

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



Scaled data based on original data using
LM-79-2019 Approved Method: Electrical and Photometric Measurements of Solid-
State Lighting Products

Test Report Prepared for
Cooper Lighting Solutions

Brand: STREETWORKS

Report Number: P362882

Luminaire Tested: NVN-SA4D-727-U-T2-HSS

Issue Date: 3/3/2020

Test Information

Test Method: LM-79-2019
Report Number: P362882
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-13)
Test Lab: INNOVATION CENTER
Issue Date: 3/3/2020
Manufacturer: COOPER LIGHTING SOLUTIONS
Product Line: STREETWORKS
Catalog Number: NVN-SA4D-727-U-T2-HSS
Description: NAVION ROADWAY AND AREA LUMINAIRE
(4) 70 CRI, 2700K, 1200mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE II OPTICS WITH HOUSE SIDE SHIELD
Light Source: -
Ballast/Driver: ELECTRONIC DRIVER

Summary

Lumens per Lamp: N/A
Luminaire Lumens: 18872 lumens
Efficiency: N/A
Efficacy: 73.1 lumens/watt
Luminous Opening: Rectangular (W 1' x L: 1.5' x H: 0')
IES Classification: Type II - Medium
BUG Rating: B1 - U0 - G3

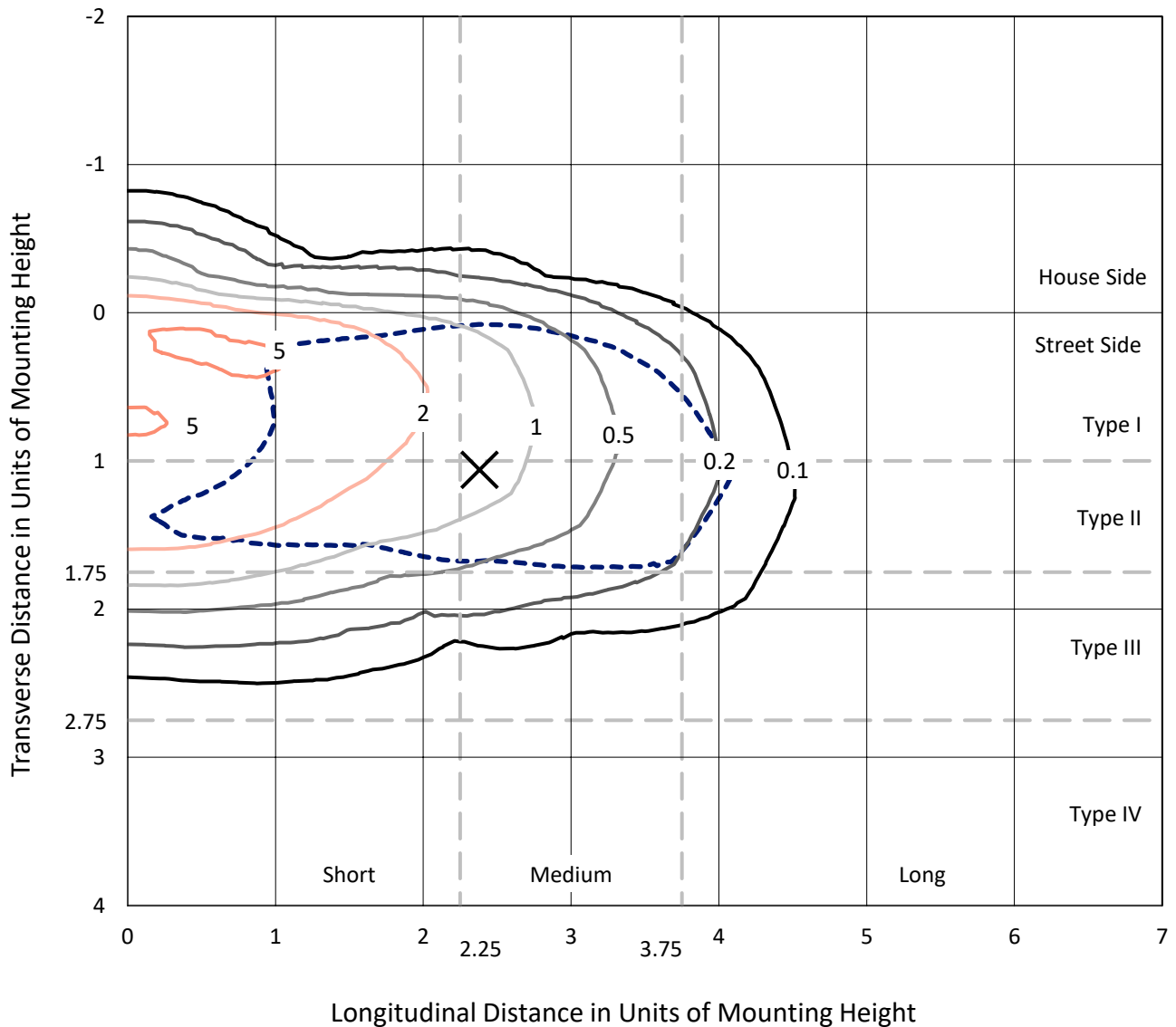
Input Watts (W): 258
Input Voltage (V): NR
Input Current (Ain): NR
Voltage Rise (V): NR
Power Factor: NR
Total Harmonic Distortion (THDi): NR
Frequency (hertz): 60
Stabilization Time: NR
Operation Time: NR
Ambient Temperature (°C): NR
Test Distance: 28.75 FT



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Iso-Footcandle Lines of Horizontal Illumination

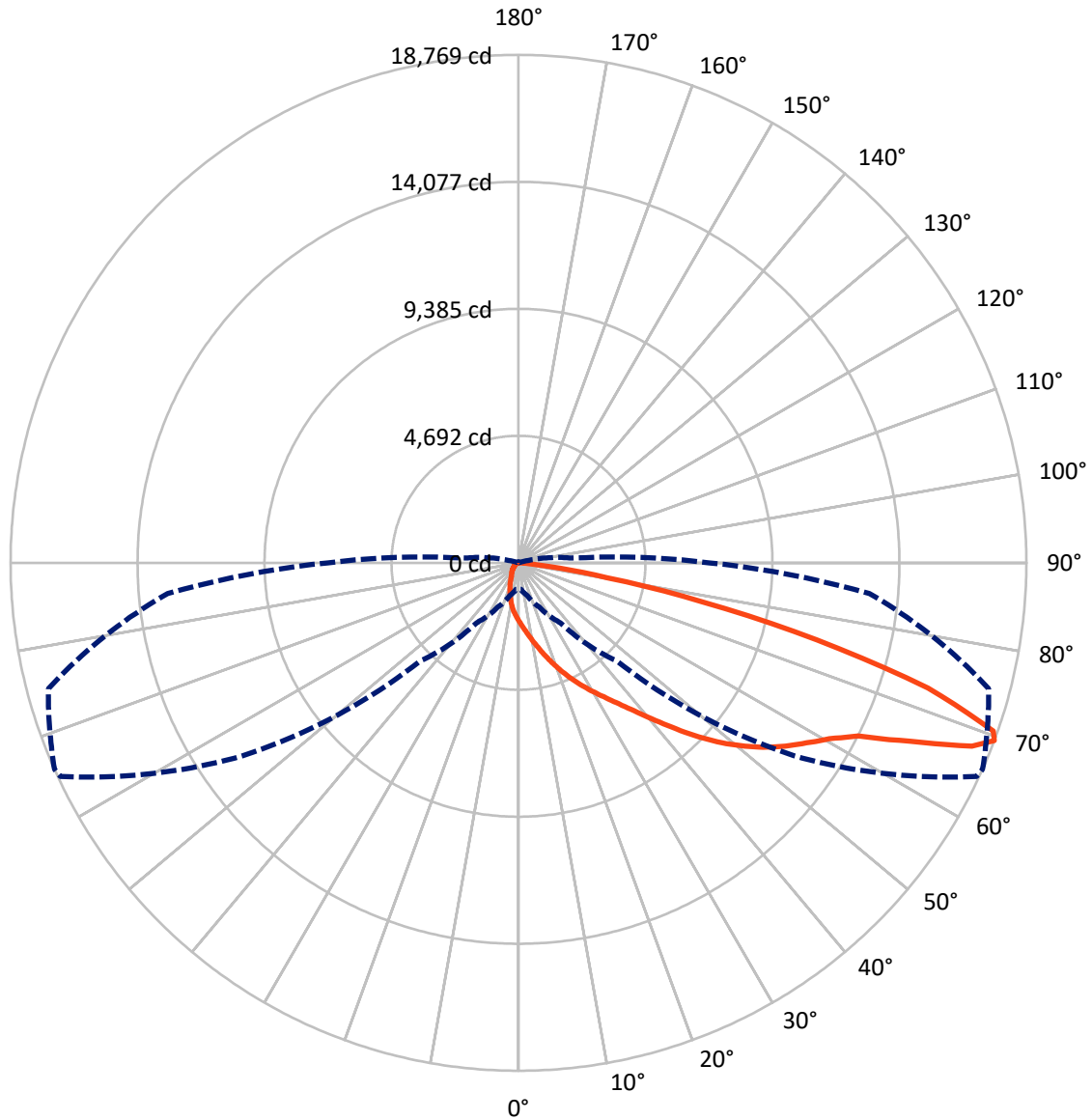
✕ Max cd
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 5.7 fc
 Type II - Medium - N/A

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CATALOG NUMBER: NVN-SA4D-727-U-T2-HSS

Luminous Intensity Polar Plot



— Vertical Plane Through 66-Deg Lateral - - - Horizontal Cone Through 69-Deg Vertical

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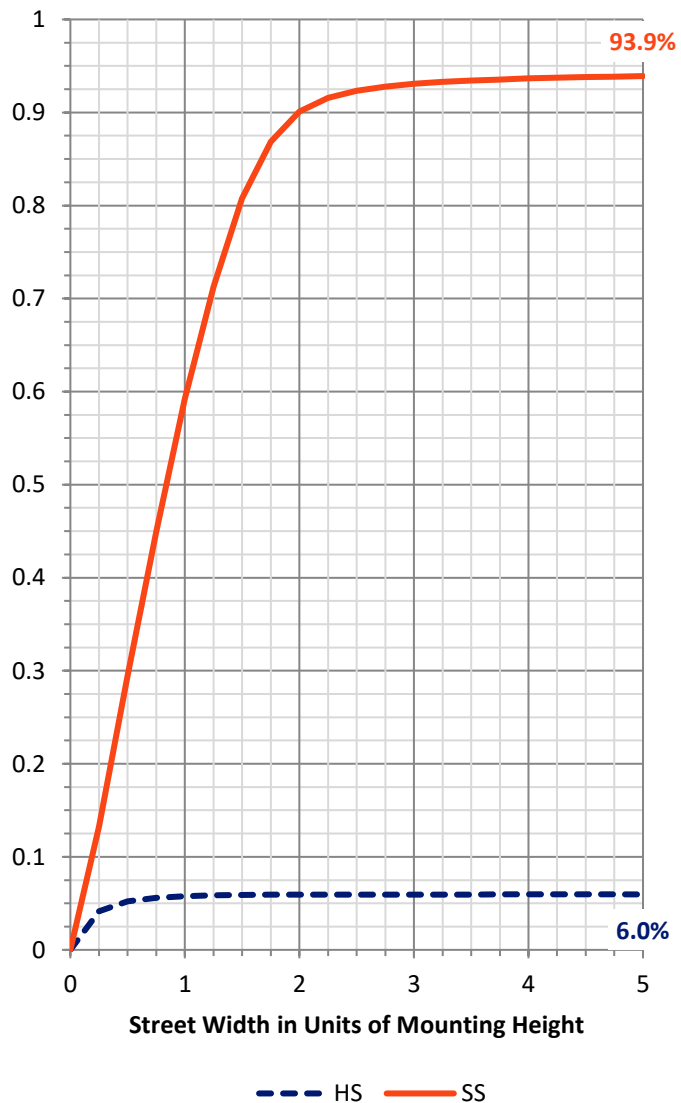
FLUX DISTRIBUTION:

| | | Downward | Upward | Total |
|--------------------|-----------|----------|--------|---------|
| House Side | Lumens | 1132.1 | 0.0 | 1132.1 |
| | % Fixture | 6.0 | 0.0 | 6.0 |
| Street Side | Lumens | 17739.9 | 0.0 | 17739.9 |
| | % Fixture | 94.0 | 0.0 | 94.0 |
| Total | Lumens | 18872.0 | 0.0 | 18872.0 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

ZONAL LUMENS:

| Zone | Lumens | % Fixture |
|-----------|---------|-----------|
| 0°-10° | 207.6 | 1.1 |
| 10°-20° | 617.9 | 3.3 |
| 20°-30° | 1075.9 | 5.7 |
| 30°-40° | 1887.7 | 10.0 |
| 40°-50° | 3159.7 | 16.7 |
| 50°-60° | 4644.5 | 24.6 |
| 60°-70° | 4768.8 | 25.3 |
| 70°-80° | 2354.2 | 12.5 |
| 80°-90° | 155.7 | 0.8 |
| 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° | 18872.0 | 100.0 |
| 0°-180° | 18872.0 | 100.0 |

Coefficient of Utilization

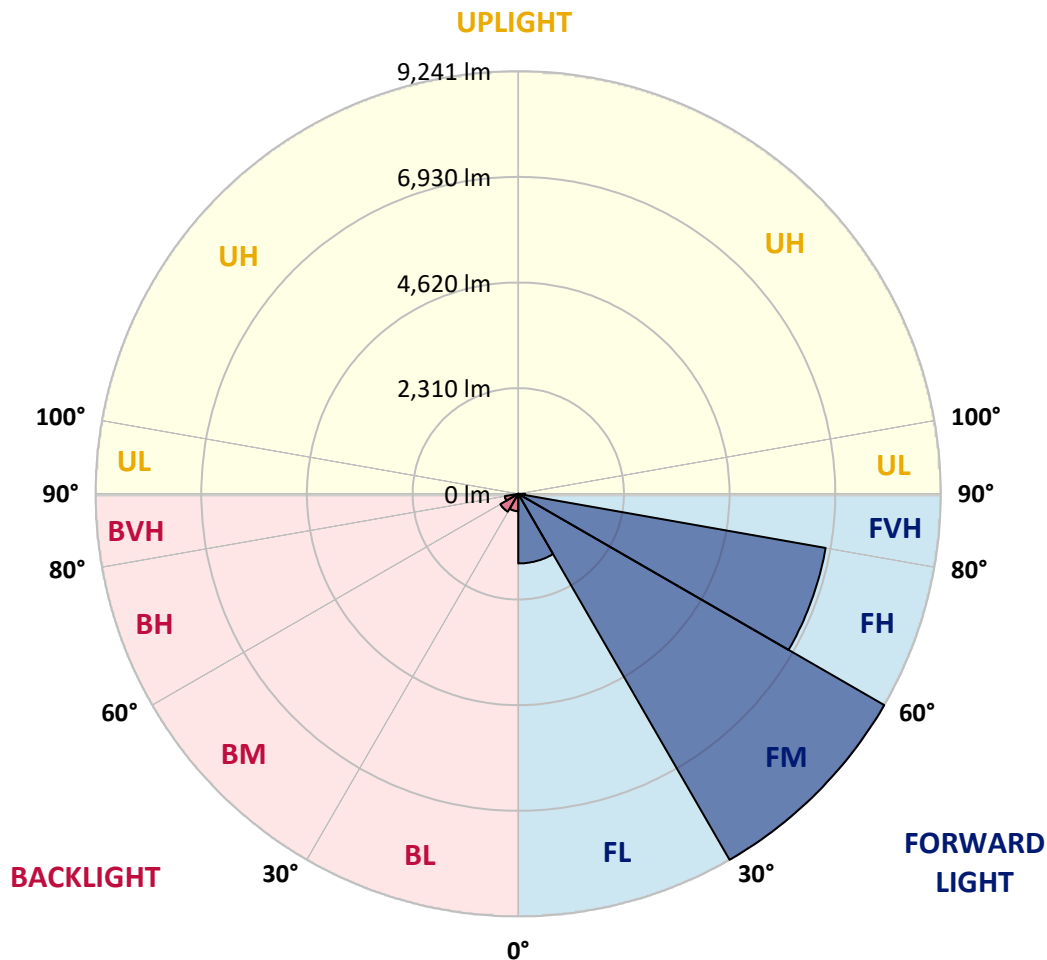


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LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | Lumens | % Fixture | Zone Rating/Lumen Limit | | |
|----------------|--------|-----------|-------------------------|------|---------|
| | | | B | U | G |
| FL (0°-30°) | 1522.8 | 8.1 | | | |
| FM (30°-60°) | 9240.6 | 49.0 | | | |
| FH (60°-80°) | 6824.6 | 36.2 | | | G3/7500 |
| FVH (80°-90°) | 151.9 | 0.8 | | | G2/225 |
| BL (0°-30°) | 378.6 | 2.0 | B1/500 | | |
| BM (30°-60°) | 451.4 | 2.4 | B1/1000 | | |
| BH (60°-80°) | 298.3 | 1.6 | B1/500 | | G1/500 |
| BVH (80°-90°) | 3.8 | 0.0 | | | G0/10 |
| UL (90°-100°) | 0.0 | 0.0 | | U0/0 | |
| UH (100°-180°) | 0.0 | 0.0 | | U0/0 | |

BUG Rating: B1-U0-G3
 Type II Medium





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CANDELA DISTRIBUTION (FULL):

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 65° | 66° | 75° | 85° |
|-------|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|
| 0° | 2147.7 | 2147.7 | 2147.7 | 2147.7 | 2147.7 | 2147.7 | 2147.7 | 2147.7 | 2147.7 | 2147.7 | 2147.7 |
| 2.5° | 2527.8 | 2517.0 | 2512.5 | 2492.8 | 2458.7 | 2432.7 | 2382.5 | 2324.3 | 2313.5 | 2257.1 | 2188.0 |
| 5° | 2855.8 | 2846.9 | 2840.6 | 2812.8 | 2777.8 | 2712.4 | 2621.0 | 2512.5 | 2491.9 | 2384.3 | 2246.3 |
| 7.5° | 3084.4 | 3100.5 | 3100.5 | 3082.6 | 3038.7 | 2989.4 | 2877.3 | 2729.4 | 2703.4 | 2538.5 | 2324.3 |
| 10° | 3218.0 | 3237.7 | 3252.9 | 3268.2 | 3261.9 | 3242.2 | 3136.4 | 2969.7 | 2938.3 | 2719.6 | 2414.8 |
| 12.5° | 3230.5 | 3250.2 | 3293.3 | 3356.9 | 3418.7 | 3463.6 | 3397.2 | 3235.9 | 3200.0 | 2929.3 | 2522.4 |
| 15° | 3160.6 | 3181.2 | 3247.5 | 3371.2 | 3520.9 | 3651.8 | 3673.3 | 3530.8 | 3494.0 | 3179.4 | 2656.8 |
| 17.5° | 3038.7 | 3052.1 | 3147.1 | 3318.3 | 3553.2 | 3793.4 | 3923.4 | 3847.2 | 3813.1 | 3465.4 | 2806.5 |
| 20° | 2948.1 | 2958.0 | 3041.4 | 3225.1 | 3533.5 | 3882.2 | 4160.0 | 4183.3 | 4147.5 | 3771.9 | 2968.8 |
| 22.5° | 3103.2 | 3121.1 | 3123.8 | 3210.8 | 3479.7 | 3926.1 | 4368.0 | 4514.1 | 4487.2 | 4097.3 | 3128.3 |
| 25° | 3527.2 | 3547.8 | 3479.7 | 3425.9 | 3525.4 | 3945.8 | 4546.4 | 4852.9 | 4831.4 | 4447.8 | 3288.8 |
| 27.5° | 4087.4 | 4108.9 | 4021.1 | 3860.7 | 3764.7 | 4020.2 | 4705.0 | 5197.1 | 5196.2 | 4818.9 | 3461.8 |
| 30° | 4637.8 | 4659.3 | 4569.7 | 4409.2 | 4188.7 | 4230.8 | 4842.2 | 5557.5 | 5562.9 | 5201.6 | 3645.5 |
| 32.5° | 5215.1 | 5242.0 | 5149.6 | 4943.5 | 4713.1 | 4594.8 | 5034.9 | 5919.6 | 5950.1 | 5645.3 | 3852.6 |
| 35° | 5871.2 | 5874.8 | 5744.8 | 5528.8 | 5263.5 | 5081.5 | 5344.1 | 6325.7 | 6398.3 | 6194.8 | 4115.2 |
| 37.5° | 6514.8 | 6540.8 | 6434.1 | 6093.5 | 5849.7 | 5643.5 | 5804.0 | 6833.0 | 6936.1 | 6866.2 | 4458.5 |
| 40° | 6991.7 | 7046.3 | 7031.1 | 6663.6 | 6432.3 | 6285.3 | 6375.0 | 7436.3 | 7567.1 | 7647.8 | 4891.5 |
| 42.5° | 7291.0 | 7332.3 | 7402.2 | 7180.8 | 6971.0 | 6995.2 | 7049.0 | 8139.0 | 8300.4 | 8538.8 | 5389.0 |
| 45° | 7634.4 | 7654.1 | 7712.3 | 7614.6 | 7473.0 | 7716.8 | 7764.3 | 8930.5 | 9099.9 | 9497.0 | 5941.1 |
| 47.5° | 8053.9 | 8100.5 | 8116.6 | 8027.0 | 7962.4 | 8355.0 | 8453.6 | 9650.3 | 9887.8 | 10523.3 | 6525.5 |
| 50° | 8588.1 | 8600.6 | 8628.4 | 8570.2 | 8505.6 | 8903.6 | 9072.1 | 10405.9 | 10621.9 | 11553.3 | 7101.9 |
| 52.5° | 9110.7 | 9155.5 | 9252.3 | 9215.5 | 9189.5 | 9370.6 | 9623.4 | 11087.2 | 11328.3 | 12412.0 | 7677.4 |
| 55° | 9261.3 | 9299.8 | 9634.1 | 9862.7 | 10074.3 | 9946.1 | 10150.5 | 11697.6 | 11958.4 | 13179.3 | 8231.3 |
| 57.5° | 8659.8 | 8737.8 | 9316.8 | 9912.0 | 10789.6 | 10840.7 | 10874.7 | 12324.1 | 12558.1 | 13767.3 | 8807.7 |
| 60° | 7139.6 | 7154.8 | 8104.9 | 9125.9 | 10671.2 | 11621.4 | 11932.4 | 12997.3 | 13193.6 | 14315.0 | 9497.9 |
| 62.5° | 4541.0 | 4696.1 | 5738.5 | 7179.9 | 9419.9 | 11508.4 | 13211.5 | 14015.6 | 14087.3 | 14972.0 | 10487.5 |
| 65° | 2162.9 | 2263.3 | 3014.5 | 4436.1 | 6823.1 | 10062.6 | 14094.5 | 15857.6 | 15889.9 | 16274.4 | 11809.6 |
| 67.5° | 1197.5 | 1245.9 | 1603.6 | 2387.9 | 3988.8 | 7116.3 | 13737.7 | 18039.4 | 18069.9 | 17604.6 | 12969.5 |
| 69° | 936.7 | 977.9 | 1259.4 | 1799.9 | 2704.3 | 5114.7 | 12431.7 | 18678.5 | 18769.0 | 17985.6 | 13010.8 |
| 70° | 795.1 | 835.4 | 1084.6 | 1520.2 | 2174.6 | 3952.1 | 11065.6 | 18519.8 | 18615.7 | 17949.7 | 12703.3 |
| 72.5° | 486.7 | 510.0 | 722.5 | 1070.3 | 1457.5 | 1988.1 | 6824.0 | 15662.2 | 15824.5 | 16465.4 | 10917.7 |
| 75° | 328.1 | 340.6 | 451.8 | 738.6 | 1042.5 | 1023.7 | 3545.1 | 11039.7 | 11391.0 | 12808.2 | 8063.7 |
| 77.5° | 234.8 | 246.5 | 303.0 | 477.8 | 730.5 | 675.9 | 1605.4 | 6860.8 | 6936.1 | 7681.9 | 4397.6 |
| 80° | 133.6 | 144.3 | 214.2 | 284.1 | 495.7 | 450.9 | 638.2 | 3277.1 | 3314.8 | 3294.1 | 1468.2 |
| 82.5° | 69.9 | 78.9 | 117.4 | 187.3 | 318.2 | 294.9 | 265.3 | 1097.2 | 1102.5 | 917.0 | 321.8 |
| 85° | 13.4 | 16.1 | 58.3 | 128.2 | 164.0 | 128.2 | 108.5 | 257.3 | 262.6 | 232.2 | 79.8 |
| 87.5° | 0.0 | 0.9 | 23.3 | 28.7 | 32.3 | 33.2 | 35.0 | 50.2 | 53.8 | 72.6 | 21.5 |
| 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: P362882
 CATALOG NUMBER: NVN-SA4D-727-U-T2-HSS

CANDELA DISTRIBUTION (continued):

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0° | 2147.7 | 2147.7 | 2147.7 | 2147.7 | 2147.7 | 2147.7 | 2147.7 | 2147.7 | 2147.7 | 2147.7 | 2147.7 |
| 2.5° | 2157.6 | 2125.3 | 2063.4 | 1991.7 | 1936.2 | 1881.5 | 1838.4 | 1793.6 | 1777.5 | 1769.4 | 1768.5 |
| 5° | 2179.1 | 2110.9 | 1980.1 | 1845.6 | 1735.4 | 1631.4 | 1557.0 | 1486.2 | 1453.0 | 1437.8 | 1431.5 |
| 7.5° | 2214.9 | 2105.6 | 1894.9 | 1689.7 | 1531.0 | 1401.0 | 1297.9 | 1220.9 | 1182.3 | 1166.2 | 1159.9 |
| 10° | 2257.1 | 2098.4 | 1795.4 | 1524.7 | 1322.1 | 1187.7 | 1085.5 | 1009.3 | 967.2 | 949.3 | 940.3 |
| 12.5° | 2306.4 | 2085.8 | 1680.7 | 1358.0 | 1143.8 | 1009.3 | 885.6 | 791.5 | 743.1 | 722.5 | 712.6 |
| 15° | 2367.3 | 2073.3 | 1560.6 | 1201.1 | 986.9 | 822.9 | 687.5 | 623.9 | 614.0 | 610.4 | 611.3 |
| 17.5° | 2427.4 | 2053.6 | 1429.7 | 1046.1 | 822.0 | 642.7 | 573.7 | 570.1 | 571.9 | 571.9 | 571.9 |
| 20° | 2481.1 | 2008.8 | 1287.2 | 913.4 | 665.1 | 542.3 | 528.0 | 521.7 | 517.2 | 513.6 | 509.1 |
| 22.5° | 2523.3 | 1948.7 | 1150.0 | 781.6 | 543.2 | 496.6 | 474.2 | 454.5 | 438.3 | 427.6 | 422.2 |
| 25° | 2552.0 | 1868.9 | 1024.5 | 655.2 | 488.5 | 451.8 | 411.4 | 378.3 | 353.2 | 337.9 | 331.7 |
| 27.5° | 2573.5 | 1782.9 | 912.5 | 548.6 | 450.9 | 399.8 | 346.9 | 307.5 | 281.5 | 268.0 | 262.6 |
| 30° | 2588.7 | 1685.2 | 813.9 | 482.2 | 408.7 | 345.1 | 288.6 | 250.1 | 231.3 | 224.1 | 220.5 |
| 32.5° | 2603.0 | 1576.7 | 720.7 | 450.9 | 369.3 | 294.9 | 242.0 | 212.4 | 200.8 | 191.8 | 189.1 |
| 35° | 2638.9 | 1476.3 | 631.9 | 417.7 | 329.0 | 251.9 | 208.0 | 186.4 | 174.8 | 169.4 | 167.6 |
| 37.5° | 2724.1 | 1401.9 | 546.8 | 383.6 | 288.6 | 217.8 | 182.0 | 166.7 | 156.0 | 150.6 | 148.8 |
| 40° | 2861.2 | 1364.3 | 475.1 | 346.9 | 249.2 | 191.8 | 164.9 | 150.6 | 138.9 | 130.9 | 129.1 |
| 42.5° | 3062.9 | 1369.6 | 424.9 | 310.1 | 217.8 | 171.2 | 148.8 | 131.8 | 119.2 | 112.0 | 110.3 |
| 45° | 3307.6 | 1409.1 | 389.9 | 274.3 | 191.8 | 155.1 | 130.9 | 112.9 | 101.3 | 95.0 | 93.2 |
| 47.5° | 3572.9 | 1472.7 | 361.2 | 242.0 | 171.2 | 139.8 | 112.9 | 94.1 | 84.3 | 78.9 | 78.0 |
| 50° | 3852.6 | 1534.6 | 331.7 | 210.6 | 153.3 | 124.6 | 95.0 | 78.0 | 69.9 | 65.4 | 63.6 |
| 52.5° | 4135.8 | 1606.3 | 304.8 | 182.0 | 138.0 | 106.7 | 78.9 | 63.6 | 57.4 | 53.8 | 52.0 |
| 55° | 4440.6 | 1660.1 | 278.8 | 159.6 | 122.8 | 90.5 | 65.4 | 52.9 | 47.5 | 43.0 | 42.1 |
| 57.5° | 4799.1 | 1743.4 | 251.9 | 138.0 | 104.9 | 75.3 | 53.8 | 42.1 | 37.6 | 33.2 | 32.3 |
| 60° | 5283.2 | 1841.1 | 223.2 | 121.9 | 86.1 | 61.8 | 43.9 | 34.1 | 28.7 | 25.1 | 24.2 |
| 62.5° | 5921.4 | 1949.6 | 187.3 | 106.7 | 69.9 | 50.2 | 35.0 | 26.9 | 20.6 | 16.1 | 16.1 |
| 65° | 6730.8 | 2126.2 | 153.3 | 89.6 | 57.4 | 41.2 | 26.9 | 19.7 | 11.7 | 7.2 | 7.2 |
| 67.5° | 7203.2 | 2156.7 | 123.7 | 73.5 | 46.6 | 35.0 | 22.4 | 13.4 | 3.6 | 0.9 | 0.0 |
| 69° | 7051.7 | 1980.1 | 104.9 | 62.7 | 40.3 | 33.2 | 20.6 | 9.9 | 1.8 | 0.0 | 0.0 |
| 70° | 6766.7 | 1810.7 | 92.3 | 55.6 | 36.8 | 31.4 | 19.7 | 7.2 | 1.8 | 0.0 | 0.0 |
| 72.5° | 5591.5 | 1289.0 | 69.9 | 41.2 | 26.9 | 27.8 | 17.9 | 4.5 | 1.8 | 0.0 | 0.0 |
| 75° | 4073.1 | 783.4 | 50.2 | 28.7 | 17.0 | 20.6 | 12.5 | 1.8 | 0.9 | 0.0 | 0.0 |
| 77.5° | 2266.0 | 369.3 | 31.4 | 16.1 | 10.8 | 12.5 | 6.3 | 0.0 | 0.0 | 0.0 | 0.0 |
| 80° | 735.9 | 100.4 | 14.3 | 9.0 | 6.3 | 7.2 | 2.7 | 0.0 | 0.0 | 0.0 | 0.0 |
| 82.5° | 136.2 | 28.7 | 8.1 | 4.5 | 1.8 | 1.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 85° | 29.6 | 11.7 | 4.5 | 1.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 87.5° | 9.9 | 3.6 | 0.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 90° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

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 | | | |

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

TM-30-18

Summary

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



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)