

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: P318979

Luminaire Tested: **GLEON-SA5D-727-U-T4W**

Issue Date: 3/3/2020

Test Information

Test Method: LM-79-08
Report Number: P318979
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-18)
Test Lab: INNOVATION CENTER
Issue Date: 3/3/2020
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)
Product Line: McGRAW-EDISON
Catalog Number: GLEON-SA5D-727-U-T4W
Description: GALLEON AREA AND ROADWAY LUMINAIRE
(5) 70 CRI, 2700K, 1200mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE IV WIDE OPTICS
Light Source: -
Ballast/Driver: ELECTRONIC DRIVER

Summary

Lumens per Lamp: N/A
Luminaire Lumens: 32204 lumens
Efficiency: N/A
Efficacy: 100.6 lumens/watt
Luminous Opening: Rectangular (W 1.5' x L: 1' x H: 0')
IES Classification: Type IV - Short
BUG Rating: B3 - U0 - G5

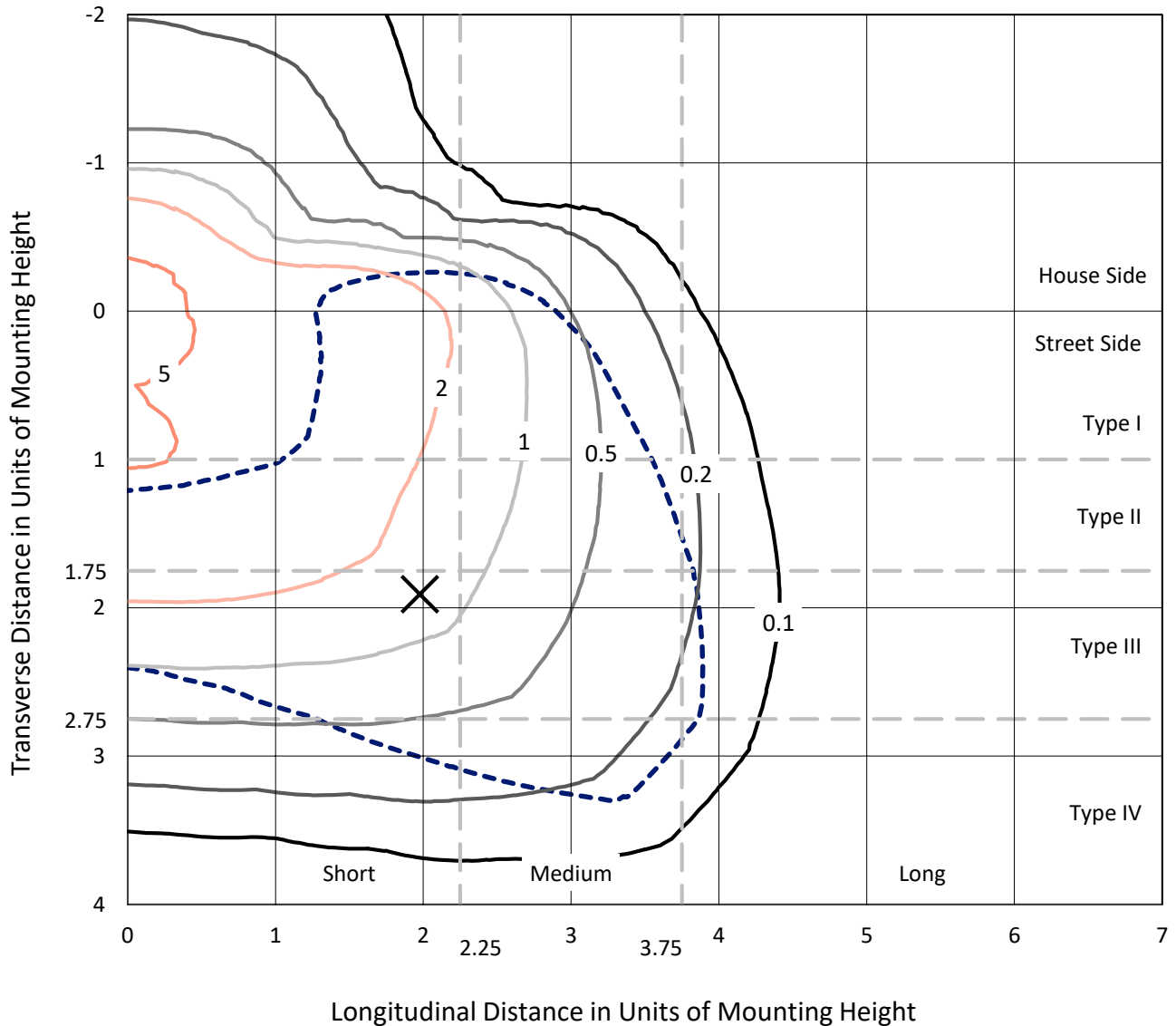
Input Watts (W): 320
Input Voltage (V): NR
Input Current (Ain): NR
Voltage Rise (V): NR
Power Factor: NR
Total Harmonic Distortion (THDi): NR
Frequency (hertz): 60
Stabilization Time: NR
Operation Time: NR
Ambient Temperature (°C): NR
Test Distance: 24 FT



REPORT NUMBER: P318979
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Iso-Footcandle Lines of Horizontal Illumination

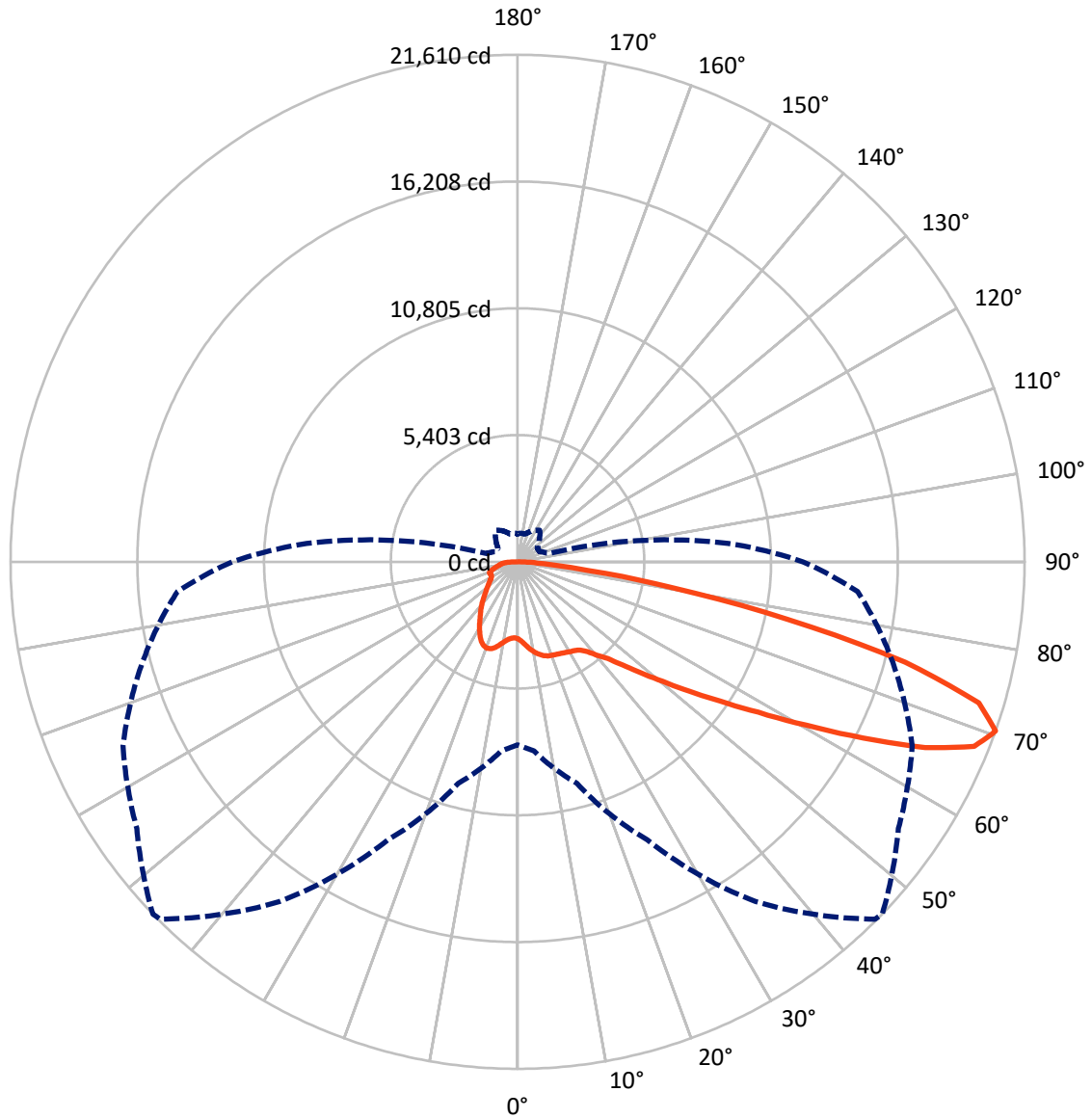
× Max cd
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 6.6 fc
 Type IV - Short - N/A

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Luminous Intensity Polar Plot



— Vertical Plane Through 46-Deg Lateral - - - Horizontal Cone Through 70-Deg Vertical

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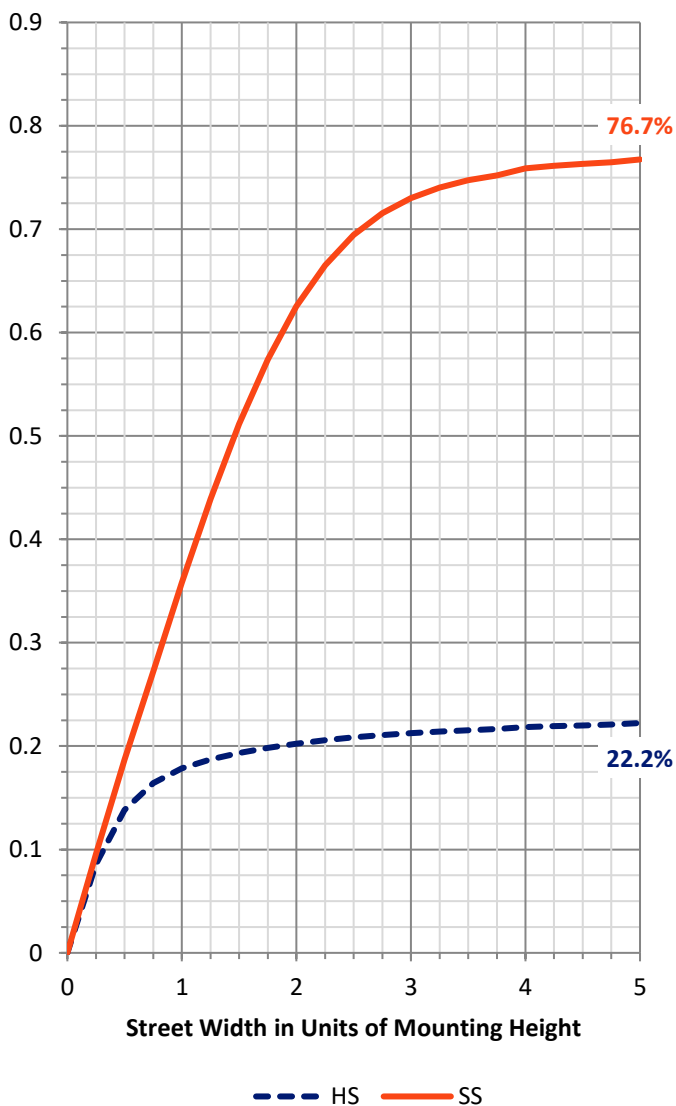
FLUX DISTRIBUTION:

| | | Downward | Upward | Total |
|--------------------|-----------|----------|--------|---------|
| House Side | Lumens | 7381.1 | 0.0 | 7381.1 |
| | % Fixture | 22.9 | 0.0 | 22.9 |
| Street Side | Lumens | 24822.9 | 0.0 | 24822.9 |
| | % Fixture | 77.1 | 0.0 | 77.1 |
| Total | Lumens | 32204.0 | 0.0 | 32204.0 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

ZONAL LUMENS:

| Zone | Lumens | % Fixture |
|-----------|---------|-----------|
| 0°-10° | 334.5 | 1.0 |
| 10°-20° | 1114.4 | 3.5 |
| 20°-30° | 1858.1 | 5.8 |
| 30°-40° | 2636.7 | 8.2 |
| 40°-50° | 3878.4 | 12.0 |
| 50°-60° | 6568.1 | 20.4 |
| 60°-70° | 9323.3 | 29.0 |
| 70°-80° | 5664.0 | 17.6 |
| 80°-90° | 826.6 | 2.6 |
| 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° | 32204.0 | 100.0 |
| 0°-180° | 32204.0 | 100.0 |

Coefficient of Utilization

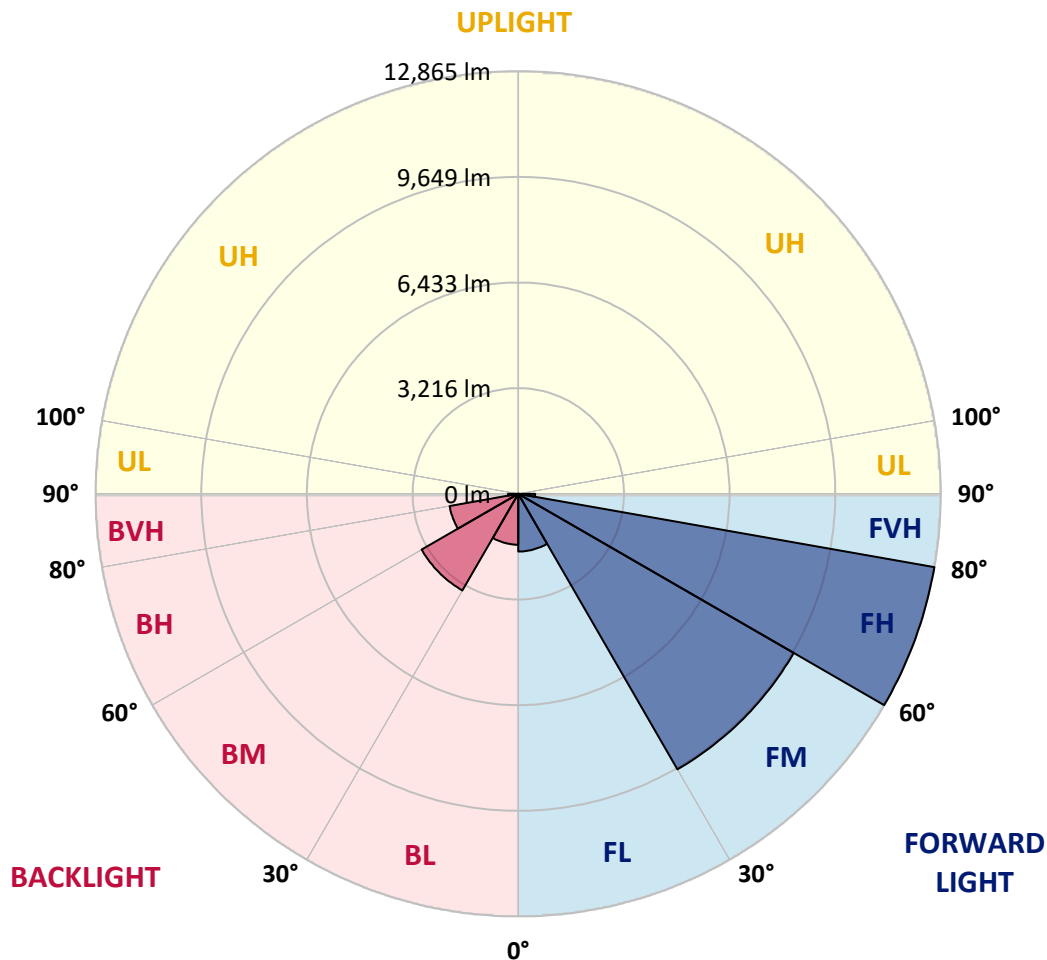


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LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | Lumens | % Fixture | Zone Rating/Lumen Limit | | |
|----------------|---------|-----------|-------------------------|------|---------|
| | | | B | U | G |
| FL (0°-30°) | 1757.2 | 5.5 | | | |
| FM (30°-60°) | 9685.5 | 30.1 | | | |
| FH (60°-80°) | 12865.3 | 39.9 | | | G5 |
| FVH (80°-90°) | 514.9 | 1.6 | | | G4/750 |
| BL (0°-30°) | 1549.7 | 4.8 | B3/2500 | | |
| BM (30°-60°) | 3397.7 | 10.6 | B3/5000 | | |
| BH (60°-80°) | 2122.0 | 6.6 | B3/2500 | | G3/2500 |
| BVH (80°-90°) | 311.7 | 1.0 | | | G3/500 |
| UL (90°-100°) | 0.0 | 0.0 | | U0/0 | |
| UH (100°-180°) | 0.0 | 0.0 | | U0/0 | |

BUG Rating: B3-U0-G5
 Type IV Short





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CATALOG NUMBER: GLEON-SA5D-727-U-T4W

CANDELA DISTRIBUTION (FULL):

| | 0° | 5° | 15° | 25° | 35° | 45° | 46° | 55° | 65° | 75° | 85° |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0° | 3281.0 | 3281.0 | 3281.0 | 3281.0 | 3281.0 | 3281.0 | 3281.0 | 3281.0 | 3281.0 | 3281.0 | 3281.0 |
| 2.5° | 3445.2 | 3447.4 | 3451.8 | 3440.8 | 3409.9 | 3401.1 | 3397.8 | 3365.8 | 3344.9 | 3314.0 | 3287.6 |
| 5° | 3720.7 | 3722.9 | 3716.3 | 3685.4 | 3617.1 | 3566.4 | 3562.0 | 3489.3 | 3423.1 | 3352.6 | 3299.7 |
| 7.5° | 4008.3 | 4011.7 | 3990.7 | 3932.3 | 3836.4 | 3748.2 | 3742.7 | 3643.5 | 3543.3 | 3436.4 | 3357.0 |
| 10° | 4262.9 | 4249.7 | 4215.5 | 4134.0 | 4020.5 | 3912.5 | 3908.1 | 3804.5 | 3688.7 | 3559.8 | 3454.0 |
| 12.5° | 4432.7 | 4421.6 | 4377.5 | 4278.4 | 4153.8 | 4054.6 | 4045.8 | 3949.9 | 3837.5 | 3696.4 | 3569.7 |
| 15° | 4526.3 | 4534.0 | 4474.5 | 4362.1 | 4240.9 | 4157.1 | 4149.4 | 4081.1 | 3980.8 | 3838.6 | 3693.1 |
| 17.5° | 4538.5 | 4545.1 | 4487.8 | 4376.4 | 4277.3 | 4219.9 | 4216.6 | 4171.5 | 4098.7 | 3962.1 | 3810.0 |
| 20° | 4467.9 | 4472.3 | 4424.9 | 4333.5 | 4268.4 | 4250.8 | 4249.7 | 4229.9 | 4175.9 | 4054.6 | 3907.0 |
| 22.5° | 4365.4 | 4368.7 | 4334.6 | 4268.4 | 4246.4 | 4274.0 | 4281.7 | 4274.0 | 4235.4 | 4121.9 | 3983.0 |
| 25° | 4340.1 | 4337.9 | 4302.6 | 4235.4 | 4254.1 | 4312.5 | 4322.4 | 4325.7 | 4299.3 | 4200.1 | 4080.0 |
| 27.5° | 4462.4 | 4454.7 | 4387.5 | 4279.5 | 4291.6 | 4362.1 | 4375.3 | 4407.3 | 4390.8 | 4303.7 | 4190.2 |
| 30° | 4816.2 | 4803.0 | 4665.2 | 4447.0 | 4387.5 | 4423.8 | 4440.4 | 4491.1 | 4494.4 | 4421.6 | 4336.8 |
| 32.5° | 5413.5 | 5397.0 | 5150.1 | 4760.0 | 4549.5 | 4486.7 | 4502.1 | 4578.1 | 4618.9 | 4562.7 | 4471.2 |
| 35° | 6168.5 | 6149.7 | 5825.7 | 5292.3 | 4820.6 | 4606.8 | 4617.8 | 4678.4 | 4760.0 | 4680.6 | 4559.4 |
| 37.5° | 6955.4 | 6910.2 | 6598.3 | 5918.3 | 5251.5 | 4863.6 | 4863.6 | 4871.3 | 4909.9 | 4744.5 | 4663.0 |
| 40° | 7737.9 | 7692.7 | 7410.5 | 6654.5 | 5809.2 | 5268.0 | 5242.7 | 5071.9 | 5041.0 | 4898.8 | 4871.3 |
| 42.5° | 8465.2 | 8452.0 | 8285.6 | 7486.6 | 6463.8 | 5665.9 | 5630.6 | 5340.8 | 5347.4 | 5259.2 | 5260.3 |
| 45° | 9238.9 | 9238.9 | 9103.4 | 8326.4 | 7226.5 | 6305.1 | 6269.9 | 5843.3 | 5909.5 | 5868.7 | 5966.8 |
| 47.5° | 9870.4 | 9890.3 | 9871.5 | 9201.4 | 8113.7 | 7117.4 | 7053.5 | 6539.9 | 6725.0 | 6865.0 | 7150.4 |
| 50° | 10515.2 | 10546.0 | 10549.3 | 10161.4 | 9186.0 | 8082.8 | 8010.1 | 7464.5 | 7877.8 | 8279.0 | 8840.0 |
| 52.5° | 11450.8 | 11520.3 | 11243.6 | 11119.1 | 10499.7 | 9229.0 | 9157.4 | 8653.7 | 9343.6 | 9906.8 | 10873.3 |
| 55° | 12318.2 | 12257.6 | 12060.3 | 12137.4 | 11906.0 | 10533.9 | 10479.9 | 10037.9 | 10976.9 | 11708.7 | 12964.0 |
| 57.5° | 12787.7 | 12783.3 | 12981.7 | 13312.3 | 13422.5 | 12143.0 | 12097.8 | 11668.0 | 12818.5 | 13368.5 | 14926.9 |
| 60° | 13338.7 | 13346.5 | 13838.0 | 14588.5 | 15042.6 | 14146.6 | 14126.7 | 13800.5 | 14607.3 | 14918.1 | 16466.5 |
| 62.5° | 13415.9 | 13554.8 | 14401.2 | 15692.8 | 16559.1 | 16487.4 | 16531.5 | 15721.5 | 16207.5 | 16154.6 | 17616.0 |
| 65° | 12528.7 | 12711.6 | 14243.6 | 16026.8 | 18066.8 | 19047.6 | 19088.4 | 17653.5 | 17469.4 | 17211.5 | 18027.1 |
| 67.5° | 10710.2 | 10981.3 | 12645.5 | 15300.5 | 18563.8 | 20939.9 | 20997.2 | 19151.2 | 18516.4 | 17569.7 | 17037.4 |
| 70° | 7794.1 | 8094.9 | 9770.1 | 13067.6 | 17677.7 | 21545.0 | 21610.0 | 19813.6 | 18556.1 | 16550.3 | 14544.4 |
| 72.5° | 4708.2 | 4944.0 | 6325.0 | 9620.2 | 14920.3 | 20442.9 | 20558.6 | 18973.8 | 16941.5 | 14018.7 | 10740.0 |
| 75° | 2067.5 | 2221.8 | 3058.3 | 5543.6 | 10681.6 | 16914.0 | 17058.3 | 16240.6 | 13765.3 | 10187.8 | 6348.1 |
| 77.5° | 880.6 | 924.7 | 1254.2 | 2408.1 | 6038.4 | 11557.7 | 11756.1 | 11866.3 | 9339.2 | 5543.6 | 2682.5 |
| 80° | 548.8 | 566.5 | 709.8 | 1090.0 | 2825.8 | 6491.4 | 6705.2 | 6981.8 | 4637.6 | 2037.8 | 936.8 |
| 82.5° | 333.9 | 353.8 | 471.7 | 659.1 | 1471.3 | 2942.6 | 3045.1 | 3240.2 | 1799.7 | 880.6 | 484.9 |
| 85° | 200.6 | 214.9 | 288.8 | 416.6 | 837.6 | 1157.2 | 1156.1 | 1278.4 | 847.5 | 566.5 | 255.7 |
| 87.5° | 95.9 | 106.9 | 154.3 | 216.0 | 422.1 | 434.2 | 406.7 | 460.7 | 514.7 | 371.4 | 128.9 |
| 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: GLEON-SA5D-727-U-T4W

CANDELA DISTRIBUTION (continued):

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|-------|---------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0° | 3281.0 | 3281.0 | 3281.0 | 3281.0 | 3281.0 | 3281.0 | 3281.0 | 3281.0 | 3281.0 | 3281.0 | 3281.0 |
| 2.5° | 3278.8 | 3274.3 | 3260.0 | 3249.0 | 3246.8 | 3240.2 | 3234.7 | 3238.0 | 3242.4 | 3243.5 | 3243.5 |
| 5° | 3277.7 | 3265.5 | 3246.8 | 3239.1 | 3249.0 | 3262.2 | 3278.8 | 3300.8 | 3314.0 | 3323.9 | 3330.6 |
| 7.5° | 3330.6 | 3307.4 | 3286.5 | 3282.1 | 3301.9 | 3337.2 | 3374.6 | 3420.9 | 3452.9 | 3474.9 | 3479.3 |
| 10° | 3418.7 | 3390.1 | 3369.1 | 3373.5 | 3408.8 | 3459.5 | 3512.4 | 3571.9 | 3620.4 | 3650.2 | 3652.4 |
| 12.5° | 3520.1 | 3492.6 | 3472.7 | 3491.5 | 3549.9 | 3611.6 | 3666.7 | 3718.5 | 3762.6 | 3792.3 | 3792.3 |
| 15° | 3636.9 | 3617.1 | 3594.0 | 3636.9 | 3716.3 | 3771.4 | 3794.5 | 3819.9 | 3844.1 | 3866.2 | 3861.8 |
| 17.5° | 3749.4 | 3730.6 | 3718.5 | 3769.2 | 3851.8 | 3877.2 | 3861.8 | 3843.0 | 3843.0 | 3855.2 | 3857.4 |
| 20° | 3846.3 | 3829.8 | 3837.5 | 3887.1 | 3930.1 | 3903.6 | 3846.3 | 3786.8 | 3762.6 | 3769.2 | 3775.8 |
| 22.5° | 3931.2 | 3923.5 | 3946.6 | 3969.8 | 3938.9 | 3846.3 | 3740.5 | 3660.1 | 3630.3 | 3628.1 | 3630.3 |
| 25° | 4030.4 | 4029.3 | 4057.9 | 4016.1 | 3879.4 | 3708.6 | 3566.4 | 3488.2 | 3471.6 | 3484.8 | 3506.9 |
| 27.5° | 4153.8 | 4165.9 | 4180.3 | 4027.1 | 3758.2 | 3500.3 | 3355.9 | 3301.9 | 3318.4 | 3350.4 | 3371.3 |
| 30° | 4311.4 | 4344.5 | 4313.6 | 3999.5 | 3584.0 | 3262.2 | 3124.5 | 3109.0 | 3154.2 | 3199.4 | 3221.4 |
| 32.5° | 4464.6 | 4516.4 | 4441.5 | 3927.9 | 3359.2 | 3009.8 | 2902.9 | 2898.5 | 2953.6 | 2997.7 | 3028.6 |
| 35° | 4588.1 | 4690.5 | 4537.4 | 3785.7 | 3099.1 | 2777.3 | 2699.0 | 2669.3 | 2689.1 | 2740.9 | 2776.2 |
| 37.5° | 4749.0 | 4919.8 | 4603.5 | 3568.6 | 2817.0 | 2585.5 | 2494.1 | 2425.7 | 2408.1 | 2429.0 | 2446.7 |
| 40° | 5043.2 | 5269.1 | 4634.3 | 3265.5 | 2541.4 | 2393.8 | 2301.2 | 2200.9 | 2131.5 | 2080.8 | 2081.9 |
| 42.5° | 5523.7 | 5724.3 | 4614.5 | 2897.4 | 2286.9 | 2206.4 | 2101.7 | 1986.0 | 1873.6 | 1759.0 | 1750.1 |
| 45° | 6304.0 | 6401.0 | 4555.0 | 2507.3 | 2063.1 | 2010.2 | 1912.1 | 1796.4 | 1646.5 | 1516.5 | 1504.4 |
| 47.5° | 7552.7 | 7337.8 | 4462.4 | 2166.7 | 1865.9 | 1843.8 | 1753.4 | 1620.1 | 1461.4 | 1356.7 | 1347.9 |
| 50° | 9255.5 | 8690.1 | 4417.2 | 1895.6 | 1691.7 | 1698.3 | 1624.5 | 1483.4 | 1333.5 | 1256.4 | 1247.6 |
| 52.5° | 11292.1 | 10265.0 | 4504.3 | 1686.2 | 1551.8 | 1574.9 | 1519.8 | 1387.5 | 1261.9 | 1201.3 | 1192.5 |
| 55° | 13404.9 | 11896.1 | 4598.0 | 1534.1 | 1419.5 | 1464.7 | 1446.0 | 1336.8 | 1223.3 | 1167.1 | 1159.4 |
| 57.5° | 15213.4 | 13113.9 | 4410.6 | 1410.7 | 1301.6 | 1372.1 | 1388.6 | 1304.9 | 1203.5 | 1152.8 | 1144.0 |
| 60° | 16351.9 | 13604.3 | 3919.1 | 1295.0 | 1207.9 | 1298.3 | 1355.6 | 1296.1 | 1211.2 | 1206.8 | 1200.2 |
| 62.5° | 16891.9 | 13561.4 | 3181.8 | 1203.5 | 1149.5 | 1266.3 | 1379.8 | 1345.7 | 1299.4 | 1339.1 | 1342.4 |
| 65° | 16649.5 | 12913.3 | 2369.5 | 1142.9 | 1107.6 | 1278.4 | 1452.6 | 1439.3 | 1324.7 | 1364.4 | 1369.9 |
| 67.5° | 15053.6 | 11367.1 | 1754.5 | 1090.0 | 1061.3 | 1312.6 | 1584.8 | 1470.2 | 1275.1 | 1303.8 | 1286.2 |
| 70° | 12167.2 | 9011.9 | 1353.4 | 1030.5 | 1013.9 | 1308.2 | 1644.3 | 1451.5 | 1221.1 | 1227.7 | 1180.4 |
| 72.5° | 8390.3 | 6145.3 | 1101.0 | 975.4 | 945.6 | 1192.5 | 1602.5 | 1405.2 | 1175.9 | 1125.2 | 1062.4 |
| 75° | 4562.7 | 3298.6 | 935.7 | 918.1 | 825.5 | 1047.0 | 1525.3 | 1372.1 | 1135.2 | 1067.9 | 1032.7 |
| 77.5° | 1795.3 | 1368.8 | 812.2 | 839.8 | 721.9 | 924.7 | 1439.3 | 1309.3 | 1079.0 | 990.8 | 973.2 |
| 80° | 732.9 | 698.7 | 673.4 | 726.3 | 620.5 | 808.9 | 1335.7 | 1235.5 | 1011.7 | 919.2 | 883.9 |
| 82.5° | 415.5 | 434.2 | 523.5 | 573.1 | 503.7 | 745.0 | 1286.2 | 1175.9 | 931.3 | 823.3 | 781.4 |
| 85° | 212.7 | 254.6 | 364.8 | 411.1 | 370.3 | 633.7 | 1184.8 | 1029.4 | 747.2 | 630.4 | 633.7 |
| 87.5° | 102.5 | 142.2 | 230.3 | 257.9 | 240.3 | 458.5 | 885.0 | 746.1 | 581.9 | 460.7 | 446.4 |
| 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 (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 | 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

TM-30-18

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

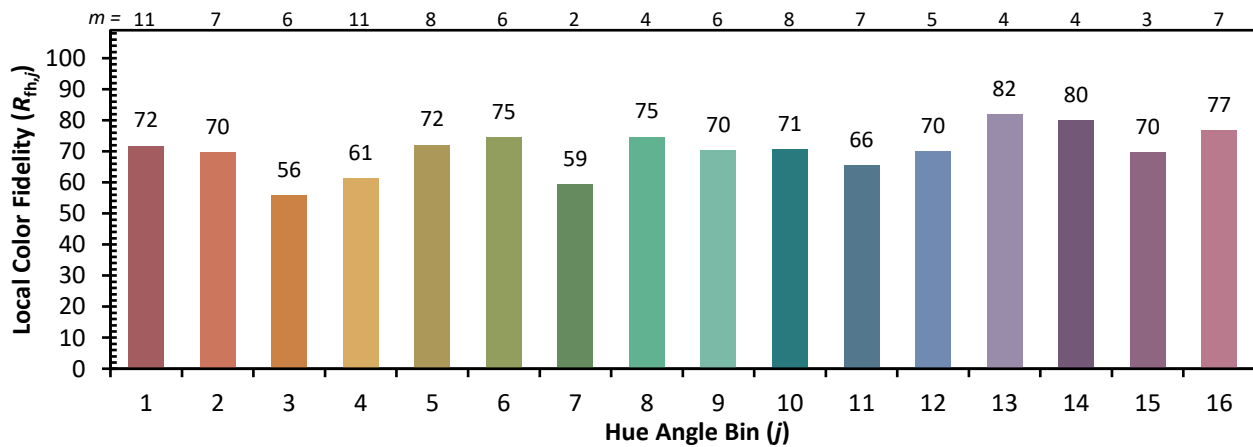
| | | | |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 54 | CES51 = 77 | CES76 = 48 |
| CES02 = 63 | CES27 = 74 | CES52 = 80 | CES77 = 75 |
| CES03 = 31 | CES28 = 80 | CES53 = 66 | CES78 = 56 |
| CES04 = 71 | CES29 = 44 | CES54 = 77 | CES79 = 81 |
| CES05 = 50 | CES30 = 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)