

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: P323518

Luminaire Tested: **GLEON-SA4B-740-U-SL3-HSS**

Issue Date: 3/3/2020

### Test Information

Test Method: LM-79-08  
Report Number: P323518  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-23)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA4B-740-U-SL3-HSS  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(4) 70 CRI, 4000K, 800mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III  
SPILL LIGHT ELIMINATOR OPTICS WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

### Summary

Lumens per Lamp: N/A  
Luminaire Lumens: 19694 lumens  
Efficiency: N/A  
Efficacy: 115.2 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 1' x H: 0')  
IES Classification: Type III - Medium  
BUG Rating: B2 - U0 - G4

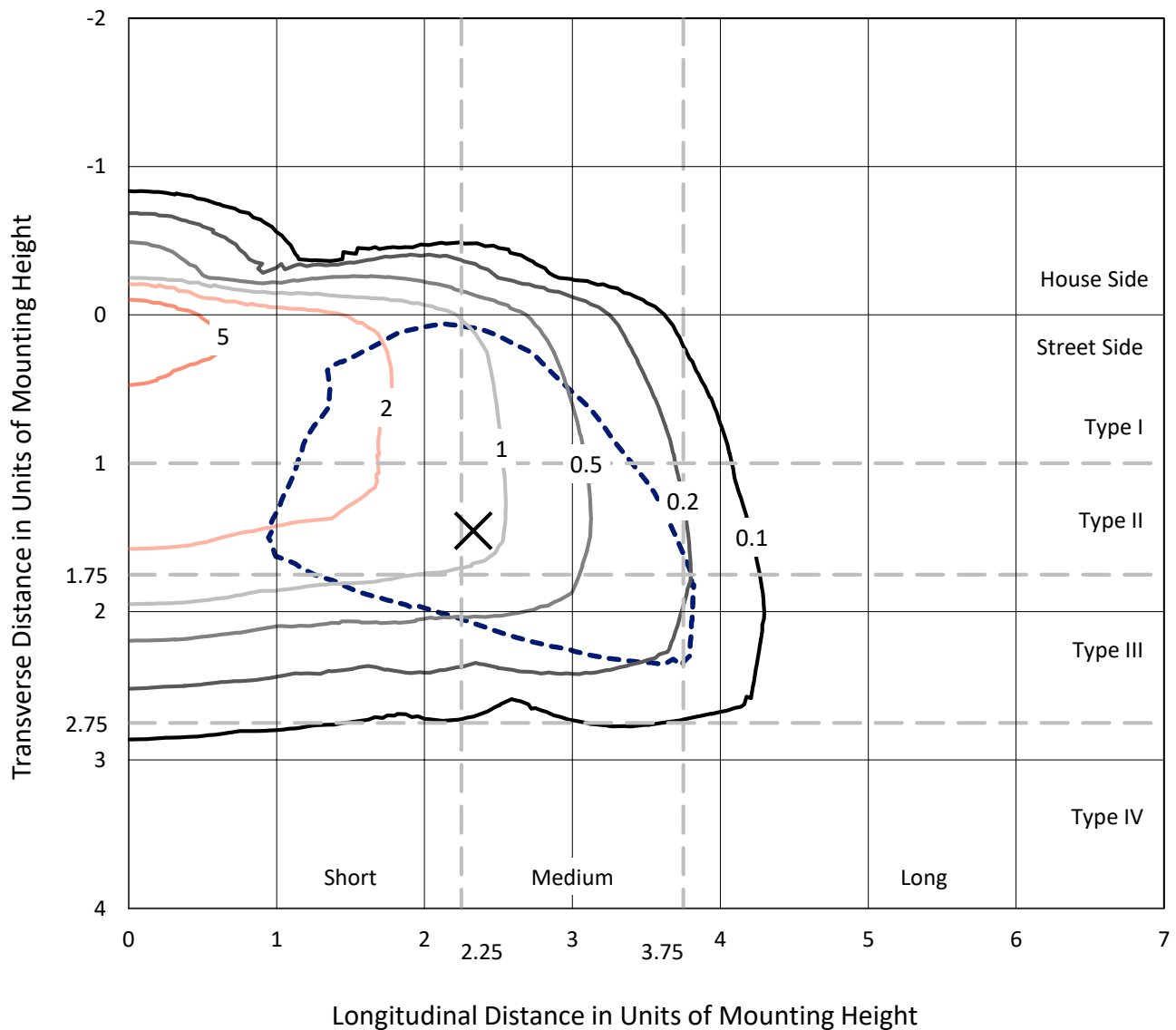
Input Watts (W): 171  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



REPORT NUMBER: P323518  
 CATALOG NUMBER: GLEON-SA4B-740-U-SL3-HSS

## Iso-Footcandle Lines of Horizontal Illumination

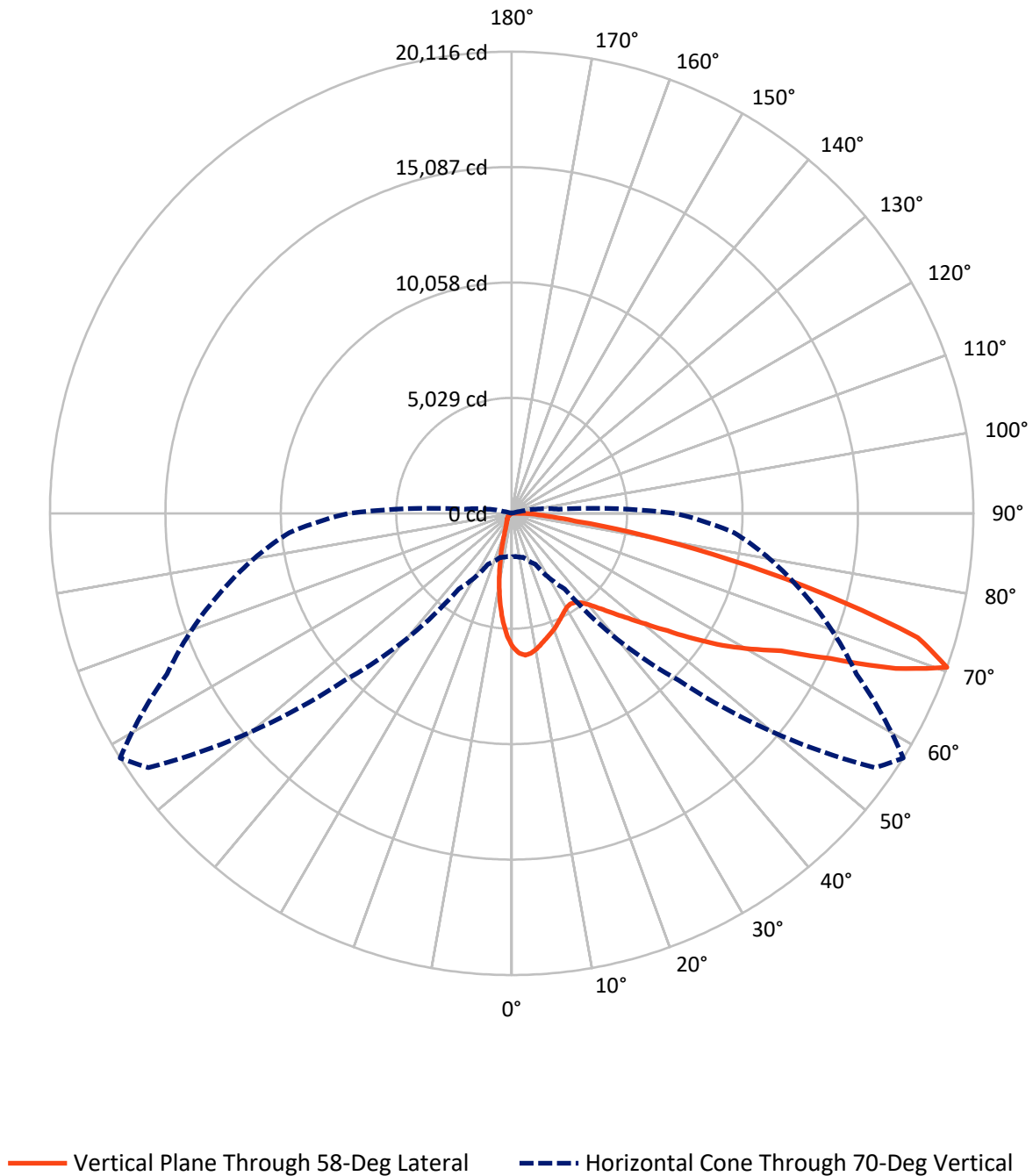
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 9.5 fc  
 Type III - Medium - N/A

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## Luminous Intensity Polar Plot



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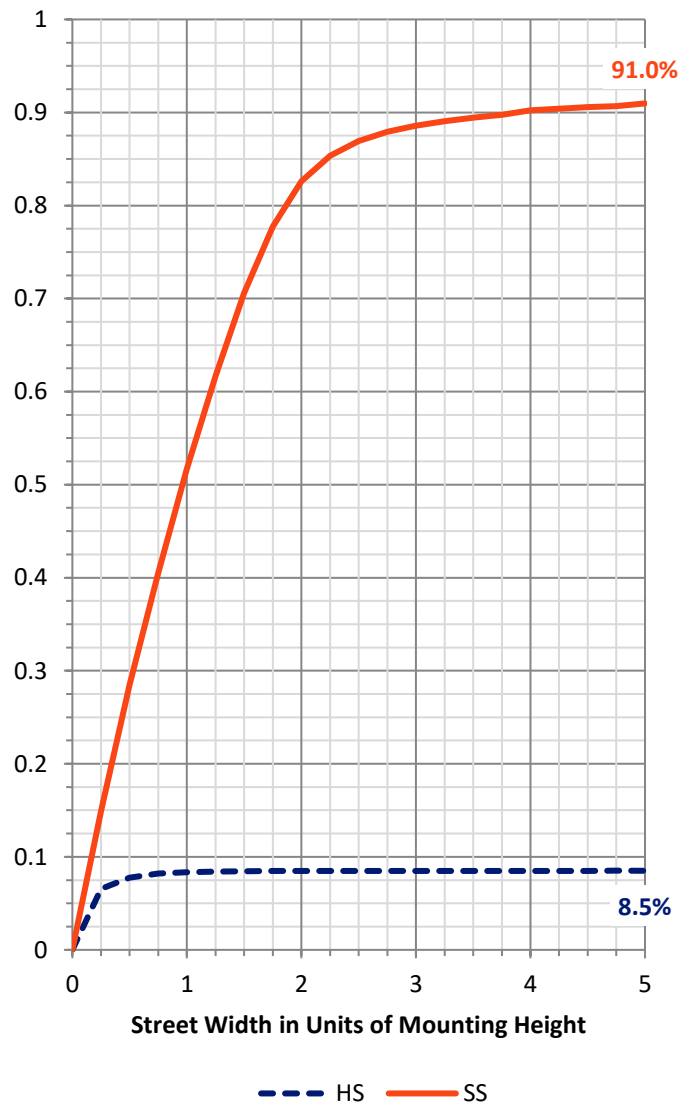
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 1685.4   | 0.0    | 1685.4  |
|                    | % Fixture | 8.6      | 0.0    | 8.6     |
| <b>Street Side</b> | Lumens    | 18008.6  | 0.0    | 18008.6 |
|                    | % Fixture | 91.4     | 0.0    | 91.4    |
| <b>Total</b>       | Lumens    | 19694.0  | 0.0    | 19694.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 475.7   | 2.4       |
| 10°-20°   | 998.4   | 5.1       |
| 20°-30°   | 1312.6  | 6.7       |
| 30°-40°   | 1738.4  | 8.8       |
| 40°-50°   | 2598.4  | 13.2      |
| 50°-60°   | 4162.5  | 21.1      |
| 60°-70°   | 5246.7  | 26.6      |
| 70°-80°   | 2830.1  | 14.4      |
| 80°-90°   | 331.3   | 1.7       |
| 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°    | 19694.0 | 100.0     |
| 0°-180°   | 19694.0 | 100.0     |

**Coefficient of Utilization**



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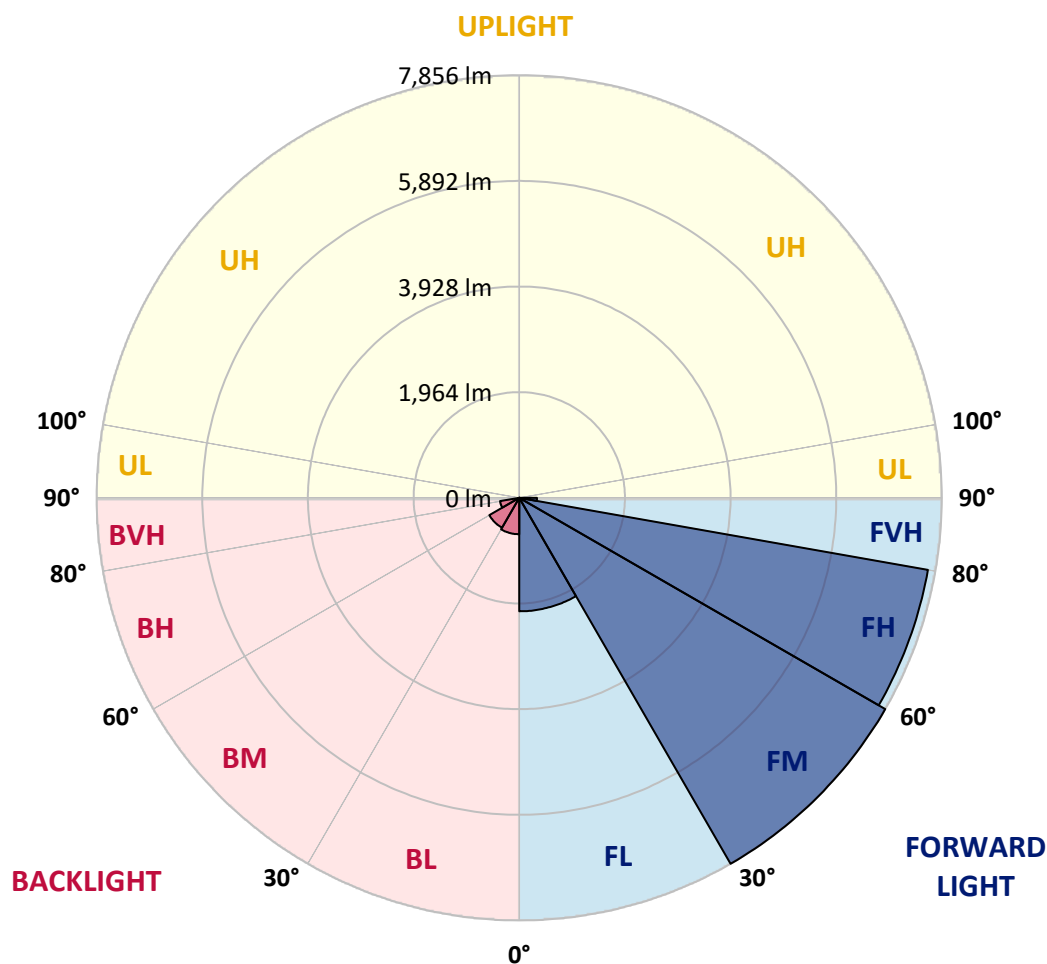
CATALOG NUMBER: GLEON-SA4B-740-U-SL3-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |          |
|------|-------------|--------|-----------|-------------------------|------|----------|
|      |             |        |           | B                       | U    | G        |
| FL   | (0°-30°)    | 2109.6 | 10.7      |                         |      |          |
| FM   | (30°-60°)   | 7856.2 | 39.9      |                         |      |          |
| FH   | (60°-80°)   | 7714.3 | 39.2      |                         |      | G4/12000 |
| FVH  | (80°-90°)   | 328.4  | 1.7       |                         |      | G3/500   |
| BL   | (0°-30°)    | 677.1  | 3.4       | B2/1000                 |      |          |
| BM   | (30°-60°)   | 642.9  | 3.3       | B1/1000                 |      |          |
| BH   | (60°-80°)   | 362.4  | 1.8       | B1/500                  |      | G1/500   |
| BVH  | (80°-90°)   | 2.9    | 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-G4**

Type III Medium



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°     | 45°     | 55°     | 58°     | 65°     | 75°     | 85°     |
|-------|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 5817.5 | 5817.5 | 5817.5 | 5817.5 | 5817.5  | 5817.5  | 5817.5  | 5817.5  | 5817.5  | 5817.5  | 5817.5  |
| 2.5°  | 6299.9 | 6284.3 | 6278.6 | 6268.7 | 6231.1  | 6194.2  | 6121.3  | 6100.9  | 6055.0  | 5946.1  | 5830.6  |
| 5°    | 6304.8 | 6303.9 | 6321.1 | 6317.0 | 6303.9  | 6286.7  | 6234.3  | 6207.3  | 6129.5  | 5973.9  | 5762.6  |
| 7.5°  | 6000.9 | 6016.5 | 6055.0 | 6086.1 | 6122.1  | 6168.8  | 6175.4  | 6149.2  | 6085.3  | 5917.4  | 5637.4  |
| 10°   | 5593.1 | 5617.7 | 5671.7 | 5733.2 | 5827.3  | 5920.7  | 6004.2  | 6000.9  | 5978.8  | 5813.4  | 5486.7  |
| 12.5° | 5184.5 | 5213.2 | 5275.4 | 5366.3 | 5499.8  | 5652.1  | 5801.1  | 5821.6  | 5858.5  | 5720.1  | 5347.5  |
| 15°   | 4826.6 | 4851.2 | 4912.6 | 5024.0 | 5189.4  | 5394.1  | 5612.8  | 5650.5  | 5745.5  | 5647.2  | 5231.2  |
| 17.5° | 4522.8 | 4538.4 | 4583.4 | 4707.1 | 4898.7  | 5146.8  | 5431.0  | 5504.7  | 5646.4  | 5589.9  | 5130.5  |
| 20°   | 4310.7 | 4313.2 | 4342.7 | 4429.5 | 4621.1  | 4898.7  | 5242.6  | 5348.3  | 5541.5  | 5540.7  | 5026.5  |
| 22.5° | 4205.9 | 4197.7 | 4203.4 | 4253.4 | 4394.3  | 4662.0  | 5054.3  | 5179.6  | 5447.4  | 5499.0  | 4920.8  |
| 25°   | 4186.3 | 4179.7 | 4163.3 | 4169.9 | 4255.0  | 4454.9  | 4864.3  | 5009.3  | 5364.7  | 5473.6  | 4829.1  |
| 27.5° | 4247.7 | 4254.2 | 4226.4 | 4196.9 | 4203.4  | 4320.6  | 4695.6  | 4863.5  | 5297.5  | 5473.6  | 4764.4  |
| 30°   | 4371.3 | 4374.6 | 4354.1 | 4315.6 | 4264.0  | 4282.9  | 4578.5  | 4746.4  | 5263.9  | 5511.2  | 4723.5  |
| 32.5° | 4508.1 | 4526.1 | 4523.6 | 4492.5 | 4418.8  | 4342.7  | 4550.7  | 4703.8  | 5261.5  | 5594.8  | 4719.4  |
| 35°   | 4677.6 | 4698.1 | 4732.5 | 4725.9 | 4648.9  | 4523.6  | 4645.7  | 4766.0  | 5309.8  | 5732.3  | 4763.6  |
| 37.5° | 4857.8 | 4888.9 | 4962.6 | 4997.8 | 4947.8  | 4806.2  | 4858.6  | 4944.6  | 5439.2  | 5955.1  | 4875.8  |
| 40°   | 5032.2 | 5067.4 | 5201.7 | 5340.1 | 5302.4  | 5156.7  | 5181.2  | 5250.0  | 5669.3  | 6275.3  | 5088.7  |
| 42.5° | 5203.3 | 5255.7 | 5453.1 | 5680.8 | 5725.8  | 5609.5  | 5622.6  | 5677.5  | 6010.8  | 6715.9  | 5436.7  |
| 45°   | 5408.1 | 5467.0 | 5759.4 | 6040.3 | 6160.6  | 6109.9  | 6165.5  | 6201.6  | 6457.1  | 7298.1  | 5906.0  |
| 47.5° | 5708.6 | 5776.6 | 6135.3 | 6455.4 | 6666.7  | 6699.5  | 6811.7  | 6835.4  | 7021.3  | 7976.2  | 6517.7  |
| 50°   | 6294.9 | 6313.8 | 6638.1 | 6928.8 | 7233.4  | 7429.9  | 7557.7  | 7575.7  | 7704.3  | 8717.3  | 7281.7  |
| 52.5° | 7032.8 | 7045.1 | 7228.5 | 7423.4 | 7769.8  | 8171.1  | 8470.0  | 8495.3  | 8522.4  | 9439.5  | 8035.9  |
| 55°   | 7765.7 | 7764.1 | 7885.3 | 7999.9 | 8396.3  | 8979.3  | 9627.9  | 9643.4  | 9449.4  | 10125.0 | 8612.4  |
| 57.5° | 8223.5 | 8267.7 | 8451.9 | 8599.3 | 9152.9  | 9900.6  | 10800.6 | 10857.9 | 10423.0 | 10632.7 | 9182.4  |
| 60°   | 8077.7 | 8099.0 | 8507.6 | 9053.0 | 10095.5 | 11210.0 | 11987.2 | 12001.9 | 11155.1 | 11139.6 | 9903.0  |
| 62.5° | 6882.1 | 6893.6 | 7535.6 | 8659.9 | 10572.9 | 12908.4 | 13418.6 | 13178.7 | 11997.0 | 11843.0 | 10765.3 |
| 65°   | 4716.9 | 4791.4 | 5327.8 | 6717.5 | 9695.9  | 13973.8 | 15634.6 | 15237.4 | 13280.2 | 12856.8 | 11544.9 |
| 67.5° | 2777.7 | 2762.2 | 3027.5 | 4051.1 | 7121.2  | 13266.3 | 18437.7 | 18043.0 | 15030.2 | 13535.7 | 11316.5 |
| 70°   | 1897.4 | 1886.8 | 1988.3 | 2452.6 | 4020.0  | 10291.2 | 19319.7 | 20116.4 | 16575.5 | 13078.8 | 9739.3  |
| 72.5° | 1354.5 | 1360.2 | 1510.1 | 1905.6 | 2523.9  | 5996.0  | 16614.0 | 18499.9 | 16091.5 | 11401.6 | 7402.9  |
| 75°   | 919.6  | 935.2  | 1149.7 | 1563.3 | 2212.7  | 3050.4  | 11789.8 | 14063.1 | 13103.3 | 8286.5  | 4255.0  |
| 77.5° | 494.6  | 511.8  | 764.9  | 1259.5 | 2000.6  | 2119.3  | 7583.9  | 9678.7  | 8230.8  | 3725.2  | 1233.3  |
| 80°   | 206.4  | 216.2  | 357.9  | 915.5  | 1728.7  | 1861.4  | 4462.2  | 5869.1  | 3507.4  | 734.6   | 275.2   |
| 82.5° | 89.3   | 94.2   | 149.0  | 546.2  | 1292.2  | 1571.5  | 2362.5  | 2823.6  | 1062.9  | 161.3   | 138.4   |
| 85°   | 17.2   | 18.0   | 61.4   | 289.1  | 824.6   | 886.9   | 1531.4  | 1501.1  | 477.4   | 69.6    | 100.7   |
| 87.5° | 0.0    | 0.0    | 14.7   | 90.9   | 242.4   | 483.2   | 934.4   | 922.9   | 162.1   | 33.6    | 37.7    |
| 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: P323518

CATALOG NUMBER: GLEON-SA4B-740-U-SL3-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 5817.5 | 5817.5 | 5817.5 | 5817.5 | 5817.5 | 5817.5 | 5817.5 | 5817.5 | 5817.5 | 5817.5 | 5817.5 |
| 2.5°  | 5771.7 | 5715.2 | 5596.4 | 5449.8 | 5337.6 | 5214.0 | 5115.7 | 4991.2 | 4937.2 | 4939.6 | 4910.2 |
| 5°    | 5642.3 | 5526.0 | 5263.1 | 4931.5 | 4676.0 | 4412.3 | 4185.4 | 3959.4 | 3825.9 | 3782.5 | 3741.6 |
| 7.5°  | 5457.2 | 5272.9 | 4853.7 | 4342.7 | 3910.3 | 3487.7 | 3120.0 | 2796.6 | 2591.8 | 2491.9 | 2455.1 |
| 10°   | 5248.4 | 4989.6 | 4382.8 | 3709.6 | 3092.2 | 2520.6 | 2044.0 | 1629.6 | 1464.2 | 1352.0 | 1323.4 |
| 12.5° | 5064.9 | 4714.4 | 3922.6 | 3060.3 | 2327.3 | 1637.8 | 1183.3 | 925.4  | 813.2  | 769.0  | 761.6  |
| 15°   | 4892.1 | 4457.3 | 3479.5 | 2472.3 | 1611.6 | 1008.1 | 752.6  | 665.0  | 638.7  | 631.4  | 631.4  |
| 17.5° | 4729.2 | 4212.5 | 3046.3 | 1893.3 | 1066.2 | 706.7  | 623.2  | 603.5  | 595.3  | 594.5  | 595.3  |
| 20°   | 4558.9 | 3967.6 | 2620.5 | 1387.2 | 744.4  | 598.6  | 575.7  | 565.0  | 562.6  | 562.6  | 562.6  |
| 22.5° | 4395.9 | 3722.8 | 2206.1 | 990.9  | 597.0  | 546.2  | 534.7  | 527.4  | 524.9  | 524.1  | 522.5  |
| 25°   | 4239.5 | 3490.2 | 1801.6 | 700.2  | 524.1  | 500.4  | 490.5  | 480.7  | 473.3  | 469.2  | 466.8  |
| 27.5° | 4110.9 | 3283.0 | 1424.9 | 561.8  | 473.3  | 452.9  | 440.6  | 425.8  | 407.8  | 399.6  | 396.4  |
| 30°   | 4008.5 | 3093.8 | 1098.2 | 474.1  | 425.8  | 405.4  | 386.5  | 361.1  | 334.9  | 321.0  | 320.2  |
| 32.5° | 3928.3 | 2907.9 | 833.6  | 419.3  | 383.2  | 357.9  | 330.8  | 298.9  | 268.6  | 253.0  | 252.2  |
| 35°   | 3889.0 | 2744.2 | 637.1  | 379.2  | 345.6  | 313.6  | 280.1  | 244.9  | 215.4  | 200.6  | 199.0  |
| 37.5° | 3915.2 | 2605.8 | 497.1  | 345.6  | 313.6  | 276.8  | 237.5  | 200.6  | 174.4  | 161.3  | 160.5  |
| 40°   | 4011.0 | 2517.3 | 403.7  | 316.9  | 286.6  | 241.6  | 199.0  | 164.6  | 142.5  | 131.8  | 131.0  |
| 42.5° | 4214.9 | 2484.6 | 344.8  | 293.2  | 260.4  | 208.8  | 165.4  | 135.9  | 115.5  | 108.1  | 106.5  |
| 45°   | 4555.6 | 2532.9 | 304.6  | 270.2  | 233.4  | 177.7  | 136.8  | 111.4  | 93.4   | 87.6   | 86.8   |
| 47.5° | 5009.3 | 2659.8 | 276.0  | 248.1  | 208.8  | 149.9  | 113.8  | 90.1   | 76.2   | 70.4   | 69.6   |
| 50°   | 5594.0 | 2861.3 | 252.2  | 226.0  | 185.9  | 126.9  | 94.2   | 71.2   | 59.0   | 54.9   | 54.9   |
| 52.5° | 6230.2 | 3101.2 | 230.9  | 205.5  | 163.0  | 105.6  | 76.2   | 54.9   | 46.7   | 41.8   | 41.8   |
| 55°   | 6756.0 | 3310.8 | 208.0  | 190.0  | 135.1  | 87.6   | 58.1   | 41.8   | 34.4   | 31.9   | 31.9   |
| 57.5° | 7280.9 | 3534.4 | 181.8  | 163.0  | 108.1  | 71.2   | 44.2   | 31.1   | 25.4   | 23.7   | 23.7   |
| 60°   | 7961.4 | 3807.9 | 156.4  | 132.7  | 85.2   | 54.0   | 32.8   | 22.1   | 18.8   | 18.0   | 18.0   |
| 62.5° | 8709.9 | 3968.4 | 133.5  | 106.5  | 66.3   | 40.1   | 23.7   | 14.7   | 13.9   | 13.9   | 13.1   |
| 65°   | 9167.7 | 3741.6 | 112.2  | 85.2   | 51.6   | 30.3   | 15.6   | 10.6   | 12.3   | 11.5   | 9.8    |
| 67.5° | 8583.8 | 2929.2 | 91.7   | 66.3   | 40.1   | 22.9   | 9.8    | 7.4    | 13.1   | 10.6   | 8.2    |
| 70°   | 7107.3 | 2050.5 | 71.2   | 46.7   | 31.9   | 19.7   | 6.6    | 4.9    | 13.9   | 10.6   | 6.6    |
| 72.5° | 5318.8 | 1372.5 | 56.5   | 31.1   | 23.7   | 17.2   | 5.7    | 2.5    | 12.3   | 9.0    | 5.7    |
| 75°   | 2906.3 | 552.8  | 45.0   | 19.7   | 14.7   | 12.3   | 4.1    | 1.6    | 8.2    | 6.6    | 4.1    |
| 77.5° | 764.9  | 145.8  | 32.8   | 13.1   | 8.2    | 4.9    | 2.5    | 0.8    | 4.1    | 3.3    | 1.6    |
| 80°   | 194.9  | 56.5   | 21.3   | 9.0    | 5.7    | 2.5    | 0.0    | 0.0    | 0.8    | 0.0    | 0.0    |
| 82.5° | 104.0  | 23.7   | 13.1   | 6.6    | 3.3    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 85°   | 78.6   | 15.6   | 7.4    | 4.1    | 0.8    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 87.5° | 30.3   | 4.9    | 2.5    | 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

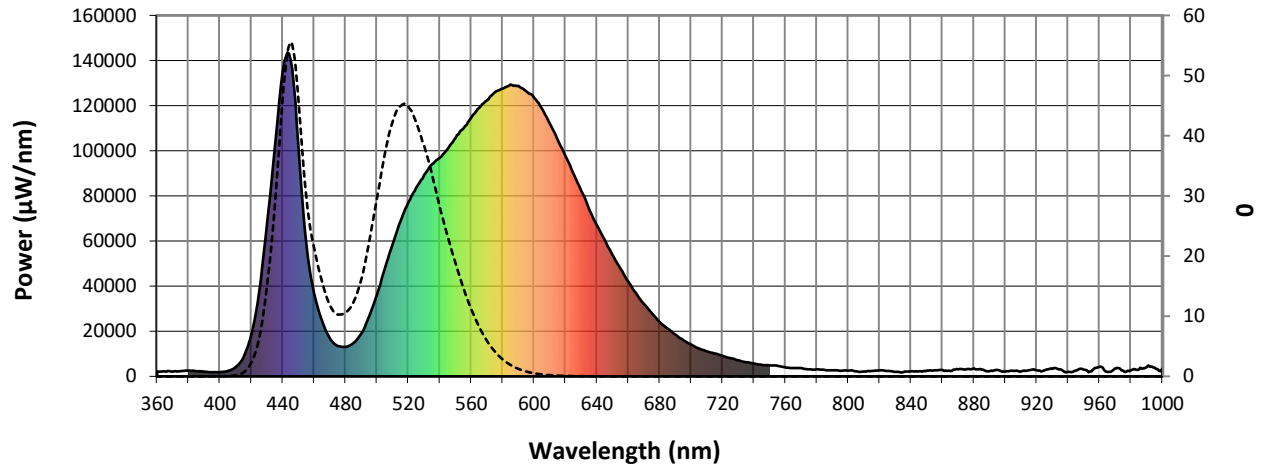


#####

| 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              |           |                  |                  |

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### Scotopic Flux vs. Wavelength



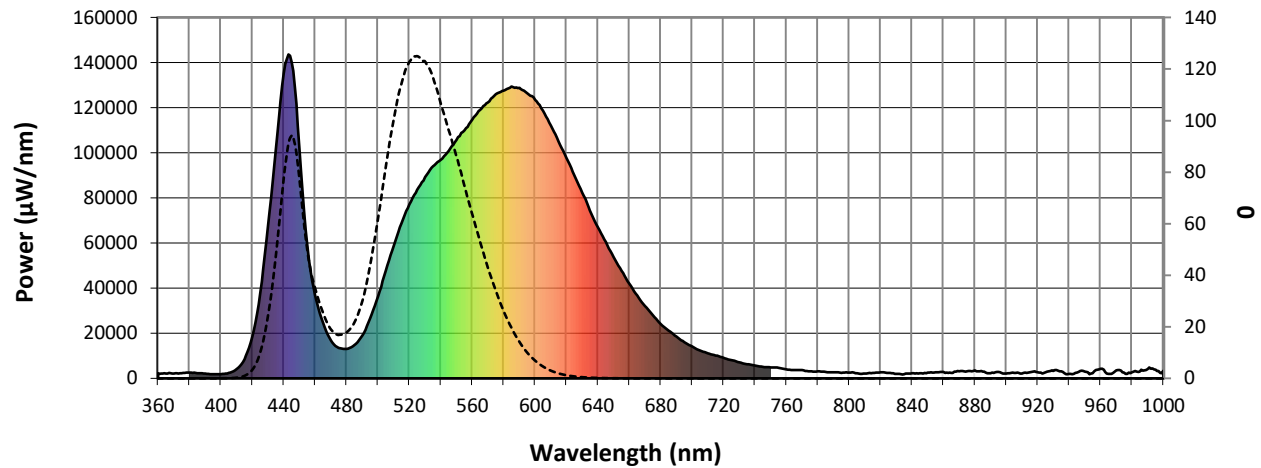
Scotopic Lumens: 10425.8

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                            |                   |                               |                                |

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### 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              |           |                  |                  |

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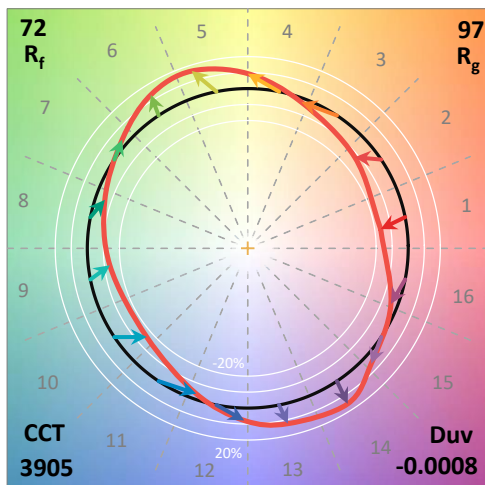
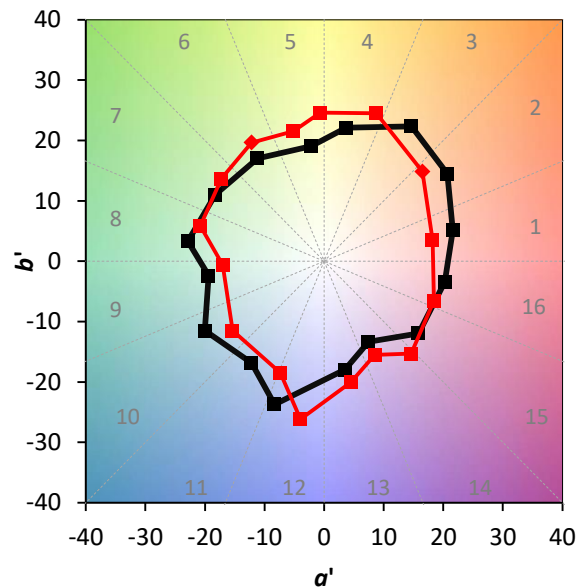
TM-30-18

### 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**


REPORT NUMBER: SP1-2101-121-2

**TM-30-18**

**Measure Comparisons**



(END OF REPORT)