

Signify Classified - Internal  
Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



Scaled data based on original data using  
LM-79-08 Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Test Report Prepared for  
Cooper Lighting Solutions  
(formerly Eaton)

Brand: McGRAW-EDISON

Report Number: P386319

Luminaire Tested: **GWC-SA2A-722-U-T4FT**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P386319  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-16)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GWC-SA2A-722-U-T4FT  
Description: GALLEON WALL LUMINAIRE  
(2) 70 CRI, 2200K, 615mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE IV  
FORWARD THROW OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 7192 lumens  
Efficiency: N/A  
Efficacy: 109.0 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 0.5' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B1 - 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

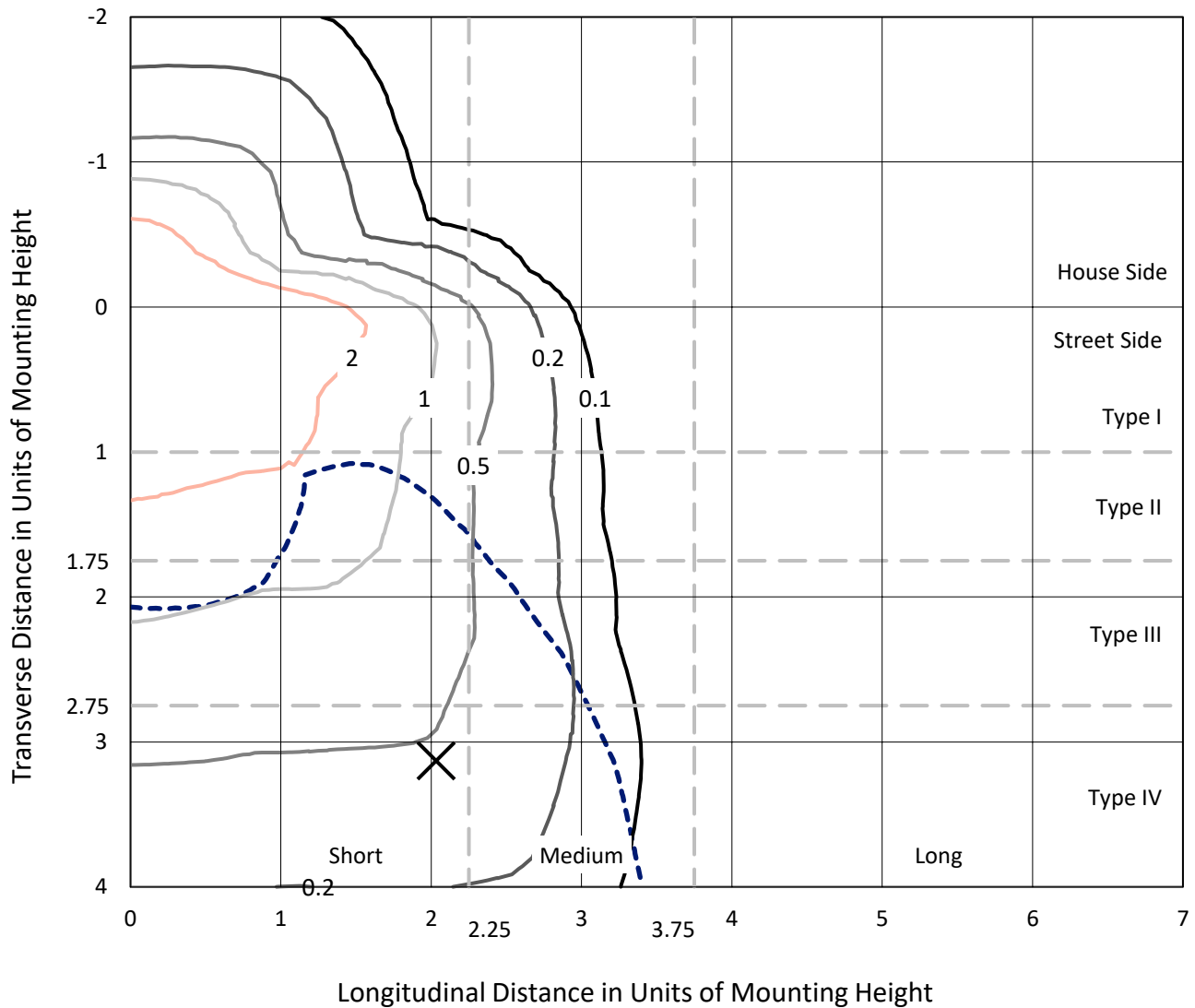


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## Iso-Footcandle Lines of Horizontal Illumination

× Max cd  
 --- 1/2 Max cd

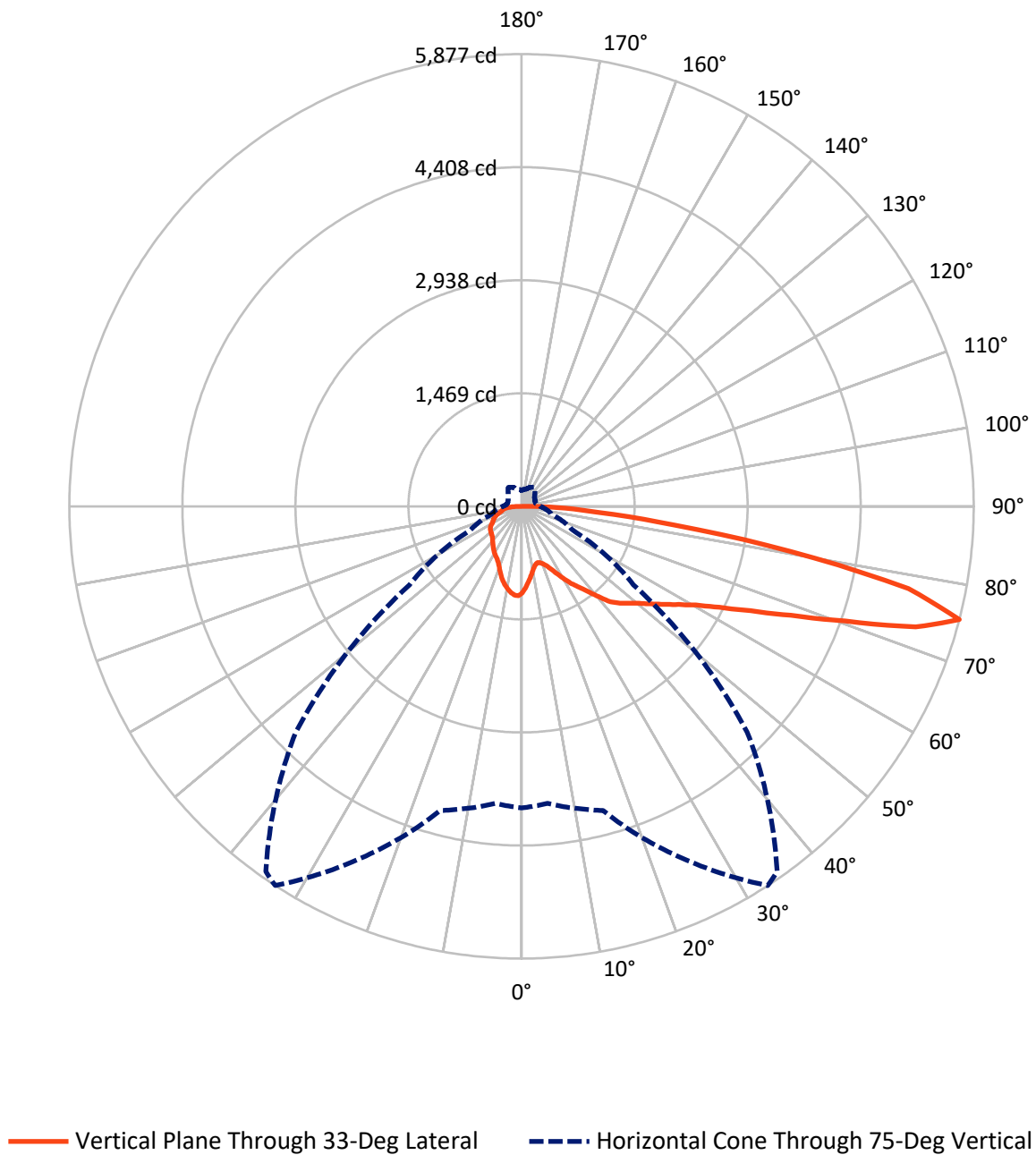


Based on 15 foot mounting height. Maximum calculated value = 5 fc  
 Type IV - Short - N/A

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## Luminous Intensity Polar Plot



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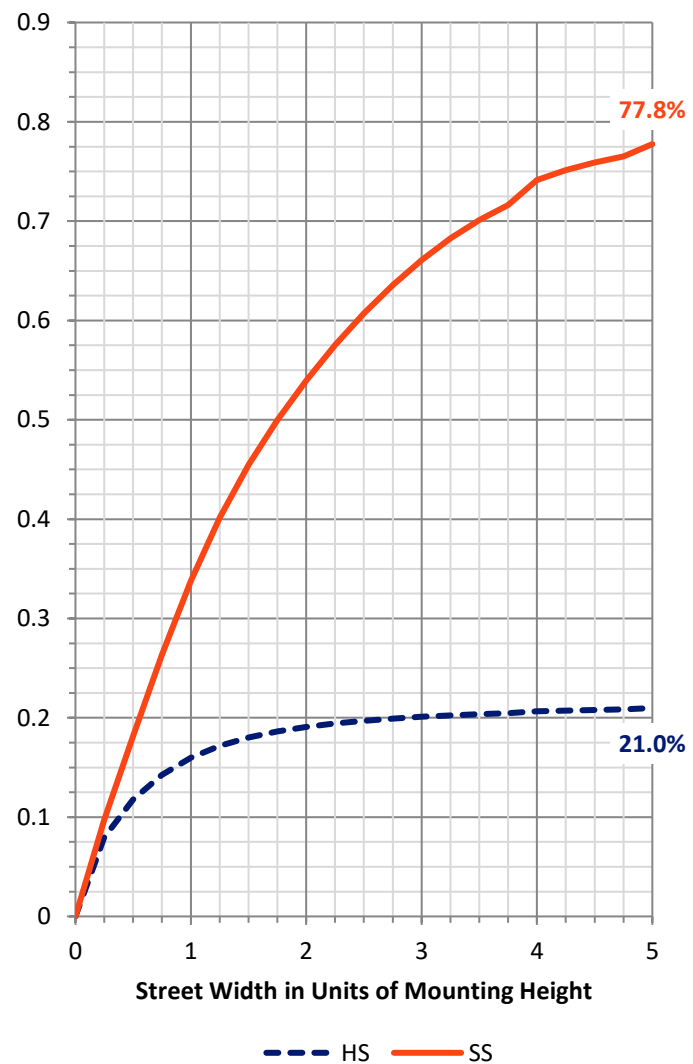
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 1544.3   | 0.0    | 1544.3 |
|                    | % Fixture | 21.5     | 0.0    | 21.5   |
| <b>Street Side</b> | Lumens    | 5647.7   | 0.0    | 5647.7 |
|                    | % Fixture | 78.5     | 0.0    | 78.5   |
| <b>Total</b>       | Lumens    | 7192.0   | 0.0    | 7192.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 101.7  | 1.4       |
| 10°-20°   | 275.4  | 3.8       |
| 20°-30°   | 449.7  | 6.3       |
| 30°-40°   | 669.7  | 9.3       |
| 40°-50°   | 960.5  | 13.4      |
| 50°-60°   | 1318.7 | 18.3      |
| 60°-70°   | 1650.9 | 23.0      |
| 70°-80°   | 1493.5 | 20.8      |
| 80°-90°   | 272.0  | 3.8       |
| 90°-100°  | 0.0    | 0.0       |
| 100°-110° | 0.0    | 0.0       |
| 110°-120° | 0.0    | 0.0       |
| 120°-130° | 0.0    | 0.0       |
| 130°-140° | 0.0    | 0.0       |
| 140°-150° | 0.0    | 0.0       |
| 150°-160° | 0.0    | 0.0       |
| 160°-170° | 0.0    | 0.0       |
| 170°-180° | 0.0    | 0.0       |
| 0°-90°    | 7192.0 | 100.0     |
| 0°-180°   | 7192.0 | 100.0     |

**Coefficient of Utilization**



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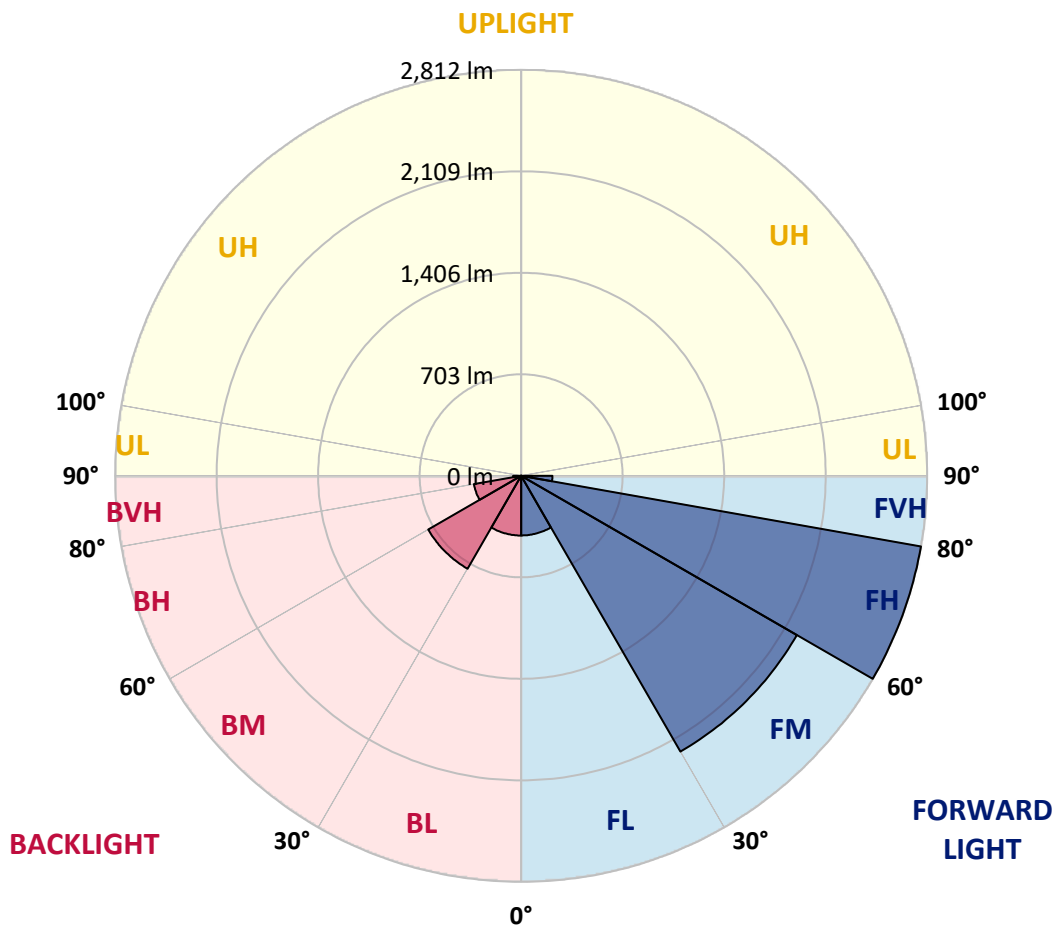
CATALOG NUMBER: GWC-SA2A-722-U-T4FT

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 413.1  | 5.7       |                         |      |         |
| FM   | (30°-60°)   | 2205.6 | 30.7      |                         |      |         |
| FH   | (60°-80°)   | 2812.3 | 39.1      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 216.7  | 3.0       |                         |      | G2/225  |
| BL   | (0°-30°)    | 413.6  | 5.8       | B1/500                  |      |         |
| BM   | (30°-60°)   | 743.2  | 10.3      | B1/1000                 |      |         |
| BH   | (60°-80°)   | 332.1  | 4.6       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 55.4   | 0.8       |                         |      | G1/100  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B1-U0-G2**

Type IV Short



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 33°    | 35°    | 45°    | 55°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1124.1 | 1124.1 | 1124.1 | 1124.1 | 1124.1 | 1124.1 | 1124.1 | 1124.1 | 1124.1 | 1124.1 | 1124.1 |
| 2.5°  | 1043.9 | 1039.9 | 1047.4 | 1048.4 | 1054.8 | 1057.3 | 1066.3 | 1080.2 | 1091.6 | 1104.8 | 1116.7 |
| 5°    | 949.3  | 946.5  | 957.0  | 964.4  | 978.6  | 984.5  | 1005.6 | 1035.2 | 1061.5 | 1091.4 | 1118.4 |
| 7.5°  | 859.3  | 857.8  | 869.5  | 886.4  | 902.8  | 911.0  | 947.5  | 990.5  | 1034.5 | 1082.7 | 1124.1 |
| 10°   | 783.6  | 783.1  | 794.2  | 810.9  | 835.0  | 844.2  | 891.4  | 948.0  | 1009.6 | 1076.0 | 1133.8 |
| 12.5° | 741.1  | 742.8  | 748.0  | 761.9  | 784.3  | 793.5  | 845.9  | 912.5  | 988.8  | 1073.7 | 1148.0 |
| 15°   | 751.5  | 754.2  | 745.3  | 744.8  | 760.7  | 767.9  | 817.1  | 887.1  | 973.8  | 1077.4 | 1168.6 |
| 17.5° | 796.0  | 796.5  | 772.9  | 758.0  | 767.7  | 771.4  | 808.1  | 872.7  | 965.2  | 1085.9 | 1194.5 |
| 20°   | 858.6  | 857.3  | 815.6  | 790.8  | 796.0  | 797.0  | 820.8  | 873.0  | 964.4  | 1100.5 | 1228.0 |
| 22.5° | 941.6  | 932.4  | 876.2  | 842.4  | 841.2  | 839.7  | 853.4  | 891.4  | 975.3  | 1124.4 | 1268.0 |
| 25°   | 1049.9 | 1041.2 | 963.9  | 917.7  | 907.8  | 904.0  | 906.0  | 930.6  | 997.0  | 1150.0 | 1312.7 |
| 27.5° | 1170.4 | 1155.2 | 1080.7 | 1015.3 | 994.7  | 989.5  | 977.6  | 986.0  | 1020.6 | 1174.6 | 1365.9 |
| 30°   | 1271.2 | 1263.0 | 1197.9 | 1120.4 | 1096.1 | 1088.6 | 1057.3 | 1048.1 | 1054.6 | 1208.1 | 1432.9 |
| 32.5° | 1327.6 | 1322.1 | 1282.6 | 1220.0 | 1197.4 | 1187.0 | 1142.8 | 1124.4 | 1109.2 | 1261.0 | 1523.9 |
| 35°   | 1395.9 | 1392.5 | 1368.6 | 1323.1 | 1289.6 | 1278.7 | 1244.4 | 1225.3 | 1186.3 | 1333.8 | 1641.4 |
| 37.5° | 1482.9 | 1479.2 | 1479.7 | 1442.9 | 1402.9 | 1392.7 | 1370.1 | 1350.0 | 1286.1 | 1429.5 | 1769.1 |
| 40°   | 1581.3 | 1574.1 | 1571.3 | 1569.6 | 1544.2 | 1538.5 | 1526.6 | 1499.3 | 1411.3 | 1543.7 | 1895.0 |
| 42.5° | 1729.3 | 1703.7 | 1649.1 | 1669.7 | 1694.8 | 1691.8 | 1701.5 | 1662.3 | 1550.5 | 1678.9 | 2018.0 |
| 45°   | 1872.2 | 1830.2 | 1735.8 | 1740.3 | 1795.2 | 1811.8 | 1884.3 | 1856.5 | 1701.3 | 1827.0 | 2145.2 |
| 47.5° | 1937.3 | 1905.5 | 1825.2 | 1825.5 | 1879.9 | 1914.4 | 2073.4 | 2053.5 | 1859.8 | 1995.1 | 2300.5 |
| 50°   | 2010.1 | 1978.3 | 1906.2 | 1933.3 | 1980.7 | 2017.5 | 2256.0 | 2245.8 | 2010.6 | 2179.2 | 2486.5 |
| 52.5° | 2089.6 | 2035.6 | 1989.9 | 2038.4 | 2105.0 | 2147.7 | 2438.8 | 2411.0 | 2148.9 | 2364.6 | 2700.4 |
| 55°   | 2090.5 | 2075.9 | 2110.7 | 2146.2 | 2245.8 | 2298.2 | 2630.4 | 2556.9 | 2261.7 | 2546.7 | 2874.6 |
| 57.5° | 2209.5 | 2185.7 | 2259.5 | 2275.9 | 2406.1 | 2465.2 | 2820.9 | 2683.8 | 2376.5 | 2686.3 | 2968.5 |
| 60°   | 2367.0 | 2346.7 | 2407.0 | 2450.3 | 2604.3 | 2683.3 | 3024.4 | 2814.2 | 2466.7 | 2791.6 | 2964.0 |
| 62.5° | 2639.1 | 2616.0 | 2615.2 | 2675.8 | 2883.3 | 2975.2 | 3252.7 | 2942.2 | 2502.4 | 2812.5 | 2837.6 |
| 65°   | 3037.3 | 3000.5 | 2931.2 | 2960.1 | 3268.6 | 3360.3 | 3507.8 | 3034.8 | 2455.2 | 2700.7 | 2511.9 |
| 67.5° | 3424.9 | 3423.6 | 3338.4 | 3397.5 | 3777.4 | 3850.9 | 3798.5 | 3044.0 | 2307.9 | 2311.4 | 1934.0 |
| 70°   | 3811.2 | 3816.1 | 3801.7 | 4007.4 | 4464.8 | 4541.3 | 4108.1 | 2920.6 | 1976.8 | 1669.2 | 1158.7 |
| 72.5° | 4117.2 | 4116.0 | 4188.5 | 4718.9 | 5356.9 | 5339.8 | 4368.9 | 2546.4 | 1419.3 | 901.1  | 553.8  |
| 75°   | 3919.0 | 3875.8 | 4091.9 | 5071.2 | 5876.9 | 5793.2 | 4147.1 | 1776.3 | 736.6  | 410.2  | 298.1  |
| 77.5° | 2556.1 | 2597.1 | 2914.3 | 4189.3 | 5140.5 | 5038.7 | 3042.5 | 828.8  | 347.1  | 269.1  | 216.1  |
| 80°   | 925.7  | 968.9  | 1364.6 | 2373.0 | 3541.6 | 3525.0 | 1498.3 | 340.6  | 234.8  | 203.2  | 157.5  |
| 82.5° | 318.5  | 334.4  | 538.3  | 1053.8 | 1999.6 | 2074.1 | 563.7  | 193.5  | 170.7  | 144.1  | 107.8  |
| 85°   | 125.0  | 143.1  | 246.2  | 507.0  | 1008.6 | 1016.1 | 228.3  | 115.8  | 118.7  | 94.4   | 59.1   |
| 87.5° | 47.5   | 57.6   | 117.8  | 235.5  | 460.6  | 423.1  | 81.7   | 55.2   | 67.6   | 56.1   | 28.1   |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

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CATALOG NUMBER: GWC-SA2A-722-U-T4FT

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1124.1 | 1124.1 | 1124.1 | 1124.1 | 1124.1 | 1124.1 | 1124.1 | 1124.1 | 1124.1 | 1124.1 | 1124.1 |
| 2.5°  | 1125.9 | 1131.1 | 1142.0 | 1149.5 | 1157.4 | 1159.7 | 1160.7 | 1162.7 | 1164.6 | 1163.9 | 1164.1 |
| 5°    | 1132.8 | 1143.0 | 1160.7 | 1168.1 | 1171.6 | 1167.6 | 1159.9 | 1153.7 | 1149.2 | 1146.8 | 1146.0 |
| 7.5°  | 1144.3 | 1158.7 | 1177.6 | 1176.3 | 1168.4 | 1150.7 | 1130.9 | 1116.0 | 1103.5 | 1099.1 | 1096.6 |
| 10°   | 1159.4 | 1176.3 | 1189.5 | 1175.3 | 1152.2 | 1121.7 | 1091.9 | 1068.7 | 1050.1 | 1042.9 | 1041.7 |
| 12.5° | 1178.8 | 1195.9 | 1198.4 | 1168.4 | 1130.1 | 1088.4 | 1047.9 | 1017.3 | 989.5  | 980.6  | 978.6  |
| 15°   | 1203.9 | 1220.0 | 1204.6 | 1156.2 | 1102.8 | 1046.6 | 994.2  | 952.7  | 923.4  | 912.5  | 908.5  |
| 17.5° | 1230.2 | 1245.6 | 1205.9 | 1136.1 | 1067.0 | 997.2  | 931.4  | 888.9  | 855.3  | 842.7  | 841.2  |
| 20°   | 1261.8 | 1268.7 | 1200.7 | 1107.3 | 1017.8 | 933.1  | 863.8  | 823.8  | 805.9  | 797.0  | 796.0  |
| 22.5° | 1300.8 | 1293.3 | 1188.7 | 1068.3 | 955.5  | 859.1  | 802.7  | 784.0  | 779.6  | 777.6  | 778.3  |
| 25°   | 1342.0 | 1319.2 | 1171.1 | 1017.3 | 876.7  | 785.0  | 758.0  | 763.2  | 769.1  | 768.4  | 768.4  |
| 27.5° | 1387.5 | 1345.5 | 1144.0 | 949.8  | 789.5  | 724.4  | 727.7  | 746.8  | 755.7  | 755.5  | 755.2  |
| 30°   | 1445.9 | 1375.3 | 1109.5 | 868.5  | 708.0  | 681.7  | 701.3  | 724.7  | 736.8  | 736.3  | 736.6  |
| 32.5° | 1517.7 | 1408.1 | 1062.5 | 777.8  | 649.1  | 650.1  | 672.8  | 695.9  | 710.0  | 708.8  | 709.0  |
| 35°   | 1601.6 | 1444.9 | 998.9  | 688.4  | 610.1  | 625.1  | 642.9  | 659.1  | 672.5  | 670.8  | 669.0  |
| 37.5° | 1693.1 | 1480.9 | 914.5  | 608.4  | 578.3  | 601.7  | 616.6  | 619.3  | 625.5  | 621.1  | 617.8  |
| 40°   | 1780.0 | 1508.5 | 805.7  | 542.8  | 546.3  | 581.8  | 591.5  | 580.6  | 569.4  | 567.9  | 563.4  |
| 42.5° | 1855.8 | 1517.7 | 695.6  | 490.4  | 512.5  | 561.0  | 566.9  | 544.1  | 523.9  | 514.5  | 510.5  |
| 45°   | 1935.8 | 1520.9 | 593.0  | 446.4  | 480.0  | 542.3  | 548.8  | 518.2  | 489.9  | 469.5  | 462.8  |
| 47.5° | 2040.4 | 1544.2 | 513.3  | 413.9  | 455.1  | 529.9  | 539.1  | 497.6  | 460.8  | 431.8  | 425.6  |
| 50°   | 2177.2 | 1590.5 | 448.4  | 389.0  | 439.0  | 521.7  | 532.1  | 477.5  | 437.0  | 402.0  | 395.8  |
| 52.5° | 2329.3 | 1632.9 | 396.0  | 368.9  | 423.3  | 507.3  | 523.2  | 463.1  | 414.6  | 374.4  | 367.7  |
| 55°   | 2435.6 | 1600.4 | 353.8  | 348.1  | 403.0  | 486.7  | 510.8  | 450.9  | 382.6  | 347.6  | 341.6  |
| 57.5° | 2456.0 | 1489.1 | 321.7  | 326.4  | 378.4  | 460.8  | 491.6  | 423.8  | 365.2  | 335.9  | 329.7  |
| 60°   | 2400.3 | 1334.1 | 297.9  | 306.6  | 352.0  | 428.3  | 455.9  | 404.7  | 348.5  | 323.5  | 318.2  |
| 62.5° | 2260.5 | 1175.3 | 280.2  | 288.7  | 327.4  | 395.3  | 433.5  | 384.6  | 331.7  | 309.3  | 304.1  |
| 65°   | 1978.0 | 986.8  | 263.3  | 272.8  | 304.6  | 366.7  | 413.4  | 365.9  | 315.0  | 297.9  | 292.9  |
| 67.5° | 1493.1 | 739.1  | 247.4  | 255.9  | 284.2  | 341.8  | 391.5  | 347.6  | 298.9  | 287.9  | 282.0  |
| 70°   | 879.2  | 462.8  | 229.3  | 238.2  | 262.8  | 316.0  | 368.2  | 327.4  | 278.7  | 273.8  | 266.1  |
| 72.5° | 409.2  | 278.5  | 208.7  | 217.4  | 236.0  | 281.5  | 338.1  | 301.1  | 254.9  | 244.0  | 233.5  |
| 75°   | 244.2  | 203.7  | 184.3  | 192.0  | 205.2  | 244.7  | 300.4  | 274.3  | 232.3  | 217.9  | 206.9  |
| 77.5° | 182.6  | 155.8  | 157.5  | 165.7  | 176.4  | 214.1  | 266.1  | 253.2  | 214.9  | 203.7  | 196.3  |
| 80°   | 131.4  | 118.3  | 128.4  | 137.4  | 148.6  | 194.8  | 254.9  | 234.0  | 194.3  | 179.4  | 172.4  |
| 82.5° | 87.7   | 85.0   | 96.6   | 105.8  | 116.8  | 170.4  | 239.5  | 205.0  | 166.0  | 147.1  | 131.7  |
| 85°   | 48.4   | 51.2   | 65.1   | 69.1   | 78.5   | 120.0  | 196.3  | 164.7  | 125.0  | 100.6  | 96.1   |
| 87.5° | 20.1   | 23.6   | 35.0   | 33.8   | 41.7   | 71.5   | 129.2  | 99.4   | 79.5   | 59.4   | 46.2   |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



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

Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

STREETWORKS

Report Number: SP1-2101-121-4

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

Test Date: 03/03/2021

### Test Information

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

PROGRAMMED @ 800mA.

### Spectral Parameters

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



### Test Conditions

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

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| 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: SP1-2101-121-4

**CIE 1931 Chromaticity Diagram**



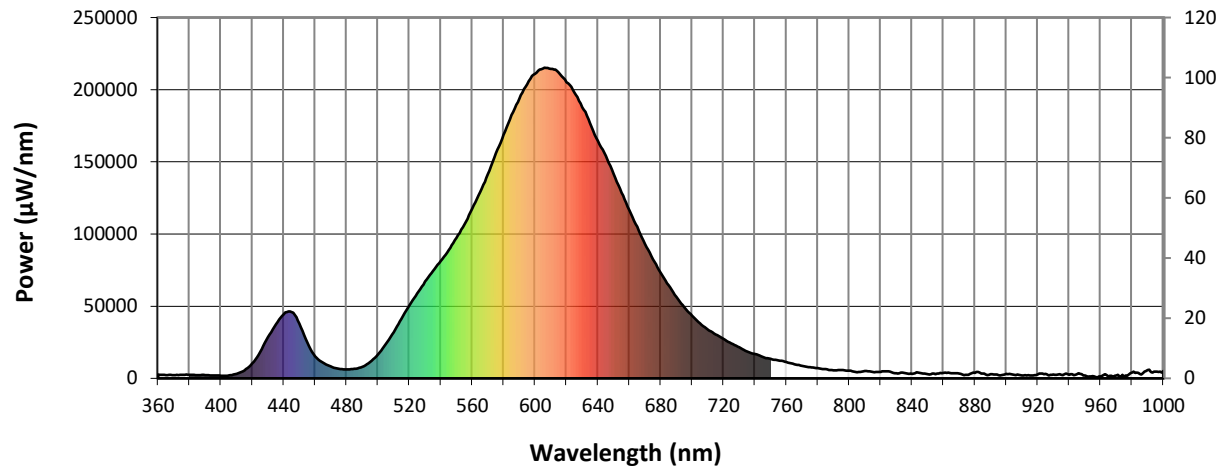
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 2200K 4-step quadrangle

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### Photopic Flux vs. Wavelength



#####

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 2623             | 0.0              | 490       | 7941             | 1.1              | 620       | 205150           | 53.4             | 750       | 13431            | 0.0              | 880       | 3867             | 0.0              |
| 365       | 2260             | 0.0              | 495       | 11299            | 2.0              | 625       | 198277           | 43.7             | 755       | 12426            | 0.0              | 885       | 3345             | 0.0              |
| 370       | 2306             | 0.0              | 500       | 16633            | 3.7              | 630       | 187878           | 34.0             | 760       | 11385            | 0.0              | 890       | 2956             | 0.0              |
| 375       | 2437             | 0.0              | 505       | 23672            | 6.6              | 635       | 176836           | 26.6             | 765       | 9797             | 0.0              | 895       | 2272             | 0.0              |
| 380       | 2473             | 0.0              | 510       | 32025            | 11.0             | 640       | 164455           | 19.7             | 770       | 8562             | 0.0              | 900       | 3003             | 0.0              |
| 385       | 2203             | 0.0              | 515       | 41295            | 17.1             | 645       | 154086           | 14.8             | 775       | 7810             | 0.0              | 905       | 2480             | 0.0              |
| 390       | 2262             | 0.0              | 520       | 50628            | 24.6             | 650       | 141592           | 10.3             | 780       | 7052             | 0.0              | 910       | 2068             | 0.0              |
| 395       | 2028             | 0.0              | 525       | 58836            | 31.6             | 655       | 128604           | 7.4              | 785       | 6345             | 0.0              | 915       | 2064             | 0.0              |
| 400       | 1806             | 0.0              | 530       | 67109            | 39.5             | 660       | 116713           | 4.9              | 790       | 5524             | 0.0              | 920       | 2581             | 0.0              |
| 405       | 1945             | 0.0              | 535       | 74404            | 46.1             | 665       | 104993           | 3.3              | 795       | 5788             | 0.0              | 925       | 3137             | 0.0              |
| 410       | 3199             | 0.0              | 540       | 81280            | 53.0             | 670       | 93149            | 2.0              | 800       | 5282             | 0.0              | 930       | 2747             | 0.0              |
| 415       | 5572             | 0.0              | 545       | 88806            | 59.1             | 675       | 82543            | 1.4              | 805       | 4258             | 0.0              | 935       | 2471             | 0.0              |
| 420       | 10322            | 0.0              | 550       | 97367            | 66.2             | 680       | 73089            | 0.8              | 810       | 5156             | 0.0              | 940       | 2339             | 0.0              |
| 425       | 18494            | 0.1              | 555       | 106598           | 72.8             | 685       | 64438            | 0.6              | 815       | 4391             | 0.0              | 945       | 2917             | 0.0              |
| 430       | 28541            | 0.2              | 560       | 117615           | 79.9             | 690       | 56546            | 0.3              | 820       | 4383             | 0.0              | 950       | 1966             | 0.0              |
| 435       | 37453            | 0.4              | 565       | 129103           | 85.8             | 695       | 49328            | 0.2              | 825       | 4881             | 0.0              | 955       | 1580             | 0.0              |
| 440       | 44455            | 0.7              | 570       | 141415           | 92.0             | 700       | 43493            | 0.1              | 830       | 3588             | 0.0              | 960       | 1318             | 0.0              |
| 445       | 45934            | 1.0              | 575       | 155854           | 97.0             | 705       | 38035            | 0.1              | 835       | 3835             | 0.0              | 965       | 1419             | 0.0              |
| 450       | 37926            | 1.0              | 580       | 168613           | 100.2            | 710       | 33716            | 0.0              | 840       | 3014             | 0.0              | 970       | 1917             | 0.0              |
| 455       | 24793            | 0.8              | 585       | 182390           | 101.3            | 715       | 30449            | 0.0              | 845       | 3765             | 0.0              | 975       | 1210             | 0.0              |
| 460       | 15340            | 0.6              | 590       | 194054           | 100.3            | 720       | 27240            | 0.0              | 850       | 2906             | 0.0              | 980       | 3915             | 0.0              |
| 465       | 10883            | 0.6              | 595       | 203639           | 96.5             | 725       | 24231            | 0.0              | 855       | 2947             | 0.0              | 985       | 3180             | 0.0              |
| 470       | 8138             | 0.5              | 600       | 211043           | 91.0             | 730       | 21490            | 0.0              | 860       | 3864             | 0.0              | 990       | 5676             | 0.0              |
| 475       | 6653             | 0.5              | 605       | 214591           | 83.1             | 735       | 18548            | 0.0              | 865       | 3546             | 0.0              | 995       | 4736             | 0.0              |
| 480       | 6220             | 0.6              | 610       | 214337           | 73.6             | 740       | 16963            | 0.0              | 870       | 3253             | 0.0              | 1000      | 5113             | 0.0              |
| 485       | 6613             | 0.8              | 615       | 211915           | 64.0             | 745       | 14922            | 0.0              | 875       | 2450             | 0.0              |           |                  |                  |

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### Scotopic Flux vs. Wavelength



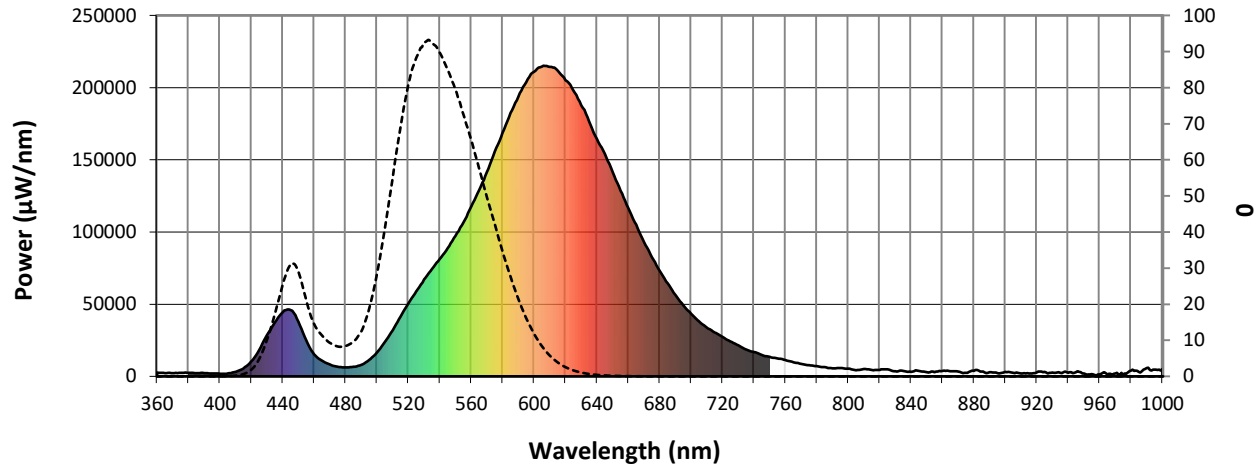
Scotopic Lumens: 7290.1

S/P: 0.84

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 2623             | 0.0              | 490       | 7941             | 12.2             | 620       | 205150           | 2.6              | 750       | 13431            | 0.0              | 880       | 3867             | 0.0              |
| 365       | 2260             | 0.0              | 495       | 11299            | 18.3             | 625       | 198277           | 1.7              | 755       | 12426            | 0.0              | 885       | 3345             | 0.0              |
| 370       | 2306             | 0.0              | 500       | 16633            | 27.8             | 630       | 187878           | 1.1              | 760       | 11385            | 0.0              | 890       | 2956             | 0.0              |
| 375       | 2437             | 0.0              | 505       | 23672            | 40.2             | 635       | 176836           | 0.7              | 765       | 9797             | 0.0              | 895       | 2272             | 0.0              |
| 380       | 2473             | 0.0              | 510       | 32025            | 54.3             | 640       | 164455           | 0.4              | 770       | 8562             | 0.0              | 900       | 3003             | 0.0              |
| 385       | 2203             | 0.0              | 515       | 41295            | 68.4             | 645       | 154086           | 0.3              | 775       | 7810             | 0.0              | 905       | 2480             | 0.0              |
| 390       | 2262             | 0.0              | 520       | 50628            | 80.5             | 650       | 141592           | 0.2              | 780       | 7052             | 0.0              | 910       | 2068             | 0.0              |
| 395       | 2028             | 0.0              | 525       | 58836            | 88.0             | 655       | 128604           | 0.1              | 785       | 6345             | 0.0              | 915       | 2064             | 0.0              |
| 400       | 1806             | 0.0              | 530       | 67109            | 92.5             | 660       | 116713           | 0.1              | 790       | 5524             | 0.0              | 920       | 2581             | 0.0              |
| 405       | 1945             | 0.1              | 535       | 74404            | 92.7             | 665       | 104993           | 0.0              | 795       | 5788             | 0.0              | 925       | 3137             | 0.0              |
| 410       | 3199             | 0.2              | 540       | 81280            | 89.8             | 670       | 93149            | 0.0              | 800       | 5282             | 0.0              | 930       | 2747             | 0.0              |
| 415       | 5572             | 0.6              | 545       | 88806            | 85.1             | 675       | 82543            | 0.0              | 805       | 4258             | 0.0              | 935       | 2471             | 0.0              |
| 420       | 10322            | 1.7              | 550       | 97367            | 79.6             | 680       | 73089            | 0.0              | 810       | 5156             | 0.0              | 940       | 2339             | 0.0              |
| 425       | 18494            | 4.5              | 555       | 106598           | 72.8             | 685       | 64438            | 0.0              | 815       | 4391             | 0.0              | 945       | 2917             | 0.0              |
| 430       | 28541            | 9.7              | 560       | 117615           | 65.7             | 690       | 56546            | 0.0              | 820       | 4383             | 0.0              | 950       | 1966             | 0.0              |
| 435       | 37453            | 16.7             | 565       | 129103           | 57.9             | 695       | 49328            | 0.0              | 825       | 4881             | 0.0              | 955       | 1580             | 0.0              |
| 440       | 44455            | 24.8             | 570       | 141415           | 49.9             | 700       | 43493            | 0.0              | 830       | 3588             | 0.0              | 960       | 1318             | 0.0              |
| 445       | 45934            | 30.8             | 575       | 155854           | 42.4             | 705       | 38035            | 0.0              | 835       | 3835             | 0.0              | 965       | 1419             | 0.0              |
| 450       | 37926            | 29.4             | 580       | 168613           | 34.7             | 710       | 33716            | 0.0              | 840       | 3014             | 0.0              | 970       | 1917             | 0.0              |
| 455       | 24793            | 21.7             | 585       | 182390           | 27.9             | 715       | 30449            | 0.0              | 845       | 3765             | 0.0              | 975       | 1210             | 0.0              |
| 460       | 15340            | 14.8             | 590       | 194054           | 21.6             | 720       | 27240            | 0.0              | 850       | 2906             | 0.0              | 980       | 3915             | 0.0              |
| 465       | 10883            | 11.5             | 595       | 203639           | 16.2             | 725       | 24231            | 0.0              | 855       | 2947             | 0.0              | 985       | 3180             | 0.0              |
| 470       | 8138             | 9.4              | 600       | 211043           | 11.9             | 730       | 21490            | 0.0              | 860       | 3864             | 0.0              | 990       | 5676             | 0.0              |
| 475       | 6653             | 8.3              | 605       | 214591           | 8.4              | 735       | 18548            | 0.0              | 865       | 3546             | 0.0              | 995       | 4736             | 0.0              |
| 480       | 6220             | 8.4              | 610       | 214337           | 5.8              | 740       | 16963            | 0.0              | 870       | 3253             | 0.0              | 1000      | 5113             | 0.0              |
| 485       | 6613             | 9.6              | 615       | 211915           | 3.9              | 745       | 14922            | 0.0              | 875       | 2450             | 0.0              |           |                  |                  |

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### Melanopic Flux vs. Wavelength



**Melanopic Lumens: 2276.7**

**M/P: 0.26**

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

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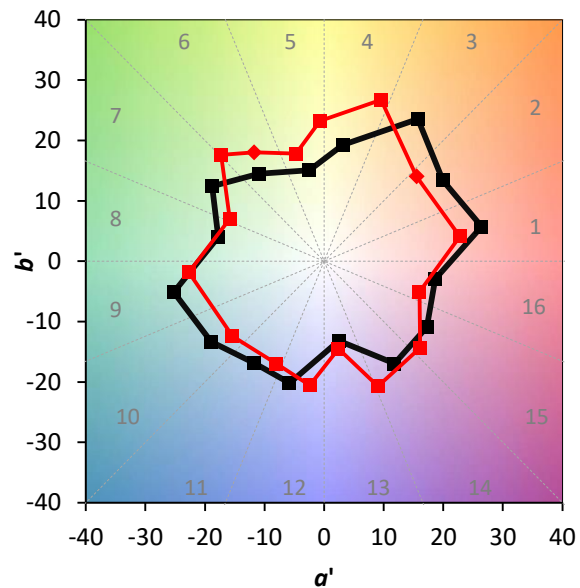
TM-30-18

### Summary

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



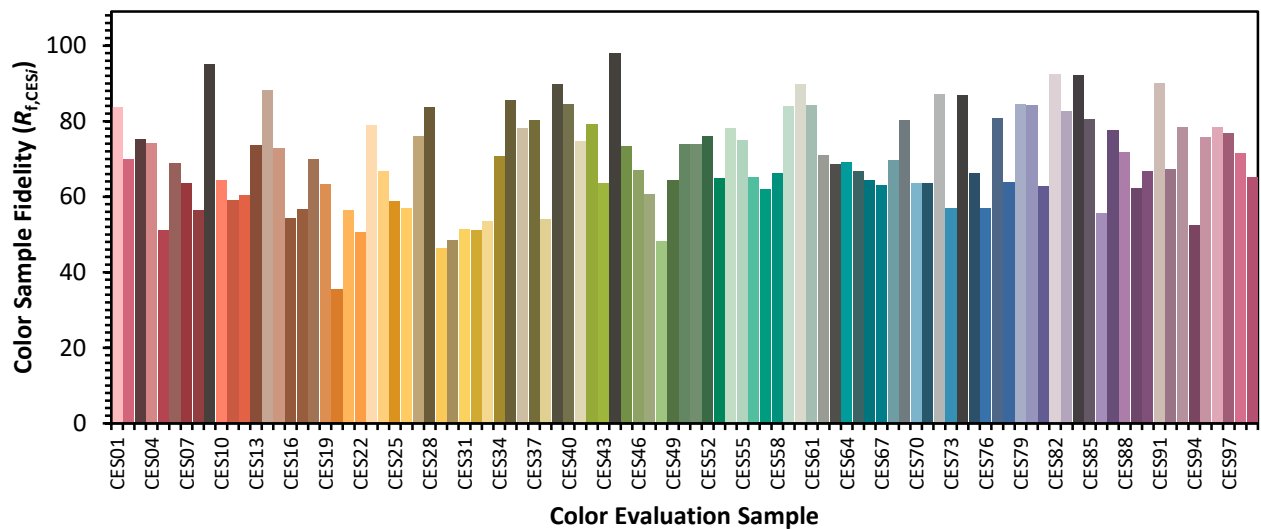
### Color Vector Graphics





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

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



Color Rendition by Hue-Angle Bin



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**TM-30-18**

**Measure Comparisons**



(END OF REPORT)