

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: P320878

Luminaire Tested: **GLEON-SA4B-727-U-AFL**

Issue Date: 3/3/2020

Test Information

Test Method: LM-79-08
Report Number: P320878
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-29)
Test Lab: INNOVATION CENTER
Issue Date: 3/3/2020
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)
Product Line: McGRAW-EDISON
Catalog Number: GLEON-SA4B-727-U-AFL
Description: GALLEON AREA AND ROADWAY LUMINAIRE
(4) 70 CRI, 2700K, 800mA LIGHTSQUARES WITH 16 LEDS EACH AND AUTOMOTIVE
FRONTLINE OPTICS
Light Source: -
Ballast/Driver: ELECTRONIC DRIVER

Summary

Lumens per Lamp: N/A
Luminaire Lumens: 19777 lumens
Efficiency: N/A
Efficacy: 115.7 lumens/watt
Luminous Opening: Rectangular (W 1' x L: 1' x H: 0')
IES Classification: Type II - Short
BUG Rating: B2 - U0 - G2

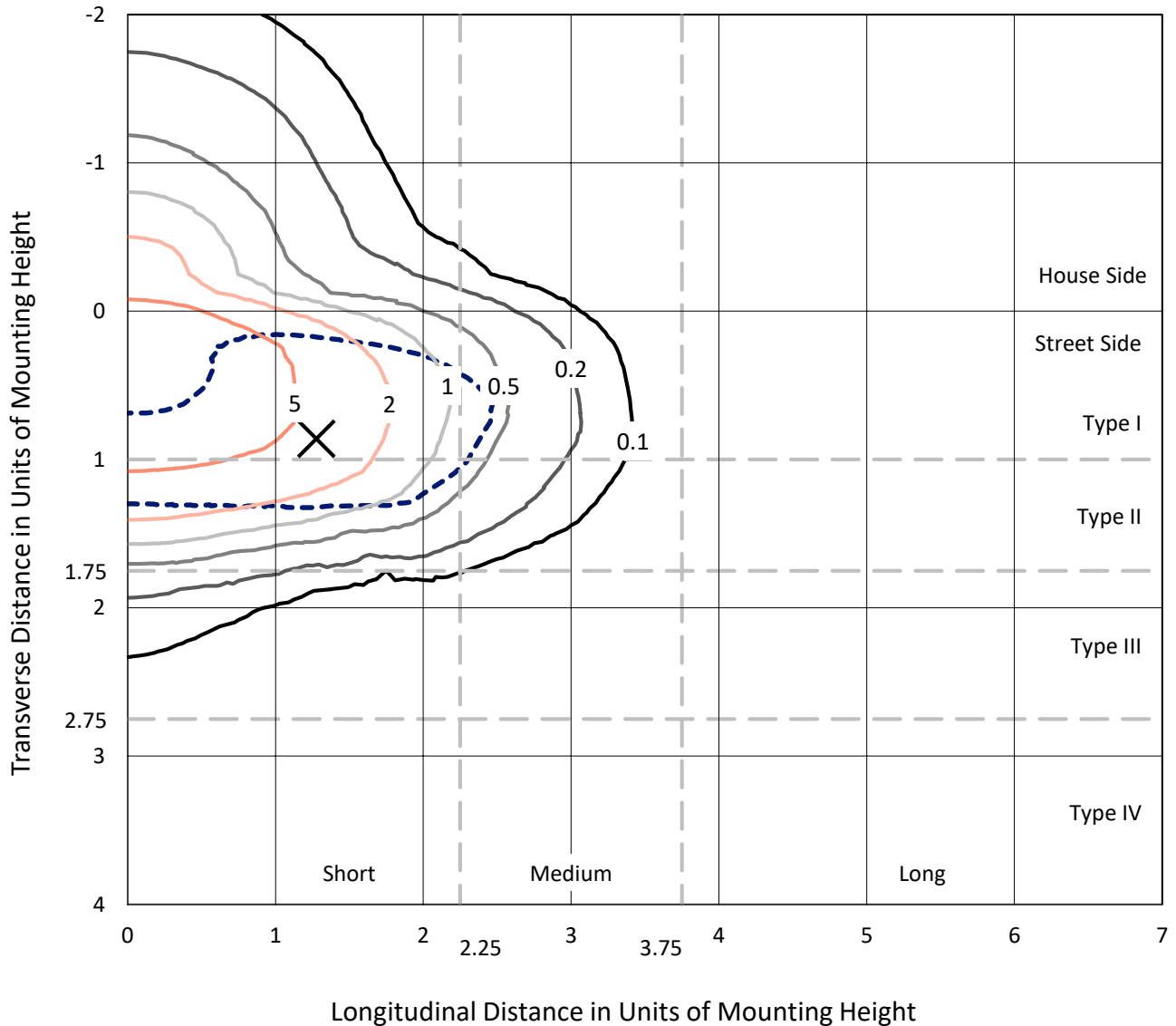
Input Watts (W): 171
Input Voltage (V): NR
Input Current (Ain): NR
Voltage Rise (V): NR
Power Factor: NR
Total Harmonic Distortion (THDi): NR
Frequency (hertz): 60
Stabilization Time: NR
Operation Time: NR
Ambient Temperature (°C): NR
Test Distance: 24 FT



REPORT NUMBER: P320878
 CATALOG NUMBER: GLEON-SA4B-727-U-AFL

Iso-Footcandle Lines of Horizontal Illumination

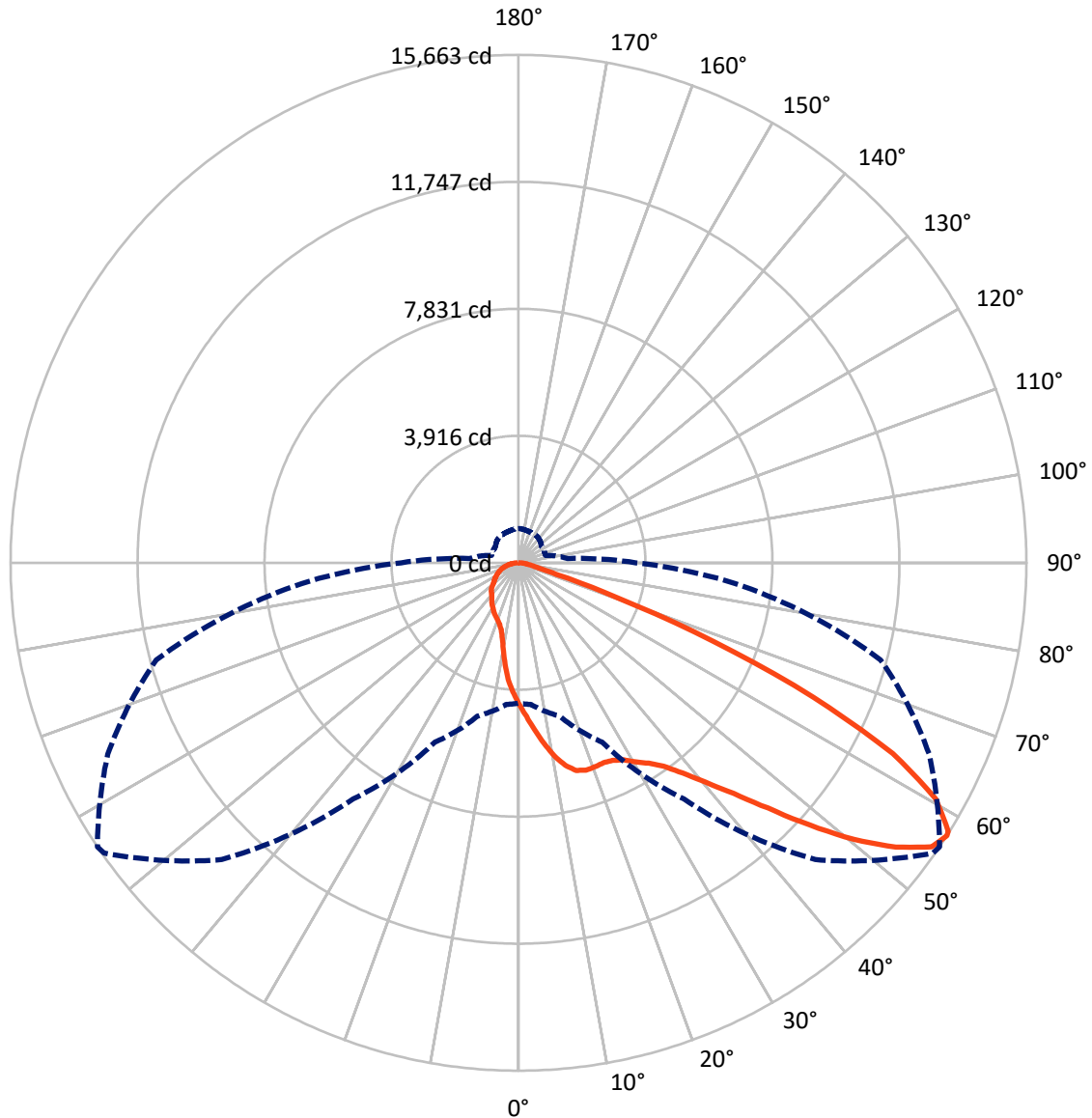
✕ Max cd
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 9.7 fc
 Type II - Short - N/A

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Luminous Intensity Polar Plot



— Vertical Plane Through 56-Deg Lateral - - - Horizontal Cone Through 57-Deg Vertical

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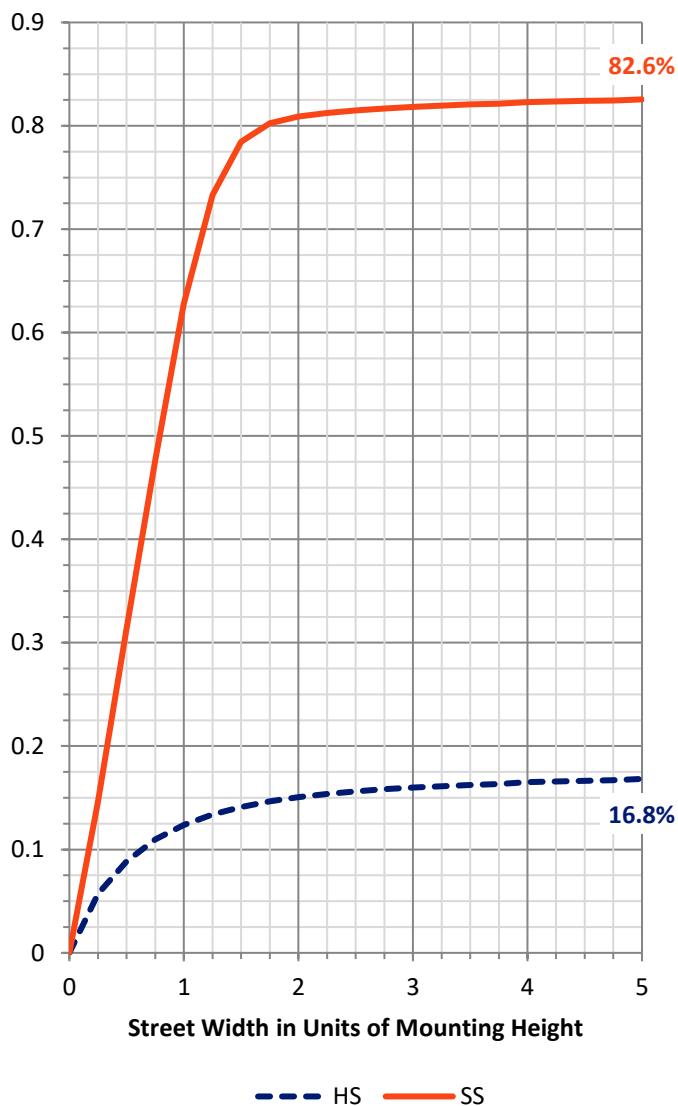
FLUX DISTRIBUTION:

| | | Downward | Upward | Total |
|--------------------|-----------|----------|--------|---------|
| House Side | Lumens | 3409.1 | 0.0 | 3409.1 |
| | % Fixture | 17.2 | 0.0 | 17.2 |
| Street Side | Lumens | 16367.9 | 0.0 | 16367.9 |
| | % Fixture | 82.8 | 0.0 | 82.8 |
| Total | Lumens | 19777.0 | 0.0 | 19777.0 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

ZONAL LUMENS:

| Zone | Lumens | % Fixture |
|-----------|---------|-----------|
| 0°-10° | 419.0 | 2.1 |
| 10°-20° | 1184.7 | 6.0 |
| 20°-30° | 1929.6 | 9.8 |
| 30°-40° | 2884.6 | 14.6 |
| 40°-50° | 4375.3 | 22.1 |
| 50°-60° | 4903.9 | 24.8 |
| 60°-70° | 2896.4 | 14.6 |
| 70°-80° | 949.0 | 4.8 |
| 80°-90° | 234.5 | 1.2 |
| 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° | 19777.0 | 100.0 |
| 0°-180° | 19777.0 | 100.0 |

Coefficient of Utilization

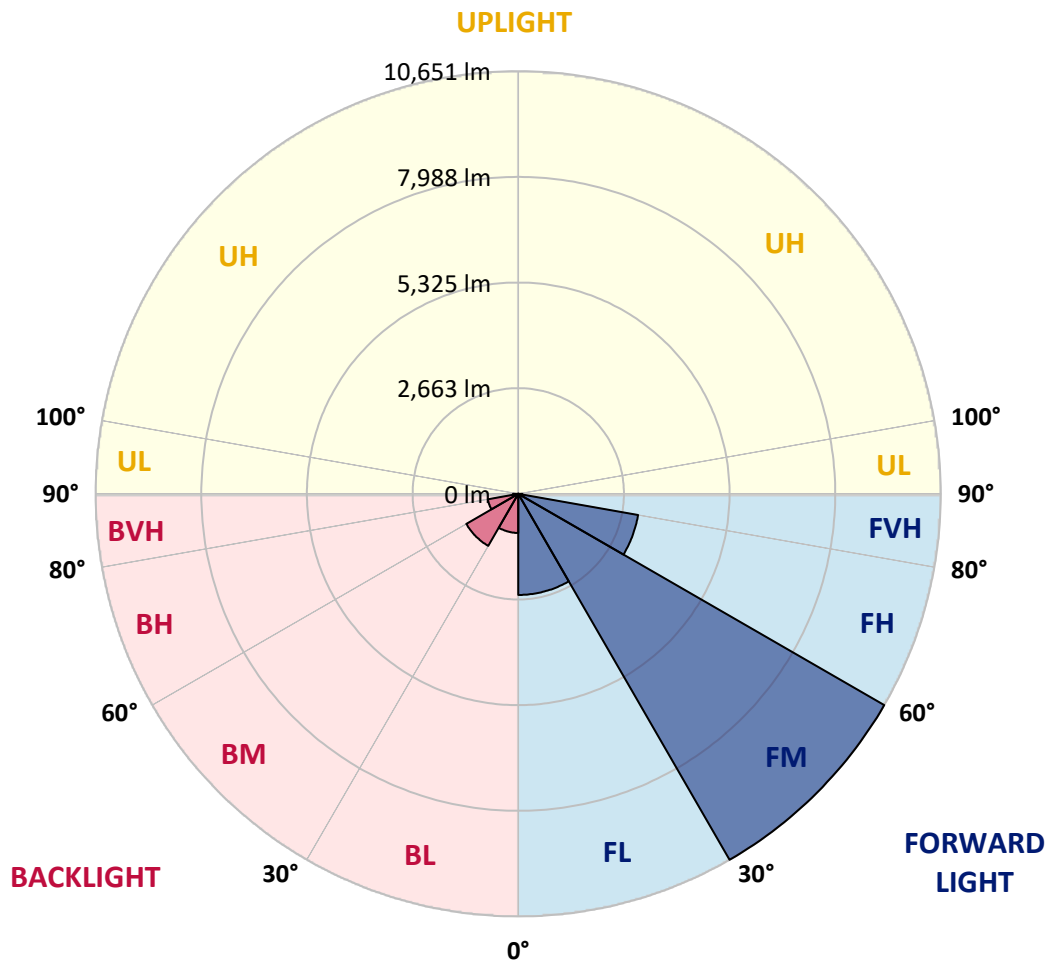


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LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | Lumens | % Fixture | Zone Rating/Lumen Limit | | |
|----------------|---------|-----------|-------------------------|------|---------|
| | | | B | U | G |
| FL (0°-30°) | 2547.6 | 12.9 | | | |
| FM (30°-60°) | 10650.6 | 53.9 | | | |
| FH (60°-80°) | 3066.5 | 15.5 | | | G2/5000 |
| FVH (80°-90°) | 103.2 | 0.5 | | | G2/225 |
| BL (0°-30°) | 985.8 | 5.0 | B2/1000 | | |
| BM (30°-60°) | 1513.2 | 7.7 | B2/2500 | | |
| BH (60°-80°) | 778.9 | 3.9 | B2/1000 | | G2/1000 |
| BVH (80°-90°) | 131.2 | 0.7 | | | G2/225 |
| UL (90°-100°) | 0.0 | 0.0 | | U0/0 | |
| UH (100°-180°) | 0.0 | 0.0 | | U0/0 | |

BUG Rating: B2-U0-G2
 Type II Short





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CANDELA DISTRIBUTION (FULL):

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 56° | 65° | 75° | 85° |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|--------|
| 0° | 4386.6 | 4386.6 | 4386.6 | 4386.6 | 4386.6 | 4386.6 | 4386.6 | 4386.6 | 4386.6 | 4386.6 | 4386.6 |
| 2.5° | 5037.0 | 5083.2 | 5062.8 | 4992.1 | 4937.8 | 4861.0 | 4775.3 | 4749.5 | 4659.1 | 4557.8 | 4436.2 |
| 5° | 5834.2 | 5811.1 | 5777.8 | 5667.7 | 5551.5 | 5416.2 | 5201.5 | 5167.5 | 4966.3 | 4737.3 | 4495.3 |
| 7.5° | 6288.3 | 6286.2 | 6266.5 | 6201.9 | 6095.9 | 5919.2 | 5660.2 | 5620.1 | 5316.3 | 4948.0 | 4572.8 |
| 10° | 6222.3 | 6217.6 | 6250.2 | 6317.5 | 6349.4 | 6312.7 | 6094.6 | 6054.5 | 5681.3 | 5181.1 | 4662.5 |
| 12.5° | 5847.8 | 5850.6 | 5902.9 | 6044.3 | 6236.6 | 6467.7 | 6432.3 | 6412.6 | 6059.9 | 5444.8 | 4771.2 |
| 15° | 5556.3 | 5562.4 | 5603.8 | 5726.9 | 5953.9 | 6373.2 | 6637.6 | 6644.4 | 6426.2 | 5735.7 | 4898.3 |
| 17.5° | 5428.5 | 5441.4 | 5460.4 | 5546.7 | 5754.7 | 6184.9 | 6686.5 | 6723.2 | 6747.0 | 6037.5 | 5020.7 |
| 20° | 5469.3 | 5481.5 | 5486.9 | 5542.0 | 5712.6 | 6070.8 | 6652.6 | 6718.5 | 6993.1 | 6321.6 | 5143.0 |
| 22.5° | 5652.1 | 5659.6 | 5663.0 | 5677.2 | 5809.8 | 6103.4 | 6630.1 | 6699.5 | 7171.1 | 6576.4 | 5235.5 |
| 25° | 5955.2 | 5949.8 | 5928.0 | 5909.7 | 5998.7 | 6232.5 | 6681.8 | 6747.7 | 7315.9 | 6807.5 | 5295.9 |
| 27.5° | 6318.2 | 6311.4 | 6269.2 | 6218.9 | 6269.9 | 6433.7 | 6830.6 | 6883.0 | 7445.7 | 7023.7 | 5326.5 |
| 30° | 6753.8 | 6736.2 | 6656.6 | 6596.8 | 6616.5 | 6735.5 | 7076.0 | 7123.6 | 7646.2 | 7269.0 | 5356.4 |
| 32.5° | 7257.5 | 7238.4 | 7123.6 | 7024.3 | 7024.3 | 7123.6 | 7328.8 | 7368.2 | 7816.1 | 7546.3 | 5404.7 |
| 35° | 7888.2 | 7864.4 | 7714.9 | 7548.4 | 7501.5 | 7551.8 | 7673.4 | 7701.3 | 8122.0 | 7895.7 | 5492.4 |
| 37.5° | 8631.7 | 8599.8 | 8406.1 | 8183.2 | 8080.5 | 8077.8 | 8165.5 | 8222.6 | 8610.7 | 8354.4 | 5641.2 |
| 40° | 9377.3 | 9354.9 | 9185.7 | 9010.3 | 8809.1 | 8744.6 | 8879.8 | 8897.5 | 9249.6 | 8924.0 | 5831.5 |
| 42.5° | 9953.7 | 9949.6 | 9918.3 | 9941.5 | 9735.5 | 9605.0 | 9711.1 | 9725.3 | 10029.8 | 9540.5 | 6034.1 |
| 45° | 10258.2 | 10265.0 | 10416.5 | 10752.3 | 10828.4 | 10733.3 | 10785.6 | 10789.7 | 10921.5 | 10162.3 | 6219.6 |
| 47.5° | 10014.2 | 10049.5 | 10432.9 | 11183.9 | 11807.1 | 12123.2 | 12036.2 | 12086.5 | 11786.1 | 10696.6 | 6365.1 |
| 50° | 9063.3 | 9106.8 | 9759.3 | 10991.5 | 12263.9 | 13468.2 | 13422.7 | 13411.1 | 12483.4 | 11088.1 | 6443.9 |
| 52.5° | 7885.5 | 7919.5 | 8457.7 | 9991.8 | 11928.8 | 14211.8 | 14629.8 | 14570.0 | 13103.3 | 11381.0 | 6458.9 |
| 55° | 6091.8 | 6144.8 | 6660.7 | 7996.3 | 10573.5 | 13927.7 | 15517.4 | 15463.7 | 13668.1 | 11534.6 | 6441.2 |
| 57° | 4330.8 | 4386.6 | 4899.0 | 6102.7 | 8894.8 | 12944.2 | 15605.8 | 15662.9 | 13973.2 | 11560.4 | 6460.9 |
| 57.5° | 3864.6 | 3921.7 | 4429.4 | 5598.4 | 8371.4 | 12588.8 | 15529.7 | 15624.8 | 14028.3 | 11556.3 | 6471.8 |
| 60° | 1945.9 | 1967.6 | 2291.2 | 3125.1 | 5291.9 | 10177.3 | 14536.7 | 14782.0 | 14077.9 | 11356.5 | 6518.7 |
| 62.5° | 1209.8 | 1194.2 | 1184.0 | 1439.5 | 2574.6 | 6749.1 | 12487.5 | 12959.8 | 13128.4 | 10872.6 | 6405.2 |
| 65° | 1063.7 | 1034.4 | 922.3 | 901.9 | 1137.1 | 3278.0 | 9403.8 | 9991.8 | 11099.6 | 10110.0 | 6134.7 |
| 67.5° | 999.1 | 970.6 | 844.1 | 768.0 | 768.7 | 1299.5 | 5838.3 | 6500.3 | 8646.7 | 8820.7 | 5496.4 |
| 70° | 932.5 | 906.7 | 788.4 | 698.7 | 654.5 | 719.8 | 2686.0 | 3188.3 | 5636.5 | 6933.3 | 4593.9 |
| 72.5° | 846.9 | 829.2 | 717.0 | 624.6 | 577.7 | 539.0 | 1028.3 | 1214.6 | 3263.1 | 4656.4 | 3190.3 |
| 75° | 757.1 | 740.8 | 645.0 | 556.6 | 499.6 | 424.1 | 579.1 | 623.9 | 1657.7 | 2382.2 | 1570.7 |
| 77.5° | 658.6 | 649.1 | 573.6 | 492.1 | 446.5 | 351.4 | 409.8 | 431.6 | 710.9 | 1021.5 | 787.7 |
| 80° | 524.0 | 542.4 | 501.6 | 438.4 | 396.2 | 281.4 | 290.2 | 304.5 | 413.9 | 498.9 | 447.2 |
| 82.5° | 341.2 | 373.1 | 392.8 | 356.1 | 326.2 | 221.6 | 208.7 | 214.8 | 269.8 | 304.5 | 194.4 |
| 85° | 142.0 | 159.7 | 258.3 | 233.1 | 216.8 | 161.8 | 140.0 | 142.7 | 167.2 | 173.3 | 79.5 |
| 87.5° | 63.2 | 67.3 | 113.5 | 106.7 | 91.8 | 55.7 | 59.8 | 65.2 | 89.0 | 84.3 | 30.6 |
| 90° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |



REPORT NUMBER: P320878
 CATALOG NUMBER: GLEON-SA4B-727-U-AFL

CANDELA DISTRIBUTION (continued):

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0° | 4386.6 | 4386.6 | 4386.6 | 4386.6 | 4386.6 | 4386.6 | 4386.6 | 4386.6 | 4386.6 | 4386.6 | 4386.6 |
| 2.5° | 4390.6 | 4333.5 | 4235.7 | 4127.6 | 4039.2 | 3968.6 | 3897.2 | 3848.3 | 3791.2 | 3760.6 | 3745.0 |
| 5° | 4394.0 | 4281.9 | 4075.9 | 3864.6 | 3675.6 | 3503.0 | 3338.5 | 3212.1 | 3093.8 | 3029.9 | 3012.3 |
| 7.5° | 4408.3 | 4239.7 | 3906.7 | 3558.7 | 3223.0 | 2916.4 | 2679.9 | 2531.8 | 2425.0 | 2377.5 | 2363.9 |
| 10° | 4419.9 | 4190.1 | 3697.4 | 3182.2 | 2725.5 | 2414.8 | 2231.3 | 2148.4 | 2111.7 | 2105.6 | 2099.5 |
| 12.5° | 4447.0 | 4139.2 | 3477.2 | 2789.3 | 2338.7 | 2124.0 | 2060.1 | 2054.6 | 2064.8 | 2079.8 | 2079.8 |
| 15° | 4489.9 | 4088.9 | 3225.7 | 2452.2 | 2092.7 | 2017.2 | 2030.2 | 2060.1 | 2087.9 | 2111.0 | 2114.4 |
| 17.5° | 4521.1 | 4027.0 | 2955.2 | 2182.4 | 1961.5 | 1981.9 | 2028.1 | 2070.3 | 2098.8 | 2121.2 | 2123.3 |
| 20° | 4543.6 | 3931.2 | 2666.3 | 1976.5 | 1886.1 | 1949.3 | 2007.1 | 2044.4 | 2064.1 | 2086.6 | 2090.0 |
| 22.5° | 4532.0 | 3802.7 | 2410.1 | 1829.0 | 1824.9 | 1901.7 | 1956.8 | 2001.6 | 1986.7 | 1964.9 | 1979.2 |
| 25° | 4476.3 | 3626.0 | 2146.4 | 1718.9 | 1760.3 | 1837.8 | 1905.8 | 1875.9 | 1825.6 | 1816.1 | 1821.5 |
| 27.5° | 4377.0 | 3400.4 | 1902.4 | 1616.9 | 1685.6 | 1778.7 | 1774.6 | 1744.7 | 1727.0 | 1714.8 | 1722.3 |
| 30° | 4270.3 | 3155.7 | 1689.0 | 1527.9 | 1602.6 | 1679.5 | 1663.8 | 1663.1 | 1645.5 | 1625.8 | 1635.3 |
| 32.5° | 4165.0 | 2909.6 | 1519.7 | 1454.5 | 1540.1 | 1550.3 | 1584.3 | 1594.5 | 1559.8 | 1518.4 | 1515.7 |
| 35° | 4073.2 | 2677.2 | 1391.3 | 1387.9 | 1464.7 | 1466.0 | 1515.7 | 1501.4 | 1415.1 | 1372.2 | 1372.2 |
| 37.5° | 4004.6 | 2445.4 | 1293.4 | 1328.1 | 1365.4 | 1400.8 | 1425.9 | 1366.8 | 1352.5 | 1328.7 | 1328.1 |
| 40° | 3974.7 | 2241.5 | 1232.2 | 1282.5 | 1295.4 | 1340.3 | 1275.7 | 1298.8 | 1305.6 | 1293.4 | 1293.4 |
| 42.5° | 3943.4 | 2064.1 | 1179.2 | 1247.9 | 1245.8 | 1239.7 | 1207.1 | 1237.0 | 1264.2 | 1264.9 | 1262.8 |
| 45° | 3912.2 | 1911.2 | 1132.3 | 1173.8 | 1202.3 | 1136.4 | 1142.5 | 1174.5 | 1212.5 | 1226.1 | 1226.1 |
| 47.5° | 3877.5 | 1790.2 | 1089.5 | 1095.6 | 1139.8 | 1095.6 | 1090.9 | 1115.3 | 1160.2 | 1181.9 | 1186.7 |
| 50° | 3801.4 | 1681.5 | 1040.6 | 1027.0 | 1039.2 | 1054.2 | 1058.2 | 1069.8 | 1119.4 | 1154.1 | 1162.2 |
| 52.5° | 3696.0 | 1584.3 | 978.0 | 963.8 | 963.8 | 1020.2 | 1039.2 | 1042.6 | 1084.7 | 1126.2 | 1134.4 |
| 55° | 3608.3 | 1522.4 | 913.5 | 910.8 | 908.0 | 984.2 | 1016.8 | 1022.2 | 1051.4 | 1084.1 | 1088.1 |
| 57° | 3614.5 | 1517.7 | 863.9 | 866.6 | 865.9 | 947.5 | 995.7 | 1007.3 | 1022.2 | 1050.1 | 1054.8 |
| 57.5° | 3617.9 | 1521.1 | 853.0 | 854.3 | 853.7 | 937.3 | 989.6 | 1002.5 | 1014.1 | 1043.3 | 1048.0 |
| 60° | 3668.8 | 1529.9 | 808.8 | 793.8 | 797.2 | 882.9 | 954.9 | 971.2 | 978.7 | 1017.5 | 1023.6 |
| 62.5° | 3593.4 | 1490.5 | 773.5 | 737.4 | 737.4 | 825.8 | 906.7 | 932.5 | 944.1 | 996.4 | 1006.6 |
| 65° | 3374.5 | 1379.7 | 732.0 | 673.5 | 680.3 | 768.7 | 848.9 | 891.0 | 908.7 | 974.0 | 984.8 |
| 67.5° | 3036.7 | 1251.3 | 687.8 | 616.5 | 623.3 | 708.9 | 789.1 | 834.6 | 862.5 | 949.5 | 958.3 |
| 70° | 2597.0 | 1094.3 | 628.0 | 556.0 | 564.1 | 643.6 | 718.4 | 770.1 | 811.5 | 926.4 | 929.1 |
| 72.5° | 1914.6 | 897.2 | 544.4 | 489.4 | 498.2 | 567.5 | 647.0 | 706.9 | 762.6 | 868.6 | 867.3 |
| 75° | 1138.4 | 701.4 | 452.0 | 422.1 | 428.2 | 492.8 | 582.5 | 655.2 | 738.8 | 846.2 | 859.1 |
| 77.5° | 690.5 | 528.1 | 368.4 | 353.4 | 360.9 | 426.8 | 536.3 | 613.7 | 728.6 | 797.9 | 793.8 |
| 80° | 417.3 | 377.2 | 294.3 | 284.8 | 292.3 | 365.0 | 496.2 | 582.5 | 636.8 | 681.7 | 681.7 |
| 82.5° | 218.2 | 230.4 | 216.1 | 208.7 | 218.9 | 296.3 | 451.3 | 508.4 | 562.8 | 483.2 | 451.3 |
| 85° | 89.0 | 120.3 | 131.2 | 130.5 | 136.6 | 205.3 | 389.4 | 435.0 | 362.9 | 344.6 | 352.7 |
| 87.5° | 29.9 | 51.0 | 63.9 | 55.1 | 57.8 | 129.1 | 269.8 | 210.0 | 249.4 | 174.0 | 165.2 |
| 90° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

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



LM-79-2008: Approved Method: Electrical and Photometric Measurements of Solid-
State Lighting Products

Report Prepared for

Cooper Lighting Solutions

McGRAW-EDISON

Report Number: SP1-1908-441-1-R4

Test Date: 08/20/2019

Luminaire Tested: SA1C-727-U-5WQ

Test Information

Test Method: LM-79-2008
 Report Number: SP1-1908-441-1-R4
 Test Lab: COOPER LIGHTING SOLUTIONS
 Photometer: SP1 - 76IN SPHERE
 Measurement Geometry: 4π
 Issue Date: 10/28/2024
 Manufacturer: COOPER LIGHTING SOLUTIONS
 Product Line: McGRAW-EDISON
 Catalog Number: **SA1C-727-U-5WQ**
 Description: McGRAW EDISON ROADWAY AND AREA LUMINAIRE

THIS IS A REVISION OF SP1-1908-441-1-R3. TO UPDATE THE CATALOG NUMBER.TESTED IN
 SITU. (1) 70 CRI, 2700K, 1050MA LIGHTSQUARE WITH 16 LEDS AND TYPE V WIDE OPTICS.

Spectral Parameters

CCT (K): 2741
 CIE u': 0.2605
 CIE v': 0.5272
 Duv: 0.0005
 CIE x: 0.4573
 CIE y: 0.4113
 CIE z: 0.1313
 Peak Wavelength (nm): 602
 Dominant Wavelength (nm): 583
 Purity: 61.2

| | | | |
|-----------|------|------|-------|
| CRI (Ra): | 71.5 | | |
| R1: | 69.2 | R9: | -16.1 |
| R2: | 79.4 | R10: | 51.4 |
| R3: | 87.8 | R11: | 63.1 |
| R4: | 69.4 | R12: | 42.0 |
| R5: | 66.4 | R13: | 70.2 |
| R6: | 69.8 | R14: | 92.4 |
| R7: | 79.8 | | |
| R8: | 50.1 | | |

Rf: 69.9
 Rg: 98.3



Test Conditions

Stabilization Time: 56M
 Operation Time: 12H
 Room Temperature (°C) / RH%: 25.3./42%
 Sphere Temperature (°C): 25.7

REPORT NUMBER: SP1-1908-441-1-R4

| Measurement and Test Equipment | | | |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 6/28/2019 | 12/28/2019 |
| Power Meter | IN0071 | 12/5/2018 | 12/5/2019 |
| AC Power Source | IN0063 | 12/5/2018 | 12/5/2019 |
| DC Power Source | IN0208 | 12/5/2018 | 12/5/2019 |
| Sphere Thermometer | IN0085 | 12/5/2018 | 12/5/2019 |
| Room Thermometer | IN0046 | 12/5/2018 | 12/5/2019 |

REPORT NUMBER: SP1-1908-441-1-R4

CIE 1931 Chromaticity Diagram



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



Point lies inside the ANSI 2700K 4-step quadrangle

REPORT NUMBER: SP1-1908-441-1-R4

Photopic Flux vs. Wavelength



Photopic Lumens: 6211.7

| λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) | λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) | λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) | λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) | λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) |
|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|
| 360 | 2044 | 0.0 | 490 | 7179 | 1.0 | 620 | 118034 | 30.7 | 750 | 8362 | 0.0 | 880 | 3128 | 0.0 |
| 365 | 2016 | 0.0 | 495 | 10476 | 1.9 | 625 | 111884 | 24.7 | 755 | 7635 | 0.0 | 885 | 3110 | 0.0 |
| 370 | 2020 | 0.0 | 500 | 15549 | 3.4 | 630 | 106119 | 19.2 | 760 | 6582 | 0.0 | 890 | 2632 | 0.0 |
| 375 | 2137 | 0.0 | 505 | 22477 | 6.3 | 635 | 99706 | 15.0 | 765 | 5777 | 0.0 | 895 | 2709 | 0.0 |
| 380 | 2046 | 0.0 | 510 | 30417 | 10.4 | 640 | 92142 | 11.0 | 770 | 5474 | 0.0 | 900 | 2016 | 0.0 |
| 385 | 1925 | 0.0 | 515 | 39274 | 16.3 | 645 | 84987 | 8.2 | 775 | 4977 | 0.0 | 905 | 1748 | 0.0 |
| 390 | 1893 | 0.0 | 520 | 47282 | 22.9 | 650 | 78016 | 5.7 | 780 | 4723 | 0.0 | 910 | 2046 | 0.0 |
| 395 | 1695 | 0.0 | 525 | 55413 | 29.7 | 655 | 71541 | 4.1 | 785 | 4219 | 0.0 | 915 | 1844 | 0.0 |
| 400 | 1633 | 0.0 | 530 | 62377 | 36.7 | 660 | 64863 | 2.7 | 790 | 3969 | 0.0 | 920 | 2734 | 0.0 |
| 405 | 2065 | 0.0 | 535 | 68520 | 42.5 | 665 | 58485 | 1.9 | 795 | 4122 | 0.0 | 925 | 2307 | 0.0 |
| 410 | 3449 | 0.0 | 540 | 73435 | 47.8 | 670 | 51641 | 1.1 | 800 | 2864 | 0.0 | 930 | 2039 | 0.0 |
| 415 | 7117 | 0.0 | 545 | 78677 | 52.4 | 675 | 46030 | 0.8 | 805 | 3151 | 0.0 | 935 | 1784 | 0.0 |
| 420 | 13992 | 0.0 | 550 | 83331 | 56.6 | 680 | 40590 | 0.5 | 810 | 3022 | 0.0 | 940 | 2464 | 0.0 |
| 425 | 25176 | 0.1 | 555 | 89120 | 60.9 | 685 | 35691 | 0.3 | 815 | 3471 | 0.0 | 945 | 2794 | 0.0 |
| 430 | 38151 | 0.3 | 560 | 94613 | 64.3 | 690 | 31631 | 0.2 | 820 | 2749 | 0.0 | 950 | 3090 | 0.0 |
| 435 | 49673 | 0.6 | 565 | 99818 | 66.4 | 695 | 27437 | 0.1 | 825 | 2729 | 0.0 | 955 | 1866 | 0.0 |
| 440 | 57273 | 0.9 | 570 | 106526 | 69.3 | 700 | 24589 | 0.1 | 830 | 2282 | 0.0 | 960 | 3110 | 0.0 |
| 445 | 54802 | 1.1 | 575 | 111610 | 69.4 | 705 | 21832 | 0.0 | 835 | 3140 | 0.0 | 965 | 3880 | 0.0 |
| 450 | 39184 | 1.0 | 580 | 117163 | 69.6 | 710 | 19500 | 0.0 | 840 | 2365 | 0.0 | 970 | 3243 | 0.0 |
| 455 | 22506 | 0.8 | 585 | 122201 | 67.9 | 715 | 17870 | 0.0 | 845 | 3024 | 0.0 | 975 | 2014 | 0.0 |
| 460 | 13692 | 0.6 | 590 | 125662 | 65.0 | 720 | 15924 | 0.0 | 850 | 2510 | 0.0 | 980 | 1688 | 0.0 |
| 465 | 9446 | 0.5 | 595 | 127415 | 60.4 | 725 | 14268 | 0.0 | 855 | 2739 | 0.0 | 985 | 2827 | 0.0 |
| 470 | 6698 | 0.4 | 600 | 129155 | 55.7 | 730 | 12438 | 0.0 | 860 | 3515 | 0.0 | 990 | 4172 | 0.0 |
| 475 | 5328 | 0.4 | 605 | 128057 | 49.6 | 735 | 11255 | 0.0 | 865 | 3600 | 0.0 | 995 | 3177 | 0.0 |
| 480 | 5081 | 0.5 | 610 | 126031 | 43.3 | 740 | 9951 | 0.0 | 870 | 3609 | 0.0 | 1000 | 3241 | 0.0 |
| 485 | 5579 | 0.7 | 615 | 123059 | 37.1 | 745 | 8870 | 0.0 | 875 | 3208 | 0.0 | | | |

REPORT NUMBER: SP1-1908-441-1-R4

Scotopic Flux vs. Wavelength



Scotopic Lumens: 6474.3

S/P: 1.04

| 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 | 2044 | 0.0 | 490 | 7179 | 6.0 | 620 | 118034 | 0.1 | 750 | 8362 | 0.0 | 880 | 3128 | 0.0 |
| 365 | 2016 | 0.0 | 495 | 10476 | 8.6 | 625 | 111884 | 0.1 | 755 | 7635 | 0.0 | 885 | 3110 | 0.0 |
| 370 | 2020 | 0.0 | 500 | 15549 | 12.5 | 630 | 106119 | 0.0 | 760 | 6582 | 0.0 | 890 | 2632 | 0.0 |
| 375 | 2137 | 0.0 | 505 | 22477 | 17.3 | 635 | 99706 | 0.0 | 765 | 5777 | 0.0 | 895 | 2709 | 0.0 |
| 380 | 2046 | 0.0 | 510 | 30417 | 21.8 | 640 | 92142 | 0.0 | 770 | 5474 | 0.0 | 900 | 2016 | 0.0 |
| 385 | 1925 | 0.0 | 515 | 39274 | 25.7 | 645 | 84987 | 0.0 | 775 | 4977 | 0.0 | 905 | 1748 | 0.0 |
| 390 | 1893 | 0.0 | 520 | 47282 | 27.5 | 650 | 78016 | 0.0 | 780 | 4723 | 0.0 | 910 | 2046 | 0.0 |
| 395 | 1695 | 0.0 | 525 | 55413 | 28.1 | 655 | 71541 | 0.0 | 785 | 4219 | 0.0 | 915 | 1844 | 0.0 |
| 400 | 1633 | 0.0 | 530 | 62377 | 27.0 | 660 | 64863 | 0.0 | 790 | 3969 | 0.0 | 920 | 2734 | 0.0 |
| 405 | 2065 | 0.0 | 535 | 68520 | 24.7 | 665 | 58485 | 0.0 | 795 | 4122 | 0.0 | 925 | 2307 | 0.0 |
| 410 | 3449 | 0.1 | 540 | 73435 | 21.5 | 670 | 51641 | 0.0 | 800 | 2864 | 0.0 | 930 | 2039 | 0.0 |
| 415 | 7117 | 0.5 | 545 | 78677 | 18.3 | 675 | 46030 | 0.0 | 805 | 3151 | 0.0 | 935 | 1784 | 0.0 |
| 420 | 13992 | 1.6 | 550 | 83331 | 15.0 | 680 | 40590 | 0.0 | 810 | 3022 | 0.0 | 940 | 2464 | 0.0 |
| 425 | 25176 | 3.9 | 555 | 89120 | 12.0 | 685 | 35691 | 0.0 | 815 | 3471 | 0.0 | 945 | 2794 | 0.0 |
| 430 | 38151 | 8.1 | 560 | 94613 | 9.3 | 690 | 31631 | 0.0 | 820 | 2749 | 0.0 | 950 | 3090 | 0.0 |
| 435 | 49673 | 13.3 | 565 | 99818 | 7.0 | 695 | 27437 | 0.0 | 825 | 2729 | 0.0 | 955 | 1866 | 0.0 |
| 440 | 57273 | 19.1 | 570 | 106526 | 5.2 | 700 | 24589 | 0.0 | 830 | 2282 | 0.0 | 960 | 3110 | 0.0 |
| 445 | 54802 | 21.6 | 575 | 111610 | 3.7 | 705 | 21832 | 0.0 | 835 | 3140 | 0.0 | 965 | 3880 | 0.0 |
| 450 | 39184 | 18.1 | 580 | 117163 | 2.6 | 710 | 19500 | 0.0 | 840 | 2365 | 0.0 | 970 | 3243 | 0.0 |
| 455 | 22506 | 11.8 | 585 | 122201 | 1.8 | 715 | 17870 | 0.0 | 845 | 3024 | 0.0 | 975 | 2014 | 0.0 |
| 460 | 13692 | 8.1 | 590 | 125662 | 1.2 | 720 | 15924 | 0.0 | 850 | 2510 | 0.0 | 980 | 1688 | 0.0 |
| 465 | 9446 | 6.2 | 595 | 127415 | 0.8 | 725 | 14268 | 0.0 | 855 | 2739 | 0.0 | 985 | 2827 | 0.0 |
| 470 | 6698 | 4.8 | 600 | 129155 | 0.5 | 730 | 12438 | 0.0 | 860 | 3515 | 0.0 | 990 | 4172 | 0.0 |
| 475 | 5328 | 4.1 | 605 | 128057 | 0.4 | 735 | 11255 | 0.0 | 865 | 3600 | 0.0 | 995 | 3177 | 0.0 |
| 480 | 5081 | 4.1 | 610 | 126031 | 0.2 | 740 | 9951 | 0.0 | 870 | 3609 | 0.0 | 1000 | 3241 | 0.0 |
| 485 | 5579 | 4.6 | 615 | 123059 | 0.1 | 745 | 8870 | 0.0 | 875 | 3208 | 0.0 | | | |

REPORT NUMBER: SP1-1908-441-1-R4

Melanopic Flux vs. Wavelength



Melanopic Lumens: 2145.7 M/P: 0.35

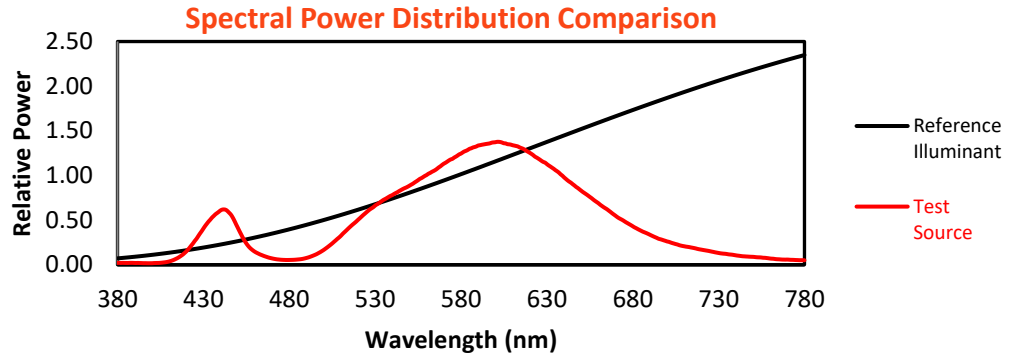
| λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) | λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) | λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) | λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) | λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) |
|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|
| 360 | 2044 | 0.0 | 490 | 7179 | 11.1 | 620 | 118034 | 1.5 | 750 | 8362 | 0.0 | 880 | 3128 | 0.0 |
| 365 | 2016 | 0.0 | 495 | 10476 | 16.9 | 625 | 111884 | 0.9 | 755 | 7635 | 0.0 | 885 | 3110 | 0.0 |
| 370 | 2020 | 0.0 | 500 | 15549 | 26.0 | 630 | 106119 | 0.6 | 760 | 6582 | 0.0 | 890 | 2632 | 0.0 |
| 375 | 2137 | 0.0 | 505 | 22477 | 38.2 | 635 | 99706 | 0.4 | 765 | 5777 | 0.0 | 895 | 2709 | 0.0 |
| 380 | 2046 | 0.0 | 510 | 30417 | 51.6 | 640 | 92142 | 0.2 | 770 | 5474 | 0.0 | 900 | 2016 | 0.0 |
| 385 | 1925 | 0.0 | 515 | 39274 | 65.1 | 645 | 84987 | 0.1 | 775 | 4977 | 0.0 | 905 | 1748 | 0.0 |
| 390 | 1893 | 0.0 | 520 | 47282 | 75.2 | 650 | 78016 | 0.1 | 780 | 4723 | 0.0 | 910 | 2046 | 0.0 |
| 395 | 1695 | 0.0 | 525 | 55413 | 82.9 | 655 | 71541 | 0.1 | 785 | 4219 | 0.0 | 915 | 1844 | 0.0 |
| 400 | 1633 | 0.0 | 530 | 62377 | 86.0 | 660 | 64863 | 0.0 | 790 | 3969 | 0.0 | 920 | 2734 | 0.0 |
| 405 | 2065 | 0.1 | 535 | 68520 | 85.4 | 665 | 58485 | 0.0 | 795 | 4122 | 0.0 | 925 | 2307 | 0.0 |
| 410 | 3449 | 0.2 | 540 | 73435 | 81.1 | 670 | 51641 | 0.0 | 800 | 2864 | 0.0 | 930 | 2039 | 0.0 |
| 415 | 7117 | 0.7 | 545 | 78677 | 75.4 | 675 | 46030 | 0.0 | 805 | 3151 | 0.0 | 935 | 1784 | 0.0 |
| 420 | 13992 | 2.3 | 550 | 83331 | 68.1 | 680 | 40590 | 0.0 | 810 | 3022 | 0.0 | 940 | 2464 | 0.0 |
| 425 | 25176 | 6.2 | 555 | 89120 | 60.9 | 685 | 35691 | 0.0 | 815 | 3471 | 0.0 | 945 | 2794 | 0.0 |
| 430 | 38151 | 13.0 | 560 | 94613 | 52.9 | 690 | 31631 | 0.0 | 820 | 2749 | 0.0 | 950 | 3090 | 0.0 |
| 435 | 49673 | 22.2 | 565 | 99818 | 44.8 | 695 | 27437 | 0.0 | 825 | 2729 | 0.0 | 955 | 1866 | 0.0 |
| 440 | 57273 | 32.0 | 570 | 106526 | 37.6 | 700 | 24589 | 0.0 | 830 | 2282 | 0.0 | 960 | 3110 | 0.0 |
| 445 | 54802 | 36.7 | 575 | 111610 | 30.4 | 705 | 21832 | 0.0 | 835 | 3140 | 0.0 | 965 | 3880 | 0.0 |
| 450 | 39184 | 30.4 | 580 | 117163 | 24.1 | 710 | 19500 | 0.0 | 840 | 2365 | 0.0 | 970 | 3243 | 0.0 |
| 455 | 22506 | 19.7 | 585 | 122201 | 18.7 | 715 | 17870 | 0.0 | 845 | 3024 | 0.0 | 975 | 2014 | 0.0 |
| 460 | 13692 | 13.2 | 590 | 125662 | 14.0 | 720 | 15924 | 0.0 | 850 | 2510 | 0.0 | 980 | 1688 | 0.0 |
| 465 | 9446 | 10.0 | 595 | 127415 | 10.2 | 725 | 14268 | 0.0 | 855 | 2739 | 0.0 | 985 | 2827 | 0.0 |
| 470 | 6698 | 7.7 | 600 | 129155 | 7.3 | 730 | 12438 | 0.0 | 860 | 3515 | 0.0 | 990 | 4172 | 0.0 |
| 475 | 5328 | 6.7 | 605 | 128057 | 5.0 | 735 | 11255 | 0.0 | 865 | 3600 | 0.0 | 995 | 3177 | 0.0 |
| 480 | 5081 | 6.9 | 610 | 126031 | 3.4 | 740 | 9951 | 0.0 | 870 | 3609 | 0.0 | 1000 | 3241 | 0.0 |
| 485 | 5579 | 8.1 | 615 | 123059 | 2.3 | 745 | 8870 | 0.0 | 875 | 3208 | 0.0 | | | |

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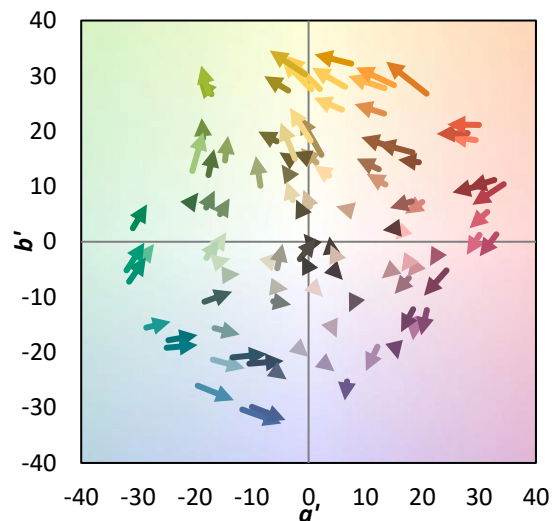
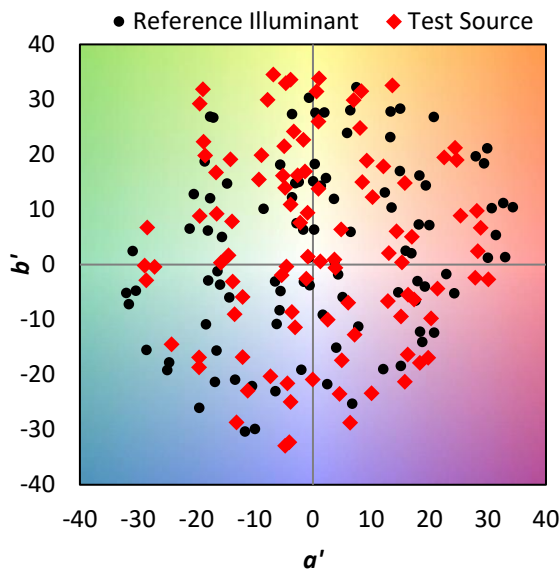
TM-30-18

Summary

$R_f = 69.9$
 $R_g = 98.3$
 CIE $R_a = 71.5$
 $R_9 = -16.1$



Color Vector Graphics

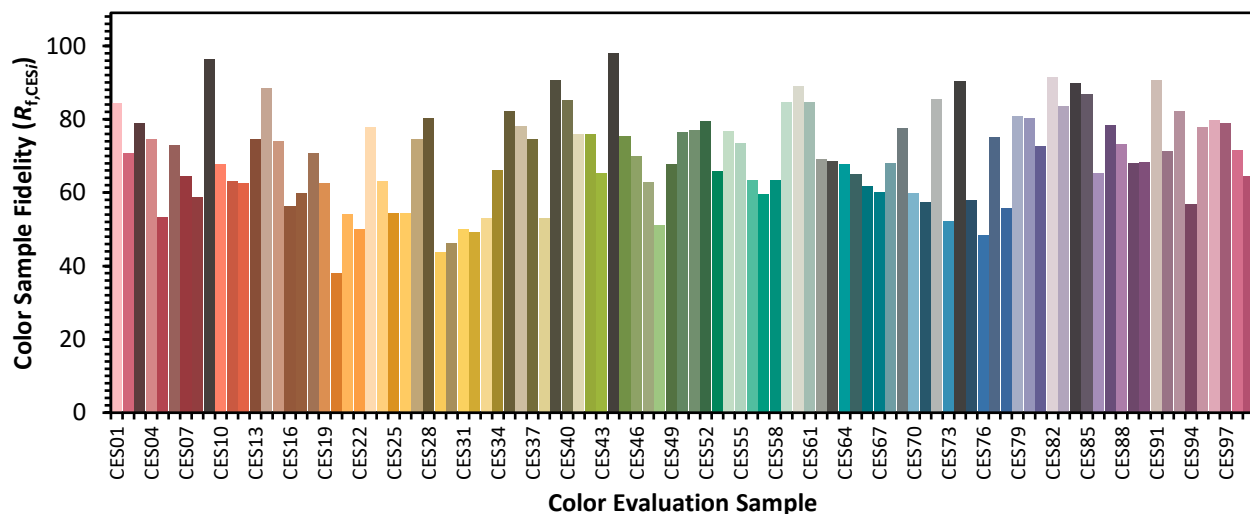


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Individual Sample Fidelity Index ($R_{f,i}$)

| | | | |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 54 | CES51 = 77 | CES76 = 48 |
| CES02 = 63 | CES27 = 74 | CES52 = 80 | CES77 = 75 |
| CES03 = 31 | CES28 = 80 | CES53 = 66 | CES78 = 56 |
| CES04 = 71 | CES29 = 44 | CES54 = 77 | CES79 = 81 |
| CES05 = 50 | CES30 = 46 | CES55 = 74 | CES80 = 80 |
| CES06 = 52 | CES31 = 50 | CES56 = 63 | CES81 = 73 |
| CES07 = 42 | CES32 = 49 | CES57 = 60 | CES82 = 91 |
| CES08 = 41 | CES33 = 53 | CES58 = 63 | CES83 = 84 |
| CES09 = 29 | CES34 = 66 | CES59 = 85 | CES84 = 90 |
| CES10 = 77 | CES35 = 82 | CES60 = 89 | CES85 = 87 |
| CES11 = 60 | CES36 = 78 | CES61 = 85 | CES86 = 65 |
| CES12 = 66 | CES37 = 75 | CES62 = 69 | CES87 = 78 |
| CES13 = 43 | CES38 = 53 | CES63 = 68 | CES88 = 73 |
| CES14 = 74 | CES39 = 91 | CES64 = 68 | CES89 = 68 |
| CES15 = 71 | CES40 = 85 | CES65 = 65 | CES90 = 68 |
| CES16 = 48 | CES41 = 76 | CES66 = 62 | CES91 = 91 |
| CES17 = 50 | CES42 = 76 | CES67 = 60 | CES92 = 71 |
| CES18 = 57 | CES43 = 65 | CES68 = 68 | CES93 = 82 |
| CES19 = 73 | CES44 = 98 | CES69 = 77 | CES94 = 57 |
| CES20 = 67 | CES45 = 75 | CES70 = 60 | CES95 = 78 |
| CES21 = 88 | CES46 = 70 | CES71 = 57 | CES96 = 80 |
| CES22 = 80 | CES47 = 63 | CES72 = 86 | CES97 = 79 |
| CES23 = 92 | CES48 = 51 | CES73 = 52 | CES98 = 71 |
| CES24 = 91 | CES49 = 68 | CES74 = 90 | CES99 = 64 |
| CES25 = 73 | CES50 = 77 | CES75 = 58 | |



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Color Rendition by Hue-Angle Bin



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Measure Comparisons



(END OF REPORT)