

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: P318714

Luminaire Tested: **GLEON-SA0A-740-U-T4FT**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P318714  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-16)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA0A-740-U-T4FT  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(10) 70 CRI, 4000K, 615mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE IV  
FORWARD THROW OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 46404 lumens  
Efficiency: N/A  
Efficacy: 143.7 lumens/watt  
Luminous Opening: Rectangular (W 2.5' x L: 1' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B4 - U0 - G5

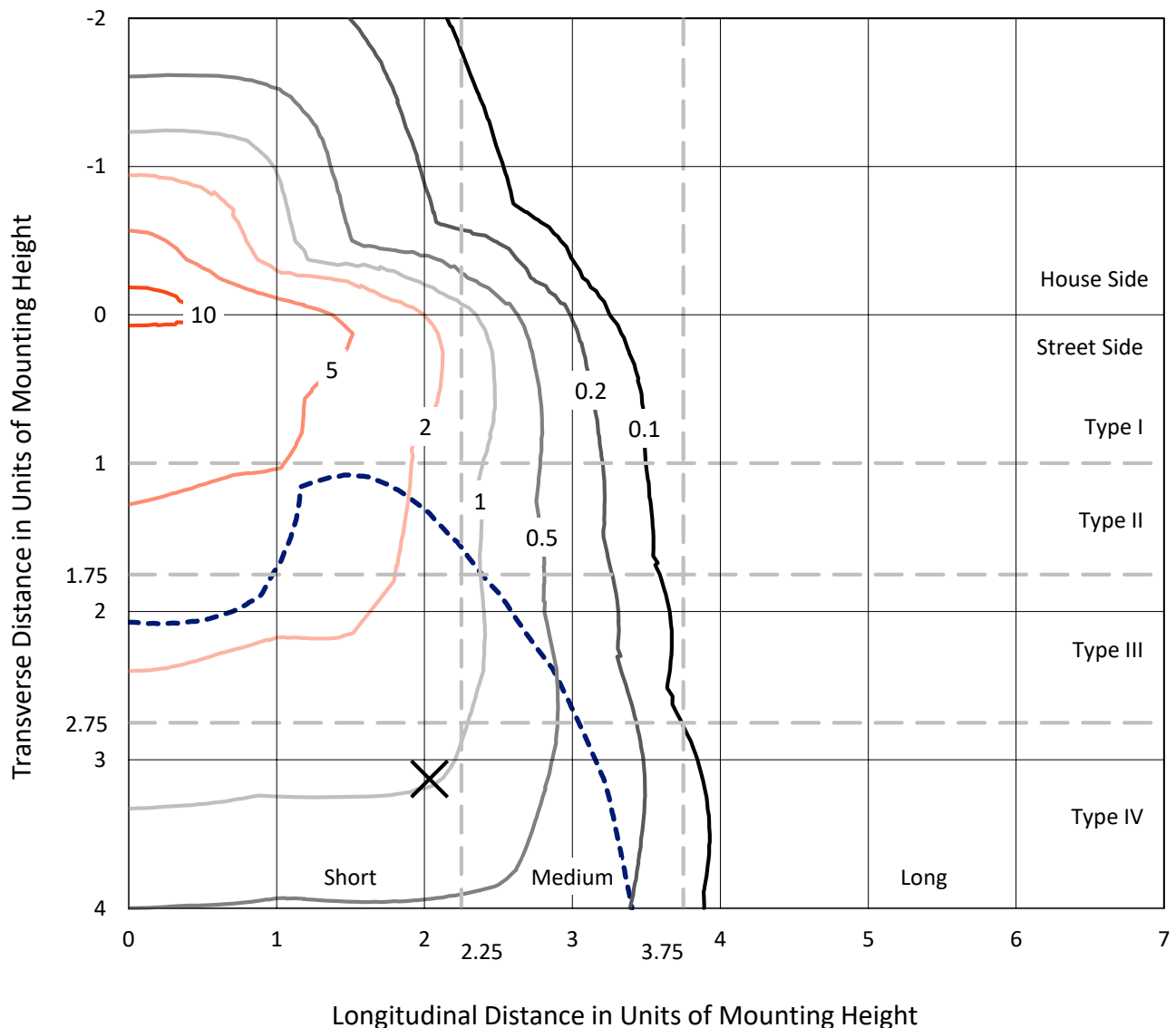
Input Watts (W): 323  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



REPORT NUMBER: P318714  
 CATALOG NUMBER: GLEON-SA0A-740-U-T4FT

## Iso-Footcandle Lines of Horizontal Illumination

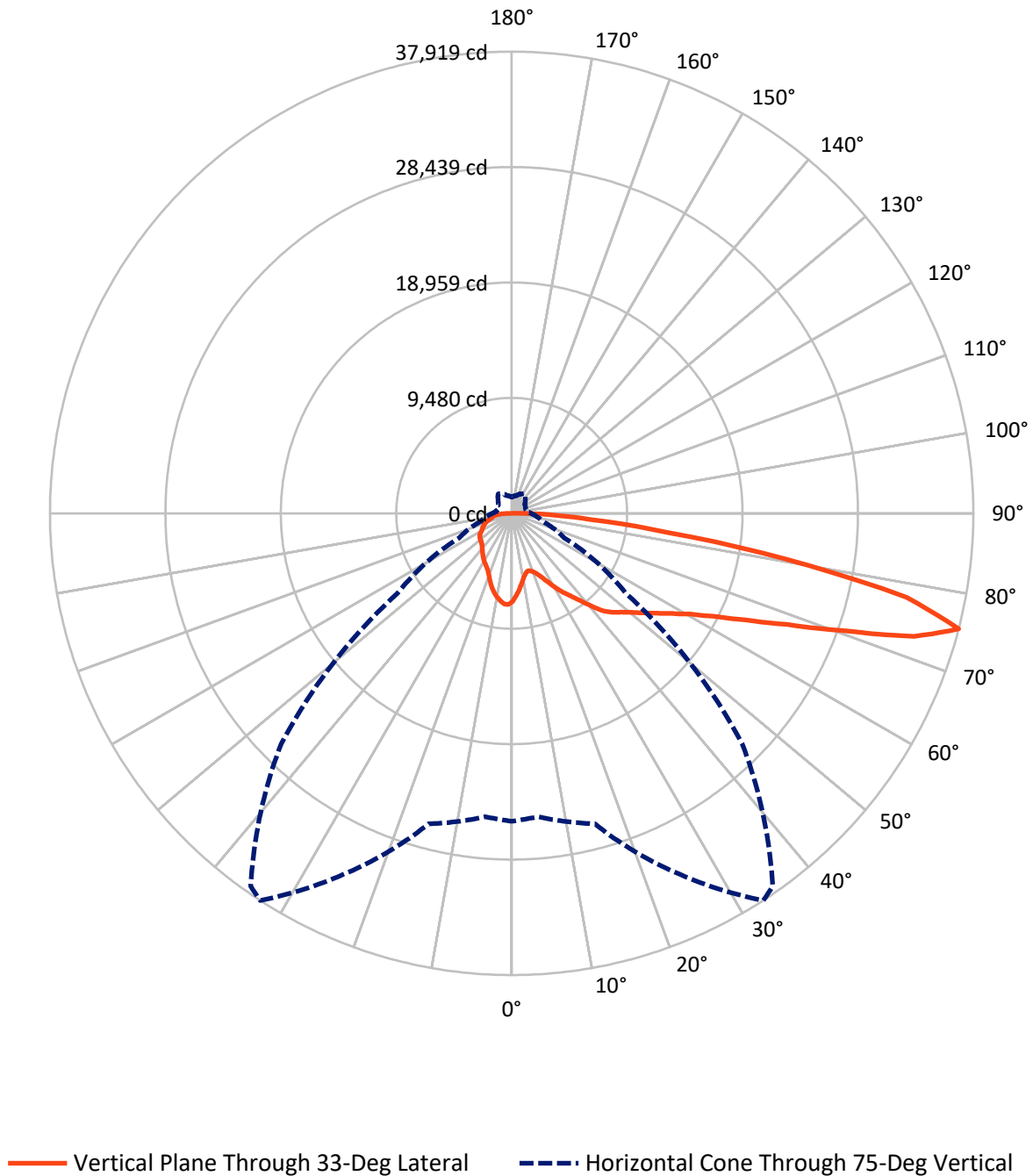
× Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 11.6 fc  
 Type IV - Short - N/A

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CATALOG NUMBER: GLEON-SA0A-740-U-T4FT

## Luminous Intensity Polar Plot



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CATALOG NUMBER: GLEON-SA0A-740-U-T4FT

**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 9964.1   | 0.0    | 9964.1  |
|                    | % Fixture | 21.5     | 0.0    | 21.5    |
| <b>Street Side</b> | Lumens    | 36439.8  | 0.0    | 36439.8 |
|                    | % Fixture | 78.5     | 0.0    | 78.5    |
| <b>Total</b>       | Lumens    | 46404.0  | 0.0    | 46404.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 656.0   | 1.4       |
| 10°-20°   | 1776.6  | 3.8       |
| 20°-30°   | 2901.5  | 6.3       |
| 30°-40°   | 4321.0  | 9.3       |
| 40°-50°   | 6197.5  | 13.4      |
| 50°-60°   | 8508.2  | 18.3      |
| 60°-70°   | 10651.8 | 23.0      |
| 70°-80°   | 9636.2  | 20.8      |
| 80°-90°   | 1755.3  | 3.8       |
| 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°    | 46404.0 | 100.0     |
| 0°-180°   | 46404.0 | 100.0     |

**Coefficient of Utilization**



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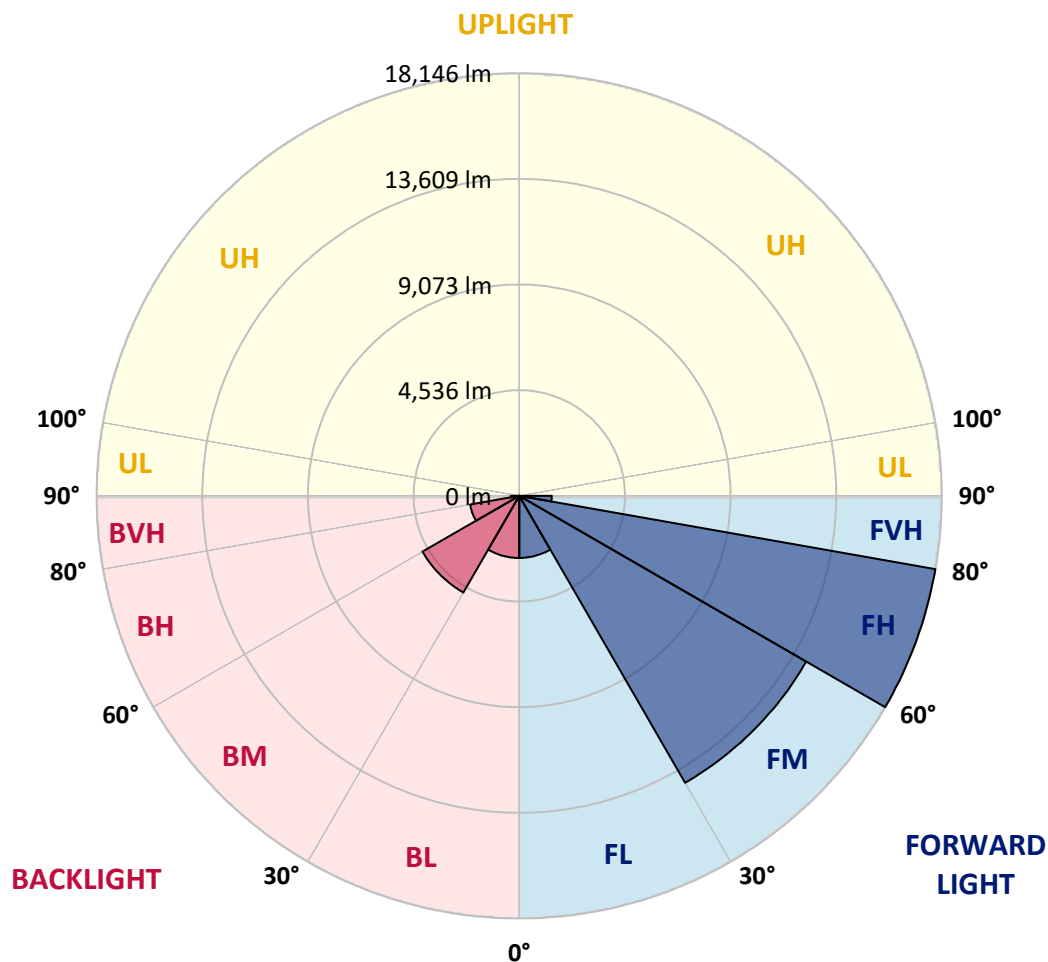
CATALOG NUMBER: GLEON-SA0A-740-U-T4FT

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|---------|-----------|-------------------------|------|---------|
|      |             |         |           | B                       | U    | G       |
| FL   | (0°-30°)    | 2665.2  | 5.7       |                         |      |         |
| FM   | (30°-60°)   | 14231.1 | 30.7      |                         |      |         |
| FH   | (60°-80°)   | 18145.6 | 39.1      |                         |      | G5      |
| FVH  | (80°-90°)   | 1397.9  | 3.0       |                         |      | G5      |
| BL   | (0°-30°)    | 2668.9  | 5.8       | B4/5000                 |      |         |
| BM   | (30°-60°)   | 4795.5  | 10.3      | B3/5000                 |      |         |
| BH   | (60°-80°)   | 2142.5  | 4.6       | B3/2500                 |      | G3/2500 |
| BVH  | (80°-90°)   | 357.4   | 0.8       |                         |      | G3/500  |
| UL   | (90°-100°)  | 0.0     | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0     | 0.0       |                         | U0/0 |         |

**BUG Rating: B4-U0-G5**

Type IV Short





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CATALOG NUMBER: GLEON-SA0A-740-U-T4FT

**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 33°     | 35°     | 45°     | 55°     | 65°     | 75°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 7253.2  | 7253.2  | 7253.2  | 7253.2  | 7253.2  | 7253.2  | 7253.2  | 7253.2  | 7253.2  | 7253.2  | 7253.2  |
| 2.5°  | 6735.5  | 6709.8  | 6757.9  | 6764.3  | 6806.0  | 6822.0  | 6879.7  | 6969.5  | 7043.2  | 7128.2  | 7205.1  |
| 5°    | 6124.8  | 6107.1  | 6174.4  | 6222.5  | 6313.9  | 6352.4  | 6488.6  | 6679.4  | 6849.3  | 7041.6  | 7216.3  |
| 7.5°  | 5544.5  | 5534.9  | 5610.2  | 5719.2  | 5825.0  | 5877.9  | 6113.5  | 6390.8  | 6674.6  | 6985.5  | 7253.2  |
| 10°   | 5055.6  | 5052.4  | 5124.5  | 5231.9  | 5387.4  | 5446.7  | 5751.3  | 6116.7  | 6514.3  | 6942.2  | 7315.7  |
| 12.5° | 4781.5  | 4792.7  | 4826.4  | 4916.2  | 5060.4  | 5119.7  | 5457.9  | 5887.5  | 6379.6  | 6927.8  | 7407.1  |
| 15°   | 4848.8  | 4866.5  | 4808.8  | 4805.5  | 4908.1  | 4954.6  | 5272.0  | 5724.0  | 6283.4  | 6951.9  | 7540.1  |
| 17.5° | 5135.8  | 5139.0  | 4986.7  | 4890.5  | 4953.0  | 4977.1  | 5214.3  | 5631.1  | 6227.3  | 7006.4  | 7706.8  |
| 20°   | 5539.7  | 5531.7  | 5262.4  | 5102.1  | 5135.8  | 5142.2  | 5296.0  | 5632.7  | 6222.5  | 7100.9  | 7923.2  |
| 22.5° | 6075.1  | 6015.8  | 5653.5  | 5435.5  | 5427.5  | 5417.9  | 5506.0  | 5751.3  | 6293.1  | 7254.8  | 8181.3  |
| 25°   | 6773.9  | 6717.8  | 6219.3  | 5921.2  | 5857.1  | 5833.0  | 5845.8  | 6004.5  | 6432.5  | 7419.9  | 8469.8  |
| 27.5° | 7551.3  | 7453.6  | 6972.7  | 6551.1  | 6418.1  | 6384.4  | 6307.5  | 6362.0  | 6584.8  | 7578.6  | 8812.8  |
| 30°   | 8202.1  | 8149.2  | 7729.3  | 7229.2  | 7072.1  | 7024.0  | 6822.0  | 6762.7  | 6804.4  | 7795.0  | 9245.6  |
| 32.5° | 8566.0  | 8530.7  | 8275.9  | 7871.9  | 7726.1  | 7658.7  | 7373.4  | 7254.8  | 7157.0  | 8136.4  | 9832.3  |
| 35°   | 9006.8  | 8984.4  | 8830.5  | 8537.1  | 8320.7  | 8250.2  | 8029.0  | 7905.6  | 7653.9  | 8606.1  | 10590.5 |
| 37.5° | 9567.8  | 9543.8  | 9547.0  | 9309.7  | 9051.7  | 8986.0  | 8840.1  | 8710.3  | 8298.3  | 9223.2  | 11414.4 |
| 40°   | 10202.6 | 10156.1 | 10138.5 | 10127.2 | 9963.7  | 9926.9  | 9849.9  | 9673.6  | 9106.2  | 9960.5  | 12227.1 |
| 42.5° | 11157.9 | 10992.8 | 10640.2 | 10773.2 | 10935.1 | 10915.9 | 10978.4 | 10725.1 | 10003.8 | 10832.5 | 13020.5 |
| 45°   | 12079.6 | 11808.7 | 11199.6 | 11228.4 | 11582.7 | 11690.1 | 12158.1 | 11978.6 | 10976.8 | 11787.9 | 13841.2 |
| 47.5° | 12499.6 | 12294.4 | 11776.6 | 11778.2 | 12129.3 | 12352.1 | 13378.0 | 13249.7 | 11999.4 | 12873.0 | 14843.0 |
| 50°   | 12969.2 | 12764.0 | 12299.2 | 12473.9 | 12780.1 | 13017.3 | 14556.1 | 14490.4 | 12972.4 | 14060.8 | 16043.6 |
| 52.5° | 13482.1 | 13134.3 | 12839.4 | 13151.9 | 13581.5 | 13857.2 | 15735.8 | 15556.3 | 13865.2 | 15256.6 | 17423.7 |
| 55°   | 13488.6 | 13394.0 | 13618.4 | 13847.6 | 14490.4 | 14828.6 | 16971.7 | 16497.2 | 14593.0 | 16431.5 | 18547.4 |
| 57.5° | 14256.4 | 14102.5 | 14578.5 | 14684.3 | 15524.3 | 15905.8 | 18201.1 | 17316.3 | 15333.5 | 17332.4 | 19153.3 |
| 60°   | 15272.6 | 15141.2 | 15530.7 | 15809.6 | 16803.4 | 17313.1 | 19513.9 | 18157.9 | 15915.4 | 18012.0 | 19124.4 |
| 62.5° | 17027.8 | 16878.7 | 16873.9 | 17265.0 | 18603.5 | 19196.5 | 20987.0 | 18983.4 | 16146.2 | 18146.6 | 18308.5 |
| 65°   | 19597.3 | 19360.0 | 18912.8 | 19098.8 | 21089.6 | 21681.1 | 22633.2 | 19581.3 | 15841.6 | 17425.3 | 16207.1 |
| 67.5° | 22097.8 | 22089.8 | 21540.0 | 21921.5 | 24372.4 | 24846.8 | 24508.6 | 19640.6 | 14891.1 | 14913.6 | 12478.7 |
| 70°   | 24590.4 | 24622.4 | 24529.5 | 25856.7 | 28807.6 | 29301.3 | 26505.9 | 18843.9 | 12754.4 | 10770.0 | 7476.0  |
| 72.5° | 26565.2 | 26557.2 | 27025.2 | 30447.4 | 34563.7 | 34453.1 | 28188.9 | 16429.9 | 9157.5  | 5813.8  | 3572.9  |
| 75°   | 25286.0 | 25007.1 | 26401.7 | 32720.4 | 37918.6 | 37378.5 | 26757.5 | 11460.9 | 4752.7  | 2646.4  | 1923.5  |
| 77.5° | 16492.4 | 16756.9 | 18803.8 | 27030.0 | 33167.6 | 32510.4 | 19630.9 | 5347.3  | 2239.3  | 1736.0  | 1394.5  |
| 80°   | 5972.5  | 6251.4  | 8804.8  | 15311.1 | 22851.2 | 22743.8 | 9667.2  | 2197.6  | 1514.8  | 1311.2  | 1016.3  |
| 82.5° | 2054.9  | 2157.5  | 3473.5  | 6799.6  | 12901.9 | 13382.8 | 3637.0  | 1248.7  | 1101.2  | 929.7   | 695.7   |
| 85°   | 806.3   | 923.3   | 1588.5  | 3271.6  | 6507.8  | 6555.9  | 1473.1  | 747.0   | 766.2   | 609.1   | 381.5   |
| 87.5° | 306.2   | 371.9   | 759.8   | 1519.6  | 2971.8  | 2729.8  | 527.4   | 355.8   | 436.0   | 362.3   | 181.1   |
| 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: P318714

CATALOG NUMBER: GLEON-SA0A-740-U-T4FT

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°     | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|---------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 7253.2  | 7253.2  | 7253.2 | 7253.2 | 7253.2 | 7253.2 | 7253.2 | 7253.2 | 7253.2 | 7253.2 | 7253.2 |
| 2.5°  | 7264.4  | 7298.1  | 7368.6 | 7416.7 | 7468.0 | 7482.4 | 7488.8 | 7501.7 | 7514.5 | 7509.7 | 7511.3 |
| 5°    | 7309.3  | 7375.0  | 7488.8 | 7536.9 | 7559.4 | 7533.7 | 7484.0 | 7444.0 | 7415.1 | 7399.1 | 7394.3 |
| 7.5°  | 7383.0  | 7476.0  | 7597.8 | 7589.8 | 7538.5 | 7424.7 | 7296.5 | 7200.3 | 7120.2 | 7091.3 | 7075.3 |
| 10°   | 7480.8  | 7589.8  | 7674.8 | 7583.4 | 7434.3 | 7237.2 | 7044.8 | 6895.8 | 6775.5 | 6729.1 | 6721.0 |
| 12.5° | 7605.8  | 7716.4  | 7732.5 | 7538.5 | 7291.7 | 7022.4 | 6761.1 | 6564.0 | 6384.4 | 6326.7 | 6313.9 |
| 15°   | 7767.7  | 7871.9  | 7772.6 | 7460.0 | 7115.4 | 6753.1 | 6414.9 | 6147.2 | 5958.0 | 5887.5 | 5861.9 |
| 17.5° | 7937.7  | 8037.0  | 7780.6 | 7330.1 | 6884.5 | 6434.1 | 6009.3 | 5735.2 | 5518.8 | 5437.1 | 5427.5 |
| 20°   | 8141.2  | 8186.1  | 7746.9 | 7144.2 | 6567.2 | 6020.6 | 5573.3 | 5315.3 | 5199.9 | 5142.2 | 5135.8 |
| 22.5° | 8392.9  | 8344.8  | 7670.0 | 6892.5 | 6164.8 | 5542.9 | 5179.0 | 5058.8 | 5030.0 | 5017.1 | 5021.9 |
| 25°   | 8659.0  | 8511.5  | 7556.2 | 6564.0 | 5656.7 | 5065.2 | 4890.5 | 4924.2 | 4962.6 | 4957.8 | 4957.8 |
| 27.5° | 8952.3  | 8681.4  | 7381.4 | 6128.0 | 5094.1 | 4674.1 | 4694.9 | 4818.4 | 4876.1 | 4874.5 | 4872.9 |
| 30°   | 9329.0  | 8873.8  | 7158.6 | 5603.8 | 4568.3 | 4398.4 | 4525.0 | 4675.7 | 4754.3 | 4751.0 | 4752.7 |
| 32.5° | 9792.2  | 9085.3  | 6855.7 | 5018.7 | 4188.4 | 4194.8 | 4340.7 | 4489.8 | 4581.1 | 4573.1 | 4574.7 |
| 35°   | 10334.0 | 9322.6  | 6445.3 | 4441.7 | 3936.8 | 4032.9 | 4148.4 | 4252.5 | 4339.1 | 4327.9 | 4316.7 |
| 37.5° | 10923.9 | 9555.0  | 5900.3 | 3925.5 | 3731.6 | 3882.3 | 3978.4 | 3996.1 | 4036.1 | 4007.3 | 3986.5 |
| 40°   | 11484.9 | 9732.9  | 5198.3 | 3502.4 | 3524.8 | 3754.0 | 3816.5 | 3746.0 | 3673.9 | 3664.3 | 3635.4 |
| 42.5° | 11973.8 | 9792.2  | 4488.2 | 3164.2 | 3306.8 | 3619.4 | 3657.9 | 3510.4 | 3380.6 | 3319.6 | 3294.0 |
| 45°   | 12489.9 | 9813.1  | 3826.2 | 2880.4 | 3096.8 | 3499.2 | 3540.8 | 3343.7 | 3161.0 | 3029.5 | 2986.2 |
| 47.5° | 13164.8 | 9963.7  | 3311.6 | 2670.5 | 2936.5 | 3419.0 | 3478.3 | 3210.6 | 2973.4 | 2785.9 | 2745.8 |
| 50°   | 14048.0 | 10261.9 | 2893.3 | 2510.2 | 2832.4 | 3366.1 | 3433.5 | 3080.8 | 2819.5 | 2593.5 | 2553.4 |
| 52.5° | 15029.0 | 10536.0 | 2555.1 | 2380.3 | 2731.4 | 3273.2 | 3375.7 | 2987.8 | 2675.3 | 2415.6 | 2372.3 |
| 55°   | 15715.0 | 10326.0 | 2282.6 | 2245.7 | 2599.9 | 3140.1 | 3295.6 | 2909.3 | 2468.5 | 2242.5 | 2204.0 |
| 57.5° | 15846.5 | 9607.9  | 2075.8 | 2106.2 | 2441.2 | 2973.4 | 3172.2 | 2734.6 | 2356.3 | 2167.1 | 2127.1 |
| 60°   | 15487.4 | 8607.7  | 1921.9 | 1978.0 | 2271.3 | 2763.4 | 2941.4 | 2611.2 | 2248.9 | 2087.0 | 2053.3 |
| 62.5° | 14585.0 | 7583.4  | 1808.1 | 1862.6 | 2112.6 | 2550.2 | 2797.1 | 2481.3 | 2139.9 | 1995.6 | 1962.0 |
| 65°   | 12762.4 | 6366.8  | 1699.1 | 1760.0 | 1965.2 | 2365.9 | 2667.3 | 2361.1 | 2032.5 | 1921.9 | 1889.8 |
| 67.5° | 9633.5  | 4768.7  | 1596.5 | 1651.0 | 1833.7 | 2205.6 | 2526.2 | 2242.5 | 1928.3 | 1857.8 | 1819.3 |
| 70°   | 5672.7  | 2986.2  | 1479.5 | 1537.2 | 1695.9 | 2038.9 | 2375.5 | 2112.6 | 1798.5 | 1766.4 | 1716.7 |
| 72.5° | 2640.0  | 1796.9  | 1346.5 | 1402.6 | 1522.8 | 1816.1 | 2181.6 | 1942.7 | 1644.6 | 1574.1 | 1506.7 |
| 75°   | 1575.7  | 1314.4  | 1189.4 | 1239.1 | 1324.0 | 1578.9 | 1937.9 | 1769.6 | 1498.7 | 1405.8 | 1335.2 |
| 77.5° | 1178.1  | 1005.0  | 1016.3 | 1069.1 | 1138.1 | 1381.7 | 1716.7 | 1633.4 | 1386.5 | 1314.4 | 1266.3 |
| 80°   | 847.9   | 763.0   | 828.7  | 886.4  | 958.5  | 1256.7 | 1644.6 | 1509.9 | 1253.5 | 1157.3 | 1112.4 |
| 82.5° | 565.8   | 548.2   | 623.5  | 682.8  | 753.4  | 1099.6 | 1545.2 | 1322.4 | 1070.7 | 948.9  | 849.5  |
| 85°   | 312.6   | 330.2   | 420.0  | 445.6  | 506.5  | 774.2  | 1266.3 | 1062.7 | 806.3  | 649.2  | 620.3  |
| 87.5° | 129.8   | 152.3   | 226.0  | 218.0  | 269.3  | 461.6  | 833.5  | 641.2  | 512.9  | 383.1  | 298.1  |
| 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            |

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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 4000K 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       | 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

| 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            | 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



**Measure Comparisons**


(END OF REPORT)