

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: P317698

Luminaire Tested: **GLEON-SA4D-727-U-T3R**

Issue Date: 3/3/2020

Test Information

Test Method: LM-79-08
Report Number: P317698
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-10)
Test Lab: INNOVATION CENTER
Issue Date: 3/3/2020
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)
Product Line: McGRAW-EDISON
Catalog Number: GLEON-SA4D-727-U-T3R
Description: GALLEON AREA AND ROADWAY LUMINAIRE
(4) 70 CRI, 2700K, 1200mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III
ROADWAY OPTICS
Light Source: -
Ballast/Driver: ELECTRONIC DRIVER

Summary

Lumens per Lamp: N/A
Luminaire Lumens: 26761 lumens
Efficiency: N/A
Efficacy: 103.7 lumens/watt
Luminous Opening: Rectangular (W 1' x L: 1' x H: 0')
IES Classification: Type IV - Medium
BUG Rating: B3 - U0 - G4

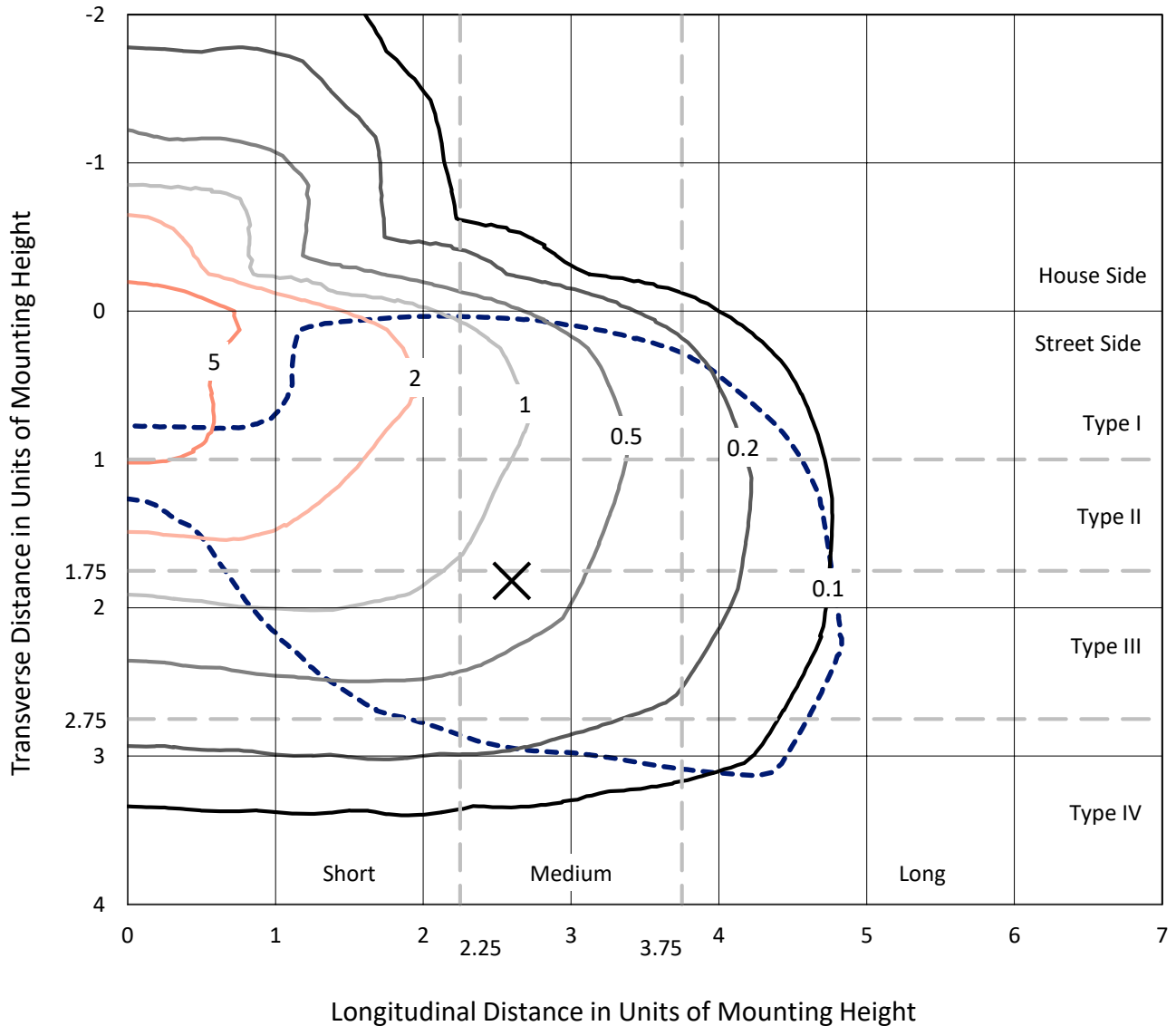
Input Watts (W): 258
Input Voltage (V): NR
Input Current (Ain): NR
Voltage Rise (V): NR
Power Factor: NR
Total Harmonic Distortion (THDi): NR
Frequency (hertz): 60
Stabilization Time: NR
Operation Time: NR
Ambient Temperature (°C): NR
Test Distance: 24 FT



REPORT NUMBER: P317698
 CATALOG NUMBER: GLEON-SA4D-727-U-T3R

Iso-Footcandle Lines of Horizontal Illumination

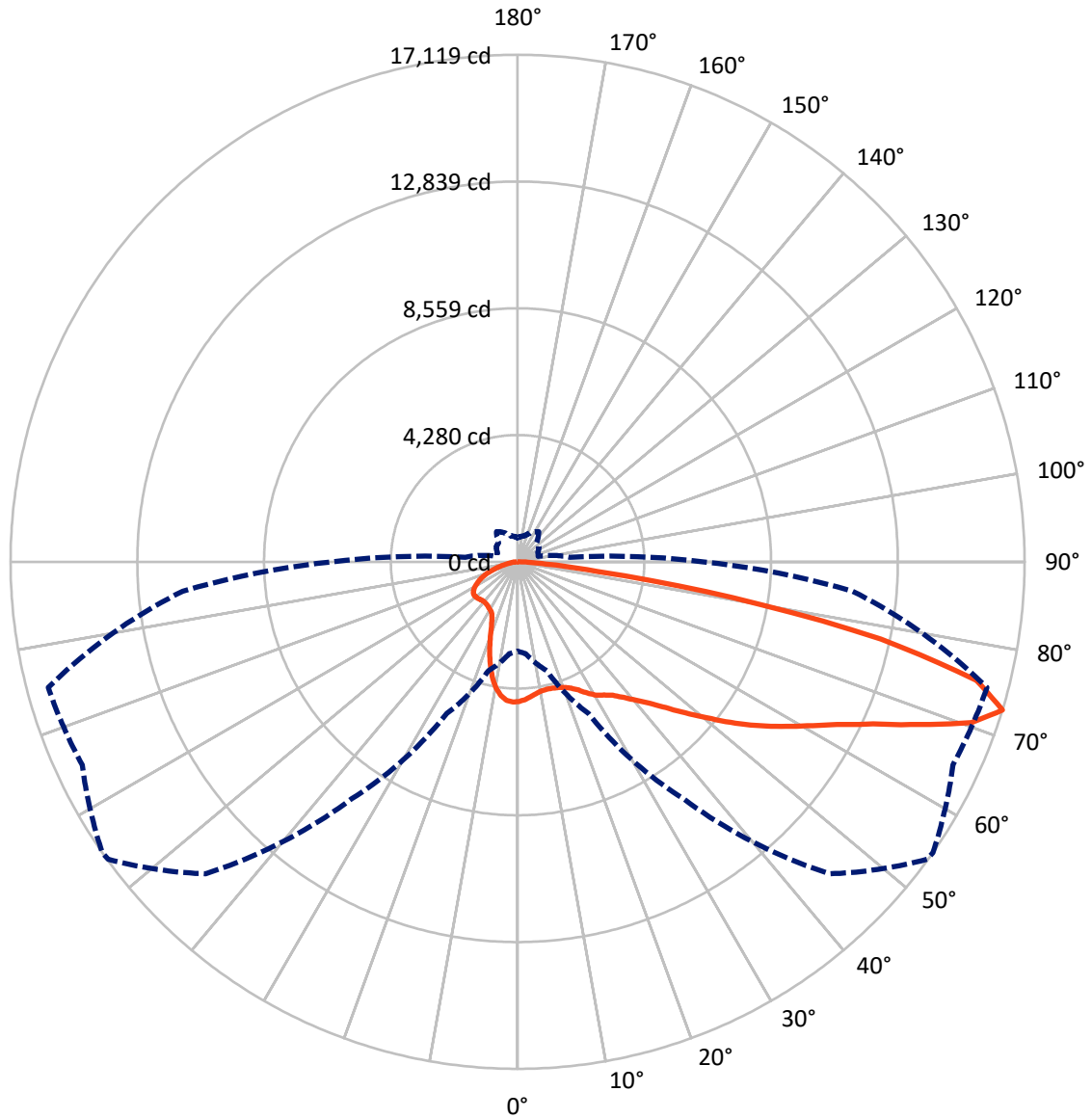
× Max cd
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 7.6 fc
 Type IV - Medium - N/A

REPORT NUMBER: P317698
CATALOG NUMBER: GLEON-SA4D-727-U-T3R

Luminous Intensity Polar Plot



— Vertical Plane Through 55-Deg Lateral - - - Horizontal Cone Through 72.5-Deg Vertical

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 CATALOG NUMBER: GLEON-SA4D-727-U-T3R

FLUX DISTRIBUTION:

| | | Downward | Upward | Total |
|--------------------|-----------|----------|--------|---------|
| House Side | Lumens | 4974.0 | 0.0 | 4974.0 |
| | % Fixture | 18.6 | 0.0 | 18.6 |
| Street Side | Lumens | 21787.0 | 0.0 | 21787.0 |
| | % Fixture | 81.4 | 0.0 | 81.4 |
| Total | Lumens | 26761.0 | 0.0 | 26761.0 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

ZONAL LUMENS:

| Zone | Lumens | % Fixture |
|-----------|---------|-----------|
| 0°-10° | 427.1 | 1.6 |
| 10°-20° | 1137.1 | 4.2 |
| 20°-30° | 1874.8 | 7.0 |
| 30°-40° | 2773.4 | 10.4 |
| 40°-50° | 3871.0 | 14.5 |
| 50°-60° | 5040.2 | 18.8 |
| 60°-70° | 6194.2 | 23.1 |
| 70°-80° | 4855.5 | 18.1 |
| 80°-90° | 587.6 | 2.2 |
| 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° | 26761.0 | 100.0 |
| 0°-180° | 26761.0 | 100.0 |

Coefficient of Utilization

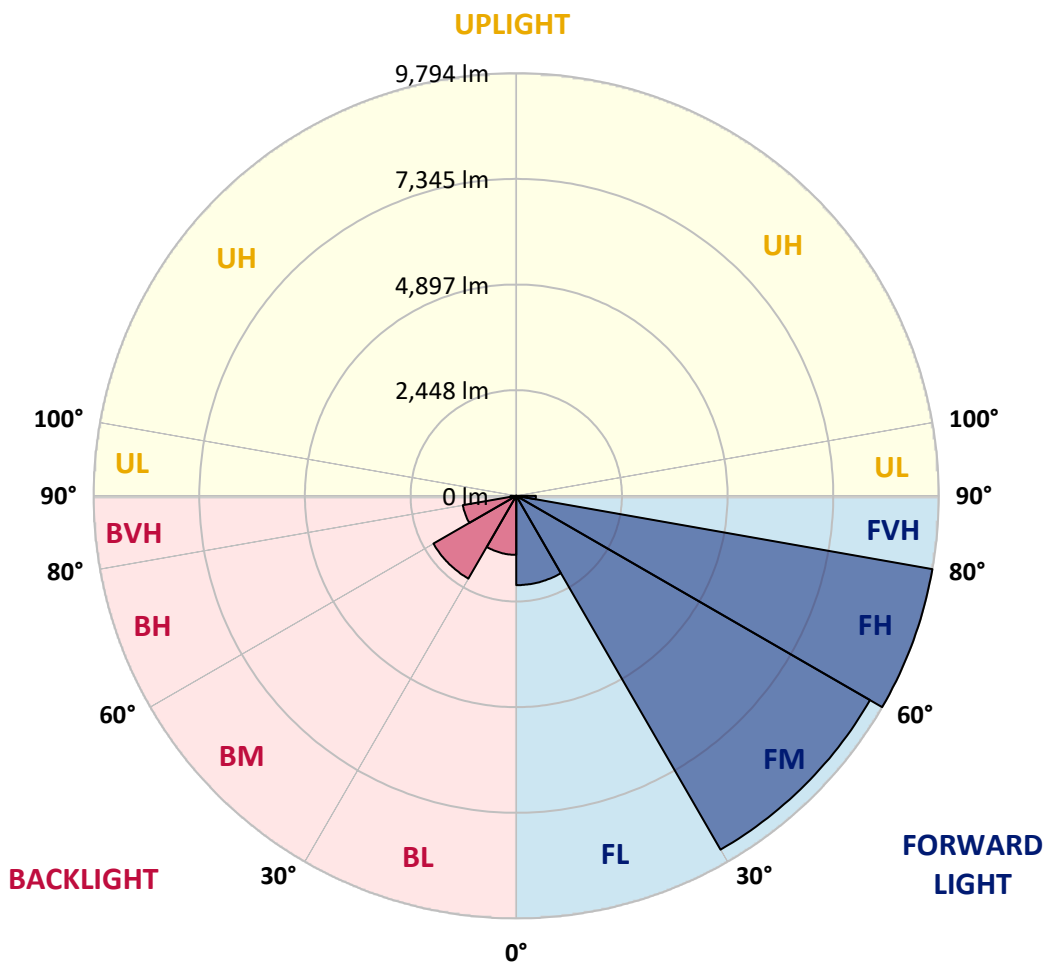


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LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | Lumens | % Fixture | Zone Rating/Lumen Limit | | |
|----------------|--------|-----------|-------------------------|------|----------|
| | | | B | U | G |
| FL (0°-30°) | 2070.5 | 7.7 | | | |
| FM (30°-60°) | 9468.6 | 35.4 | | | |
| FH (60°-80°) | 9793.6 | 36.6 | | | G4/12000 |
| FVH (80°-90°) | 454.3 | 1.7 | | | G3/500 |
| BL (0°-30°) | 1368.6 | 5.1 | B3/2500 | | |
| BM (30°-60°) | 2216.0 | 8.3 | B2/2500 | | |
| BH (60°-80°) | 1256.2 | 4.7 | B3/2500 | | G3/2500 |
| BVH (80°-90°) | 133.3 | 0.5 | | | G2/225 |
| UL (90°-100°) | 0.0 | 0.0 | | U0/0 | |
| UH (100°-180°) | 0.0 | 0.0 | | U0/0 | |

BUG Rating: B3-U0-G4
 Type IV Medium





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CATALOG NUMBER: GLEON-SA4D-727-U-T3R

CANDELA DISTRIBUTION (FULL):

| | 0° | 5° | 15° | 25° | 35° | 45° | 54° | 55° | 65° | 75° | 85° |
|-------|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|
| 0° | 4720.1 | 4720.1 | 4720.1 | 4720.1 | 4720.1 | 4720.1 | 4720.1 | 4720.1 | 4720.1 | 4720.1 | 4720.1 |
| 2.5° | 4566.4 | 4555.6 | 4569.1 | 4588.1 | 4608.9 | 4636.9 | 4653.2 | 4660.4 | 4688.4 | 4699.3 | 4722.8 |
| 5° | 4354.9 | 4349.5 | 4372.1 | 4404.6 | 4450.7 | 4515.8 | 4568.2 | 4578.2 | 4652.3 | 4704.7 | 4752.6 |
| 7.5° | 4201.2 | 4201.2 | 4227.4 | 4266.3 | 4317.8 | 4405.5 | 4479.6 | 4493.2 | 4618.8 | 4731.8 | 4820.4 |
| 10° | 4079.2 | 4083.7 | 4114.5 | 4160.6 | 4221.1 | 4314.2 | 4412.7 | 4428.1 | 4609.8 | 4795.1 | 4936.1 |
| 12.5° | 3997.9 | 4008.7 | 4036.7 | 4078.3 | 4153.3 | 4266.3 | 4391.1 | 4411.8 | 4628.8 | 4885.5 | 5075.3 |
| 15° | 4049.4 | 4067.5 | 4070.2 | 4087.3 | 4128.9 | 4251.9 | 4403.7 | 4425.4 | 4669.4 | 4977.7 | 5233.5 |
| 17.5° | 4275.4 | 4281.7 | 4253.7 | 4217.5 | 4197.6 | 4276.3 | 4441.7 | 4464.3 | 4718.3 | 5069.0 | 5385.3 |
| 20° | 4618.8 | 4615.2 | 4554.7 | 4457.0 | 4355.8 | 4368.5 | 4504.0 | 4527.5 | 4784.2 | 5149.4 | 5537.2 |
| 22.5° | 5052.7 | 5040.0 | 4946.9 | 4767.1 | 4594.4 | 4522.1 | 4613.4 | 4633.3 | 4883.7 | 5264.2 | 5699.9 |
| 25° | 5578.8 | 5550.7 | 5427.8 | 5186.5 | 4932.5 | 4746.3 | 4777.9 | 4796.9 | 5028.3 | 5392.6 | 5849.0 |
| 27.5° | 6133.7 | 6105.7 | 5949.3 | 5657.4 | 5319.3 | 5029.2 | 5004.8 | 5021.1 | 5192.8 | 5487.5 | 5959.3 |
| 30° | 6714.0 | 6684.2 | 6541.4 | 6214.2 | 5729.7 | 5322.0 | 5216.3 | 5222.6 | 5308.5 | 5539.0 | 6049.7 |
| 32.5° | 7297.0 | 7269.0 | 7109.0 | 6729.4 | 6175.3 | 5636.6 | 5369.1 | 5360.9 | 5378.1 | 5592.3 | 6151.8 |
| 35° | 7888.2 | 7899.0 | 7711.9 | 7291.6 | 6668.8 | 5986.4 | 5549.8 | 5532.7 | 5494.7 | 5701.7 | 6296.4 |
| 37.5° | 8520.9 | 8513.7 | 8271.4 | 7832.1 | 7184.9 | 6366.0 | 5809.2 | 5806.5 | 5675.5 | 5908.7 | 6523.3 |
| 40° | 8943.9 | 8948.4 | 8801.1 | 8385.3 | 7706.5 | 6786.3 | 6141.9 | 6135.5 | 5963.8 | 6218.7 | 6820.7 |
| 42.5° | 9109.3 | 9139.1 | 9177.1 | 8913.2 | 8252.4 | 7273.5 | 6538.7 | 6529.6 | 6366.0 | 6663.4 | 7170.5 |
| 45° | 9121.1 | 9180.7 | 9415.7 | 9382.3 | 8805.6 | 7831.2 | 7045.7 | 7020.4 | 6902.9 | 7254.5 | 7588.1 |
| 47.5° | 9019.8 | 9081.3 | 9471.8 | 9661.6 | 9300.0 | 8419.6 | 7638.7 | 7618.8 | 7517.6 | 7993.9 | 8040.0 |
| 50° | 8798.4 | 8857.1 | 9356.1 | 9798.1 | 9706.8 | 8985.5 | 8322.0 | 8269.6 | 8215.4 | 8848.1 | 8557.0 |
| 52.5° | 8383.5 | 8496.5 | 9201.5 | 9830.6 | 9949.9 | 9488.0 | 9040.6 | 9006.3 | 9036.1 | 9749.3 | 9075.0 |
| 55° | 7401.0 | 7527.5 | 8802.9 | 9803.5 | 10129.8 | 9910.1 | 9759.2 | 9757.4 | 9912.0 | 10694.7 | 9630.8 |
| 57.5° | 6850.5 | 6940.0 | 7991.2 | 9757.4 | 10343.1 | 10329.5 | 10470.6 | 10487.7 | 10788.7 | 11724.2 | 10212.9 |
| 60° | 6539.6 | 6633.6 | 7579.9 | 9586.6 | 10673.9 | 10871.9 | 11196.4 | 11230.7 | 11679.9 | 12864.0 | 10913.5 |
| 62.5° | 6256.7 | 6359.7 | 7325.0 | 9238.6 | 11063.5 | 11647.4 | 12065.9 | 12096.6 | 12623.6 | 14035.5 | 11590.5 |
| 65° | 5773.1 | 5889.7 | 6951.7 | 9009.9 | 11417.8 | 12658.8 | 13171.3 | 13192.1 | 13707.3 | 15262.9 | 12108.4 |
| 67.5° | 5089.8 | 5196.4 | 6247.6 | 8504.6 | 11679.9 | 13887.2 | 14641.1 | 14652.8 | 14782.1 | 16129.7 | 12373.2 |
| 70° | 4291.6 | 4332.3 | 5244.3 | 7461.5 | 11369.9 | 15036.1 | 16251.8 | 16254.5 | 15761.9 | 16684.7 | 12329.8 |
| 72.5° | 3015.3 | 3111.2 | 3807.1 | 5648.4 | 9770.9 | 14896.0 | 17087.9 | 17118.6 | 16217.4 | 16404.5 | 11344.6 |
| 75° | 1849.3 | 1950.6 | 2388.1 | 3423.0 | 6198.8 | 11715.2 | 15788.1 | 16001.4 | 15363.3 | 14626.6 | 9267.5 |
| 77.5° | 1236.5 | 1274.5 | 1558.3 | 1995.8 | 2808.4 | 6740.2 | 12138.2 | 12539.5 | 12762.8 | 10666.7 | 5926.7 |
| 80° | 689.7 | 762.0 | 1033.1 | 1240.1 | 1249.2 | 2678.2 | 7278.0 | 7372.1 | 7100.9 | 4247.3 | 1828.6 |
| 82.5° | 365.2 | 404.9 | 689.7 | 728.5 | 681.5 | 896.6 | 2712.5 | 2715.3 | 2268.7 | 1138.9 | 543.2 |
| 85° | 282.9 | 316.4 | 472.7 | 444.7 | 348.0 | 397.7 | 894.8 | 943.7 | 771.9 | 466.4 | 177.2 |
| 87.5° | 141.0 | 175.4 | 320.9 | 282.0 | 136.5 | 113.9 | 320.0 | 341.7 | 304.6 | 182.6 | 64.2 |
| 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: P317698
 CATALOG NUMBER: GLEON-SA4D-727-U-T3R

CANDELA DISTRIBUTION (continued):

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0° | 4720.1 | 4720.1 | 4720.1 | 4720.1 | 4720.1 | 4720.1 | 4720.1 | 4720.1 | 4720.1 | 4720.1 | 4720.1 |
| 2.5° | 4731.8 | 4739.9 | 4749.9 | 4739.0 | 4735.4 | 4721.0 | 4696.6 | 4691.1 | 4678.5 | 4679.4 | 4686.6 |
| 5° | 4773.4 | 4787.0 | 4781.5 | 4739.9 | 4690.2 | 4620.6 | 4548.3 | 4486.9 | 4446.2 | 4443.5 | 4440.8 |
| 7.5° | 4852.9 | 4862.0 | 4819.5 | 4701.1 | 4561.9 | 4401.0 | 4249.1 | 4116.3 | 4035.8 | 4015.9 | 4011.4 |
| 10° | 4977.7 | 4975.9 | 4859.3 | 4620.6 | 4343.1 | 4055.7 | 3811.7 | 3627.3 | 3519.7 | 3488.1 | 3479.9 |
| 12.5° | 5116.9 | 5096.1 | 4872.8 | 4474.2 | 4034.0 | 3635.4 | 3326.3 | 3121.1 | 3009.0 | 2972.9 | 2963.8 |
| 15° | 5260.6 | 5209.1 | 4839.4 | 4255.5 | 3654.4 | 3182.6 | 2858.1 | 2668.3 | 2607.7 | 2587.8 | 2584.2 |
| 17.5° | 5394.4 | 5294.9 | 4743.6 | 3959.0 | 3221.4 | 2731.5 | 2478.4 | 2402.5 | 2417.0 | 2443.2 | 2444.1 |
| 20° | 5525.4 | 5352.8 | 4589.9 | 3584.8 | 2765.0 | 2360.0 | 2274.2 | 2330.2 | 2398.9 | 2452.2 | 2459.5 |
| 22.5° | 5654.7 | 5393.5 | 4392.0 | 3152.7 | 2356.4 | 2151.2 | 2211.8 | 2313.9 | 2392.6 | 2450.4 | 2460.4 |
| 25° | 5763.1 | 5403.4 | 4119.0 | 2691.8 | 2072.6 | 2072.6 | 2182.0 | 2278.7 | 2356.4 | 2413.4 | 2423.3 |
| 27.5° | 5802.9 | 5336.5 | 3733.9 | 2265.1 | 1929.8 | 2036.4 | 2140.4 | 2220.8 | 2286.8 | 2347.4 | 2358.2 |
| 30° | 5818.3 | 5212.7 | 3289.2 | 1922.6 | 1871.0 | 1997.6 | 2084.3 | 2153.0 | 2215.4 | 2272.4 | 2282.3 |
| 32.5° | 5821.0 | 5063.5 | 2817.4 | 1728.2 | 1830.4 | 1956.9 | 2014.7 | 2075.3 | 2142.2 | 2164.8 | 2168.4 |
| 35° | 5838.2 | 4887.3 | 2320.3 | 1628.8 | 1792.4 | 1918.9 | 1965.0 | 2008.4 | 1900.0 | 1908.1 | 1915.3 |
| 37.5° | 5887.9 | 4712.8 | 1904.5 | 1572.8 | 1768.0 | 1899.1 | 1954.2 | 1796.9 | 1711.9 | 1692.1 | 1689.4 |
| 40° | 5981.0 | 4526.6 | 1596.3 | 1527.6 | 1759.0 | 1909.0 | 1884.6 | 1677.6 | 1531.2 | 1421.8 | 1405.5 |
| 42.5° | 6110.2 | 4326.0 | 1399.2 | 1497.7 | 1765.3 | 1956.9 | 1787.9 | 1562.8 | 1319.7 | 1249.2 | 1240.1 |
| 45° | 6255.8 | 4115.4 | 1292.5 | 1476.9 | 1787.0 | 1994.0 | 1768.0 | 1410.1 | 1221.1 | 1167.8 | 1163.3 |
| 47.5° | 6396.8 | 3857.8 | 1237.4 | 1467.9 | 1816.8 | 1964.1 | 1683.9 | 1363.1 | 1174.1 | 1146.1 | 1148.8 |
| 50° | 6558.6 | 3625.5 | 1204.0 | 1458.0 | 1843.0 | 1945.2 | 1589.0 | 1338.6 | 1156.1 | 1190.4 | 1226.6 |
| 52.5° | 6695.0 | 3385.0 | 1174.1 | 1438.1 | 1853.0 | 1911.7 | 1564.6 | 1343.2 | 1156.1 | 1222.0 | 1256.4 |
| 55° | 6856.8 | 3203.4 | 1139.8 | 1396.5 | 1834.0 | 1816.8 | 1547.4 | 1370.3 | 1169.6 | 1128.0 | 1131.7 |
| 57.5° | 7065.6 | 3143.7 | 1101.8 | 1331.4 | 1770.7 | 1678.5 | 1539.3 | 1396.5 | 1161.5 | 1135.3 | 1144.3 |
| 60° | 7354.9 | 3207.0 | 1086.5 | 1246.5 | 1672.2 | 1570.0 | 1540.2 | 1382.9 | 1104.5 | 1059.3 | 1060.3 |
| 62.5° | 7630.6 | 3277.5 | 1085.6 | 1193.1 | 1551.1 | 1473.3 | 1519.4 | 1338.6 | 1075.6 | 1049.4 | 1059.3 |
| 65° | 7720.9 | 3206.1 | 1042.2 | 1133.5 | 1414.6 | 1357.6 | 1481.5 | 1291.6 | 1053.9 | 1014.2 | 1012.3 |
| 67.5° | 7599.8 | 2984.6 | 954.5 | 1036.8 | 1258.2 | 1223.0 | 1431.7 | 1235.6 | 1019.6 | 987.0 | 981.6 |
| 70° | 7240.1 | 2490.2 | 846.0 | 909.3 | 1080.1 | 1071.1 | 1353.1 | 1170.5 | 973.5 | 945.5 | 922.0 |
| 72.5° | 6272.0 | 1774.3 | 713.2 | 756.5 | 879.5 | 908.4 | 1244.6 | 1085.6 | 908.4 | 847.8 | 811.7 |
| 75° | 5151.2 | 1313.3 | 585.7 | 594.8 | 668.0 | 746.6 | 1095.5 | 986.1 | 831.6 | 728.5 | 700.5 |
| 77.5° | 3154.5 | 803.5 | 466.4 | 470.0 | 479.1 | 595.7 | 902.1 | 875.0 | 734.0 | 607.4 | 587.5 |
| 80° | 1021.4 | 438.4 | 337.1 | 354.3 | 327.2 | 436.6 | 697.8 | 744.8 | 630.0 | 508.0 | 486.3 |
| 82.5° | 388.7 | 255.8 | 227.8 | 239.5 | 226.9 | 292.9 | 508.9 | 596.6 | 516.1 | 417.6 | 339.9 |
| 85° | 188.0 | 144.6 | 134.7 | 150.9 | 140.1 | 150.0 | 325.4 | 439.3 | 391.4 | 272.1 | 253.1 |
| 87.5° | 66.9 | 64.2 | 51.5 | 69.6 | 59.7 | 53.3 | 99.4 | 221.5 | 258.5 | 187.1 | 167.2 |
| 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
 R_f: 69.9
 R_g: 98.3

| | | | |
|-----------|------|------|-------|
| 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 | | |



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

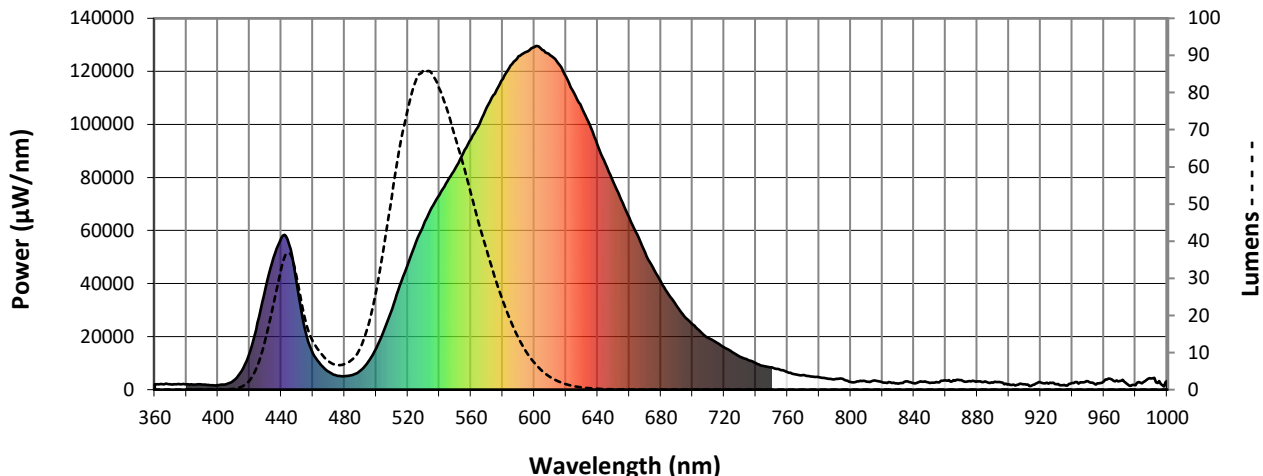


Photopic Lumens: 6211.7

| 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 | | | |

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

TM-30-18

Summary

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



Color Vector Graphics



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

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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)