

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: P322553

Luminaire Tested: **GLEON-SA9A-740-U-T4FT-HSS**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P322553  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-17)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA9A-740-U-T4FT-HSS  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(9) 70 CRI, 4000K, 615mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE IV  
FORWARD THROW OPTICS WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 29586 lumens  
Efficiency: N/A  
Efficacy: 102.0 lumens/watt  
Luminous Opening: Rectangular (W 2.5' x L: 1' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B2 - U0 - G5

Input Watts (W): 290  
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

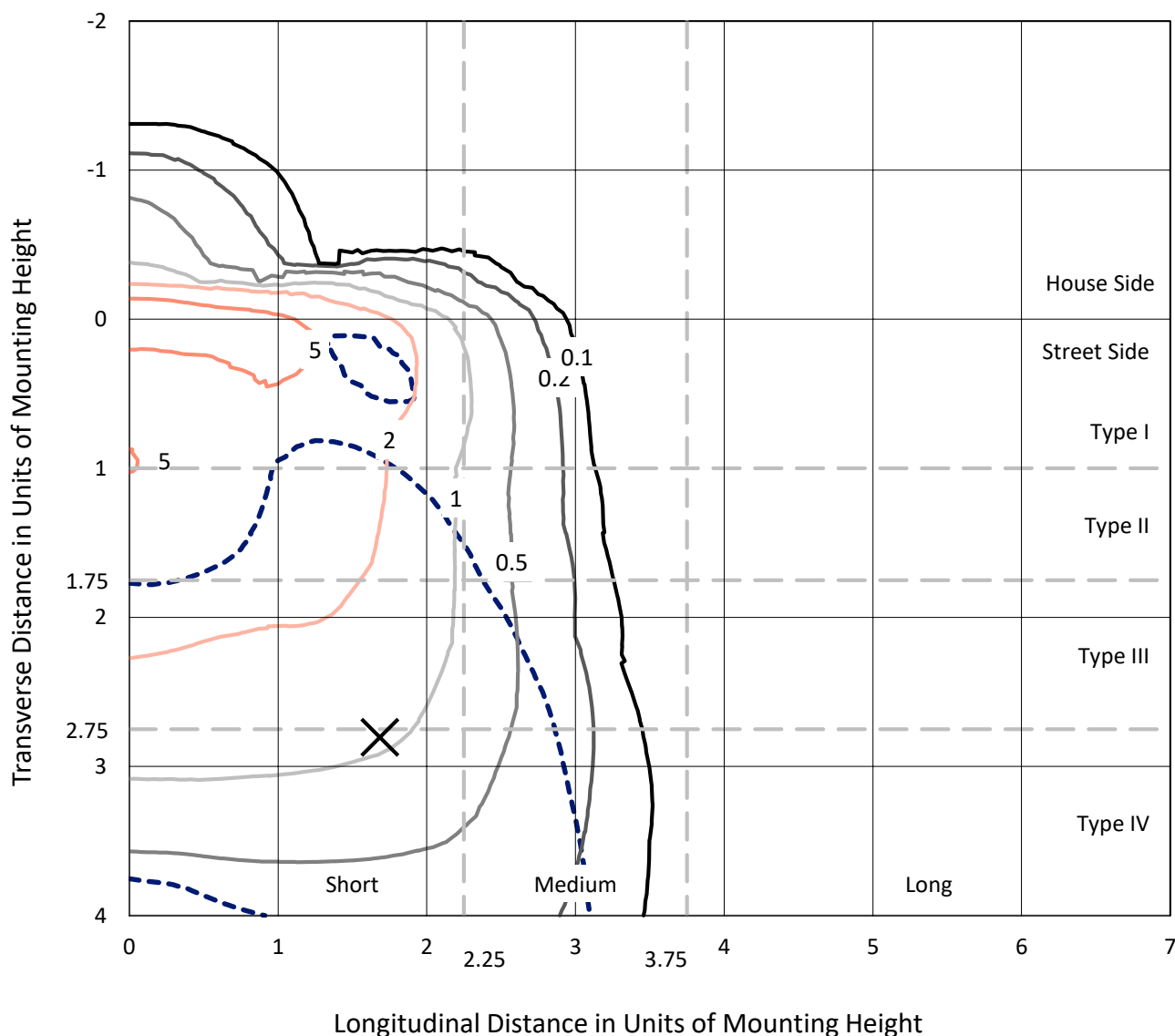


REPORT NUMBER: P322553  
 CATALOG NUMBER: GLEON-SA9A-740-U-T4FT-HSS

## Iso-Footcandle Lines of Horizontal Illumination

× Max cd

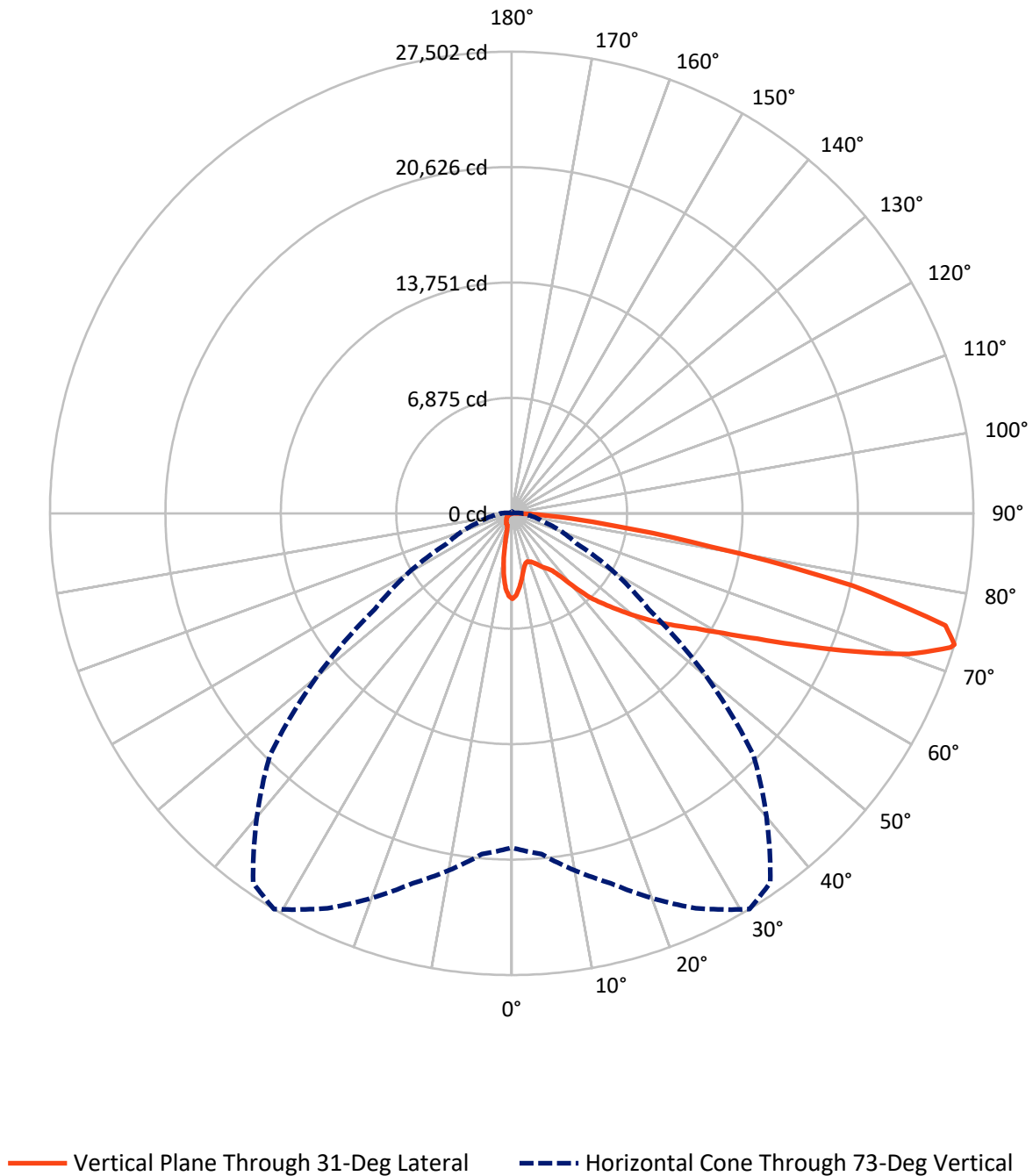
--- 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 8.1 fc  
 Type IV - Short - N/A

REPORT NUMBER: P322553  
CATALOG NUMBER: GLEON-SA9A-740-U-T4FT-HSS

## Luminous Intensity Polar Plot



REPORT NUMBER: P322553  
 CATALOG NUMBER: GLEON-SA9A-740-U-T4FT-HSS

**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 2696.9   | 0.0    | 2696.9  |
|                    | % Fixture | 9.1      | 0.0    | 9.1     |
| <b>Street Side</b> | Lumens    | 26889.1  | 0.0    | 26889.1 |
|                    | % Fixture | 90.9     | 0.0    | 90.9    |
| <b>Total</b>       | Lumens    | 29586.0  | 0.0    | 29586.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 422.1   | 1.4       |
| 10°-20°   | 916.4   | 3.1       |
| 20°-30°   | 1373.1  | 4.6       |
| 30°-40°   | 2184.5  | 7.4       |
| 40°-50°   | 3901.0  | 13.2      |
| 50°-60°   | 6053.2  | 20.5      |
| 60°-70°   | 8046.9  | 27.2      |
| 70°-80°   | 6052.9  | 20.5      |
| 80°-90°   | 636.0   | 2.1       |
| 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°    | 29586.0 | 100.0     |
| 0°-180°   | 29586.0 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P322553

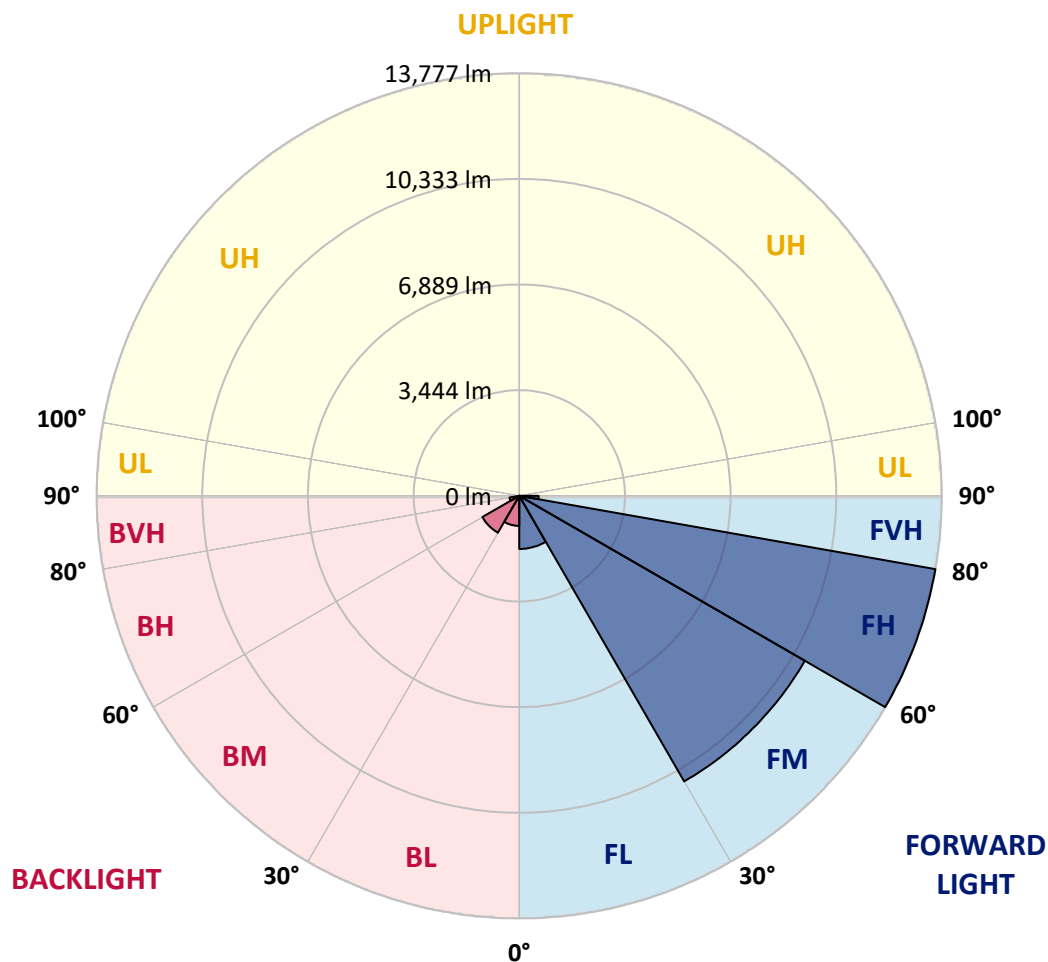
CATALOG NUMBER: GLEON-SA9A-740-U-T4FT-HSS

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |        |
|------|-------------|---------|-----------|-------------------------|------|--------|
|      |             |         |           | B                       | U    | G      |
| FL   | (0°-30°)    | 1730.8  | 5.9       |                         |      |        |
| FM   | (30°-60°)   | 10750.5 | 36.3      |                         |      |        |
| FH   | (60°-80°)   | 13777.1 | 46.6      |                         |      | G5     |
| FVH  | (80°-90°)   | 630.7   | 2.1       |                         |      | G4/750 |
| BL   | (0°-30°)    | 980.7   | 3.3       | B2/1000                 |      |        |
| BM   | (30°-60°)   | 1388.2  | 4.7       | B2/2500                 |      |        |
| BH   | (60°-80°)   | 322.7   | 1.1       | B1/500                  |      | G1/500 |
| BVH  | (80°-90°)   | 5.4     | 0.0       |                         |      | G0/10  |
| UL   | (90°-100°)  | 0.0     | 0.0       |                         | U0/0 |        |
| UH   | (100°-180°) | 0.0     | 0.0       |                         | U0/0 |        |

**BUG Rating: B2-U0-G5**

Type IV Short





REPORT NUMBER: P322553

CATALOG NUMBER: GLEON-SA9A-740-U-T4FT-HSS

**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 31°     | 35°     | 45°     | 55°     | 65°     | 75°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 5090.3  | 5090.3  | 5090.3  | 5090.3  | 5090.3  | 5090.3  | 5090.3  | 5090.3  | 5090.3  | 5090.3  | 5090.3  |
| 2.5°  | 4823.9  | 4844.2  | 4865.9  | 4870.3  | 4906.5  | 4907.9  | 4960.0  | 4999.1  | 5038.2  | 5075.9  | 5088.9  |
| 5°    | 4328.8  | 4362.1  | 4401.2  | 4440.3  | 4517.0  | 4547.4  | 4674.8  | 4805.1  | 4929.6  | 5048.3  | 5106.3  |
| 7.5°  | 3800.4  | 3838.0  | 3893.0  | 3990.0  | 4075.5  | 4134.8  | 4336.0  | 4567.7  | 4799.3  | 5017.9  | 5143.9  |
| 10°   | 3318.3  | 3353.0  | 3410.9  | 3513.7  | 3645.5  | 3726.5  | 3997.3  | 4318.7  | 4658.9  | 4990.4  | 5200.4  |
| 12.5° | 3011.3  | 3030.2  | 3062.0  | 3172.0  | 3290.8  | 3382.0  | 3700.5  | 4098.6  | 4543.1  | 4989.0  | 5291.6  |
| 15°   | 2954.9  | 2960.7  | 2934.6  | 2983.8  | 3076.5  | 3164.8  | 3487.7  | 3920.5  | 4454.8  | 5012.2  | 5410.3  |
| 17.5° | 3044.6  | 3041.7  | 2954.9  | 2949.1  | 3022.9  | 3095.3  | 3383.4  | 3797.5  | 4392.5  | 5065.7  | 5563.8  |
| 20°   | 3180.7  | 3170.6  | 3020.0  | 2992.5  | 3070.7  | 3138.7  | 3376.2  | 3751.2  | 4369.3  | 5155.5  | 5750.5  |
| 22.5° | 3361.7  | 3344.3  | 3108.3  | 3079.4  | 3163.4  | 3234.3  | 3465.9  | 3796.0  | 4389.6  | 5275.6  | 5967.7  |
| 25°   | 3586.1  | 3560.0  | 3260.4  | 3228.5  | 3313.9  | 3384.9  | 3626.6  | 3924.9  | 4450.4  | 5421.9  | 6242.8  |
| 27.5° | 3839.5  | 3801.8  | 3503.6  | 3421.1  | 3518.1  | 3591.9  | 3840.9  | 4121.8  | 4546.0  | 5576.8  | 6580.1  |
| 30°   | 4078.3  | 4029.1  | 3759.8  | 3623.7  | 3742.5  | 3825.0  | 4072.6  | 4356.3  | 4699.4  | 5815.7  | 7041.9  |
| 32.5° | 4318.7  | 4263.7  | 3988.6  | 3826.4  | 3933.6  | 4023.3  | 4311.4  | 4679.2  | 4987.5  | 6180.5  | 7655.8  |
| 35°   | 4871.7  | 4813.8  | 4476.5  | 4208.6  | 4207.2  | 4257.9  | 4645.9  | 5120.7  | 5368.3  | 6688.7  | 8388.3  |
| 37.5° | 5802.6  | 5769.3  | 5447.9  | 4939.8  | 4803.7  | 4747.2  | 5101.9  | 5647.7  | 5915.6  | 7387.9  | 9215.0  |
| 40°   | 6821.9  | 6792.9  | 6432.4  | 5972.0  | 5765.0  | 5626.0  | 5756.3  | 6381.7  | 6688.7  | 8242.1  | 10059.1 |
| 42.5° | 7972.8  | 7835.3  | 7192.5  | 7054.9  | 6869.6  | 6763.9  | 6646.7  | 7286.6  | 7638.4  | 9171.6  | 10895.9 |
| 45°   | 9018.1  | 8786.5  | 7952.6  | 7744.1  | 7702.1  | 7728.2  | 7793.3  | 8502.7  | 8706.8  | 10276.2 | 11729.8 |
| 47.5° | 9640.6  | 9458.2  | 8818.3  | 8618.5  | 8606.9  | 8779.2  | 9271.5  | 9876.6  | 9770.9  | 11239.0 | 12463.8 |
| 50°   | 10232.8 | 10067.7 | 9536.4  | 9585.6  | 9639.2  | 9873.7  | 10949.4 | 11289.6 | 10742.4 | 12112.0 | 13137.0 |
| 52.5° | 10712.0 | 10460.1 | 10182.1 | 10458.6 | 10722.1 | 11100.0 | 12680.9 | 12557.9 | 11431.5 | 12806.9 | 13713.2 |
| 55°   | 10988.5 | 10874.1 | 11008.8 | 11286.8 | 11781.9 | 12395.7 | 14315.5 | 13613.3 | 11935.4 | 13441.0 | 14096.9 |
| 57.5° | 12001.9 | 11777.5 | 12045.4 | 12285.7 | 12931.4 | 13789.9 | 15715.5 | 14399.4 | 12298.7 | 13833.4 | 14185.2 |
| 60°   | 13228.2 | 13047.2 | 13205.0 | 13604.6 | 14476.2 | 15485.3 | 17024.2 | 15040.8 | 12488.4 | 14085.3 | 13956.4 |
| 62.5° | 15179.8 | 14940.9 | 14842.5 | 15289.8 | 16445.1 | 17546.9 | 18017.4 | 15485.3 | 12446.4 | 13973.8 | 13171.7 |
| 65°   | 17794.4 | 17546.9 | 17106.8 | 17512.1 | 18981.6 | 19759.1 | 19127.8 | 15579.4 | 12156.9 | 13071.8 | 11188.3 |
| 67.5° | 20472.8 | 20293.3 | 19916.9 | 20600.2 | 21926.4 | 22176.8 | 20302.0 | 15350.6 | 11224.5 | 10599.1 | 7904.8  |
| 70°   | 22242.0 | 22165.2 | 22409.9 | 23921.4 | 25104.2 | 25031.8 | 21379.1 | 14121.5 | 8748.8  | 6517.8  | 3910.4  |
| 72.5° | 20966.5 | 21334.2 | 23141.0 | 25881.6 | 27326.5 | 26735.8 | 20826.1 | 10843.7 | 5000.6  | 2507.5  | 1130.7  |
| 73°   | 19909.6 | 20380.1 | 22812.4 | 25955.5 | 27501.7 | 26854.5 | 20361.3 | 9953.4  | 4262.2  | 1979.1  | 857.1   |
| 75°   | 13850.7 | 14428.4 | 18886.1 | 24173.3 | 26682.3 | 25586.3 | 16972.1 | 6092.2  | 1974.7  | 877.3   | 346.0   |
| 77.5° | 6724.9  | 7151.9  | 10399.3 | 17465.8 | 20750.8 | 19990.7 | 10565.8 | 2270.1  | 891.8   | 548.7   | 159.3   |
| 80°   | 2510.4  | 2791.3  | 4514.1  | 8889.3  | 11991.8 | 12306.0 | 4647.3  | 858.5   | 593.6   | 441.6   | 81.1    |
| 82.5° | 657.3   | 732.6   | 1664.9  | 3964.0  | 6145.8  | 6432.4  | 1465.1  | 432.9   | 434.3   | 363.4   | 49.2    |
| 85°   | 209.9   | 240.3   | 519.7   | 1779.3  | 2895.5  | 2542.3  | 382.2   | 209.9   | 315.6   | 270.7   | 27.5    |
| 87.5° | 26.1    | 33.3    | 165.0   | 418.4   | 638.5   | 354.7   | 59.4    | 62.3    | 134.6   | 150.6   | 15.9    |
| 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: P322553

CATALOG NUMBER: GLEON-SA9A-740-U-T4FT-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 5090.3  | 5090.3 | 5090.3 | 5090.3 | 5090.3 | 5090.3 | 5090.3 | 5090.3 | 5090.3 | 5090.3 | 5090.3 |
| 2.5°  | 5101.9  | 5094.7 | 5096.1 | 5058.5 | 5033.9 | 4984.6 | 4934.0 | 4910.8 | 4886.2 | 4876.1 | 4886.2 |
| 5°    | 5128.0  | 5114.9 | 5077.3 | 4961.5 | 4838.4 | 4679.2 | 4530.0 | 4417.1 | 4275.2 | 4236.2 | 4276.7 |
| 7.5°  | 5168.5  | 5142.5 | 5032.4 | 4796.4 | 4522.8 | 4218.8 | 3877.1 | 3628.1 | 3424.0 | 3292.2 | 3340.0 |
| 10°   | 5227.9  | 5178.6 | 4957.1 | 4556.1 | 4066.8 | 3528.2 | 3043.2 | 2665.3 | 2397.5 | 2287.5 | 2283.1 |
| 12.5° | 5327.8  | 5235.1 | 4864.5 | 4243.4 | 3509.4 | 2791.3 | 2155.7 | 1746.0 | 1528.8 | 1388.4 | 1385.5 |
| 15°   | 5437.8  | 5301.7 | 4747.2 | 3868.4 | 2860.8 | 1999.4 | 1388.4 | 1077.1 | 936.7  | 891.8  | 886.0  |
| 17.5° | 5572.4  | 5378.4 | 4595.2 | 3406.6 | 2181.8 | 1324.7 | 906.3  | 816.5  | 810.7  | 806.4  | 806.4  |
| 20°   | 5741.8  | 5469.6 | 4399.7 | 2878.2 | 1547.7 | 884.6  | 770.2  | 776.0  | 778.9  | 773.1  | 774.6  |
| 22.5° | 5938.7  | 5562.3 | 4166.7 | 2310.6 | 1046.7 | 739.8  | 736.9  | 744.1  | 747.0  | 744.1  | 745.6  |
| 25°   | 6167.5  | 5669.4 | 3882.9 | 1715.6 | 755.7  | 702.2  | 709.4  | 719.5  | 726.8  | 726.8  | 726.8  |
| 27.5° | 6451.2  | 5799.7 | 3541.2 | 1197.3 | 652.9  | 663.1  | 683.3  | 702.2  | 712.3  | 715.2  | 715.2  |
| 30°   | 6820.4  | 5961.9 | 3131.5 | 820.9  | 593.6  | 611.0  | 648.6  | 684.8  | 703.6  | 706.5  | 708.0  |
| 32.5° | 7286.6  | 6144.3 | 2656.6 | 606.6  | 542.9  | 555.9  | 596.5  | 657.3  | 693.5  | 699.3  | 699.3  |
| 35°   | 7820.8  | 6355.7 | 2145.6 | 528.4  | 506.7  | 511.1  | 542.9  | 612.4  | 676.1  | 692.0  | 693.5  |
| 37.5° | 8405.7  | 6564.2 | 1631.6 | 493.7  | 476.3  | 476.3  | 499.5  | 558.8  | 634.1  | 683.3  | 689.1  |
| 40°   | 8951.5  | 6690.1 | 1143.7 | 466.2  | 448.8  | 448.8  | 469.1  | 512.5  | 583.4  | 657.3  | 673.2  |
| 42.5° | 9455.3  | 6733.5 | 796.3  | 440.1  | 422.7  | 427.1  | 444.5  | 479.2  | 532.8  | 606.6  | 621.1  |
| 45°   | 9973.6  | 6726.3 | 580.6  | 409.7  | 396.7  | 409.7  | 422.7  | 448.8  | 487.9  | 529.9  | 532.8  |
| 47.5° | 10364.5 | 6665.5 | 460.4  | 380.8  | 372.1  | 389.4  | 401.0  | 418.4  | 440.1  | 437.2  | 437.2  |
| 50°   | 10730.8 | 6517.8 | 370.6  | 341.7  | 347.5  | 367.7  | 373.5  | 379.3  | 380.8  | 353.3  | 350.4  |
| 52.5° | 11008.8 | 6287.6 | 296.8  | 299.7  | 322.9  | 343.1  | 337.3  | 328.6  | 314.2  | 280.9  | 275.1  |
| 55°   | 11101.4 | 5844.6 | 233.1  | 247.6  | 286.7  | 312.7  | 291.0  | 272.2  | 244.7  | 217.2  | 211.4  |
| 57.5° | 10933.5 | 5272.7 | 189.7  | 192.6  | 241.8  | 263.5  | 238.9  | 217.2  | 186.8  | 163.6  | 159.3  |
| 60°   | 10577.4 | 4637.2 | 156.4  | 144.8  | 186.8  | 205.6  | 189.7  | 167.9  | 140.4  | 123.1  | 121.6  |
| 62.5° | 9870.8  | 3959.6 | 128.9  | 112.9  | 141.9  | 157.8  | 147.7  | 131.7  | 108.6  | 97.0   | 95.6   |
| 65°   | 8385.4  | 3167.7 | 104.2  | 91.2   | 110.0  | 123.1  | 114.4  | 102.8  | 85.4   | 76.7   | 75.3   |
| 67.5° | 5853.3  | 2141.2 | 85.4   | 75.3   | 86.9   | 97.0   | 89.8   | 84.0   | 68.0   | 66.6   | 68.0   |
| 70°   | 2823.1  | 1032.3 | 70.9   | 60.8   | 68.0   | 75.3   | 72.4   | 68.0   | 65.1   | 75.3   | 86.9   |
| 72.5° | 809.3   | 346.0  | 56.5   | 50.7   | 55.0   | 59.4   | 62.3   | 60.8   | 70.9   | 91.2   | 105.7  |
| 73°   | 622.5   | 279.4  | 53.6   | 47.8   | 52.1   | 57.9   | 60.8   | 59.4   | 72.4   | 92.7   | 105.7  |
| 75°   | 266.4   | 134.6  | 40.5   | 39.1   | 43.4   | 50.7   | 53.6   | 53.6   | 72.4   | 94.1   | 101.3  |
| 77.5° | 120.2   | 72.4   | 26.1   | 30.4   | 37.6   | 40.5   | 44.9   | 44.9   | 57.9   | 72.4   | 72.4   |
| 80°   | 68.0    | 39.1   | 20.3   | 23.2   | 27.5   | 27.5   | 27.5   | 24.6   | 26.1   | 29.0   | 31.9   |
| 82.5° | 43.4    | 26.1   | 15.9   | 18.8   | 17.4   | 14.5   | 11.6   | 11.6   | 10.1   | 11.6   | 14.5   |
| 85°   | 24.6    | 14.5   | 14.5   | 11.6   | 7.2    | 5.8    | 7.2    | 5.8    | 1.4    | 0.0    | 1.4    |
| 87.5° | 14.5    | 8.7    | 4.3    | 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    |

LM-79-08: Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Report Prepared for

Cooper Lighting Solutions

MCGRAW, INVUE, LUMARK AND STREETWORKS

DATA VALID FOR LUMINAIRES UTILIZING SA LIGHT ENGINES

Report Number: SP1-2101-121-2

Luminaire Tested: IFLD-S-SA2A-740-U-T3R-HSS

Test Date: 03/05/2021

### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2101-121-2  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 03/05/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: STREETWORKS  
 Catalog Number: **IFLD-S-SA2A-740-U-T3R-HSS**  
 Description: STREETWORKS INF FLOOD

SHIELD, DRIVER PROGRAMMED @ 615mA.

### Spectral Parameters

|                           |         |           |      |      |       |
|---------------------------|---------|-----------|------|------|-------|
| CCT (K):                  | 3905    | CRI (Ra): | 71.2 |      |       |
| CIE u':                   | 0.2273  | R1:       | 68.9 | R9:  | -29.7 |
| CIE v':                   | 0.5024  | R2:       | 77.0 | R10: | 46.2  |
| Duv:                      | -0.0008 | R3:       | 84.0 | R11: | 68.8  |
| CIE x:                    | 0.3841  | R4:       | 71.6 | R12: | 45.6  |
| CIE y:                    | 0.3774  | R5:       | 68.9 | R13: | 69.5  |
| CIE z:                    | 0.2385  | R6:       | 68.3 | R14: | 90.7  |
| Peak Wavelength (nm):     | 443     | R7:       | 78.7 |      |       |
| Dominant Wavelength (nm): | 579     | R8:       | 52.2 |      |       |
| Purity:                   | 28.7    |           |      |      |       |
| Rf:                       | 71.7    |           |      |      |       |
| Rg:                       | 96.9    |           |      |      |       |



### Test Conditions

Stabilization Time: 211M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.8/312%  
 Sphere Temperature (°C): 24.1

REPORT NUMBER: SP1-2101-121-2

| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 1/31/2021        | 7/31/2021            |
| Power Meter                    | IN0071                | 12/1/2020        | 12/1/2021            |
| AC Power Source                | IN0063                | 12/1/2020        | 12/1/2021            |
| DC Power Source                | IN0208                | 12/1/2020        | 12/1/2021            |
| Sphere Thermometer             | IN0085                | 12/1/2020        | 12/1/2021            |
| Room Thermometer               | IN0046                | 12/1/2020        | 12/1/2021            |

REPORT NUMBER: SP1-2101-121-2

**CIE 1931 Chromaticity Diagram**



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



Point lies inside the ANSI 4000K 4-step quadrangle

REPORT NUMBER: SP1-2101-121-2

### 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       | 2304             | 0.0              | 490       | 19043            | 2.7              | 620       | 97577            | 25.4             | 750       | 4830             | 0.0              | 880       | 3505             | 0.0              |
| 365       | 2150             | 0.0              | 495       | 26606            | 4.8              | 625       | 90158            | 19.9             | 755       | 4664             | 0.0              | 885       | 2991             | 0.0              |
| 370       | 2146             | 0.0              | 500       | 36376            | 8.0              | 630       | 82240            | 14.9             | 760       | 4006             | 0.0              | 890       | 2327             | 0.0              |
| 375       | 2332             | 0.0              | 505       | 47714            | 13.3             | 635       | 74361            | 11.2             | 765       | 3715             | 0.0              | 895       | 2775             | 0.0              |
| 380       | 2527             | 0.0              | 510       | 58741            | 20.2             | 640       | 66994            | 8.0              | 770       | 3696             | 0.0              | 900       | 2141             | 0.0              |
| 385       | 2304             | 0.0              | 515       | 68716            | 28.5             | 645       | 60405            | 5.8              | 775       | 3117             | 0.0              | 905       | 2421             | 0.0              |
| 390       | 2064             | 0.0              | 520       | 77136            | 37.4             | 650       | 53806            | 3.9              | 780       | 3062             | 0.0              | 910       | 2200             | 0.0              |
| 395       | 1856             | 0.0              | 525       | 83567            | 44.9             | 655       | 47610            | 2.7              | 785       | 2907             | 0.0              | 915       | 2716             | 0.0              |
| 400       | 1856             | 0.0              | 530       | 89283            | 52.6             | 660       | 42018            | 1.8              | 790       | 2655             | 0.0              | 920       | 2656             | 0.0              |
| 405       | 2374             | 0.0              | 535       | 94097            | 58.4             | 665       | 36742            | 1.2              | 795       | 2467             | 0.0              | 925       | 2671             | 0.0              |
| 410       | 4084             | 0.0              | 540       | 96845            | 63.1             | 670       | 32105            | 0.7              | 800       | 2609             | 0.0              | 930       | 3292             | 0.0              |
| 415       | 8543             | 0.0              | 545       | 100829           | 67.1             | 675       | 27946            | 0.5              | 805       | 2293             | 0.0              | 935       | 3188             | 0.0              |
| 420       | 18394            | 0.1              | 550       | 105648           | 71.8             | 680       | 24146            | 0.3              | 810       | 2188             | 0.0              | 940       | 1997             | 0.0              |
| 425       | 37987            | 0.2              | 555       | 110017           | 75.1             | 685       | 21191            | 0.2              | 815       | 2386             | 0.0              | 945       | 2623             | 0.0              |
| 430       | 67605            | 0.5              | 560       | 114586           | 77.9             | 690       | 18544            | 0.1              | 820       | 2712             | 0.0              | 950       | 2969             | 0.0              |
| 435       | 102160           | 1.2              | 565       | 118987           | 79.1             | 695       | 16058            | 0.1              | 825       | 2473             | 0.0              | 955       | 2277             | 0.0              |
| 440       | 135103           | 2.1              | 570       | 122326           | 79.5             | 700       | 14133            | 0.0              | 830       | 1969             | 0.0              | 960       | 4267             | 0.0              |
| 445       | 140126           | 2.9              | 575       | 125968           | 78.4             | 705       | 12309            | 0.0              | 835       | 1917             | 0.0              | 965       | 2034             | 0.0              |
| 450       | 102339           | 2.7              | 580       | 127613           | 75.8             | 710       | 11142            | 0.0              | 840       | 2248             | 0.0              | 970       | 3586             | 0.0              |
| 455       | 58751            | 2.0              | 585       | 129466           | 71.9             | 715       | 10143            | 0.0              | 845       | 2266             | 0.0              | 975       | 2505             | 0.0              |
| 460       | 36892            | 1.5              | 590       | 128813           | 66.6             | 720       | 9072             | 0.0              | 850       | 2558             | 0.0              | 980       | 2666             | 0.0              |
| 465       | 24637            | 1.3              | 595       | 126387           | 59.9             | 725       | 8130             | 0.0              | 855       | 2767             | 0.0              | 985       | 2934             | 0.0              |
| 470       | 16738            | 1.0              | 600       | 123477           | 53.2             | 730       | 7149             | 0.0              | 860       | 2826             | 0.0              | 990       | 4120             | 0.0              |
| 475       | 13456            | 1.1              | 605       | 118718           | 46.0             | 735       | 6311             | 0.0              | 865       | 2385             | 0.0              | 995       | 3858             | 0.0              |
| 480       | 13081            | 1.2              | 610       | 112091           | 38.5             | 740       | 5711             | 0.0              | 870       | 3194             | 0.0              | 1000      | 3405             | 0.0              |
| 485       | 14734            | 1.7              | 615       | 105039           | 31.7             | 745       | 5111             | 0.0              | 875       | 3189             | 0.0              |           |                  |                  |

REPORT NUMBER: SP1-2101-121-2

### Scotopic Flux vs. Wavelength



Scotopic Lumens: 10425.8

S/P: 1.47

| $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\Phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\Phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\Phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\Phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\Phi/\text{nm}$ ) |
|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|
| 360               | 2304                          | 0.0                            | 490               | 19043                         | 29.3                           | 620               | 97577                         | 1.2                            | 750               | 4830                          | 0.0                            | 880               | 3505                          | 0.0                            |
| 365               | 2150                          | 0.0                            | 495               | 26606                         | 43.0                           | 625               | 90158                         | 0.8                            | 755               | 4664                          | 0.0                            | 885               | 2991                          | 0.0                            |
| 370               | 2146                          | 0.0                            | 500               | 36376                         | 60.8                           | 630               | 82240                         | 0.5                            | 760               | 4006                          | 0.0                            | 890               | 2327                          | 0.0                            |
| 375               | 2332                          | 0.0                            | 505               | 47714                         | 81.1                           | 635               | 74361                         | 0.3                            | 765               | 3715                          | 0.0                            | 895               | 2775                          | 0.0                            |
| 380               | 2527                          | 0.0                            | 510               | 58741                         | 99.6                           | 640               | 66994                         | 0.2                            | 770               | 3696                          | 0.0                            | 900               | 2141                          | 0.0                            |
| 385               | 2304                          | 0.0                            | 515               | 68716                         | 113.9                          | 645               | 60405                         | 0.1                            | 775               | 3117                          | 0.0                            | 905               | 2421                          | 0.0                            |
| 390               | 2064                          | 0.0                            | 520               | 77136                         | 122.6                          | 650               | 53806                         | 0.1                            | 780               | 3062                          | 0.0                            | 910               | 2200                          | 0.0                            |
| 395               | 1856                          | 0.0                            | 525               | 83567                         | 125.0                          | 655               | 47610                         | 0.0                            | 785               | 2907                          | 0.0                            | 915               | 2716                          | 0.0                            |
| 400               | 1856                          | 0.0                            | 530               | 89283                         | 123.1                          | 660               | 42018                         | 0.0                            | 790               | 2655                          | 0.0                            | 920               | 2656                          | 0.0                            |
| 405               | 2374                          | 0.1                            | 535               | 94097                         | 117.3                          | 665               | 36742                         | 0.0                            | 795               | 2467                          | 0.0                            | 925               | 2671                          | 0.0                            |
| 410               | 4084                          | 0.2                            | 540               | 96845                         | 107.0                          | 670               | 32105                         | 0.0                            | 800               | 2609                          | 0.0                            | 930               | 3292                          | 0.0                            |
| 415               | 8543                          | 0.9                            | 545               | 100829                        | 96.7                           | 675               | 27946                         | 0.0                            | 805               | 2293                          | 0.0                            | 935               | 3188                          | 0.0                            |
| 420               | 18394                         | 3.0                            | 550               | 105648                        | 86.4                           | 680               | 24146                         | 0.0                            | 810               | 2188                          | 0.0                            | 940               | 1997                          | 0.0                            |
| 425               | 37987                         | 9.3                            | 555               | 110017                        | 75.2                           | 685               | 21191                         | 0.0                            | 815               | 2386                          | 0.0                            | 945               | 2623                          | 0.0                            |
| 430               | 67605                         | 23.0                           | 560               | 114586                        | 64.0                           | 690               | 18544                         | 0.0                            | 820               | 2712                          | 0.0                            | 950               | 2969                          | 0.0                            |
| 435               | 102160                        | 45.7                           | 565               | 118987                        | 53.4                           | 695               | 16058                         | 0.0                            | 825               | 2473                          | 0.0                            | 955               | 2277                          | 0.0                            |
| 440               | 135103                        | 75.5                           | 570               | 122326                        | 43.2                           | 700               | 14133                         | 0.0                            | 830               | 1969                          | 0.0                            | 960               | 4267                          | 0.0                            |
| 445               | 140126                        | 93.8                           | 575               | 125968                        | 34.3                           | 705               | 12309                         | 0.0                            | 835               | 1917                          | 0.0                            | 965               | 2034                          | 0.0                            |
| 450               | 102339                        | 79.3                           | 580               | 127613                        | 26.3                           | 710               | 11142                         | 0.0                            | 840               | 2248                          | 0.0                            | 970               | 3586                          | 0.0                            |
| 455               | 58751                         | 51.3                           | 585               | 129466                        | 19.8                           | 715               | 10143                         | 0.0                            | 845               | 2266                          | 0.0                            | 975               | 2505                          | 0.0                            |
| 460               | 36892                         | 35.6                           | 590               | 128813                        | 14.3                           | 720               | 9072                          | 0.0                            | 850               | 2558                          | 0.0                            | 980               | 2666                          | 0.0                            |
| 465               | 24637                         | 26.0                           | 595               | 126387                        | 10.1                           | 725               | 8130                          | 0.0                            | 855               | 2767                          | 0.0                            | 985               | 2934                          | 0.0                            |
| 470               | 16738                         | 19.3                           | 600               | 123477                        | 7.0                            | 730               | 7149                          | 0.0                            | 860               | 2826                          | 0.0                            | 990               | 4120                          | 0.0                            |
| 475               | 13456                         | 16.8                           | 605               | 118718                        | 4.7                            | 735               | 6311                          | 0.0                            | 865               | 2385                          | 0.0                            | 995               | 3858                          | 0.0                            |
| 480               | 13081                         | 17.7                           | 610               | 112091                        | 3.0                            | 740               | 5711                          | 0.0                            | 870               | 3194                          | 0.0                            | 1000              | 3405                          | 0.0                            |
| 485               | 14734                         | 21.4                           | 615               | 105039                        | 1.9                            | 745               | 5111                          | 0.0                            | 875               | 3189                          | 0.0                            |                   |                               |                                |

REPORT NUMBER: SP1-2101-121-2

### Melanopic Flux vs. Wavelength



**Melanopic Lumens: 3927.2**

**M/P: 0.55**

| 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       | 2304             | 0.0              | 490       | 19043            | 15.8             | 620       | 97577            | 0.1              | 750       | 4830             | 0.0              | 880       | 3505             | 0.0              |
| 365       | 2150             | 0.0              | 495       | 26606            | 22.0             | 625       | 90158            | 0.0              | 755       | 4664             | 0.0              | 885       | 2991             | 0.0              |
| 370       | 2146             | 0.0              | 500       | 36376            | 29.2             | 630       | 82240            | 0.0              | 760       | 4006             | 0.0              | 890       | 2327             | 0.0              |
| 375       | 2332             | 0.0              | 505       | 47714            | 36.6             | 635       | 74361            | 0.0              | 765       | 3715             | 0.0              | 895       | 2775             | 0.0              |
| 380       | 2527             | 0.0              | 510       | 58741            | 42.2             | 640       | 66994            | 0.0              | 770       | 3696             | 0.0              | 900       | 2141             | 0.0              |
| 385       | 2304             | 0.0              | 515       | 68716            | 44.9             | 645       | 60405            | 0.0              | 775       | 3117             | 0.0              | 905       | 2421             | 0.0              |
| 390       | 2064             | 0.0              | 520       | 77136            | 44.9             | 650       | 53806            | 0.0              | 780       | 3062             | 0.0              | 910       | 2200             | 0.0              |
| 395       | 1856             | 0.0              | 525       | 83567            | 42.4             | 655       | 47610            | 0.0              | 785       | 2907             | 0.0              | 915       | 2716             | 0.0              |
| 400       | 1856             | 0.0              | 530       | 89283            | 38.6             | 660       | 42018            | 0.0              | 790       | 2655             | 0.0              | 920       | 2656             | 0.0              |
| 405       | 2374             | 0.0              | 535       | 94097            | 33.9             | 665       | 36742            | 0.0              | 795       | 2467             | 0.0              | 925       | 2671             | 0.0              |
| 410       | 4084             | 0.2              | 540       | 96845            | 28.3             | 670       | 32105            | 0.0              | 800       | 2609             | 0.0              | 930       | 3292             | 0.0              |
| 415       | 8543             | 0.6              | 545       | 100829           | 23.4             | 675       | 27946            | 0.0              | 805       | 2293             | 0.0              | 935       | 3188             | 0.0              |
| 420       | 18394            | 2.1              | 550       | 105648           | 19.0             | 680       | 24146            | 0.0              | 810       | 2188             | 0.0              | 940       | 1997             | 0.0              |
| 425       | 37987            | 5.9              | 555       | 110017           | 14.8             | 685       | 21191            | 0.0              | 815       | 2386             | 0.0              | 945       | 2623             | 0.0              |
| 430       | 67605            | 14.3             | 560       | 114586           | 11.3             | 690       | 18544            | 0.0              | 820       | 2712             | 0.0              | 950       | 2969             | 0.0              |
| 435       | 102160           | 27.3             | 565       | 118987           | 8.4              | 695       | 16058            | 0.0              | 825       | 2473             | 0.0              | 955       | 2277             | 0.0              |
| 440       | 135103           | 45.1             | 570       | 122326           | 6.0              | 700       | 14133            | 0.0              | 830       | 1969             | 0.0              | 960       | 4267             | 0.0              |
| 445       | 140126           | 55.3             | 575       | 125968           | 4.2              | 705       | 12309            | 0.0              | 835       | 1917             | 0.0              | 965       | 2034             | 0.0              |
| 450       | 102339           | 47.2             | 580       | 127613           | 2.9              | 710       | 11142            | 0.0              | 840       | 2248             | 0.0              | 970       | 3586             | 0.0              |
| 455       | 58751            | 30.8             | 585       | 129466           | 1.9              | 715       | 10143            | 0.0              | 845       | 2266             | 0.0              | 975       | 2505             | 0.0              |
| 460       | 36892            | 21.7             | 590       | 128813           | 1.3              | 720       | 9072             | 0.0              | 850       | 2558             | 0.0              | 980       | 2666             | 0.0              |
| 465       | 24637            | 16.1             | 595       | 126387           | 0.8              | 725       | 8130             | 0.0              | 855       | 2767             | 0.0              | 985       | 2934             | 0.0              |
| 470       | 16738            | 12.0             | 600       | 123477           | 0.5              | 730       | 7149             | 0.0              | 860       | 2826             | 0.0              | 990       | 4120             | 0.0              |
| 475       | 13456            | 10.3             | 605       | 118718           | 0.3              | 735       | 6311             | 0.0              | 865       | 2385             | 0.0              | 995       | 3858             | 0.0              |
| 480       | 13081            | 10.5             | 610       | 112091           | 0.2              | 740       | 5711             | 0.0              | 870       | 3194             | 0.0              | 1000      | 3405             | 0.0              |
| 485       | 14734            | 12.1             | 615       | 105039           | 0.1              | 745       | 5111             | 0.0              | 875       | 3189             | 0.0              |           |                  |                  |

REPORT NUMBER: SP1-2101-121-2

TM-30-18

### Summary

$R_f = 71.7$   
 $R_g = 96.9$   
 CIE  $R_a = 71.2$   
 $R_g = -29.7$



### Color Vector Graphics



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 55 | CES51 = 86 | CES76 = 45 |
| CES02 = 61 | CES27 = 80 | CES52 = 87 | CES77 = 68 |
| CES03 = 30 | CES28 = 79 | CES53 = 74 | CES78 = 49 |
| CES04 = 70 | CES29 = 51 | CES54 = 81 | CES79 = 77 |
| CES05 = 47 | CES30 = 60 | CES55 = 80 | CES80 = 75 |
| CES06 = 50 | CES31 = 56 | CES56 = 69 | CES81 = 75 |
| CES07 = 40 | CES32 = 52 | CES57 = 67 | CES82 = 90 |
| CES08 = 39 | CES33 = 62 | CES58 = 69 | CES83 = 85 |
| CES09 = 29 | CES34 = 65 | CES59 = 86 | CES84 = 87 |
| CES10 = 74 | CES35 = 81 | CES60 = 91 | CES85 = 83 |
| CES11 = 57 | CES36 = 92 | CES61 = 85 | CES86 = 72 |
| CES12 = 63 | CES37 = 74 | CES62 = 81 | CES87 = 77 |
| CES13 = 42 | CES38 = 69 | CES63 = 72 | CES88 = 77 |
| CES14 = 74 | CES39 = 92 | CES64 = 69 | CES89 = 72 |
| CES15 = 71 | CES40 = 86 | CES65 = 64 | CES90 = 75 |
| CES16 = 46 | CES41 = 84 | CES66 = 63 | CES91 = 91 |
| CES17 = 49 | CES42 = 75 | CES67 = 60 | CES92 = 66 |
| CES18 = 56 | CES43 = 70 | CES68 = 67 | CES93 = 80 |
| CES19 = 72 | CES44 = 98 | CES69 = 77 | CES94 = 56 |
| CES20 = 65 | CES45 = 80 | CES70 = 57 | CES95 = 72 |
| CES21 = 86 | CES46 = 77 | CES71 = 53 | CES96 = 78 |
| CES22 = 78 | CES47 = 74 | CES72 = 84 | CES97 = 83 |
| CES23 = 92 | CES48 = 66 | CES73 = 47 | CES98 = 73 |
| CES24 = 91 | CES49 = 76 | CES74 = 96 | CES99 = 63 |
| CES25 = 72 | CES50 = 85 | CES75 = 52 |            |



### Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)