

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: P319559

Luminaire Tested: **GLEON-SA5B-722-U-SL2**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P319559  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-20)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA5B-722-U-SL2  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(5) 70 CRI, 2200K, 800mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE II SPILL  
LIGHT ELIMINATOR OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 20569 lumens  
Efficiency: N/A  
Efficacy: 97.9 lumens/watt  
Luminous Opening: Rectangular (W 1.5' x L: 1' x H: 0')  
IES Classification: Type III - Medium  
BUG Rating: B3 - U0 - G4

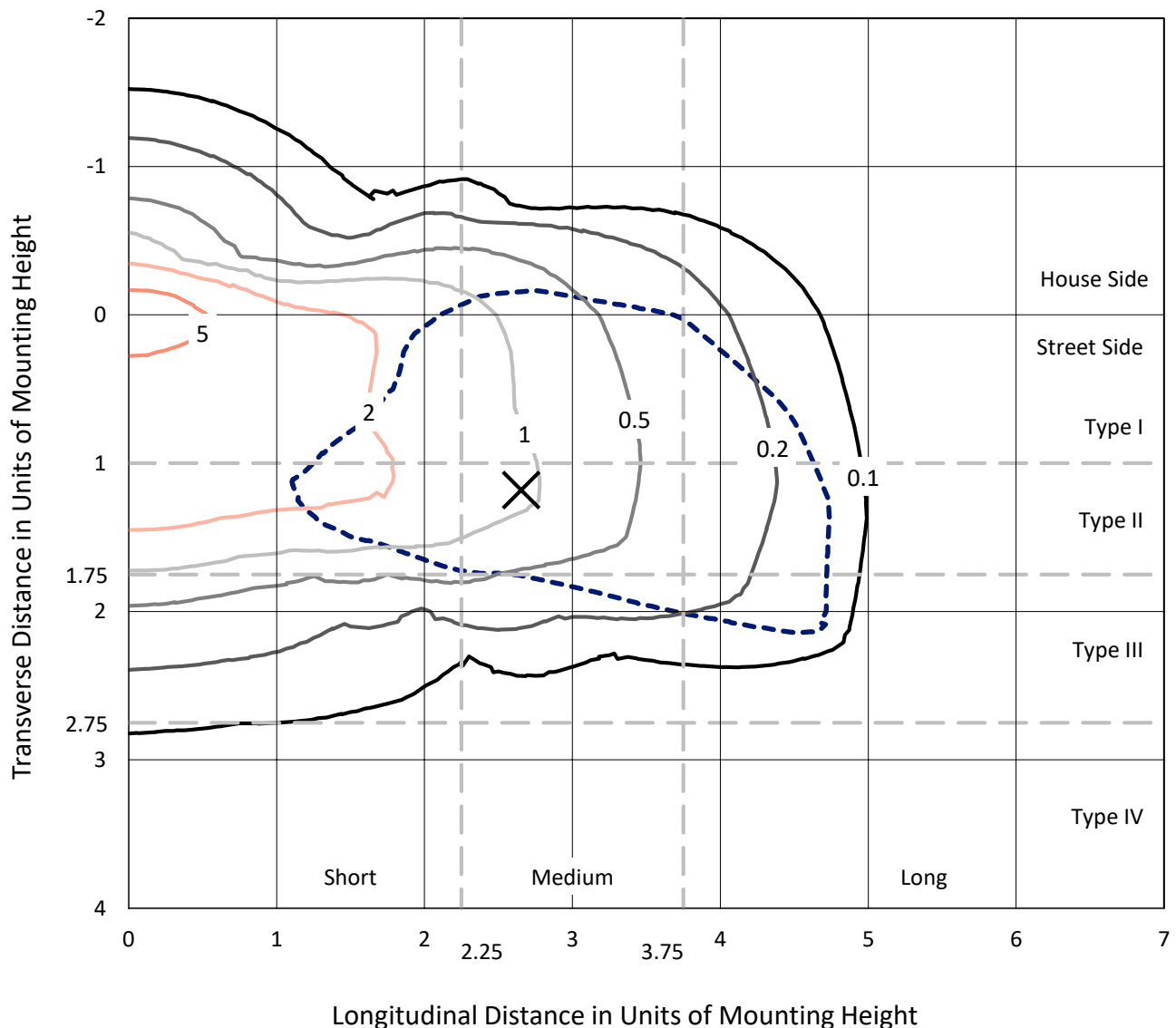
Input Watts (W): 210  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



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 CATALOG NUMBER: GLEON-SA5B-722-U-SL2

## Iso-Footcandle Lines of Horizontal Illumination

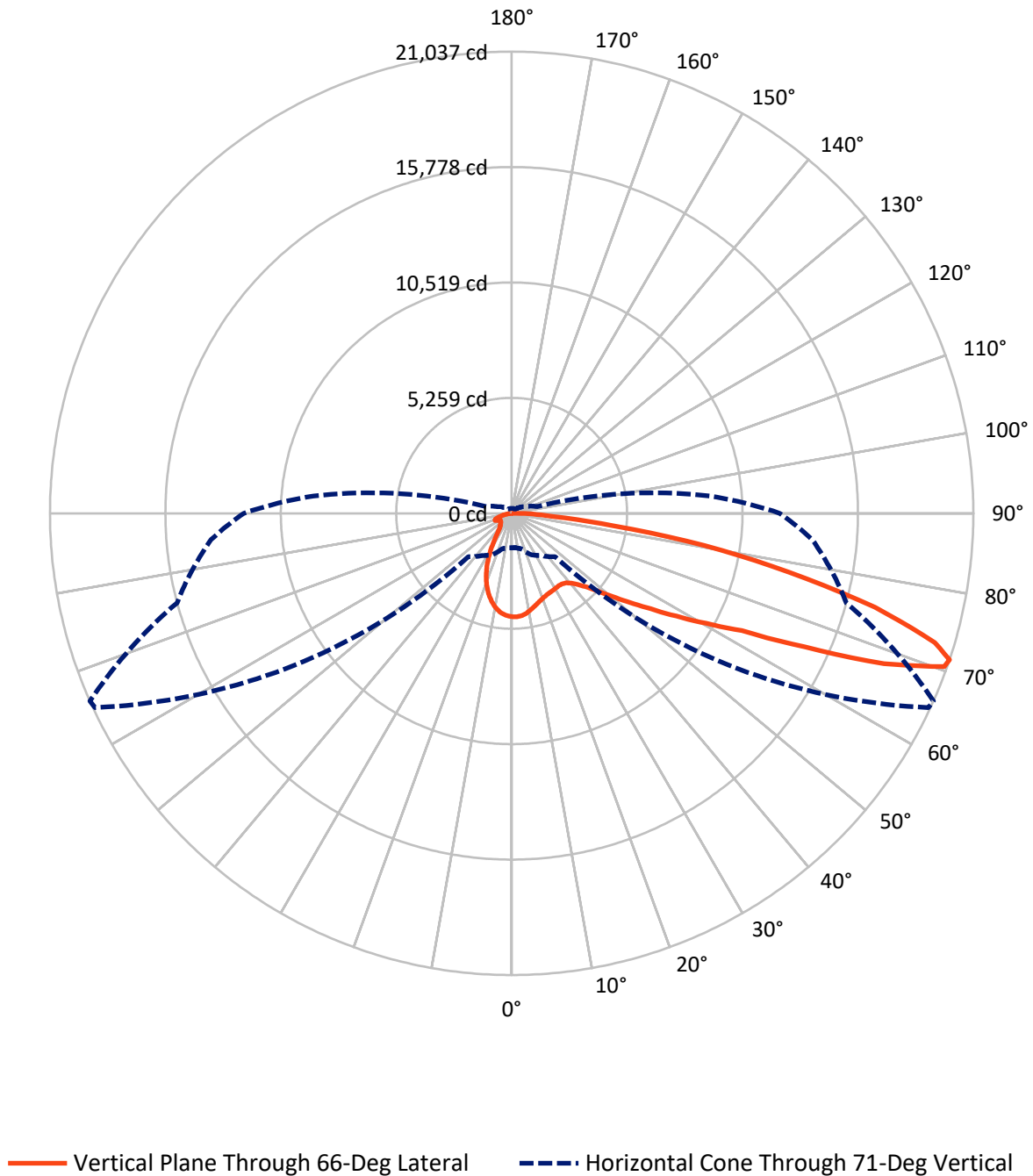
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 7.5 fc  
 Type III - Medium - N/A

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## Luminous Intensity Polar Plot



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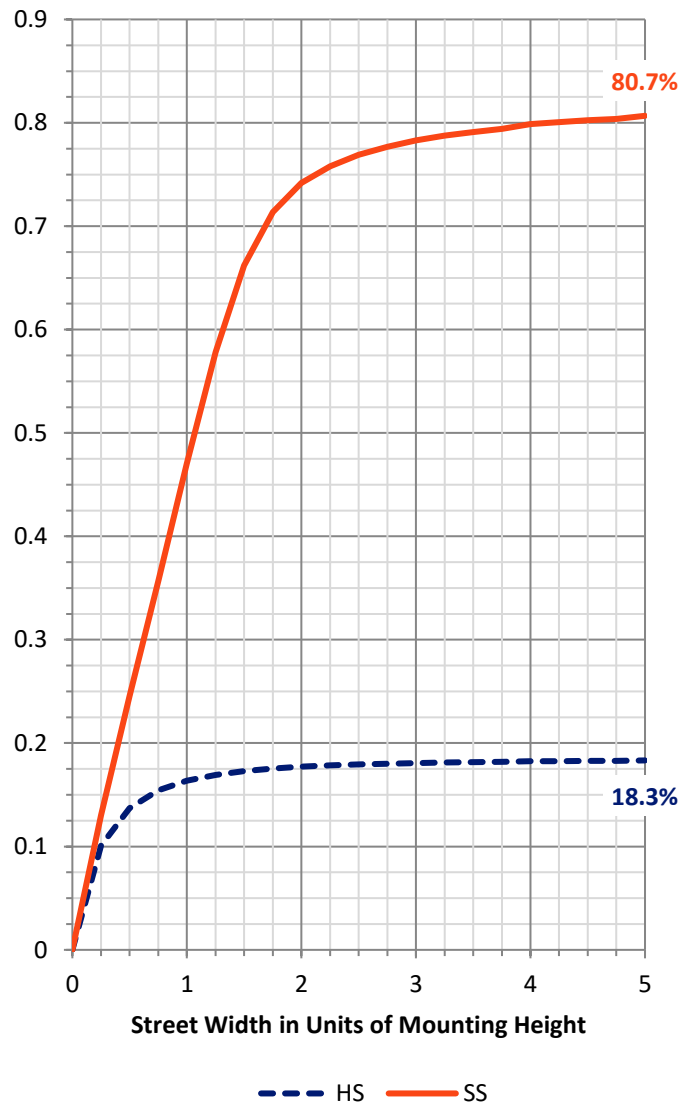
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 3812.0   | 0.0    | 3812.0  |
|                    | % Fixture | 18.5     | 0.0    | 18.5    |
| <b>Street Side</b> | Lumens    | 16757.0  | 0.0    | 16757.0 |
|                    | % Fixture | 81.5     | 0.0    | 81.5    |
| <b>Total</b>       | Lumens    | 20569.0  | 0.0    | 20569.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 414.8   | 2.0       |
| 10°-20°   | 994.8   | 4.8       |
| 20°-30°   | 1336.2  | 6.5       |
| 30°-40°   | 1757.8  | 8.5       |
| 40°-50°   | 2557.2  | 12.4      |
| 50°-60°   | 3994.5  | 19.4      |
| 60°-70°   | 5003.8  | 24.3      |
| 70°-80°   | 3816.8  | 18.6      |
| 80°-90°   | 693.1   | 3.4       |
| 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°    | 20569.0 | 100.0     |
| 0°-180°   | 20569.0 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P319559

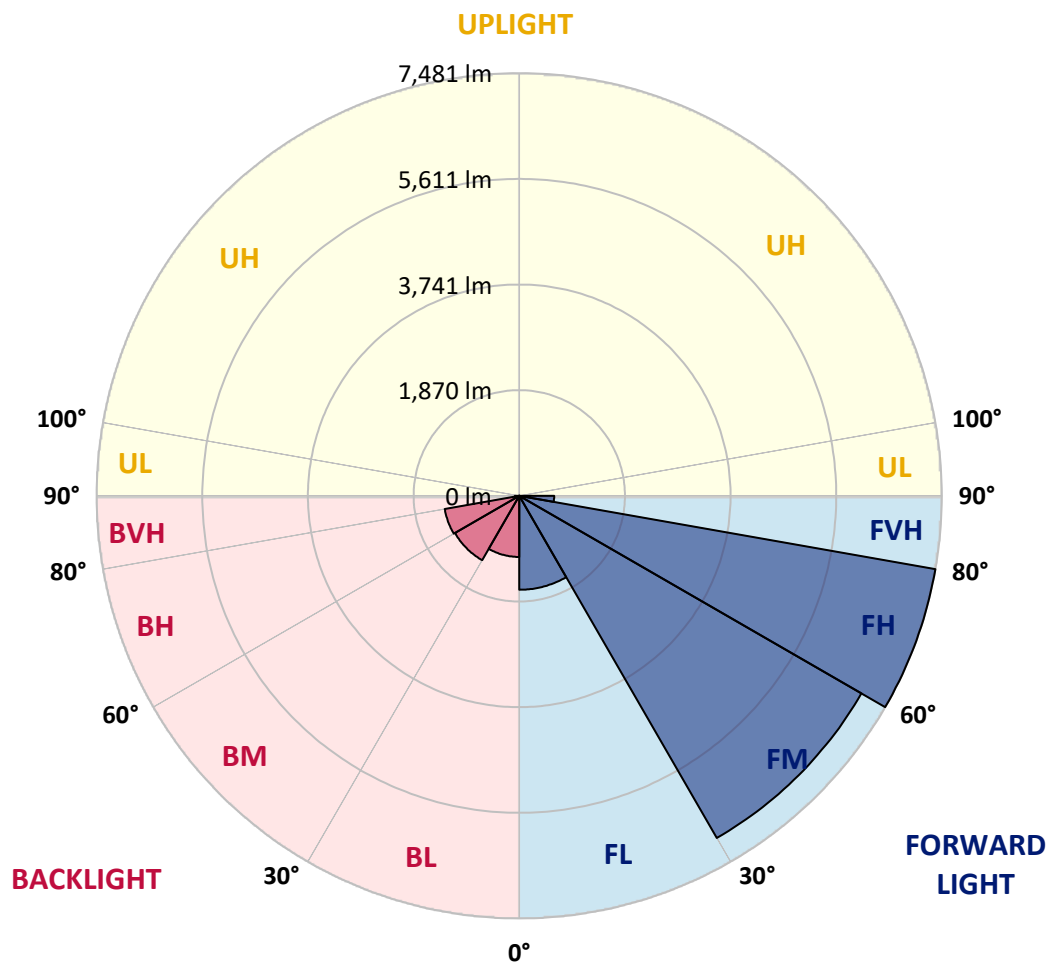
CATALOG NUMBER: GLEON-SA5B-722-U-SL2

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 1663.3 | 8.1       |                         |      |         |
| FM   | (30°-60°)   | 6994.5 | 34.0      |                         |      |         |
| FH   | (60°-80°)   | 7481.2 | 36.4      |                         |      | G3/7500 |
| FVH  | (80°-90°)   | 618.1  | 3.0       |                         |      | G4/750  |
| BL   | (0°-30°)    | 1082.5 | 5.3       | B3/2500                 |      |         |
| BM   | (30°-60°)   | 1315.0 | 6.4       | B2/2500                 |      |         |
| BH   | (60°-80°)   | 1339.4 | 6.5       | B3/2500                 |      | G3/2500 |
| BVH  | (80°-90°)   | 75.0   | 0.4       |                         |      | G1/100  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B3-U0-G4**

Type III Medium





REPORT NUMBER: P319559

CATALOG NUMBER: GLEON-SA5B-722-U-SL2

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°     | 55°     | 65°     | 66°     | 75°     | 85°     |
|-------|--------|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|
| 0°    | 4712.0 | 4712.0 | 4712.0 | 4712.0 | 4712.0 | 4712.0  | 4712.0  | 4712.0  | 4712.0  | 4712.0  | 4712.0  |
| 2.5°  | 4624.6 | 4617.5 | 4638.8 | 4660.8 | 4669.3 | 4683.6  | 4704.9  | 4716.9  | 4716.2  | 4718.4  | 4711.2  |
| 5°    | 4317.8 | 4308.6 | 4351.2 | 4386.0 | 4452.7 | 4528.0  | 4619.6  | 4685.0  | 4686.4  | 4723.3  | 4733.3  |
| 7.5°  | 4027.4 | 4021.0 | 4070.0 | 4126.1 | 4203.5 | 4318.5  | 4467.0  | 4607.6  | 4616.1  | 4716.2  | 4751.0  |
| 10°   | 3794.4 | 3793.0 | 3840.6 | 3901.7 | 3991.9 | 4120.4  | 4290.8  | 4496.8  | 4509.6  | 4682.1  | 4753.9  |
| 12.5° | 3612.6 | 3615.5 | 3656.7 | 3726.2 | 3821.4 | 3955.6  | 4140.3  | 4372.5  | 4393.1  | 4628.2  | 4737.5  |
| 15°   | 3478.4 | 3489.8 | 3523.1 | 3593.4 | 3687.2 | 3823.5  | 4013.2  | 4257.5  | 4288.7  | 4567.8  | 4728.3  |
| 17.5° | 3401.7 | 3414.5 | 3437.9 | 3496.2 | 3584.2 | 3715.6  | 3895.3  | 4163.0  | 4191.4  | 4521.6  | 4729.0  |
| 20°   | 3379.0 | 3389.6 | 3403.1 | 3438.6 | 3513.2 | 3632.5  | 3802.2  | 4077.8  | 4108.3  | 4484.7  | 4736.1  |
| 22.5° | 3423.7 | 3431.5 | 3432.9 | 3430.1 | 3475.6 | 3572.9  | 3734.8  | 4015.3  | 4048.0  | 4460.6  | 4741.1  |
| 25°   | 3519.6 | 3530.2 | 3522.4 | 3496.2 | 3481.2 | 3540.9  | 3700.0  | 3974.1  | 4006.8  | 4442.8  | 4731.1  |
| 27.5° | 3663.8 | 3665.2 | 3658.8 | 3624.7 | 3554.4 | 3544.4  | 3689.3  | 3950.0  | 3981.2  | 4422.2  | 4710.5  |
| 30°   | 3859.8 | 3869.0 | 3857.6 | 3811.5 | 3696.4 | 3601.3  | 3702.1  | 3926.5  | 3954.9  | 4395.9  | 4677.2  |
| 32.5° | 4089.1 | 4111.9 | 4111.2 | 4062.9 | 3898.1 | 3728.4  | 3754.7  | 3912.3  | 3934.3  | 4368.2  | 4636.7  |
| 35°   | 4327.0 | 4358.3 | 4416.5 | 4395.9 | 4192.1 | 3929.4  | 3855.5  | 3935.0  | 3950.0  | 4364.7  | 4608.3  |
| 37.5° | 4574.2 | 4605.4 | 4725.5 | 4780.8 | 4542.2 | 4217.0  | 4014.6  | 4015.3  | 4022.4  | 4408.0  | 4606.1  |
| 40°   | 4832.7 | 4866.1 | 5046.4 | 5190.6 | 4996.0 | 4581.3  | 4270.9  | 4182.9  | 4175.1  | 4514.5  | 4648.0  |
| 42.5° | 5194.9 | 5224.7 | 5441.3 | 5625.2 | 5499.5 | 5047.9  | 4625.3  | 4441.4  | 4425.1  | 4723.3  | 4782.3  |
| 45°   | 5652.9 | 5678.5 | 5908.6 | 6105.3 | 6040.7 | 5580.5  | 5070.6  | 4797.2  | 4794.3  | 5071.3  | 5054.3  |
| 47.5° | 6197.6 | 6217.5 | 6424.2 | 6614.5 | 6637.9 | 6193.4  | 5630.2  | 5346.1  | 5300.0  | 5548.5  | 5475.4  |
| 50°   | 6765.1 | 6787.1 | 6927.7 | 7132.2 | 7306.2 | 7013.6  | 6350.3  | 6018.7  | 5956.9  | 6178.5  | 6071.9  |
| 52.5° | 7140.7 | 7169.8 | 7292.0 | 7551.2 | 8057.6 | 7912.7  | 7201.8  | 6833.9  | 6740.2  | 6941.9  | 6860.2  |
| 55°   | 6973.1 | 7038.5 | 7225.2 | 7640.7 | 8658.4 | 9286.1  | 8252.1  | 7784.9  | 7679.0  | 7846.6  | 7798.3  |
| 57.5° | 6211.1 | 6300.6 | 6555.6 | 7196.8 | 8742.9 | 10496.3 | 9840.1  | 8904.8  | 8830.2  | 8781.9  | 8803.9  |
| 60°   | 4818.5 | 4904.4 | 5220.4 | 6056.3 | 8154.1 | 11379.7 | 12229.8 | 10285.4 | 10177.4 | 9720.8  | 9740.7  |
| 62.5° | 3410.2 | 3366.9 | 3583.5 | 4195.0 | 6625.9 | 11483.4 | 14949.0 | 12131.8 | 11776.7 | 10712.2 | 10624.8 |
| 65°   | 2600.6 | 2590.7 | 2688.0 | 2882.6 | 4013.2 | 10242.7 | 16568.9 | 15235.2 | 14680.6 | 11878.3 | 11672.3 |
| 67.5° | 2136.9 | 2119.1 | 2215.0 | 2498.4 | 2584.3 | 6608.1  | 16604.4 | 18835.8 | 18291.1 | 13329.8 | 12883.9 |
| 70°   | 1757.0 | 1737.1 | 1826.6 | 2192.3 | 2388.3 | 3351.3  | 13974.7 | 20944.3 | 20915.1 | 15167.8 | 13798.5 |
| 71°   | 1575.2 | 1560.9 | 1668.2 | 2074.4 | 2346.4 | 2793.1  | 12065.7 | 20949.9 | 21037.3 | 15789.9 | 13744.6 |
| 72.5° | 1282.6 | 1287.5 | 1401.2 | 1846.4 | 2315.1 | 2466.4  | 8867.9  | 19973.5 | 20158.1 | 16382.8 | 13253.9 |
| 75°   | 852.2  | 856.5  | 1005.6 | 1420.3 | 2244.8 | 2413.1  | 4873.9  | 16759.9 | 17099.4 | 16027.8 | 12094.1 |
| 77.5° | 572.4  | 571.0  | 672.5  | 974.3  | 1955.8 | 2413.1  | 2857.7  | 12535.2 | 12908.0 | 12753.2 | 9323.8  |
| 80°   | 394.1  | 391.3  | 463.0  | 672.5  | 1480.7 | 2442.3  | 2209.3  | 8784.8  | 8897.7  | 6887.2  | 3789.5  |
| 82.5° | 241.5  | 243.6  | 302.5  | 475.1  | 1007.7 | 2198.0  | 2085.8  | 4790.1  | 4667.2  | 1931.7  | 946.7   |
| 85°   | 138.5  | 137.8  | 193.2  | 321.7  | 647.0  | 1855.0  | 2033.9  | 2061.6  | 1891.2  | 581.6   | 342.3   |
| 87.5° | 49.7   | 53.3   | 103.7  | 178.3  | 370.7  | 1291.8  | 1725.7  | 1072.4  | 966.5   | 262.8   | 154.8   |
| 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: P319559

CATALOG NUMBER: GLEON-SA5B-722-U-SL2

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 4712.0  | 4712.0 | 4712.0 | 4712.0 | 4712.0 | 4712.0 | 4712.0 | 4712.0 | 4712.0 | 4712.0 | 4712.0 |
| 2.5°  | 4706.3  | 4710.5 | 4705.6 | 4677.2 | 4653.0 | 4614.0 | 4591.9 | 4561.4 | 4552.2 | 4547.9 | 4559.3 |
| 5°    | 4724.0  | 4725.5 | 4683.6 | 4609.0 | 4525.2 | 4426.5 | 4355.5 | 4268.1 | 4226.9 | 4209.2 | 4220.5 |
| 7.5°  | 4740.4  | 4734.0 | 4642.4 | 4499.6 | 4344.8 | 4172.9 | 4020.3 | 3880.4 | 3798.7 | 3765.3 | 3768.1 |
| 10°   | 4742.5  | 4715.5 | 4568.5 | 4347.6 | 4107.6 | 3855.5 | 3621.1 | 3405.3 | 3268.9 | 3180.1 | 3207.1 |
| 12.5° | 4720.5  | 4675.0 | 4459.9 | 4150.9 | 3817.9 | 3474.1 | 3157.4 | 2833.6 | 2639.0 | 2548.8 | 2551.6 |
| 15°   | 4703.4  | 4621.1 | 4326.3 | 3919.4 | 3472.0 | 3016.8 | 2584.3 | 2203.6 | 1996.3 | 1904.0 | 1860.6 |
| 17.5° | 4689.2  | 4562.8 | 4171.5 | 3658.8 | 3063.7 | 2486.3 | 1966.5 | 1627.0 | 1513.4 | 1486.4 | 1475.0 |
| 20°   | 4669.3  | 4501.0 | 3999.0 | 3357.0 | 2598.5 | 1892.6 | 1436.0 | 1268.4 | 1269.1 | 1300.3 | 1304.6 |
| 22.5° | 4641.7  | 4430.7 | 3815.0 | 3018.2 | 2099.3 | 1378.4 | 1125.6 | 1077.3 | 1126.3 | 1186.0 | 1196.6 |
| 25°   | 4600.5  | 4347.6 | 3610.5 | 2644.0 | 1600.7 | 1059.6 | 961.6  | 959.4  | 1019.1 | 1081.6 | 1090.8 |
| 27.5° | 4542.2  | 4239.0 | 3383.2 | 2242.0 | 1179.6 | 900.5  | 861.4  | 876.3  | 920.4  | 965.8  | 969.4  |
| 30°   | 4464.1  | 4112.6 | 3132.5 | 1818.0 | 924.6  | 801.8  | 797.5  | 811.0  | 838.0  | 870.0  | 872.8  |
| 32.5° | 4378.2  | 3984.0 | 2864.8 | 1407.6 | 791.8  | 748.5  | 752.8  | 759.2  | 772.0  | 784.7  | 787.6  |
| 35°   | 4300.1  | 3852.7 | 2590.7 | 1069.5 | 728.6  | 713.7  | 710.9  | 709.5  | 710.9  | 706.6  | 707.3  |
| 37.5° | 4249.6  | 3744.0 | 2305.2 | 851.5  | 692.4  | 683.2  | 674.7  | 664.0  | 651.9  | 644.8  | 646.3  |
| 40°   | 4231.2  | 3663.0 | 2016.2 | 735.7  | 662.6  | 656.2  | 639.9  | 617.1  | 602.9  | 598.7  | 598.7  |
| 42.5° | 4280.9  | 3621.1 | 1737.1 | 677.5  | 637.7  | 627.1  | 600.1  | 573.8  | 563.2  | 562.5  | 561.7  |
| 45°   | 4432.9  | 3638.2 | 1471.5 | 645.5  | 615.0  | 594.4  | 558.9  | 536.9  | 529.8  | 531.2  | 530.5  |
| 47.5° | 4705.6  | 3745.4 | 1244.2 | 624.2  | 592.3  | 565.3  | 525.5  | 507.8  | 499.2  | 499.2  | 500.0  |
| 50°   | 5169.3  | 3996.1 | 1063.1 | 606.5  | 573.1  | 538.3  | 501.4  | 479.4  | 468.0  | 467.3  | 467.3  |
| 52.5° | 5844.7  | 4444.9 | 950.2  | 591.6  | 551.8  | 514.2  | 477.2  | 449.5  | 436.0  | 433.2  | 431.8  |
| 55°   | 6691.2  | 5088.3 | 919.0  | 581.6  | 523.4  | 487.9  | 448.1  | 420.4  | 405.5  | 399.1  | 398.4  |
| 57.5° | 7637.8  | 5871.0 | 980.7  | 569.6  | 494.3  | 456.6  | 416.2  | 389.9  | 374.3  | 366.4  | 365.7  |
| 60°   | 8595.9  | 6725.3 | 1232.9 | 552.5  | 470.1  | 422.5  | 383.5  | 359.3  | 343.7  | 335.2  | 333.8  |
| 62.5° | 9555.3  | 7625.8 | 1747.7 | 551.1  | 453.1  | 389.9  | 350.1  | 329.5  | 314.6  | 305.4  | 303.2  |
| 65°   | 10637.6 | 8611.5 | 2332.9 | 588.7  | 447.4  | 360.1  | 316.0  | 299.7  | 286.9  | 278.4  | 277.7  |
| 67.5° | 11880.4 | 9724.3 | 2276.8 | 666.1  | 466.6  | 333.1  | 284.1  | 271.3  | 262.1  | 255.0  | 254.2  |
| 70°   | 12463.4 | 9550.3 | 1415.4 | 720.8  | 493.6  | 306.8  | 253.5  | 244.3  | 237.2  | 232.2  | 230.1  |
| 71°   | 12219.1 | 9068.1 | 1186.7 | 714.4  | 490.7  | 295.4  | 241.5  | 234.4  | 227.3  | 223.0  | 220.9  |
| 72.5° | 11553.0 | 8269.9 | 990.0  | 664.7  | 458.8  | 274.8  | 225.8  | 218.7  | 212.3  | 207.4  | 205.9  |
| 75°   | 10367.0 | 7385.7 | 792.5  | 531.2  | 365.7  | 232.2  | 198.1  | 190.3  | 185.4  | 182.5  | 179.7  |
| 77.5° | 7620.8  | 5270.9 | 612.9  | 419.7  | 269.2  | 189.6  | 169.0  | 163.3  | 158.4  | 154.1  | 152.0  |
| 80°   | 2919.5  | 2041.7 | 412.6  | 313.2  | 197.4  | 149.8  | 136.4  | 133.5  | 128.5  | 125.7  | 125.7  |
| 82.5° | 786.2   | 610.0  | 220.2  | 189.6  | 132.1  | 109.4  | 104.4  | 103.0  | 98.7   | 93.0   | 93.7   |
| 85°   | 318.2   | 269.2  | 123.6  | 104.4  | 81.0   | 64.6   | 70.3   | 71.0   | 66.0   | 58.9   | 59.7   |
| 87.5° | 139.9   | 114.3  | 68.9   | 46.2   | 35.5   | 24.9   | 32.0   | 32.0   | 29.1   | 24.1   | 22.0   |
| 90°   | 0.0     | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



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

Report Prepared for

Cooper Lighting Solutions

McGRAW-EDISON

Report Number: SP1-1908-441-10-R4

Test Date: 10/25/2019

Luminaire Tested: SA1C-722-U-5WQ

Data in this report applies to families of products SA1C-722-U-5WQ.

### Test Information

Test Method: LM-79-2008 Report  
 Number: SP1-1908-441-10-R4  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 10/28/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: MCGRAW-EDISON  
 Catalog Number: **SA1C-722-U-5WQ**  
 Description: MCGRAW EDISON ROADWAY AND AREA LUMINAIRE

\*\*\*THIS IS A REVISION OF SP1-1908-441-4-R3. TO UPDATE THE CATALOG INFORMATION.\*\*\*TESTED IN SITU. ROADWAY AND AREA LUMINAIRE. (1) 70 CRI, 5000K, 1050MA LIGHTSQUARE WITH 16 LEDS AND TYPE V WIDE OPTICS.

### Spectral Parameters

|                           |         |           |      |      |       |
|---------------------------|---------|-----------|------|------|-------|
| CCT (K):                  | 2237    | CRI (Ra): | 72.0 |      |       |
| CIE u':                   | 0.2876  | R1:       | 68.9 | R9:  | -17.4 |
| CIE v':                   | 0.5346  | R2:       | 83.0 | R10: | 61.3  |
| Duv:                      | -0.0006 | R3:       | 95.2 | R11: | 59.8  |
| CIE x:                    | 0.5005  | R4:       | 66.2 | R12: | 50.5  |
| CIE y:                    | 0.4134  | R5:       | 65.9 | R13: | 71.1  |
| CIE z:                    | 0.0860  | R6:       | 76.3 | R14: | 96.9  |
| Peak Wavelength (nm):     | 603     | R7:       | 76.7 |      |       |
| Dominant Wavelength (nm): | 587     | R8:       | 43.8 |      |       |
| Purity:                   | 74.5    |           |      |      |       |
| Rf:                       | 69.8    |           |      |      |       |
| Rg:                       | 99.2    |           |      |      |       |



### Test Conditions

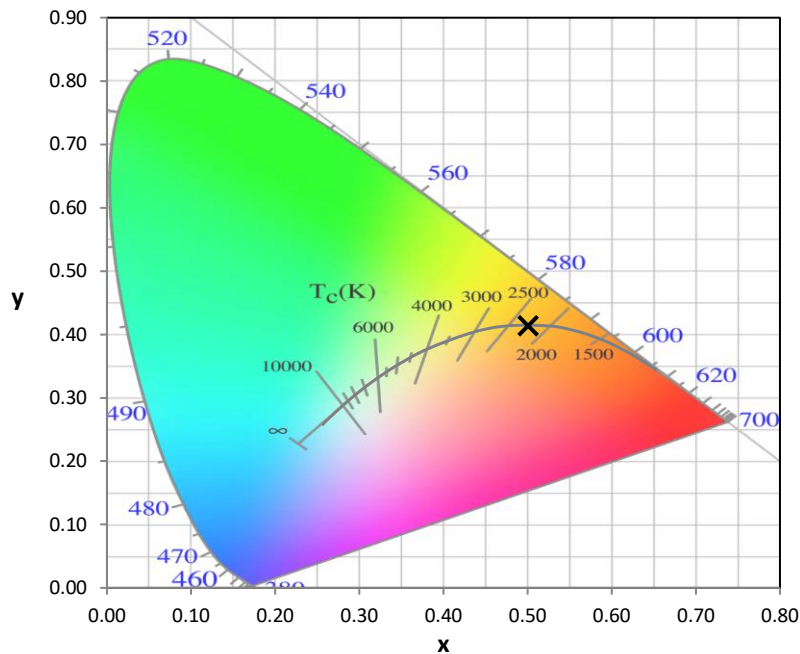
Stabilization Time: 71M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.7/41%  
 Sphere Temperature (°C): 25.6

REPORT NUMBER: SP1-1908-441-10-R4

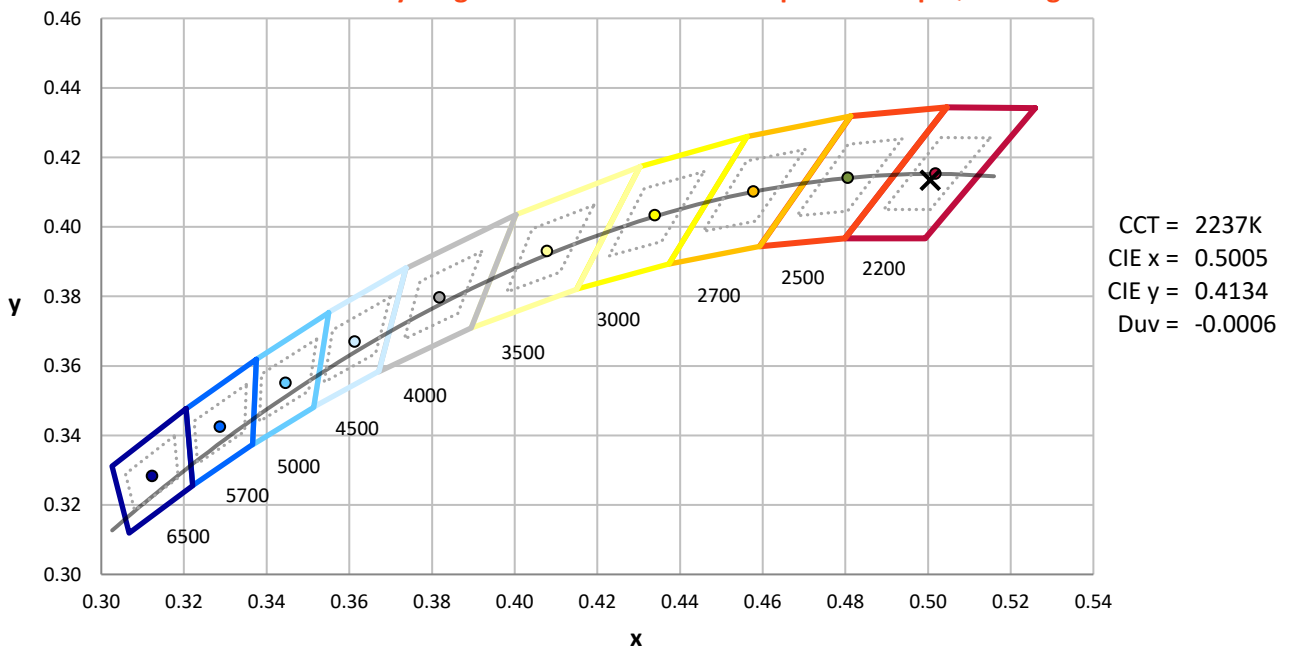
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| 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: SP1-1908-441-10-R4

**CIE 1931 Chromaticity Diagram**



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



Point lies inside the ANSI 2200K 4-step quadrangle

REPORT NUMBER: SP1-1908-441-10-R4

**Photopic Flux vs. Wavelength**



#####

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 1768             | NR               | 490       | 5206             | NR               | 620       | 130919           | NR               | 750       | 8553             | NR               | 880       | 2713             | NR               |
| 365       | 1569             | NR               | 495       | 7286             | NR               | 625       | 125335           | NR               | 755       | 7696             | NR               | 885       | 2316             | NR               |
| 370       | 1594             | NR               | 500       | 10654            | NR               | 630       | 118388           | NR               | 760       | 6978             | NR               | 890       | 2539             | NR               |
| 375       | 1744             | NR               | 505       | 15189            | NR               | 635       | 111855           | NR               | 765       | 6377             | NR               | 895       | 1933             | NR               |
| 380       | 1659             | NR               | 510       | 20541            | NR               | 640       | 104062           | NR               | 770       | 5600             | NR               | 900       | 2216             | NR               |
| 385       | 1504             | NR               | 515       | 26492            | NR               | 645       | 96365            | NR               | 775       | 5000             | NR               | 905       | 2067             | NR               |
| 390       | 1541             | NR               | 520       | 32294            | NR               | 650       | 88651            | NR               | 780       | 4709             | NR               | 910       | 1959             | NR               |
| 395       | 1355             | NR               | 525       | 38123            | NR               | 655       | 81152            | NR               | 785       | 4305             | NR               | 915       | 1874             | NR               |
| 400       | 1243             | NR               | 530       | 43232            | NR               | 660       | 73523            | NR               | 790       | 4040             | NR               | 920       | 1484             | NR               |
| 405       | 1417             | NR               | 535       | 48012            | NR               | 665       | 66123            | NR               | 795       | 3642             | NR               | 925       | 1914             | NR               |
| 410       | 2147             | NR               | 540       | 52623            | NR               | 670       | 58677            | NR               | 800       | 3594             | NR               | 930       | 1948             | NR               |
| 415       | 3837             | NR               | 545       | 57516            | NR               | 675       | 52349            | NR               | 805       | 3190             | NR               | 935       | 2079             | NR               |
| 420       | 7159             | NR               | 550       | 62613            | NR               | 680       | 46159            | NR               | 810       | 3241             | NR               | 940       | 2263             | NR               |
| 425       | 12599            | NR               | 555       | 68554            | NR               | 685       | 40525            | NR               | 815       | 2732             | NR               | 945       | 1688             | NR               |
| 430       | 19019            | NR               | 560       | 75325            | NR               | 690       | 35615            | NR               | 820       | 2612             | NR               | 950       | 1560             | NR               |
| 435       | 24875            | NR               | 565       | 82533            | NR               | 695       | 31158            | NR               | 825       | 2966             | NR               | 955       | 2826             | NR               |
| 440       | 29103            | NR               | 570       | 90909            | NR               | 700       | 27409            | NR               | 830       | 2574             | NR               | 960       | 1477             | NR               |
| 445       | 29901            | NR               | 575       | 99621            | NR               | 705       | 24204            | NR               | 835       | 2633             | NR               | 965       | 1568             | NR               |
| 450       | 24862            | NR               | 580       | 108484           | NR               | 710       | 21558            | NR               | 840       | 2526             | NR               | 970       | 2030             | NR               |
| 455       | 15942            | NR               | 585       | 116679           | NR               | 715       | 19222            | NR               | 845       | 2631             | NR               | 975       | 1986             | NR               |
| 460       | 9916             | NR               | 590       | 123752           | NR               | 720       | 17310            | NR               | 850       | 2079             | NR               | 980       | 2540             | NR               |
| 465       | 7051             | NR               | 595       | 129324           | NR               | 725       | 15280            | NR               | 855       | 2309             | NR               | 985       | 1139             | NR               |
| 470       | 5227             | NR               | 600       | 134082           | NR               | 730       | 13282            | NR               | 860       | 2528             | NR               | 990       | 2018             | NR               |
| 475       | 4257             | NR               | 605       | 135698           | NR               | 735       | 11753            | NR               | 865       | 2121             | NR               | 995       | 3445             | NR               |
| 480       | 4052             | NR               | 610       | 135144           | NR               | 740       | 10654            | NR               | 870       | 2751             | NR               | 1000      | 3704             | NR               |
| 485       | 4298             | NR               | 615       | 134180           | NR               | 745       | 9451             | NR               | 875       | 2317             | NR               |           |                  |                  |

REPORT NUMBER: SP1-1908-441-10-R4

Scotopic Flux vs. Wavelength



Scotopic Lumens: 4696.9

S/P: 0.85

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 1768             | NR               | 490       | 5206             | NR               | 620       | 130919           | NR               | 750       | 8553             | NR               | 880       | 2713             | NR               |
| 365       | 1569             | NR               | 495       | 7286             | NR               | 625       | 125335           | NR               | 755       | 7696             | NR               | 885       | 2316             | NR               |
| 370       | 1594             | NR               | 500       | 10654            | NR               | 630       | 118388           | NR               | 760       | 6978             | NR               | 890       | 2539             | NR               |
| 375       | 1744             | NR               | 505       | 15189            | NR               | 635       | 111855           | NR               | 765       | 6377             | NR               | 895       | 1933             | NR               |
| 380       | 1659             | NR               | 510       | 20541            | NR               | 640       | 104062           | NR               | 770       | 5600             | NR               | 900       | 2216             | NR               |
| 385       | 1504             | NR               | 515       | 26492            | NR               | 645       | 96365            | NR               | 775       | 5000             | NR               | 905       | 2067             | NR               |
| 390       | 1541             | NR               | 520       | 32294            | NR               | 650       | 88651            | NR               | 780       | 4709             | NR               | 910       | 1959             | NR               |
| 395       | 1355             | NR               | 525       | 38123            | NR               | 655       | 81152            | NR               | 785       | 4305             | NR               | 915       | 1874             | NR               |
| 400       | 1243             | NR               | 530       | 43232            | NR               | 660       | 73523            | NR               | 790       | 4040             | NR               | 920       | 1484             | NR               |
| 405       | 1417             | NR               | 535       | 48012            | NR               | 665       | 66123            | NR               | 795       | 3642             | NR               | 925       | 1914             | NR               |
| 410       | 2147             | NR               | 540       | 52623            | NR               | 670       | 58677            | NR               | 800       | 3594             | NR               | 930       | 1948             | NR               |
| 415       | 3837             | NR               | 545       | 57516            | NR               | 675       | 52349            | NR               | 805       | 3190             | NR               | 935       | 2079             | NR               |
| 420       | 7159             | NR               | 550       | 62613            | NR               | 680       | 46159            | NR               | 810       | 3241             | NR               | 940       | 2263             | NR               |
| 425       | 12599            | NR               | 555       | 68554            | NR               | 685       | 40525            | NR               | 815       | 2732             | NR               | 945       | 1688             | NR               |
| 430       | 19019            | NR               | 560       | 75325            | NR               | 690       | 35615            | NR               | 820       | 2612             | NR               | 950       | 1560             | NR               |
| 435       | 24875            | NR               | 565       | 82533            | NR               | 695       | 31158            | NR               | 825       | 2966             | NR               | 955       | 2826             | NR               |
| 440       | 29103            | NR               | 570       | 90909            | NR               | 700       | 27409            | NR               | 830       | 2574             | NR               | 960       | 1477             | NR               |
| 445       | 29901            | NR               | 575       | 99621            | NR               | 705       | 24204            | NR               | 835       | 2633             | NR               | 965       | 1568             | NR               |
| 450       | 24862            | NR               | 580       | 108484           | NR               | 710       | 21558            | NR               | 840       | 2526             | NR               | 970       | 2030             | NR               |
| 455       | 15942            | NR               | 585       | 116679           | NR               | 715       | 19222            | NR               | 845       | 2631             | NR               | 975       | 1986             | NR               |
| 460       | 9916             | NR               | 590       | 123752           | NR               | 720       | 17310            | NR               | 850       | 2079             | NR               | 980       | 2540             | NR               |
| 465       | 7051             | NR               | 595       | 129324           | NR               | 725       | 15280            | NR               | 855       | 2309             | NR               | 985       | 1139             | NR               |
| 470       | 5227             | NR               | 600       | 134082           | NR               | 730       | 13282            | NR               | 860       | 2528             | NR               | 990       | 2018             | NR               |
| 475       | 4257             | NR               | 605       | 135698           | NR               | 735       | 11753            | NR               | 865       | 2121             | NR               | 995       | 3445             | NR               |
| 480       | 4052             | NR               | 610       | 135144           | NR               | 740       | 10654            | NR               | 870       | 2751             | NR               | 1000      | 3704             | NR               |
| 485       | 4298             | NR               | 615       | 134180           | NR               | 745       | 9451             | NR               | 875       | 2317             | NR               |           |                  |                  |

REPORT NUMBER: SP1-1908-441-10-R4

**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 1470.8 M/P: 0.27**

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 1768             | NR               | 490       | 5206             | NR               | 620       | 130919           | NR               | 750       | 8553             | NR               | 880       | 2713             | NR               |
| 365       | 1569             | NR               | 495       | 7286             | NR               | 625       | 125335           | NR               | 755       | 7696             | NR               | 885       | 2316             | NR               |
| 370       | 1594             | NR               | 500       | 10654            | NR               | 630       | 118388           | NR               | 760       | 6978             | NR               | 890       | 2539             | NR               |
| 375       | 1744             | NR               | 505       | 15189            | NR               | 635       | 111855           | NR               | 765       | 6377             | NR               | 895       | 1933             | NR               |
| 380       | 1659             | NR               | 510       | 20541            | NR               | 640       | 104062           | NR               | 770       | 5600             | NR               | 900       | 2216             | NR               |
| 385       | 1504             | NR               | 515       | 26492            | NR               | 645       | 96365            | NR               | 775       | 5000             | NR               | 905       | 2067             | NR               |
| 390       | 1541             | NR               | 520       | 32294            | NR               | 650       | 88651            | NR               | 780       | 4709             | NR               | 910       | 1959             | NR               |
| 395       | 1355             | NR               | 525       | 38123            | NR               | 655       | 81152            | NR               | 785       | 4305             | NR               | 915       | 1874             | NR               |
| 400       | 1243             | NR               | 530       | 43232            | NR               | 660       | 73523            | NR               | 790       | 4040             | NR               | 920       | 1484             | NR               |
| 405       | 1417             | NR               | 535       | 48012            | NR               | 665       | 66123            | NR               | 795       | 3642             | NR               | 925       | 1914             | NR               |
| 410       | 2147             | NR               | 540       | 52623            | NR               | 670       | 58677            | NR               | 800       | 3594             | NR               | 930       | 1948             | NR               |
| 415       | 3837             | NR               | 545       | 57516            | NR               | 675       | 52349            | NR               | 805       | 3190             | NR               | 935       | 2079             | NR               |
| 420       | 7159             | NR               | 550       | 62613            | NR               | 680       | 46159            | NR               | 810       | 3241             | NR               | 940       | 2263             | NR               |
| 425       | 12599            | NR               | 555       | 68554            | NR               | 685       | 40525            | NR               | 815       | 2732             | NR               | 945       | 1688             | NR               |
| 430       | 19019            | NR               | 560       | 75325            | NR               | 690       | 35615            | NR               | 820       | 2612             | NR               | 950       | 1560             | NR               |
| 435       | 24875            | NR               | 565       | 82533            | NR               | 695       | 31158            | NR               | 825       | 2966             | NR               | 955       | 2826             | NR               |
| 440       | 29103            | NR               | 570       | 90909            | NR               | 700       | 27409            | NR               | 830       | 2574             | NR               | 960       | 1477             | NR               |
| 445       | 29901            | NR               | 575       | 99621            | NR               | 705       | 24204            | NR               | 835       | 2633             | NR               | 965       | 1568             | NR               |
| 450       | 24862            | NR               | 580       | 108484           | NR               | 710       | 21558            | NR               | 840       | 2526             | NR               | 970       | 2030             | NR               |
| 455       | 15942            | NR               | 585       | 116679           | NR               | 715       | 19222            | NR               | 845       | 2631             | NR               | 975       | 1986             | NR               |
| 460       | 9916             | NR               | 590       | 123752           | NR               | 720       | 17310            | NR               | 850       | 2079             | NR               | 980       | 2540             | NR               |
| 465       | 7051             | NR               | 595       | 129324           | NR               | 725       | 15280            | NR               | 855       | 2309             | NR               | 985       | 1139             | NR               |
| 470       | 5227             | NR               | 600       | 134082           | NR               | 730       | 13282            | NR               | 860       | 2528             | NR               | 990       | 2018             | NR               |
| 475       | 4257             | NR               | 605       | 135698           | NR               | 735       | 11753            | NR               | 865       | 2121             | NR               | 995       | 3445             | NR               |
| 480       | 4052             | NR               | 610       | 135144           | NR               | 740       | 10654            | NR               | 870       | 2751             | NR               | 1000      | 3704             | NR               |
| 485       | 4298             | NR               | 615       | 134180           | NR               | 745       | 9451             | NR               | 875       | 2317             | NR               |           |                  |                  |

REPORT NUMBER: SP1-1908-441-10-R4

**TM-30-18**

### Summary

$R_f = 69.8$   
 $R_g = 99.2$   
 CIE  $R_a = 72.0$   
 $R_g = -17.4$



### Color Vector Graphics





REPORT NUMBER: SP1-1908-441-10-R4

**TM-30-18**

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

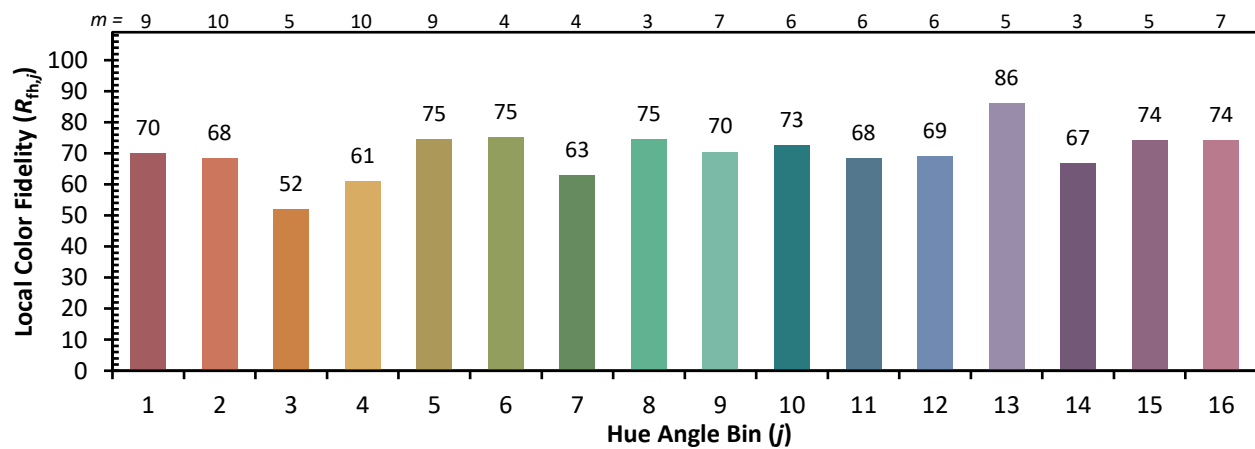
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 87 | CES26 = 56 | CES51 = 74 | CES76 = 56 |
| CES02 = 65 | CES27 = 76 | CES52 = 76 | CES77 = 81 |
| CES03 = 32 | CES28 = 83 | CES53 = 65 | CES78 = 63 |
| CES04 = 72 | CES29 = 46 | CES54 = 78 | CES79 = 84 |
| CES05 = 52 | CES30 = 48 | CES55 = 75 | CES80 = 84 |
| CES06 = 52 | CES31 = 51 | CES56 = 65 | CES81 = 63 |
| CES07 = 44 | CES32 = 51 | CES57 = 62 | CES82 = 92 |
| CES08 = 42 | CES33 = 53 | CES58 = 66 | CES83 = 83 |
| CES09 = 29 | CES34 = 70 | CES59 = 84 | CES84 = 92 |
| CES10 = 78 | CES35 = 85 | CES60 = 90 | CES85 = 81 |
| CES11 = 61 | CES36 = 78 | CES61 = 84 | CES86 = 56 |
| CES12 = 68 | CES37 = 80 | CES62 = 70 | CES87 = 78 |
| CES13 = 45 | CES38 = 53 | CES63 = 68 | CES88 = 72 |
| CES14 = 75 | CES39 = 90 | CES64 = 69 | CES89 = 62 |
| CES15 = 72 | CES40 = 84 | CES65 = 67 | CES90 = 67 |
| CES16 = 49 | CES41 = 75 | CES66 = 64 | CES91 = 90 |
| CES17 = 51 | CES42 = 79 | CES67 = 63 | CES92 = 67 |
| CES18 = 57 | CES43 = 64 | CES68 = 69 | CES93 = 79 |
| CES19 = 74 | CES44 = 98 | CES69 = 80 | CES94 = 52 |
| CES20 = 68 | CES45 = 73 | CES70 = 63 | CES95 = 76 |
| CES21 = 89 | CES46 = 67 | CES71 = 63 | CES96 = 78 |
| CES22 = 81 | CES47 = 60 | CES72 = 87 | CES97 = 77 |
| CES23 = 92 | CES48 = 48 | CES73 = 56 | CES98 = 71 |
| CES24 = 92 | CES49 = 64 | CES74 = 87 | CES99 = 65 |
| CES25 = 74 | CES50 = 74 | CES75 = 66 |            |



REPORT NUMBER: SP1-1908-441-10-R4

**TM-30-18**

Color Rendition by Hue-Angle Bin



REPORT NUMBER: SP1-1908-441-10-R4

**TM-30-18**

**Measure Comparisons**



(END OF REPORT)