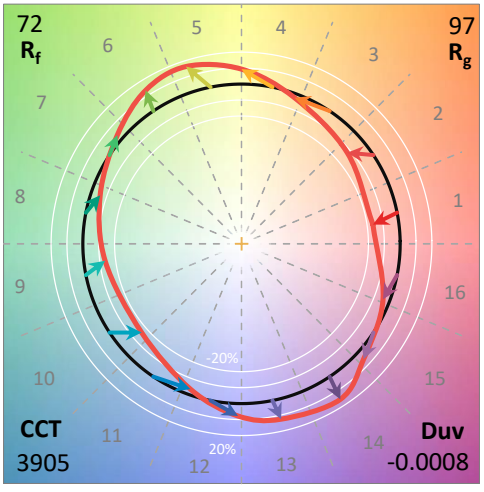
| | |
|---|---|
| Test Method: | LM-79-08 |
| Report Number: | SP1-2101-121-2 |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Photometer: | SP1 |
| Measurement Geometry: | 4π |
| Issue Date: | 03/05/2021 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS (FORMERLY EATON) |
| Product Line: | STREETWORKS |
|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

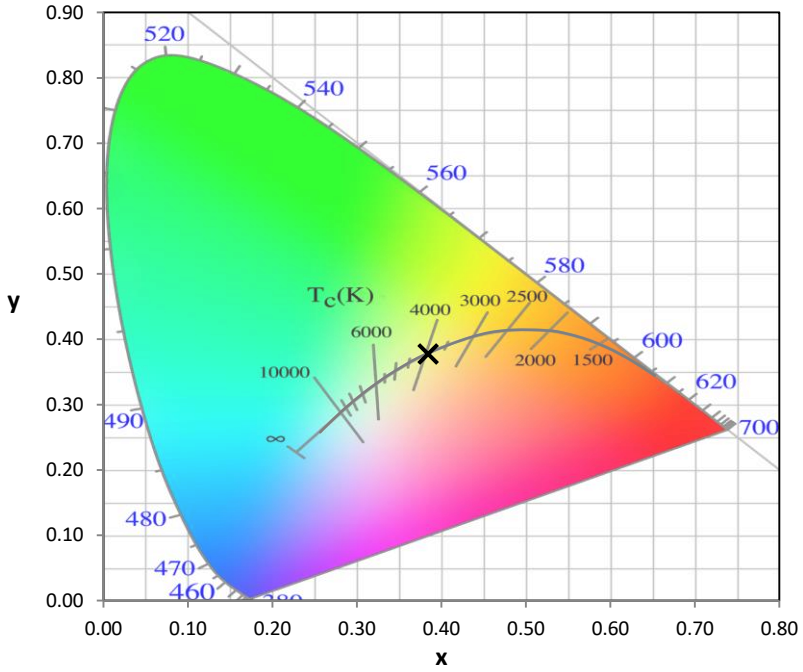
| | |
|---|---|
| Stabilization Time: | 211M |
| Operation Time: | 12H |
| Room Temperature (°C) / RH%: | 24.8/312% |
| Sphere Temperature (°C): | 24.1 |

REPORT NUMBER: SP1-2101-121-2

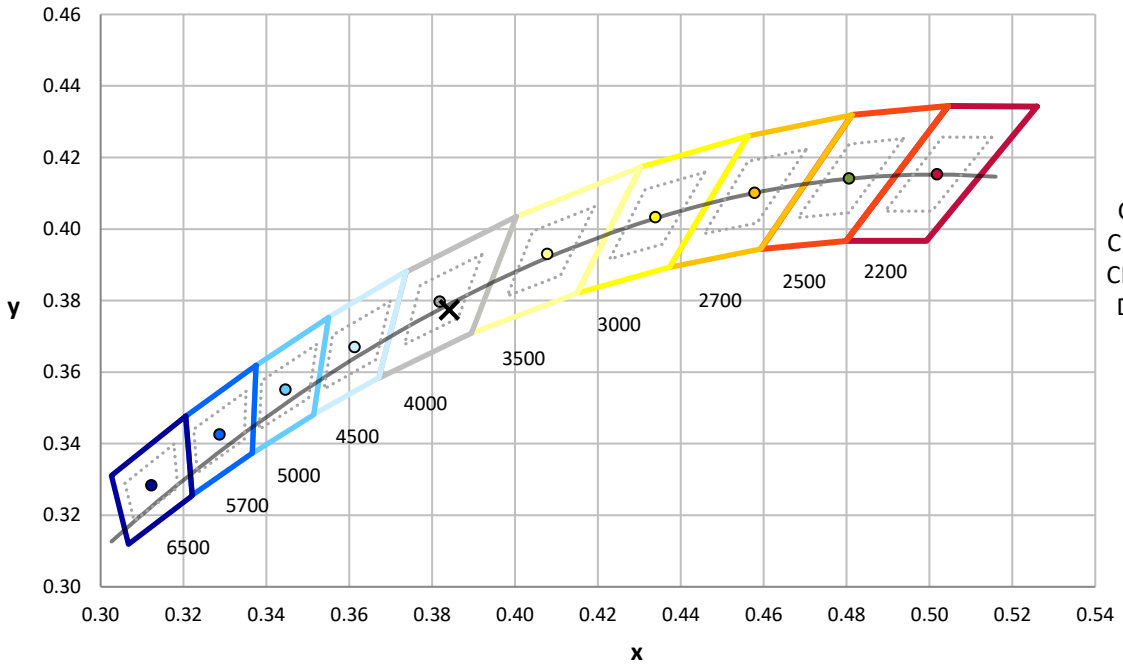
| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 1/31/2021 | 7/31/2021 |
| Power Meter | IN0071 | 12/1/2020 | 12/1/2021 |
| AC Power Source | IN0063 | 12/1/2020 | 12/1/2021 |
| DC Power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

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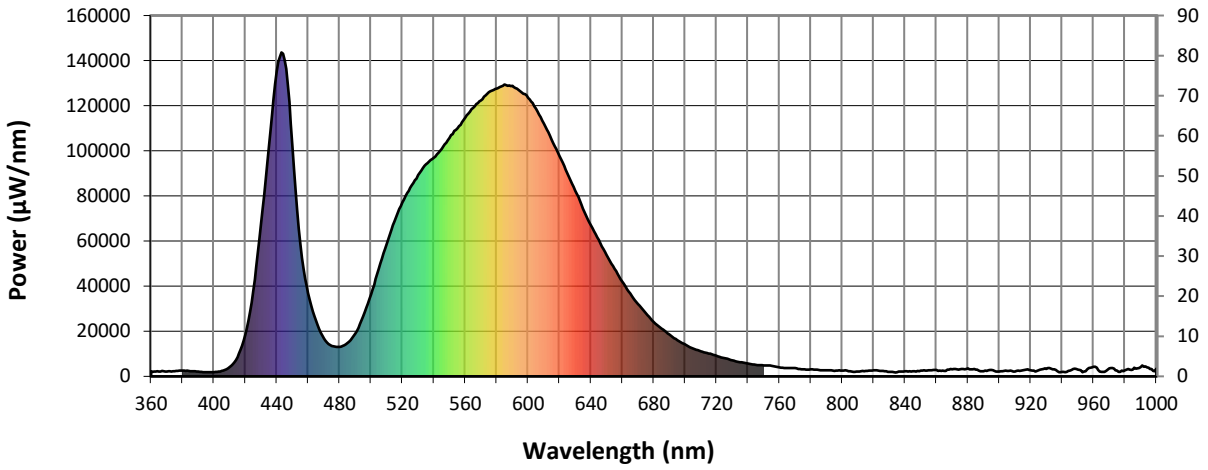
## Photopic Flux vs. Wavelength




######

| 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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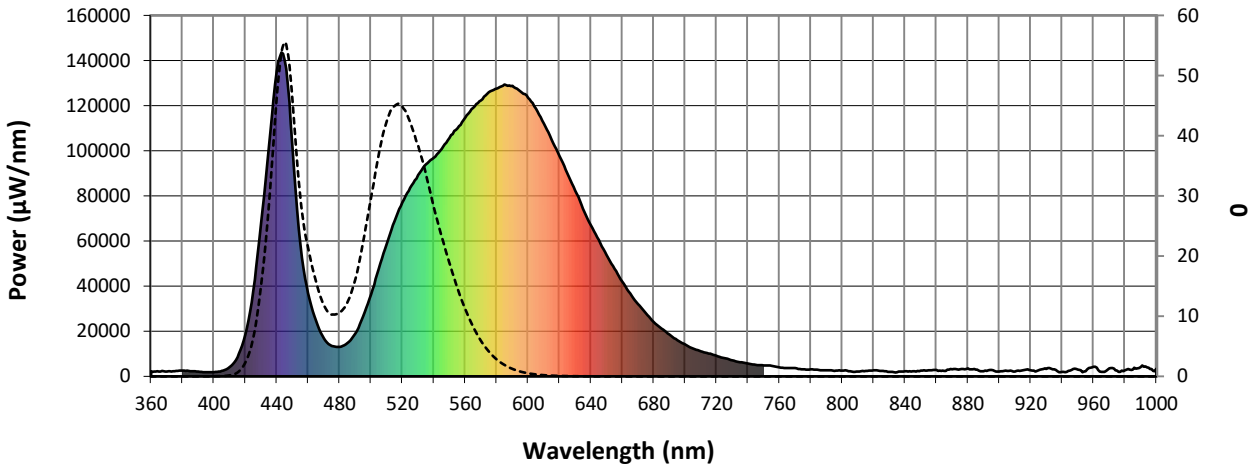
## Scotopic Flux vs. Wavelength




**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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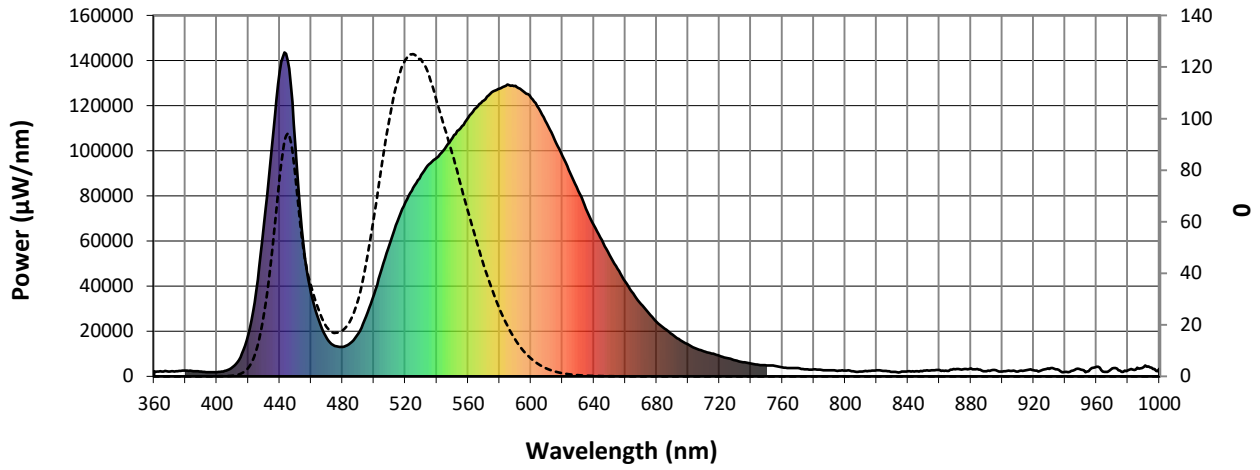
## Melanopic Flux vs. Wavelength




**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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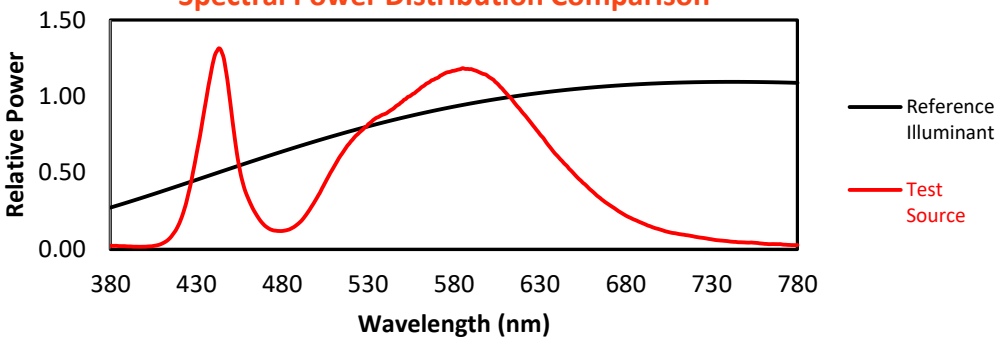
# TM-30-18

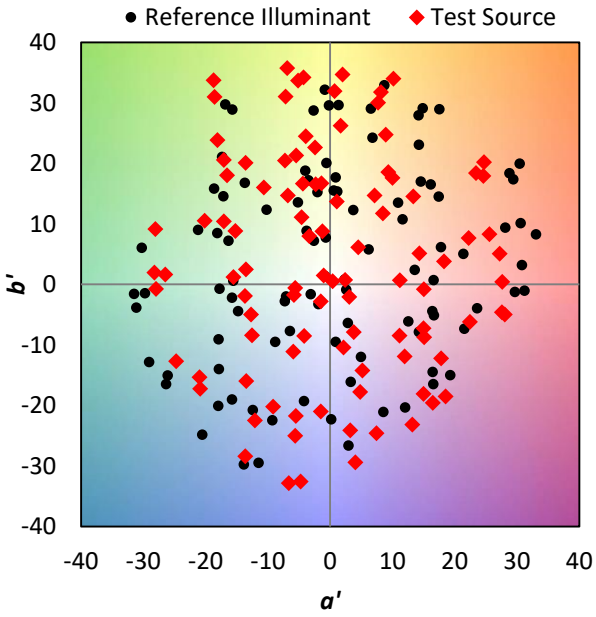
## Summary

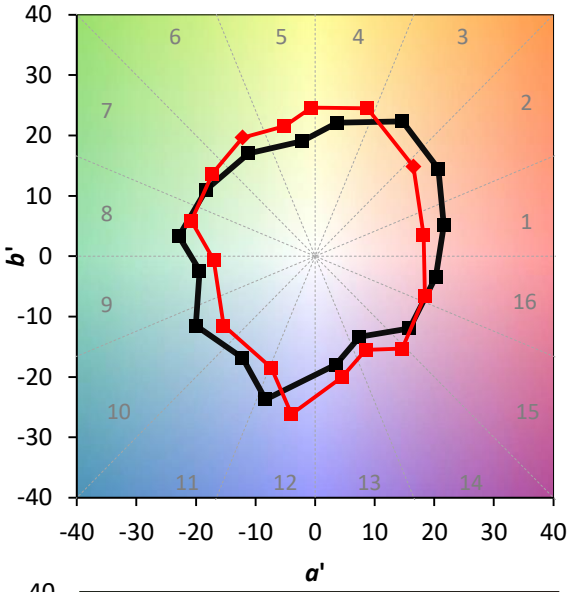
$R_f$ = 71.7
$R_g$ = 96.9
CIE $R_a$ = 71.2
$R_9$ = -29.7

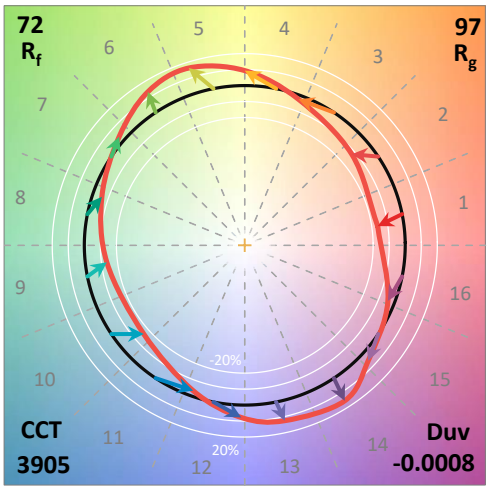
## Spectral Power Distribution Comparison

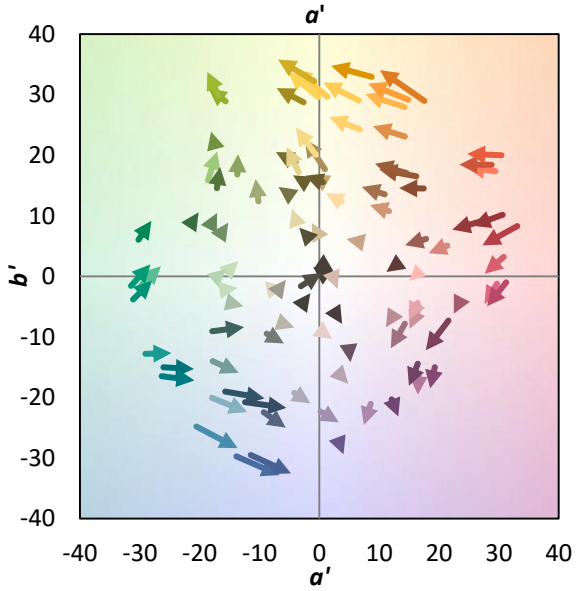



## Color Vector Graphics



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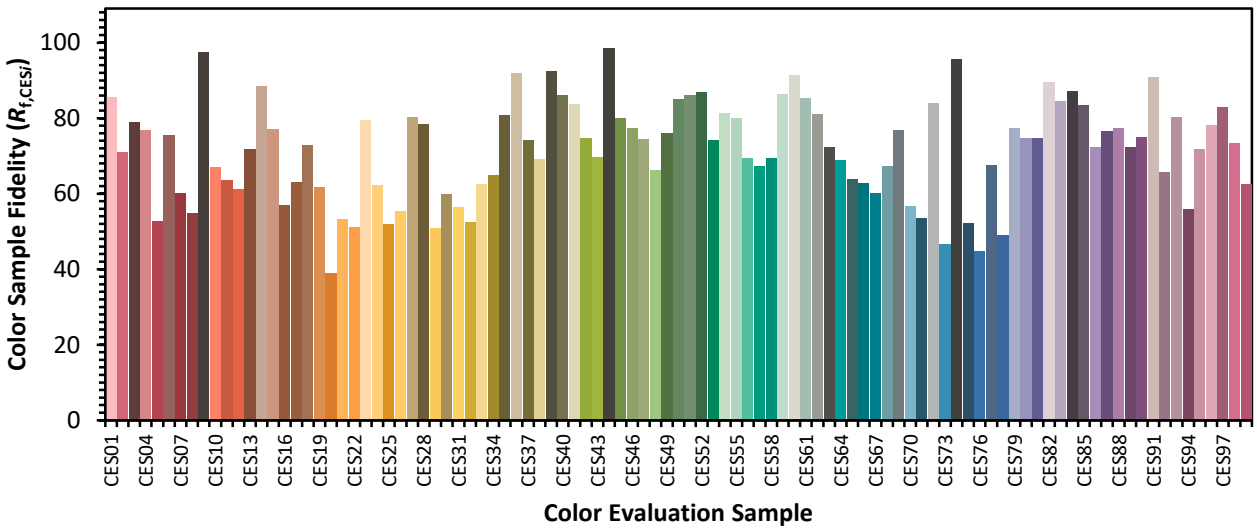
# TM-30-18

## 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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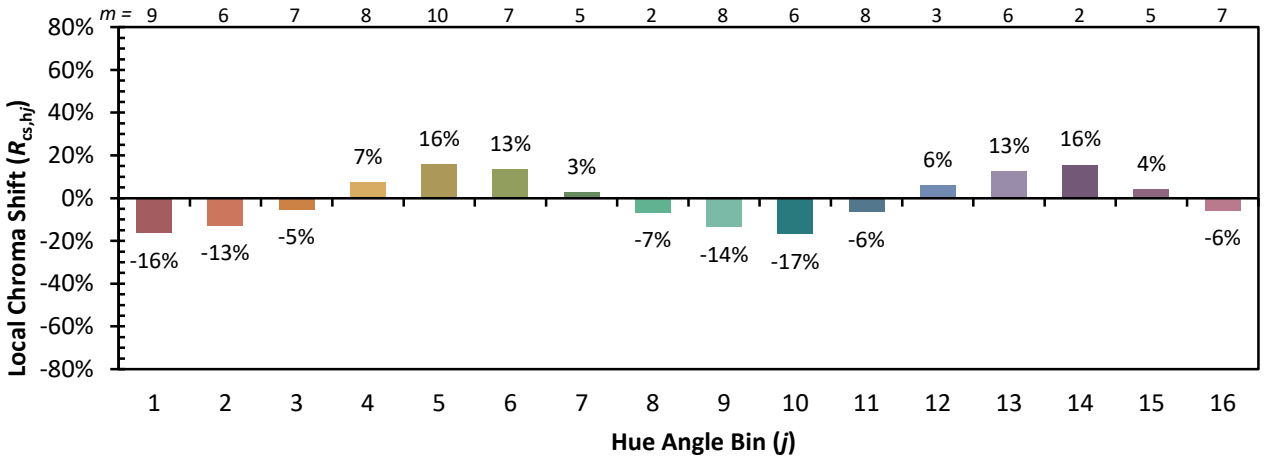
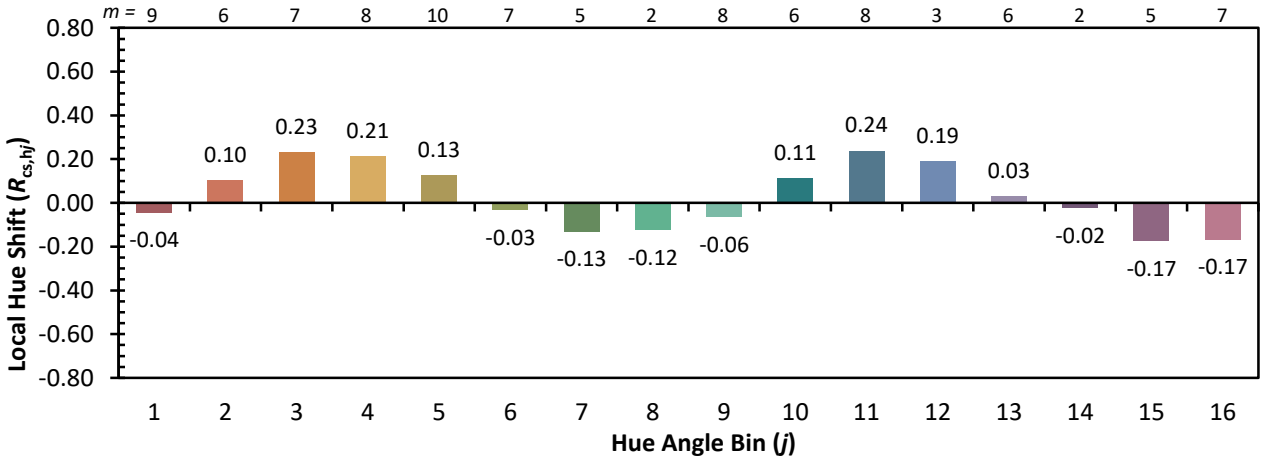
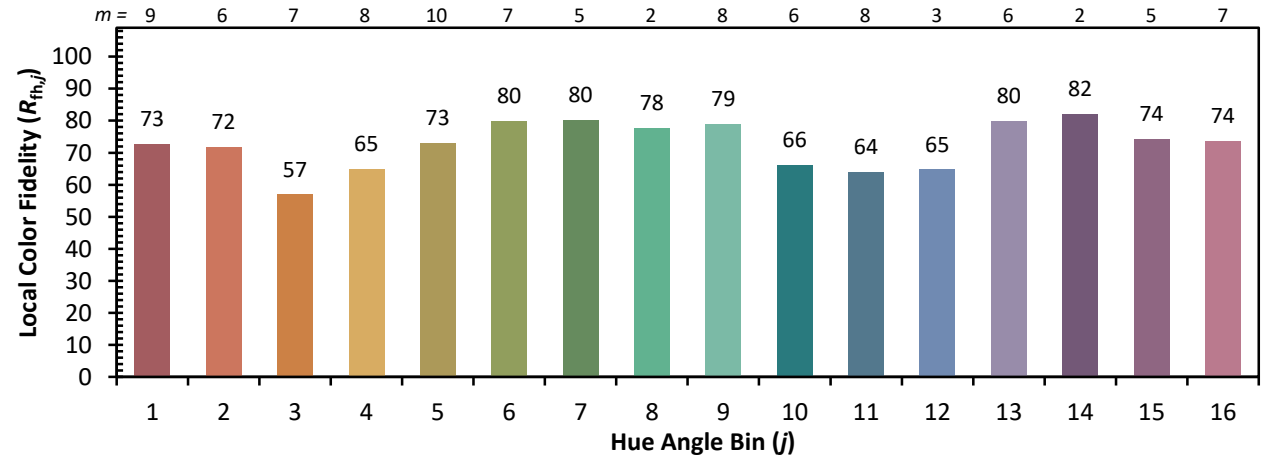
## Color Rendition by Hue-Angle Bin



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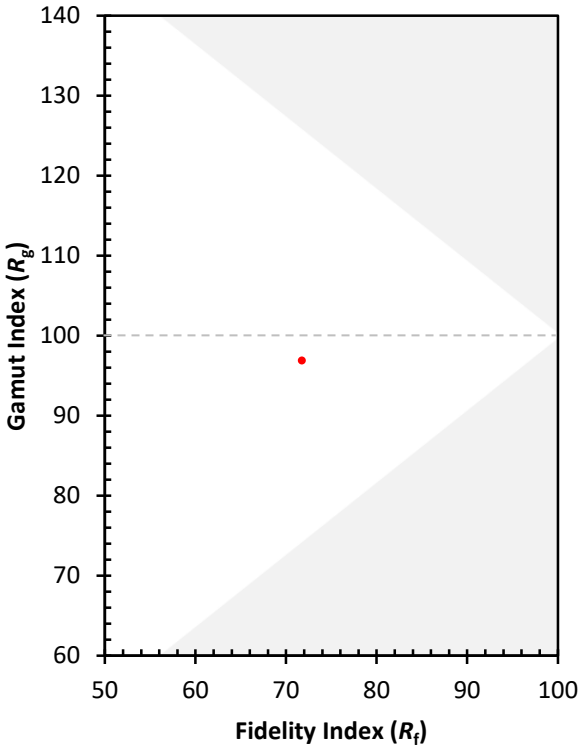
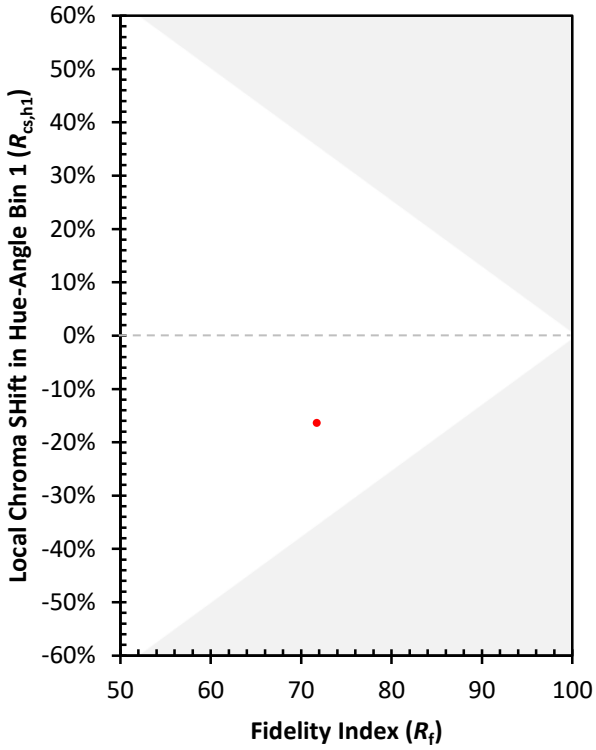
## TM-30-18

### Measure Comparisons




(END OF REPORT)