

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: P383112

Luminaire Tested: **GLEON-SA4C-735-U-SL4-HSS**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P383112  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-25)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA4C-735-U-SL4-HSS  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(4) 70 CRI, 3500K, 1050mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE IV  
SPILL LIGHT ELIMINATOR OPTICS WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 21571.9 lumens  
Efficiency: N/A  
Efficacy: 95.9 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 1' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B2 - U0 - G4

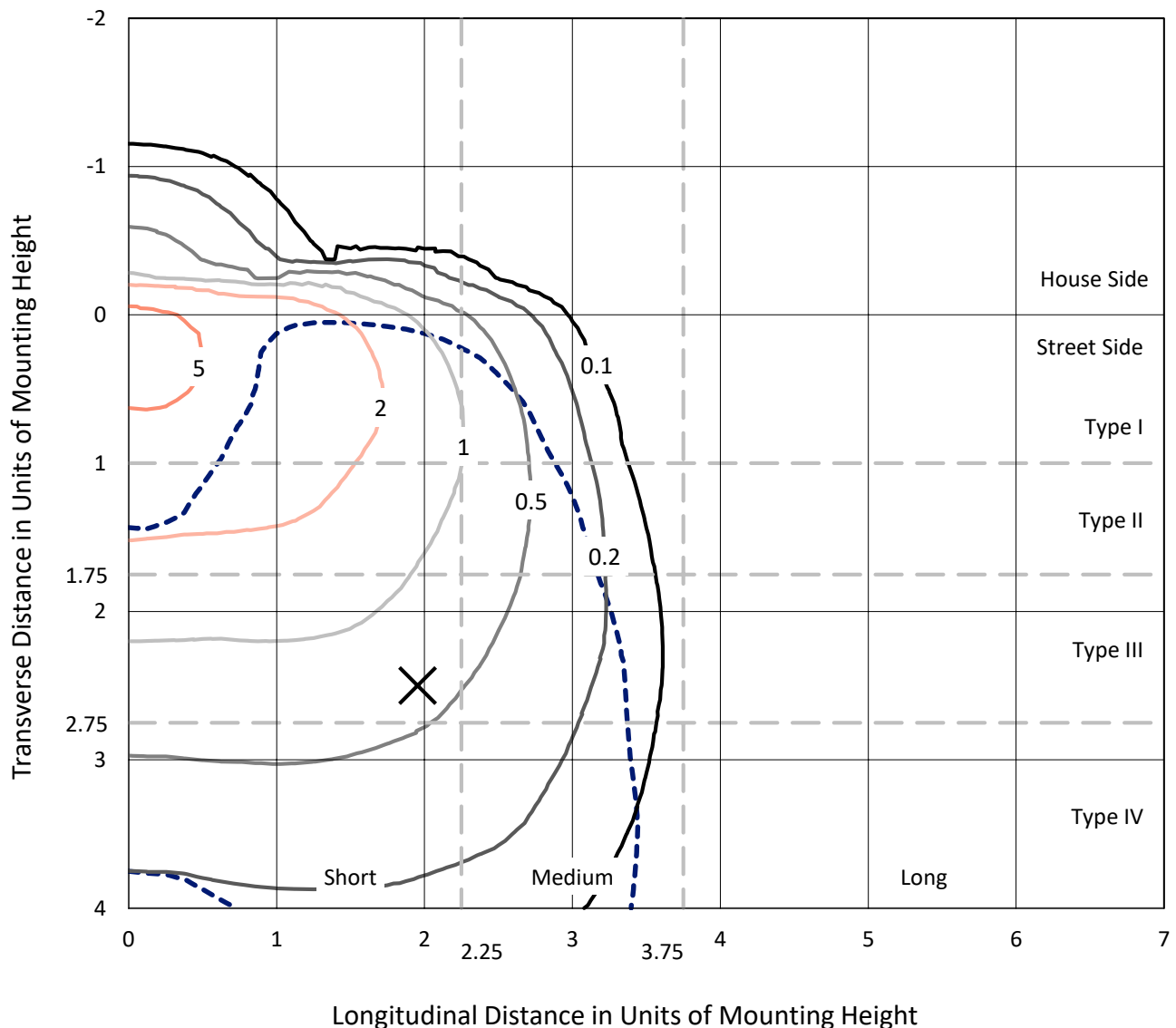
Input Watts (W): 225  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



REPORT NUMBER: P383112  
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## Iso-Footcandle Lines of Horizontal Illumination

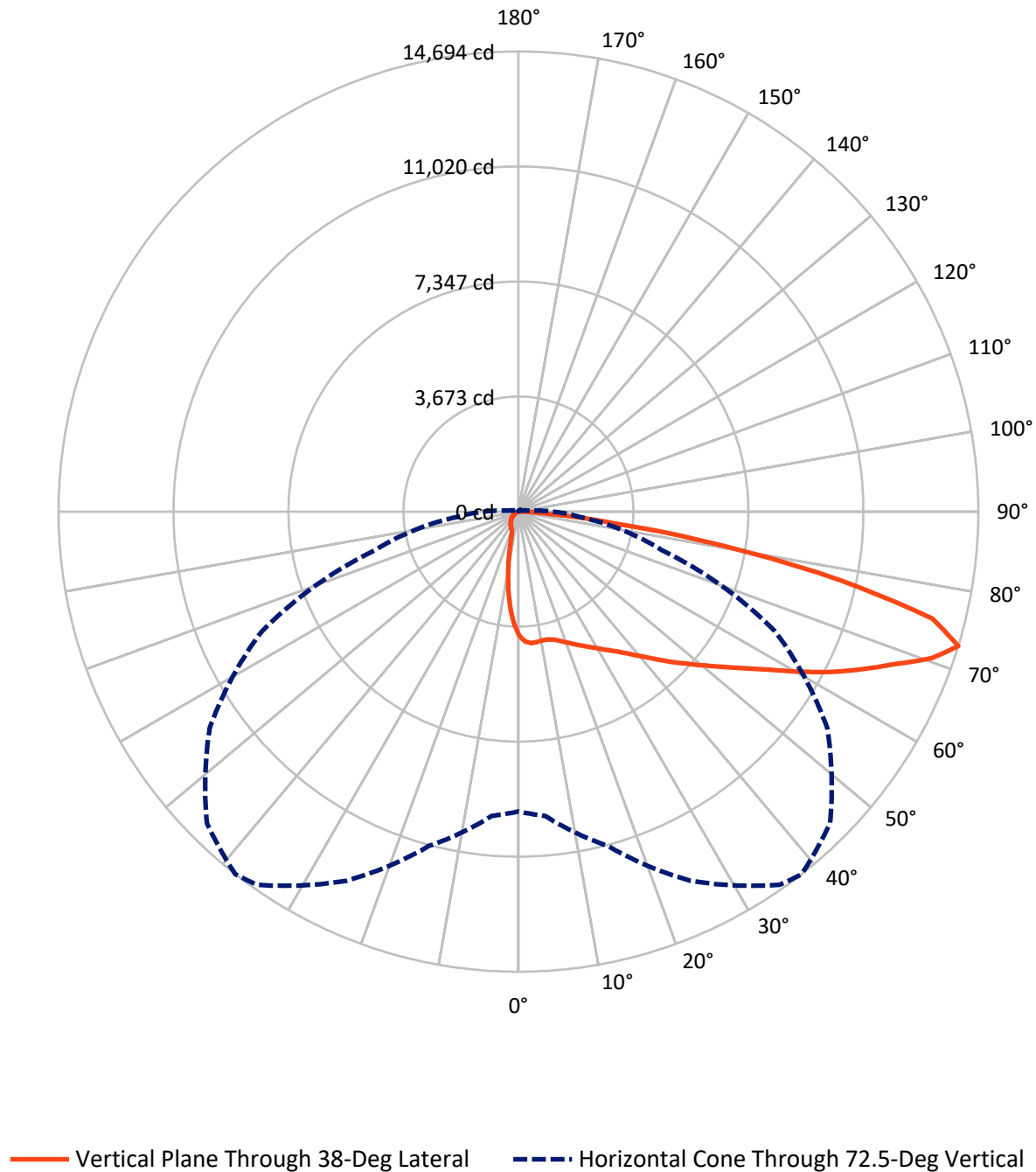
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 6.7 fc  
 Type IV - Short - N/A

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## Luminous Intensity Polar Plot



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**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 1815.3   | 0.0    | 1815.3  |
|                    | % Fixture | 8.4      | 0.0    | 8.4     |
| <b>Street Side</b> | Lumens    | 19756.5  | 0.0    | 19756.5 |
|                    | % Fixture | 91.6     | 0.0    | 91.6    |
| <b>Total</b>       | Lumens    | 21571.9  | 0.0    | 21571.9 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 338.1   | 1.6       |
| 10°-20°   | 826.6   | 3.8       |
| 20°-30°   | 1314.8  | 6.1       |
| 30°-40°   | 1976.6  | 9.2       |
| 40°-50°   | 3015.4  | 14.0      |
| 50°-60°   | 4261.8  | 19.8      |
| 60°-70°   | 5345.8  | 24.8      |
| 70°-80°   | 3997.1  | 18.5      |
| 80°-90°   | 495.6   | 2.3       |
| 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°    | 21571.9 | 100.0     |
| 0°-180°   | 21571.9 | 100.0     |

**Coefficient of Utilization**



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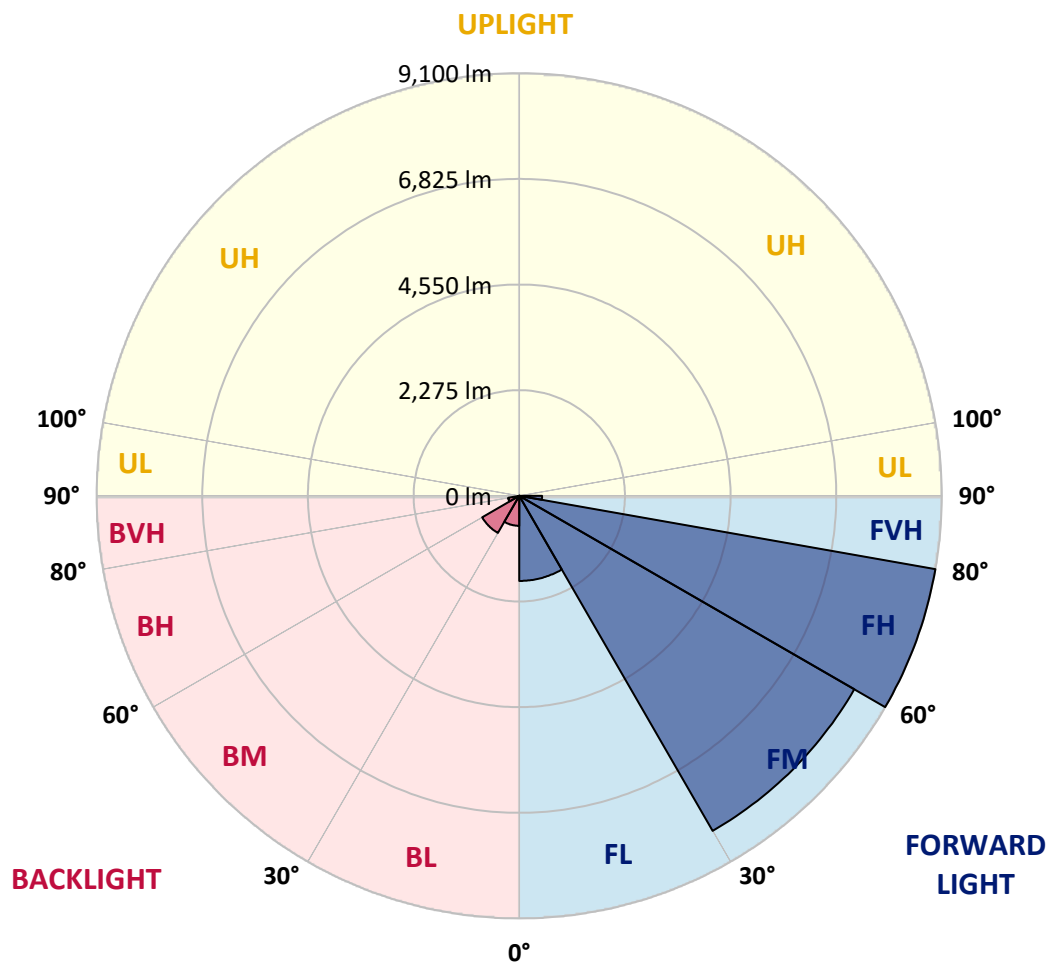
CATALOG NUMBER: GLEON-SA4C-735-U-SL4-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |          |
|------|-------------|--------|-----------|-------------------------|------|----------|
|      |             |        |           | B                       | U    | G        |
| FL   | (0°-30°)    | 1833.1 | 8.5       |                         |      |          |
| FM   | (30°-60°)   | 8332.0 | 38.6      |                         |      |          |
| FH   | (60°-80°)   | 9100.4 | 42.2      |                         |      | G4/12000 |
| FVH  | (80°-90°)   | 491.0  | 2.3       |                         |      | G3/500   |
| BL   | (0°-30°)    | 646.4  | 3.0       | B2/1000                 |      |          |
| BM   | (30°-60°)   | 921.9  | 4.3       | B1/1000                 |      |          |
| BH   | (60°-80°)   | 242.5  | 1.1       | B1/500                  |      | G1/500   |
| BVH  | (80°-90°)   | 4.6    | 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 IV Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°     | 25°     | 35°     | 38°     | 45°     | 55°     | 65°     | 75°     | 85°    |
|-------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|--------|
| 0°    | 3967.0 | 3967.0 | 3967.0  | 3967.0  | 3967.0  | 3967.0  | 3967.0  | 3967.0  | 3967.0  | 3967.0  | 3967.0 |
| 2.5°  | 4210.7 | 4211.5 | 4201.7  | 4185.6  | 4164.9  | 4154.2  | 4136.4  | 4107.7  | 4077.2  | 4022.5  | 3963.4 |
| 5°    | 4296.7 | 4296.7 | 4284.1  | 4262.7  | 4229.5  | 4219.6  | 4185.6  | 4139.9  | 4077.2  | 3988.5  | 3889.0 |
| 7.5°  | 4287.7 | 4289.5 | 4272.4  | 4250.1  | 4216.9  | 4208.0  | 4166.8  | 4115.7  | 4037.8  | 3930.3  | 3803.0 |
| 10°   | 4241.1 | 4245.6 | 4232.2  | 4221.4  | 4190.9  | 4181.1  | 4142.6  | 4091.5  | 4013.6  | 3898.9  | 3752.8 |
| 12.5° | 4193.6 | 4198.1 | 4202.6  | 4212.5  | 4193.6  | 4190.1  | 4159.6  | 4116.6  | 4042.3  | 3923.1  | 3758.2 |
| 15°   | 4163.2 | 4172.1 | 4204.4  | 4242.9  | 4247.4  | 4243.9  | 4224.1  | 4183.8  | 4108.5  | 3984.9  | 3796.8 |
| 17.5° | 4163.2 | 4177.5 | 4244.7  | 4318.2  | 4344.2  | 4346.9  | 4329.8  | 4273.4  | 4183.8  | 4051.2  | 3832.6 |
| 20°   | 4198.1 | 4217.9 | 4322.7  | 4426.6  | 4469.6  | 4469.6  | 4436.4  | 4357.6  | 4252.8  | 4111.2  | 3856.8 |
| 22.5° | 4287.7 | 4313.7 | 4445.4  | 4565.4  | 4611.2  | 4601.3  | 4556.5  | 4441.8  | 4324.4  | 4179.3  | 3887.3 |
| 25°   | 4464.3 | 4483.9 | 4621.0  | 4741.9  | 4769.7  | 4747.4  | 4690.9  | 4543.9  | 4415.8  | 4271.6  | 3942.8 |
| 27.5° | 4691.7 | 4694.4 | 4836.0  | 4938.1  | 4921.1  | 4905.9  | 4835.1  | 4672.1  | 4547.5  | 4403.3  | 4038.6 |
| 30°   | 4941.7 | 4941.7 | 5066.2  | 5144.2  | 5092.2  | 5079.7  | 5008.9  | 4827.0  | 4716.0  | 4582.5  | 4174.8 |
| 32.5° | 5183.6 | 5194.4 | 5295.6  | 5344.8  | 5286.6  | 5274.0  | 5205.1  | 5023.3  | 4939.9  | 4855.7  | 4387.1 |
| 35°   | 5417.4 | 5425.5 | 5521.4  | 5548.2  | 5492.7  | 5496.3  | 5447.0  | 5292.9  | 5261.6  | 5250.8  | 4707.0 |
| 37.5° | 5644.1 | 5645.9 | 5743.5  | 5760.6  | 5732.7  | 5763.2  | 5767.8  | 5631.6  | 5689.8  | 5776.7  | 5157.6 |
| 40°   | 5851.1 | 5852.8 | 5949.6  | 5993.5  | 6041.0  | 6080.4  | 6115.3  | 6042.8  | 6235.4  | 6437.0  | 5694.3 |
| 42.5° | 6016.8 | 6035.6 | 6158.4  | 6241.6  | 6367.0  | 6442.3  | 6537.3  | 6533.7  | 6884.9  | 7187.7  | 6342.9 |
| 45°   | 6162.8 | 6195.1 | 6366.2  | 6512.2  | 6727.3  | 6847.2  | 6996.0  | 7112.5  | 7616.0  | 8023.6  | 6999.6 |
| 47.5° | 6355.4 | 6385.9 | 6581.2  | 6820.4  | 7107.1  | 7264.8  | 7511.2  | 7762.9  | 8419.5  | 8844.2  | 7641.0 |
| 50°   | 6626.8 | 6613.4 | 6806.1  | 7149.2  | 7517.4  | 7724.3  | 8075.5  | 8452.7  | 9216.9  | 9559.2  | 8018.2 |
| 52.5° | 6916.3 | 6910.9 | 7053.3  | 7506.7  | 8001.2  | 8243.1  | 8707.2  | 9165.9  | 9979.3  | 10051.9 | 8191.1 |
| 55°   | 7274.6 | 7236.1 | 7356.2  | 7914.2  | 8575.5  | 8835.3  | 9381.7  | 9871.8  | 10586.7 | 10329.6 | 8278.0 |
| 57.5° | 7650.0 | 7586.3 | 7701.0  | 8368.5  | 9223.2  | 9530.5  | 10128.9 | 10559.8 | 10990.8 | 10519.5 | 8277.1 |
| 60°   | 8038.0 | 7962.7 | 8098.8  | 8936.5  | 10027.6 | 10383.3 | 10938.8 | 11024.8 | 11368.0 | 10615.4 | 8216.2 |
| 62.5° | 8362.2 | 8317.4 | 8519.9  | 9543.9  | 10926.2 | 11275.6 | 11550.7 | 11447.7 | 11686.0 | 10689.7 | 8073.7 |
| 65°   | 8705.3 | 8708.0 | 9035.0  | 10252.5 | 11881.2 | 12116.9 | 12140.2 | 11995.9 | 11952.0 | 10674.5 | 7591.7 |
| 67.5° | 9169.4 | 9212.4 | 9758.1  | 11214.7 | 12810.3 | 12992.2 | 12990.3 | 12590.0 | 12146.4 | 10068.9 | 6523.0 |
| 70°   | 9660.3 | 9761.6 | 10591.2 | 12315.8 | 13824.4 | 14009.0 | 13914.1 | 12968.0 | 11436.9 | 8141.8  | 4616.5 |
| 72.5° | 9577.9 | 9753.5 | 11054.4 | 13010.1 | 14552.8 | 14693.5 | 14076.2 | 12038.9 | 9039.6  | 4732.1  | 1965.6 |
| 75°   | 7389.3 | 7592.7 | 10136.1 | 12322.0 | 13788.6 | 13662.3 | 12094.5 | 9368.3  | 4939.9  | 1320.6  | 442.6  |
| 77.5° | 3903.4 | 4011.8 | 6695.9  | 9387.1  | 10751.5 | 10487.3 | 8519.9  | 5197.0  | 1506.0  | 327.0   | 198.9  |
| 80°   | 2044.4 | 2069.5 | 2917.9  | 5326.0  | 6635.9  | 6637.6  | 5049.3  | 2282.8  | 620.9   | 167.5   | 133.5  |
| 82.5° | 1094.8 | 1116.3 | 1541.8  | 2461.0  | 3476.9  | 3151.7  | 1933.3  | 1256.0  | 361.1   | 94.9    | 128.1  |
| 85°   | 263.3  | 267.9  | 874.4   | 1124.4  | 1367.1  | 976.5   | 574.3   | 1054.4  | 97.6    | 55.5    | 104.0  |
| 87.5° | 101.3  | 103.0  | 324.3   | 486.5   | 348.5   | 225.8   | 268.8   | 393.3   | 12.6    | 21.5    | 16.1   |
| 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: P383112

CATALOG NUMBER: GLEON-SA4C-735-U-SL4-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 3967.0 | 3967.0 | 3967.0 | 3967.0 | 3967.0 | 3967.0 | 3967.0 | 3967.0 | 3967.0 | 3967.0 | 3967.0 |
| 2.5°  | 3927.6 | 3904.3 | 3846.9 | 3774.4 | 3709.9 | 3663.3 | 3593.4 | 3547.7 | 3517.2 | 3516.4 | 3504.7 |
| 5°    | 3828.1 | 3780.7 | 3657.0 | 3510.1 | 3376.6 | 3256.6 | 3115.0 | 3003.0 | 2919.7 | 2906.2 | 2877.6 |
| 7.5°  | 3721.5 | 3643.6 | 3453.6 | 3224.3 | 3000.3 | 2772.8 | 2508.5 | 2344.5 | 2203.9 | 2136.7 | 2129.5 |
| 10°   | 3656.1 | 3546.8 | 3277.2 | 2945.6 | 2594.5 | 2224.5 | 1878.7 | 1639.4 | 1466.5 | 1417.3 | 1380.6 |
| 12.5° | 3642.7 | 3498.4 | 3141.0 | 2684.1 | 2182.3 | 1693.3 | 1310.7 | 1056.3 | 918.3  | 874.4  | 862.7  |
| 15°   | 3656.1 | 3476.1 | 3026.3 | 2425.2 | 1764.9 | 1201.4 | 879.8  | 731.9  | 679.9  | 667.5  | 666.5  |
| 17.5° | 3664.1 | 3449.1 | 2896.4 | 2137.6 | 1360.0 | 858.2  | 673.7  | 630.8  | 622.6  | 621.7  | 623.6  |
| 20°   | 3663.3 | 3408.0 | 2741.5 | 1816.9 | 1011.5 | 674.6  | 609.2  | 600.3  | 598.4  | 599.4  | 598.4  |
| 22.5° | 3657.0 | 3359.5 | 2571.2 | 1486.3 | 764.1  | 602.9  | 581.5  | 576.1  | 575.1  | 575.1  | 575.1  |
| 25°   | 3668.6 | 3321.1 | 2383.9 | 1170.0 | 629.8  | 569.8  | 556.3  | 551.8  | 551.0  | 551.0  | 549.1  |
| 27.5° | 3710.7 | 3299.5 | 2178.8 | 900.3  | 568.9  | 540.2  | 529.5  | 528.6  | 525.9  | 525.0  | 526.8  |
| 30°   | 3778.8 | 3299.5 | 1953.9 | 700.6  | 532.2  | 509.7  | 501.7  | 499.9  | 499.0  | 498.1  | 499.0  |
| 32.5° | 3898.9 | 3324.6 | 1708.5 | 582.3  | 497.3  | 475.7  | 470.3  | 473.0  | 470.3  | 470.3  | 470.3  |
| 35°   | 4115.7 | 3399.9 | 1451.4 | 508.0  | 460.5  | 442.6  | 437.2  | 440.8  | 438.9  | 438.9  | 438.1  |
| 37.5° | 4431.9 | 3539.7 | 1192.4 | 463.2  | 428.2  | 409.4  | 402.2  | 407.6  | 405.9  | 405.9  | 404.9  |
| 40°   | 4817.2 | 3743.1 | 946.1  | 429.2  | 396.8  | 377.2  | 370.9  | 373.6  | 369.1  | 369.1  | 370.9  |
| 42.5° | 5292.9 | 4001.0 | 731.1  | 396.0  | 365.5  | 346.7  | 343.1  | 340.5  | 332.4  | 327.9  | 328.8  |
| 45°   | 5821.5 | 4269.8 | 569.8  | 363.8  | 335.9  | 320.7  | 315.3  | 308.2  | 294.7  | 285.8  | 286.7  |
| 47.5° | 6293.6 | 4476.7 | 463.2  | 332.4  | 309.1  | 297.4  | 289.3  | 275.9  | 256.3  | 245.5  | 246.4  |
| 50°   | 6541.8 | 4508.1 | 394.2  | 301.0  | 284.0  | 272.4  | 260.7  | 240.1  | 216.8  | 205.1  | 204.3  |
| 52.5° | 6605.4 | 4361.2 | 343.1  | 272.4  | 258.9  | 245.5  | 230.3  | 202.4  | 176.5  | 164.0  | 162.2  |
| 55°   | 6628.7 | 4137.2 | 297.4  | 245.5  | 232.0  | 216.8  | 197.1  | 165.7  | 141.6  | 129.0  | 128.1  |
| 57.5° | 6551.7 | 3803.0 | 261.6  | 221.2  | 205.1  | 186.3  | 162.2  | 132.6  | 109.3  | 99.5   | 99.5   |
| 60°   | 6380.5 | 3350.6 | 233.8  | 195.3  | 177.4  | 155.8  | 130.8  | 103.0  | 81.5   | 73.5   | 73.5   |
| 62.5° | 6039.2 | 2764.7 | 207.8  | 168.4  | 151.4  | 129.0  | 105.7  | 78.0   | 57.4   | 52.8   | 53.8   |
| 65°   | 5395.1 | 2097.3 | 181.8  | 144.2  | 129.0  | 106.6  | 82.4   | 55.5   | 38.6   | 38.6   | 40.3   |
| 67.5° | 4399.7 | 1456.8 | 155.0  | 122.8  | 111.1  | 86.9   | 62.7   | 38.6   | 26.9   | 30.5   | 34.0   |
| 70°   | 2912.6 | 817.1  | 132.6  | 101.3  | 94.9   | 69.0   | 46.6   | 26.0   | 21.5   | 28.7   | 34.9   |
| 72.5° | 1099.2 | 318.0  | 111.1  | 81.5   | 82.4   | 52.8   | 33.2   | 19.7   | 19.7   | 31.4   | 41.2   |
| 75°   | 306.4  | 155.8  | 79.7   | 60.0   | 64.5   | 38.6   | 24.2   | 17.0   | 18.8   | 35.9   | 48.3   |
| 77.5° | 180.1  | 114.7  | 52.0   | 34.9   | 43.9   | 26.9   | 16.1   | 13.4   | 16.1   | 30.5   | 46.6   |
| 80°   | 145.1  | 60.9   | 30.5   | 17.9   | 24.2   | 15.2   | 10.7   | 8.1    | 4.5    | 11.6   | 24.2   |
| 82.5° | 145.1  | 36.7   | 14.3   | 12.6   | 12.6   | 8.1    | 5.4    | 3.5    | 0.9    | 0.0    | 6.2    |
| 85°   | 97.6   | 15.2   | 8.9    | 8.1    | 6.2    | 2.7    | 1.8    | 0.9    | 0.0    | 0.0    | 0.0    |
| 87.5° | 16.1   | 6.2    | 3.5    | 1.8    | 0.9    | 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

All Brands

Data applicable to all product families using SA light engines

Report Number: SP1-2101-121-7

Luminaire Tested: IFLD-S-SA2A-735-U-T2

Test Date: 03/04/2021

### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2101-121-7  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 03/04/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: STREETWORKS  
 Catalog Number: **IFLD-S-SA2A-735-U-T2**  
 Description: STREETWORKS INF FLOOD

PROGRAMMED @ 615mA.

### Spectral Parameters

|                           |        |           |      |      |       |
|---------------------------|--------|-----------|------|------|-------|
| CCT (K):                  | 3388   | CRI (Ra): | 73.1 |      |       |
| CIE u':                   | 0.2371 | R1:       | 68.9 | R9:  | -34.6 |
| CIE v':                   | 0.5177 | R2:       | 81.1 | R10: | 57.8  |
| Duv:                      | 0.0032 | R3:       | 93.1 | R11: | 68.6  |
| CIE x:                    | 0.4153 | R4:       | 71.6 | R12: | 53.9  |
| CIE y:                    | 0.4030 | R5:       | 69.4 | R13: | 70.9  |
| CIE z:                    | 0.1817 | R6:       | 75.0 | R14: | 96.2  |
| Peak Wavelength (nm):     | 590    | R7:       | 79.5 |      |       |
| Dominant Wavelength (nm): | 580    | R8:       | 46.4 |      |       |
| Purity:                   | 45.7   |           |      |      |       |
| Rf:                       | 76.9   |           |      |      |       |
| Rg:                       | 94.4   |           |      |      |       |



### Test Conditions

Stabilization Time: 81M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.0/30%  
 Sphere Temperature (°C): 24.1

REPORT NUMBER: SP1-2101-121-7

| 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            |

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**CIE 1931 Chromaticity Diagram**



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



Point lies inside the ANSI 3500K 4-step quadrangle

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### 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       | 2672             | 0.0              | 490       | 34553            | 4.9              | 620       | 136720           | 35.6             | 750       | 5870             | 0.0              | 880       | 4216             | 0.0              |
| 365       | 2252             | 0.0              | 495       | 44336            | 8.0              | 625       | 126308           | 27.9             | 755       | 5421             | 0.0              | 885       | 4132             | 0.0              |
| 370       | 2217             | 0.0              | 500       | 54643            | 12.1             | 630       | 114625           | 20.7             | 760       | 5097             | 0.0              | 890       | 3992             | 0.0              |
| 375       | 2697             | 0.0              | 505       | 64676            | 18.1             | 635       | 103216           | 15.5             | 765       | 4626             | 0.0              | 895       | 3214             | 0.0              |
| 380       | 3039             | 0.0              | 510       | 73825            | 25.4             | 640       | 92605            | 11.1             | 770       | 3782             | 0.0              | 900       | 2580             | 0.0              |
| 385       | 2655             | 0.0              | 515       | 81872            | 33.9             | 645       | 83234            | 8.0              | 775       | 3506             | 0.0              | 905       | 1776             | 0.0              |
| 390       | 2357             | 0.0              | 520       | 88574            | 43.0             | 650       | 73263            | 5.4              | 780       | 3507             | 0.0              | 910       | 3995             | 0.0              |
| 395       | 2186             | 0.0              | 525       | 93289            | 50.1             | 655       | 64627            | 3.7              | 785       | 3267             | 0.0              | 915       | 4288             | 0.0              |
| 400       | 2015             | 0.0              | 530       | 98393            | 57.9             | 660       | 56614            | 2.4              | 790       | 2849             | 0.0              | 920       | 2446             | 0.0              |
| 405       | 2234             | 0.0              | 535       | 103269           | 64.0             | 665       | 49537            | 1.6              | 795       | 3037             | 0.0              | 925       | 3009             | 0.0              |
| 410       | 3412             | 0.0              | 540       | 107316           | 69.9             | 670       | 42866            | 0.9              | 800       | 2716             | 0.0              | 930       | 3026             | 0.0              |
| 415       | 6135             | 0.0              | 545       | 113101           | 75.3             | 675       | 36708            | 0.6              | 805       | 2648             | 0.0              | 935       | 4734             | 0.0              |
| 420       | 12146            | 0.0              | 550       | 120690           | 82.0             | 680       | 31814            | 0.4              | 810       | 3187             | 0.0              | 940       | 3719             | 0.0              |
| 425       | 23983            | 0.1              | 555       | 128583           | 87.8             | 685       | 27485            | 0.2              | 815       | 2931             | 0.0              | 945       | 1480             | 0.0              |
| 430       | 42142            | 0.3              | 560       | 137796           | 93.6             | 690       | 23698            | 0.1              | 820       | 2717             | 0.0              | 950       | 3450             | 0.0              |
| 435       | 68228            | 0.8              | 565       | 146577           | 97.5             | 695       | 20309            | 0.1              | 825       | 2236             | 0.0              | 955       | 5051             | 0.0              |
| 440       | 99323            | 1.6              | 570       | 154581           | 100.5            | 700       | 17890            | 0.1              | 830       | 2628             | 0.0              | 960       | 3176             | 0.0              |
| 445       | 115584           | 2.4              | 575       | 162633           | 101.2            | 705       | 15500            | 0.0              | 835       | 3140             | 0.0              | 965       | 5178             | 0.0              |
| 450       | 94997            | 2.5              | 580       | 168101           | 99.9             | 710       | 13699            | 0.0              | 840       | 3675             | 0.0              | 970       | 6385             | 0.0              |
| 455       | 61433            | 2.1              | 585       | 173145           | 96.2             | 715       | 12398            | 0.0              | 845       | 3283             | 0.0              | 975       | 3810             | 0.0              |
| 460       | 43373            | 1.8              | 590       | 174675           | 90.3             | 720       | 11147            | 0.0              | 850       | 3055             | 0.0              | 980       | 4322             | 0.0              |
| 465       | 32472            | 1.7              | 595       | 173724           | 82.3             | 725       | 9761             | 0.0              | 855       | 2932             | 0.0              | 985       | 4200             | 0.0              |
| 470       | 24257            | 1.5              | 600       | 171241           | 73.8             | 730       | 8651             | 0.0              | 860       | 3382             | 0.0              | 990       | 4661             | 0.0              |
| 475       | 21690            | 1.7              | 605       | 165134           | 64.0             | 735       | 7730             | 0.0              | 865       | 2605             | 0.0              | 995       | 6746             | 0.0              |
| 480       | 23173            | 2.2              | 610       | 156652           | 53.8             | 740       | 6847             | 0.0              | 870       | 3325             | 0.0              | 1000      | 4150             | 0.0              |
| 485       | 27564            | 3.3              | 615       | 147879           | 44.6             | 745       | 6124             | 0.0              | 875       | 3325             | 0.0              |           |                  |                  |

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### Scotopic Flux vs. Wavelength



Scotopic Lumens: 12126

S/P: 1.36

| $\lambda$<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               | 2672                          | 0.0                            | 490               | 34553                         | 53.2                           | 620               | 136720                        | 1.7                            | 750               | 5870                          | 0.0                            | 880               | 4216                          | 0.0                            |
| 365               | 2252                          | 0.0                            | 495               | 44336                         | 71.7                           | 625               | 126308                        | 1.1                            | 755               | 5421                          | 0.0                            | 885               | 4132                          | 0.0                            |
| 370               | 2217                          | 0.0                            | 500               | 54643                         | 91.4                           | 630               | 114625                        | 0.6                            | 760               | 5097                          | 0.0                            | 890               | 3992                          | 0.0                            |
| 375               | 2697                          | 0.0                            | 505               | 64676                         | 110.0                          | 635               | 103216                        | 0.4                            | 765               | 4626                          | 0.0                            | 895               | 3214                          | 0.0                            |
| 380               | 3039                          | 0.0                            | 510               | 73825                         | 125.1                          | 640               | 92605                         | 0.2                            | 770               | 3782                          | 0.0                            | 900               | 2580                          | 0.0                            |
| 385               | 2655                          | 0.0                            | 515               | 81872                         | 135.7                          | 645               | 83234                         | 0.1                            | 775               | 3506                          | 0.0                            | 905               | 1776                          | 0.0                            |
| 390               | 2357                          | 0.0                            | 520               | 88574                         | 140.8                          | 650               | 73263                         | 0.1                            | 780               | 3507                          | 0.0                            | 910               | 3995                          | 0.0                            |
| 395               | 2186                          | 0.0                            | 525               | 93289                         | 139.6                          | 655               | 64627                         | 0.1                            | 785               | 3267                          | 0.0                            | 915               | 4288                          | 0.0                            |
| 400               | 2015                          | 0.0                            | 530               | 98393                         | 135.7                          | 660               | 56614                         | 0.0                            | 790               | 2849                          | 0.0                            | 920               | 2446                          | 0.0                            |
| 405               | 2234                          | 0.1                            | 535               | 103269                        | 128.7                          | 665               | 49537                         | 0.0                            | 795               | 3037                          | 0.0                            | 925               | 3009                          | 0.0                            |
| 410               | 3412                          | 0.2                            | 540               | 107316                        | 118.6                          | 670               | 42866                         | 0.0                            | 800               | 2716                          | 0.0                            | 930               | 3026                          | 0.0                            |
| 415               | 6135                          | 0.6                            | 545               | 113101                        | 108.4                          | 675               | 36708                         | 0.0                            | 805               | 2648                          | 0.0                            | 935               | 4734                          | 0.0                            |
| 420               | 12146                         | 2.0                            | 550               | 120690                        | 98.7                           | 680               | 31814                         | 0.0                            | 810               | 3187                          | 0.0                            | 940               | 3719                          | 0.0                            |
| 425               | 23983                         | 5.9                            | 555               | 128583                        | 87.9                           | 685               | 27485                         | 0.0                            | 815               | 2931                          | 0.0                            | 945               | 1480                          | 0.0                            |
| 430               | 42142                         | 14.3                           | 560               | 137796                        | 77.0                           | 690               | 23698                         | 0.0                            | 820               | 2717                          | 0.0                            | 950               | 3450                          | 0.0                            |
| 435               | 68228                         | 30.5                           | 565               | 146577                        | 65.8                           | 695               | 20309                         | 0.0                            | 825               | 2236                          | 0.0                            | 955               | 5051                          | 0.0                            |
| 440               | 99323                         | 55.5                           | 570               | 154581                        | 54.6                           | 700               | 17890                         | 0.0                            | 830               | 2628                          | 0.0                            | 960               | 3176                          | 0.0                            |
| 445               | 115584                        | 77.4                           | 575               | 162633                        | 44.3                           | 705               | 15500                         | 0.0                            | 835               | 3140                          | 0.0                            | 965               | 5178                          | 0.0                            |
| 450               | 94997                         | 73.6                           | 580               | 168101                        | 34.6                           | 710               | 13699                         | 0.0                            | 840               | 3675                          | 0.0                            | 970               | 6385                          | 0.0                            |
| 455               | 61433                         | 53.7                           | 585               | 173145                        | 26.5                           | 715               | 12398                         | 0.0                            | 845               | 3283                          | 0.0                            | 975               | 3810                          | 0.0                            |
| 460               | 43373                         | 41.9                           | 590               | 174675                        | 19.5                           | 720               | 11147                         | 0.0                            | 850               | 3055                          | 0.0                            | 980               | 4322                          | 0.0                            |
| 465               | 32472                         | 34.3                           | 595               | 173724                        | 13.9                           | 725               | 9761                          | 0.0                            | 855               | 2932                          | 0.0                            | 985               | 4200                          | 0.0                            |
| 470               | 24257                         | 27.9                           | 600               | 171241                        | 9.7                            | 730               | 8651                          | 0.0                            | 860               | 3382                          | 0.0                            | 990               | 4661                          | 0.0                            |
| 475               | 21690                         | 27.1                           | 605               | 165134                        | 6.5                            | 735               | 7730                          | 0.0                            | 865               | 2605                          | 0.0                            | 995               | 6746                          | 0.0                            |
| 480               | 23173                         | 31.3                           | 610               | 156652                        | 4.2                            | 740               | 6847                          | 0.0                            | 870               | 3325                          | 0.0                            | 1000              | 4150                          | 0.0                            |
| 485               | 27564                         | 40.0                           | 615               | 147879                        | 2.7                            | 745               | 6124                          | 0.0                            | 875               | 3325                          | 0.0                            |                   |                               |                                |

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### Melanopic Flux vs. Wavelength



**Melanopic Lumens: 4490.7**

**M/P: 0.5**

| 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       | 2672             | 0.0              | 490       | 34553            | 28.8             | 620       | 136720           | 0.1              | 750       | 5870             | 0.0              | 880       | 4216             | 0.0              |
| 365       | 2252             | 0.0              | 495       | 44336            | 36.6             | 625       | 126308           | 0.1              | 755       | 5421             | 0.0              | 885       | 4132             | 0.0              |
| 370       | 2217             | 0.0              | 500       | 54643            | 43.9             | 630       | 114625           | 0.0              | 760       | 5097             | 0.0              | 890       | 3992             | 0.0              |
| 375       | 2697             | 0.0              | 505       | 64676            | 49.6             | 635       | 103216           | 0.0              | 765       | 4626             | 0.0              | 895       | 3214             | 0.0              |
| 380       | 3039             | 0.0              | 510       | 73825            | 53.0             | 640       | 92605            | 0.0              | 770       | 3782             | 0.0              | 900       | 2580             | 0.0              |
| 385       | 2655             | 0.0              | 515       | 81872            | 53.5             | 645       | 83234            | 0.0              | 775       | 3506             | 0.0              | 905       | 1776             | 0.0              |
| 390       | 2357             | 0.0              | 520       | 88574            | 51.6             | 650       | 73263            | 0.0              | 780       | 3507             | 0.0              | 910       | 3995             | 0.0              |
| 395       | 2186             | 0.0              | 525       | 93289            | 47.3             | 655       | 64627            | 0.0              | 785       | 3267             | 0.0              | 915       | 4288             | 0.0              |
| 400       | 2015             | 0.0              | 530       | 98393            | 42.5             | 660       | 56614            | 0.0              | 790       | 2849             | 0.0              | 920       | 2446             | 0.0              |
| 405       | 2234             | 0.0              | 535       | 103269           | 37.2             | 665       | 49537            | 0.0              | 795       | 3037             | 0.0              | 925       | 3009             | 0.0              |
| 410       | 3412             | 0.1              | 540       | 107316           | 31.4             | 670       | 42866            | 0.0              | 800       | 2716             | 0.0              | 930       | 3026             | 0.0              |
| 415       | 6135             | 0.4              | 545       | 113101           | 26.3             | 675       | 36708            | 0.0              | 805       | 2648             | 0.0              | 935       | 4734             | 0.0              |
| 420       | 12146            | 1.4              | 550       | 120690           | 21.7             | 680       | 31814            | 0.0              | 810       | 3187             | 0.0              | 940       | 3719             | 0.0              |
| 425       | 23983            | 3.7              | 555       | 128583           | 17.3             | 685       | 27485            | 0.0              | 815       | 2931             | 0.0              | 945       | 1480             | 0.0              |
| 430       | 42142            | 8.9              | 560       | 137796           | 13.6             | 690       | 23698            | 0.0              | 820       | 2717             | 0.0              | 950       | 3450             | 0.0              |
| 435       | 68228            | 18.2             | 565       | 146577           | 10.3             | 695       | 20309            | 0.0              | 825       | 2236             | 0.0              | 955       | 5051             | 0.0              |
| 440       | 99323            | 33.2             | 570       | 154581           | 7.6              | 700       | 17890            | 0.0              | 830       | 2628             | 0.0              | 960       | 3176             | 0.0              |
| 445       | 115584           | 45.6             | 575       | 162633           | 5.4              | 705       | 15500            | 0.0              | 835       | 3140             | 0.0              | 965       | 5178             | 0.0              |
| 450       | 94997            | 43.8             | 580       | 168101           | 3.8              | 710       | 13699            | 0.0              | 840       | 3675             | 0.0              | 970       | 6385             | 0.0              |
| 455       | 61433            | 32.2             | 585       | 173145           | 2.6              | 715       | 12398            | 0.0              | 845       | 3283             | 0.0              | 975       | 3810             | 0.0              |
| 460       | 43373            | 25.6             | 590       | 174675           | 1.7              | 720       | 11147            | 0.0              | 850       | 3055             | 0.0              | 980       | 4322             | 0.0              |
| 465       | 32472            | 21.2             | 595       | 173724           | 1.1              | 725       | 9761             | 0.0              | 855       | 2932             | 0.0              | 985       | 4200             | 0.0              |
| 470       | 24257            | 17.4             | 600       | 171241           | 0.7              | 730       | 8651             | 0.0              | 860       | 3382             | 0.0              | 990       | 4661             | 0.0              |
| 475       | 21690            | 16.6             | 605       | 165134           | 0.5              | 735       | 7730             | 0.0              | 865       | 2605             | 0.0              | 995       | 6746             | 0.0              |
| 480       | 23173            | 18.6             | 610       | 156652           | 0.3              | 740       | 6847             | 0.0              | 870       | 3325             | 0.0              | 1000      | 4150             | 0.0              |
| 485       | 27564            | 22.7             | 615       | 147879           | 0.2              | 745       | 6124             | 0.0              | 875       | 3325             | 0.0              |           |                  |                  |

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TM-30-18

### Summary

$R_f = 76.9$   
 $R_g = 94.4$   
 CIE  $R_a = 73.1$   
 $R_g = -34.6$

### Spectral Power Distribution Comparison



### Color Vector Graphics



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 68 | CES51 = 90 | CES76 = 63 |
| CES02 = 62 | CES27 = 88 | CES52 = 89 | CES77 = 80 |
| CES03 = 31 | CES28 = 87 | CES53 = 80 | CES78 = 65 |
| CES04 = 70 | CES29 = 67 | CES54 = 84 | CES79 = 87 |
| CES05 = 48 | CES30 = 74 | CES55 = 84 | CES80 = 86 |
| CES06 = 51 | CES31 = 71 | CES56 = 75 | CES81 = 75 |
| CES07 = 40 | CES32 = 67 | CES57 = 74 | CES82 = 94 |
| CES08 = 39 | CES33 = 74 | CES58 = 76 | CES83 = 91 |
| CES09 = 29 | CES34 = 78 | CES59 = 87 | CES84 = 89 |
| CES10 = 75 | CES35 = 89 | CES60 = 93 | CES85 = 80 |
| CES11 = 58 | CES36 = 98 | CES61 = 86 | CES86 = 66 |
| CES12 = 64 | CES37 = 86 | CES62 = 89 | CES87 = 79 |
| CES13 = 43 | CES38 = 82 | CES63 = 77 | CES88 = 79 |
| CES14 = 74 | CES39 = 95 | CES64 = 74 | CES89 = 70 |
| CES15 = 71 | CES40 = 91 | CES65 = 68 | CES90 = 77 |
| CES16 = 47 | CES41 = 89 | CES66 = 71 | CES91 = 88 |
| CES17 = 50 | CES42 = 88 | CES67 = 69 | CES92 = 60 |
| CES18 = 56 | CES43 = 82 | CES68 = 74 | CES93 = 77 |
| CES19 = 72 | CES44 = 99 | CES69 = 82 | CES94 = 52 |
| CES20 = 65 | CES45 = 87 | CES70 = 67 | CES95 = 69 |
| CES21 = 86 | CES46 = 82 | CES71 = 66 | CES96 = 78 |
| CES22 = 79 | CES47 = 82 | CES72 = 88 | CES97 = 85 |
| CES23 = 92 | CES48 = 72 | CES73 = 59 | CES98 = 76 |
| CES24 = 91 | CES49 = 82 | CES74 = 97 | CES99 = 63 |
| CES25 = 72 | CES50 = 88 | CES75 = 66 |            |



### Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)