

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: P317784

Luminaire Tested: **GLEON-SA0D-740-U-T3R**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P317784  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-10)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA0D-740-U-T3R  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(10) 70 CRI, 4000K, 1200mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III  
ROADWAY OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 78523 lumens  
Efficiency: N/A  
Efficacy: 122.7 lumens/watt  
Luminous Opening: Rectangular (W 2.5' x L: 1' x H: 0')  
IES Classification: Type IV - Medium  
BUG Rating: B4 - U0 - G5

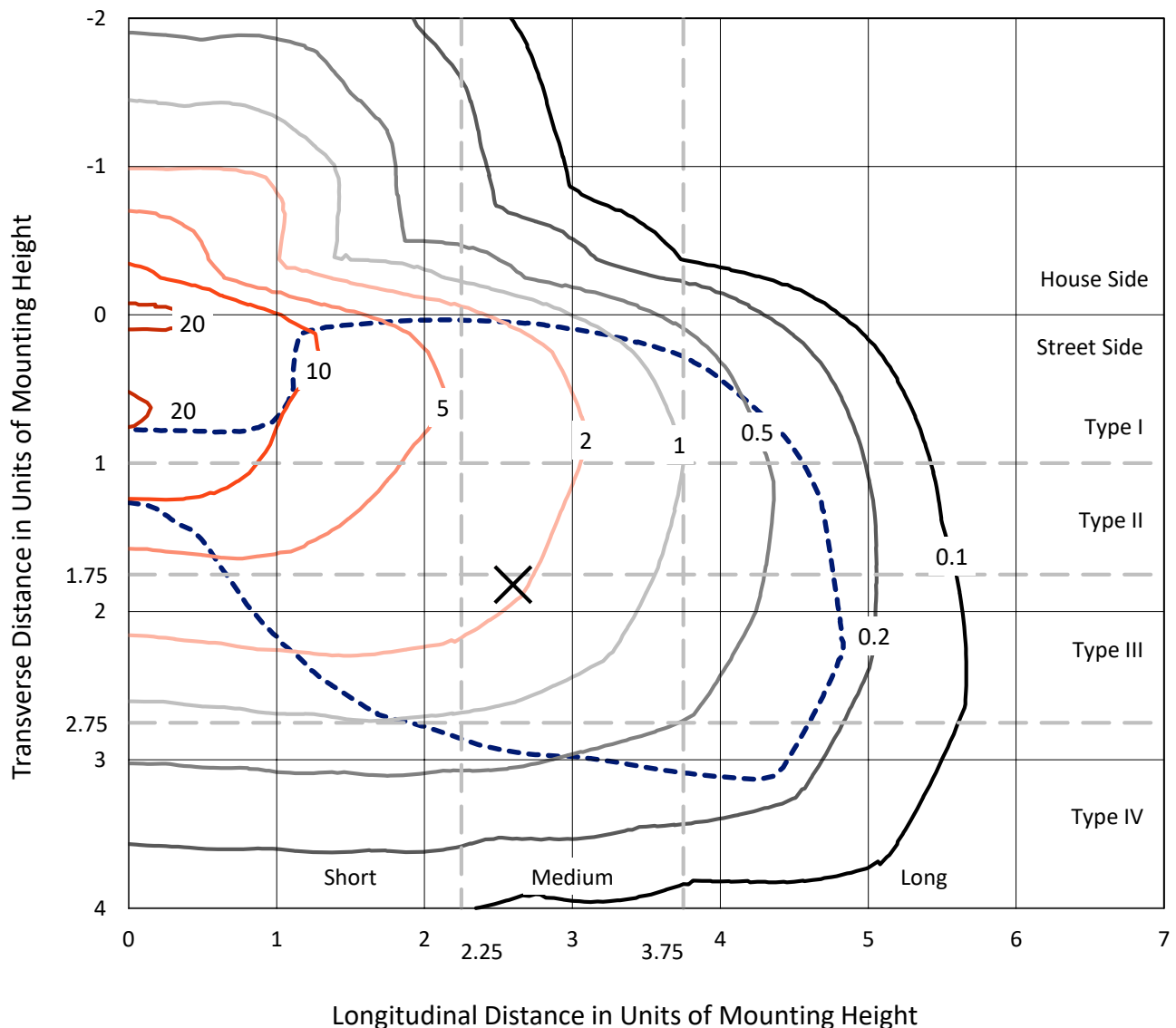
Input Watts (W): 640  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



REPORT NUMBER: P317784  
 CATALOG NUMBER: GLEON-SA0D-740-U-T3R

## Iso-Footcandle Lines of Horizontal Illumination

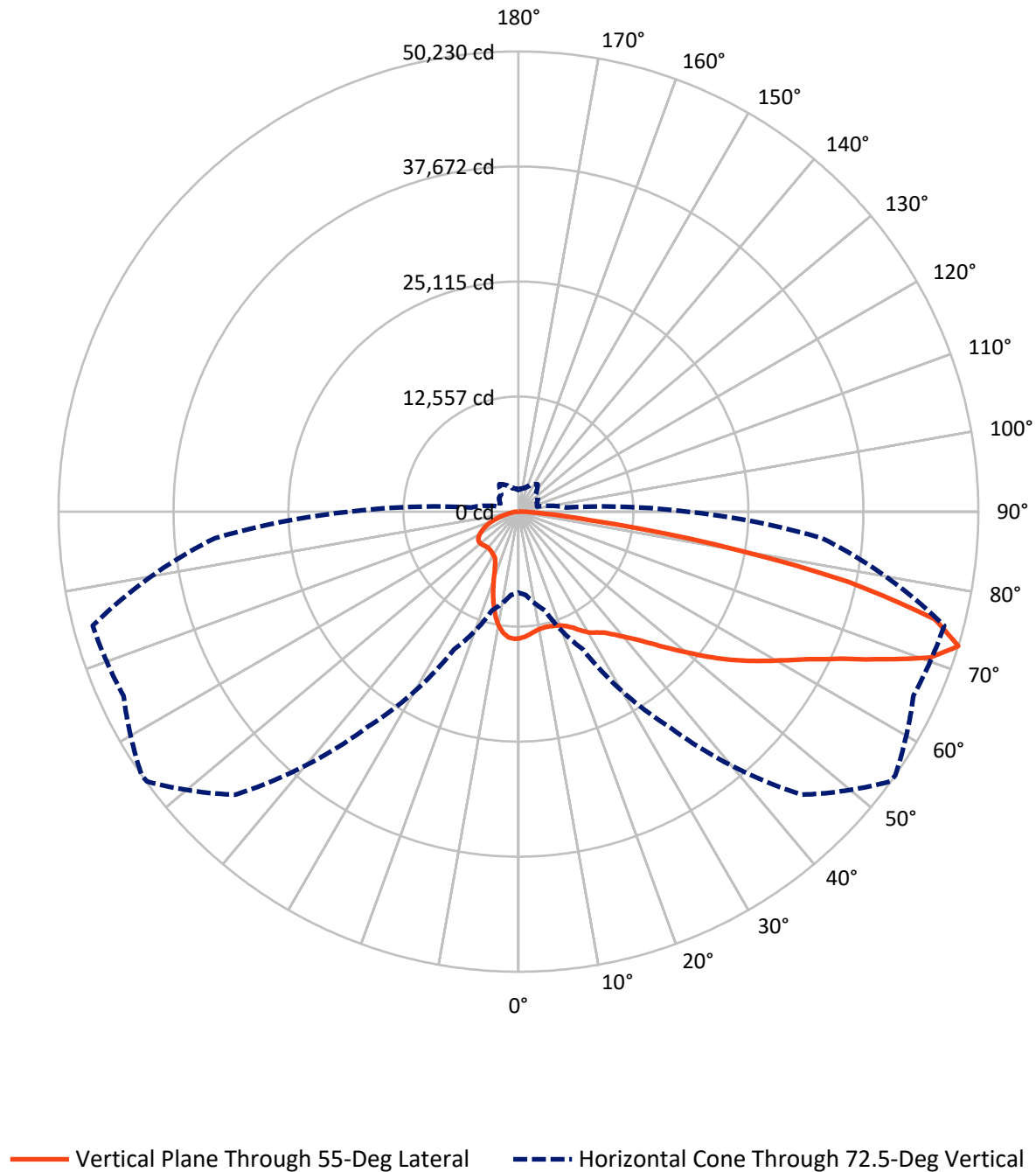
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 22.3 fc  
 Type IV - Medium - N/A

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## Luminous Intensity Polar Plot



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CATALOG NUMBER: GLEON-SA0D-740-U-T3R

**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 14594.9  | 0.0    | 14594.9 |
|                    | % Fixture | 18.6     | 0.0    | 18.6    |
| <b>Street Side</b> | Lumens    | 63928.1  | 0.0    | 63928.1 |
|                    | % Fixture | 81.4     | 0.0    | 81.4    |
| <b>Total</b>       | Lumens    | 78523.0  | 0.0    | 78523.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 1253.2  | 1.6       |
| 10°-20°   | 3336.6  | 4.2       |
| 20°-30°   | 5501.2  | 7.0       |
| 30°-40°   | 8137.7  | 10.4      |
| 40°-50°   | 11358.5 | 14.5      |
| 50°-60°   | 14789.1 | 18.8      |
| 60°-70°   | 18175.3 | 23.1      |
| 70°-80°   | 14247.3 | 18.1      |
| 80°-90°   | 1724.1  | 2.2       |
| 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°    | 78523.0 | 100.0     |
| 0°-180°   | 78523.0 | 100.0     |

**Coefficient of Utilization**



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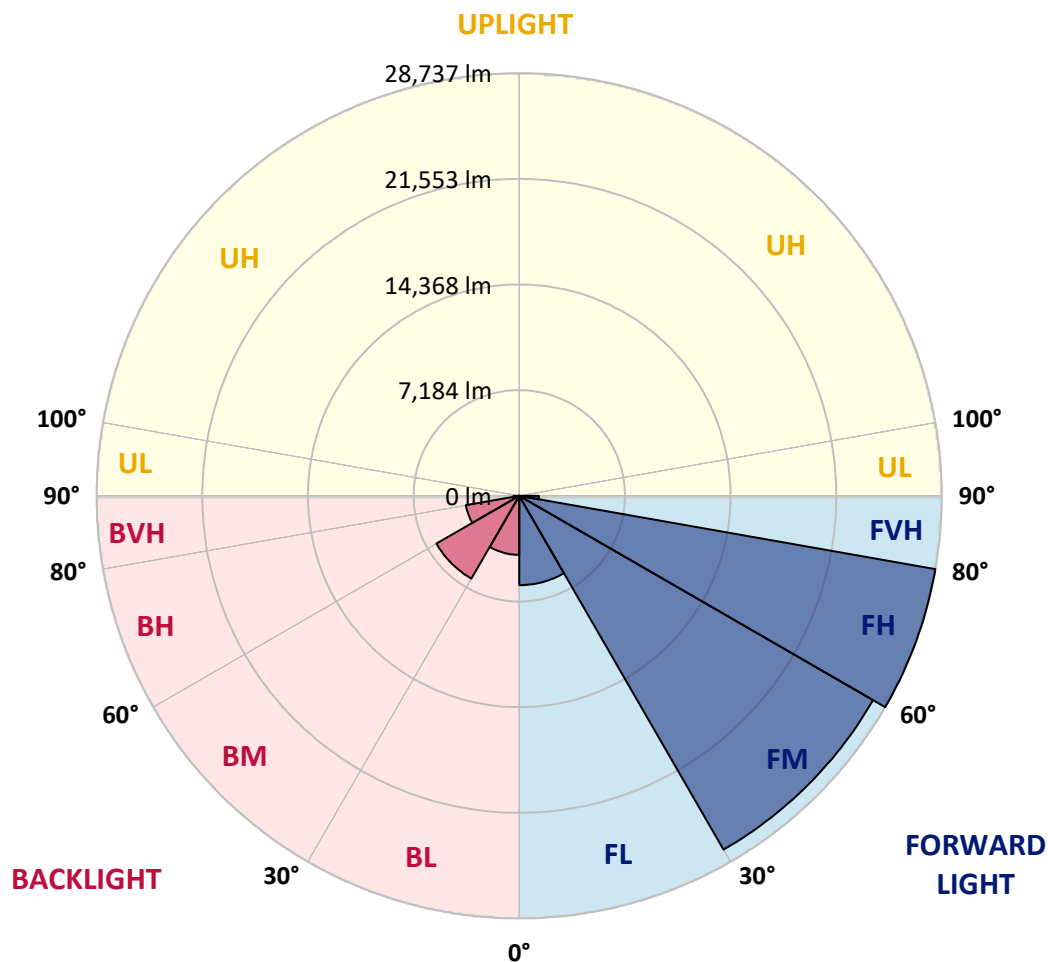
CATALOG NUMBER: GLEON-SA0D-740-U-T3R

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|---------|-----------|-------------------------|------|---------|
|      |             |         |           | B                       | U    | G       |
| FL   | (0°-30°)    | 6075.4  | 7.7       |                         |      |         |
| FM   | (30°-60°)   | 27783.0 | 35.4      |                         |      |         |
| FH   | (60°-80°)   | 28736.8 | 36.6      |                         |      | G5      |
| FVH  | (80°-90°)   | 1333.0  | 1.7       |                         |      | G5      |
| BL   | (0°-30°)    | 4015.7  | 5.1       | B4/5000                 |      |         |
| BM   | (30°-60°)   | 6502.2  | 8.3       | B4/8500                 |      |         |
| BH   | (60°-80°)   | 3685.9  | 4.7       | B4/5000                 |      | G4/5000 |
| BVH  | (80°-90°)   | 391.1   | 0.5       |                         |      | 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 Medium





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CATALOG NUMBER: GLEON-SA0D-740-U-T3R

**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 35°     | 45°     | 54°     | 55°     | 65°     | 75°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 13849.8 | 13849.8 | 13849.8 | 13849.8 | 13849.8 | 13849.8 | 13849.8 | 13849.8 | 13849.8 | 13849.8 | 13849.8 |
| 2.5°  | 13398.9 | 13367.1 | 13406.9 | 13462.5 | 13523.5 | 13605.8 | 13653.5 | 13674.7 | 13756.9 | 13788.8 | 13857.7 |
| 5°    | 12778.3 | 12762.4 | 12828.7 | 12924.2 | 13059.4 | 13250.4 | 13404.2 | 13433.4 | 13650.9 | 13804.7 | 13945.2 |
| 7.5°  | 12327.4 | 12327.4 | 12404.3 | 12518.4 | 12669.5 | 12926.8 | 13144.3 | 13184.1 | 13552.7 | 13884.2 | 14144.2 |
| 10°   | 11969.4 | 11982.6 | 12072.8 | 12208.1 | 12385.8 | 12658.9 | 12948.0 | 12993.1 | 13526.2 | 14069.9 | 14483.6 |
| 12.5° | 11730.7 | 11762.5 | 11844.7 | 11966.7 | 12186.8 | 12518.4 | 12884.4 | 12945.4 | 13581.9 | 14335.1 | 14892.1 |
| 15°   | 11881.8 | 11934.9 | 11942.8 | 11993.2 | 12115.2 | 12475.9 | 12921.5 | 12985.2 | 13701.2 | 14605.6 | 15356.2 |
| 17.5° | 12544.9 | 12563.5 | 12481.2 | 12375.1 | 12316.8 | 12547.5 | 13032.9 | 13099.2 | 13844.5 | 14873.5 | 15801.8 |
| 20°   | 13552.7 | 13542.1 | 13364.4 | 13078.0 | 12780.9 | 12818.1 | 13215.9 | 13284.8 | 14038.1 | 15109.6 | 16247.4 |
| 22.5° | 14825.8 | 14788.6 | 14515.5 | 13987.7 | 13481.1 | 13268.9 | 13536.8 | 13595.2 | 14329.8 | 15446.4 | 16724.7 |
| 25°   | 16369.4 | 16287.1 | 15926.4 | 15218.3 | 14473.0 | 13926.7 | 14019.5 | 14075.2 | 14754.2 | 15823.0 | 17162.4 |
| 27.5° | 17997.8 | 17915.6 | 17456.8 | 16600.1 | 15608.2 | 14756.8 | 14685.2 | 14732.9 | 15236.9 | 16101.5 | 17485.9 |
| 30°   | 19700.5 | 19613.0 | 19193.9 | 18233.8 | 16812.3 | 15616.1 | 15305.8 | 15324.4 | 15576.3 | 16252.7 | 17751.1 |
| 32.5° | 21411.2 | 21329.0 | 20859.5 | 19745.6 | 18119.8 | 16539.1 | 15754.0 | 15730.2 | 15780.6 | 16409.1 | 18050.8 |
| 35°   | 23145.7 | 23177.5 | 22628.5 | 21395.3 | 19567.9 | 17565.5 | 16284.5 | 16234.1 | 16122.7 | 16730.1 | 18475.2 |
| 37.5° | 25002.3 | 24981.0 | 24270.2 | 22981.3 | 21082.3 | 18679.4 | 17045.7 | 17037.7 | 16653.1 | 17337.4 | 19140.9 |
| 40°   | 26243.5 | 26256.7 | 25824.4 | 24604.4 | 22612.6 | 19912.7 | 18021.7 | 18003.1 | 17499.2 | 18247.1 | 20013.5 |
| 42.5° | 26728.8 | 26816.4 | 26927.7 | 26153.3 | 24214.5 | 21342.2 | 19186.0 | 19159.5 | 18679.4 | 19552.0 | 21039.9 |
| 45°   | 26763.3 | 26938.4 | 27627.9 | 27529.8 | 25837.7 | 22978.6 | 20673.9 | 20599.6 | 20254.8 | 21286.5 | 22265.2 |
| 47.5° | 26466.3 | 26646.6 | 27792.4 | 28349.3 | 27288.4 | 24705.2 | 22413.7 | 22355.4 | 22058.3 | 23456.0 | 23591.3 |
| 50°   | 25816.5 | 25988.9 | 27452.9 | 28749.8 | 28481.9 | 26365.5 | 24418.8 | 24264.9 | 24105.8 | 25962.3 | 25108.3 |
| 52.5° | 24599.1 | 24930.6 | 26999.4 | 28845.3 | 29195.4 | 27840.1 | 26527.3 | 26426.5 | 26514.0 | 28606.6 | 26628.0 |
| 55°   | 21716.2 | 22087.5 | 25829.7 | 28765.7 | 29723.2 | 29078.7 | 28635.8 | 28630.5 | 29084.0 | 31380.8 | 28259.1 |
| 57.5° | 20101.0 | 20363.6 | 23448.1 | 28630.5 | 30349.1 | 30309.3 | 30723.0 | 30773.4 | 31656.6 | 34401.6 | 29967.2 |
| 60°   | 19188.6 | 19464.5 | 22241.3 | 28129.2 | 31319.8 | 31900.6 | 32852.8 | 32953.5 | 34271.7 | 37746.1 | 32022.6 |
| 62.5° | 18358.5 | 18660.9 | 21493.4 | 27108.1 | 32462.9 | 34176.2 | 35404.2 | 35494.3 | 37040.6 | 41183.3 | 34009.1 |
| 65°   | 16939.6 | 17281.7 | 20398.0 | 26437.1 | 33502.5 | 37144.0 | 38647.8 | 38708.8 | 40220.6 | 44785.0 | 35528.8 |
| 67.5° | 14934.5 | 15247.5 | 18332.0 | 24954.5 | 34271.7 | 40748.3 | 42960.3 | 42994.7 | 43374.0 | 47328.4 | 36305.9 |
| 70°   | 12592.6 | 12712.0 | 15388.0 | 21893.9 | 33362.0 | 44119.3 | 47686.5 | 47694.4 | 46249.0 | 48956.9 | 36178.6 |
| 72.5° | 8847.7  | 9128.9  | 11171.0 | 16573.6 | 28670.2 | 43708.2 | 50139.8 | 50229.9 | 47585.7 | 48134.7 | 33287.7 |
| 75°   | 5426.4  | 5723.4  | 7007.1  | 10043.9 | 18188.8 | 34375.1 | 46325.9 | 46951.8 | 45079.4 | 42917.8 | 27193.0 |
| 77.5° | 3628.2  | 3739.6  | 4572.4  | 5856.0  | 8240.4  | 19777.4 | 35616.3 | 36793.9 | 37449.0 | 31298.6 | 17390.4 |
| 80°   | 2023.6  | 2235.8  | 3031.5  | 3638.8  | 3665.3  | 7858.5  | 21355.5 | 21631.3 | 20835.7 | 12462.7 | 5365.4  |
| 82.5° | 1071.5  | 1188.2  | 2023.6  | 2137.7  | 1999.8  | 2631.0  | 7959.2  | 7967.2  | 6657.0  | 3341.8  | 1594.0  |
| 85°   | 830.1   | 928.3   | 1387.1  | 1304.9  | 1021.1  | 1167.0  | 2625.7  | 2768.9  | 2265.0  | 1368.5  | 519.8   |
| 87.5° | 413.7   | 514.5   | 941.5   | 827.5   | 400.5   | 334.2   | 938.9   | 1002.5  | 893.8   | 535.7   | 188.3   |
| 90°   | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     |

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CATALOG NUMBER: GLEON-SA0D-740-U-T3R

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°     | 105°    | 115°    | 125°    | 135°    | 145°    | 155°    | 165°    | 175°    | 180°    |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 13849.8 | 13849.8 | 13849.8 | 13849.8 | 13849.8 | 13849.8 | 13849.8 | 13849.8 | 13849.8 | 13849.8 | 13849.8 |
| 2.5°  | 13884.2 | 13908.1 | 13937.3 | 13905.5 | 13894.9 | 13852.4 | 13780.8 | 13764.9 | 13727.8 | 13730.4 | 13751.6 |
| 5°    | 14006.2 | 14046.0 | 14030.1 | 13908.1 | 13762.2 | 13558.0 | 13345.9 | 13165.5 | 13046.2 | 13038.2 | 13030.2 |
| 7.5°  | 14239.6 | 14266.2 | 14141.5 | 13794.1 | 13385.6 | 12913.5 | 12468.0 | 12078.1 | 11842.1 | 11783.7 | 11770.4 |
| 10°   | 14605.6 | 14600.3 | 14258.2 | 13558.0 | 12743.8 | 11900.4 | 11184.3 | 10643.3 | 10327.7 | 10234.8 | 10211.0 |
| 12.5° | 15014.1 | 14953.1 | 14298.0 | 13128.4 | 11836.8 | 10667.1 | 9760.1  | 9158.0  | 8829.2  | 8723.1  | 8696.6  |
| 15°   | 15435.8 | 15284.6 | 14199.9 | 12486.5 | 10722.8 | 9338.4  | 8386.2  | 7829.3  | 7651.6  | 7593.2  | 7582.6  |
| 17.5° | 15828.3 | 15536.6 | 13918.7 | 11616.6 | 9452.4  | 8014.9  | 7272.3  | 7049.5  | 7092.0  | 7168.9  | 7171.5  |
| 20°   | 16212.9 | 15706.3 | 13467.9 | 10518.6 | 8113.1  | 6924.9  | 6672.9  | 6837.4  | 7038.9  | 7195.4  | 7216.6  |
| 22.5° | 16592.1 | 15825.7 | 12887.0 | 9250.9  | 6914.3  | 6312.2  | 6489.9  | 6789.6  | 7020.4  | 7190.1  | 7219.3  |
| 25°   | 16910.4 | 15854.8 | 12086.1 | 7898.2  | 6081.5  | 6081.5  | 6402.4  | 6686.2  | 6914.3  | 7081.4  | 7110.5  |
| 27.5° | 17027.1 | 15658.6 | 10956.2 | 6646.4  | 5662.4  | 5975.4  | 6280.4  | 6516.4  | 6710.1  | 6887.8  | 6919.6  |
| 30°   | 17072.2 | 15295.2 | 9651.3  | 5641.2  | 5490.0  | 5861.4  | 6116.0  | 6317.5  | 6500.5  | 6667.6  | 6696.8  |
| 32.5° | 17080.1 | 14857.6 | 8266.9  | 5071.0  | 5370.7  | 5742.0  | 5911.7  | 6089.4  | 6285.7  | 6352.0  | 6362.6  |
| 35°   | 17130.5 | 14340.4 | 6808.2  | 4779.3  | 5259.3  | 5630.6  | 5765.9  | 5893.2  | 5574.9  | 5598.8  | 5620.0  |
| 37.5° | 17276.4 | 13828.6 | 5588.2  | 4614.8  | 5187.7  | 5572.3  | 5734.0  | 5272.6  | 5023.3  | 4964.9  | 4957.0  |
| 40°   | 17549.6 | 13282.2 | 4683.8  | 4482.2  | 5161.2  | 5601.4  | 5529.8  | 4922.5  | 4492.8  | 4171.9  | 4124.2  |
| 42.5° | 17928.8 | 12693.4 | 4105.6  | 4394.7  | 5179.7  | 5742.0  | 5246.0  | 4585.6  | 3872.2  | 3665.3  | 3638.8  |
| 45°   | 18355.8 | 12075.4 | 3792.6  | 4333.7  | 5243.4  | 5850.7  | 5187.7  | 4137.4  | 3583.1  | 3426.6  | 3413.4  |
| 47.5° | 18769.6 | 11319.6 | 3630.9  | 4307.2  | 5330.9  | 5763.2  | 4941.0  | 3999.5  | 3445.2  | 3363.0  | 3370.9  |
| 50°   | 19244.3 | 10638.0 | 3532.7  | 4278.0  | 5407.8  | 5707.5  | 4662.6  | 3927.9  | 3392.2  | 3492.9  | 3599.0  |
| 52.5° | 19644.8 | 9932.5  | 3445.2  | 4219.6  | 5437.0  | 5609.4  | 4591.0  | 3941.2  | 3392.2  | 3585.8  | 3686.6  |
| 55°   | 20119.6 | 9399.4  | 3344.4  | 4097.6  | 5381.3  | 5330.9  | 4540.6  | 4020.7  | 3431.9  | 3309.9  | 3320.5  |
| 57.5° | 20732.2 | 9224.3  | 3233.0  | 3906.7  | 5195.7  | 4925.1  | 4516.7  | 4097.6  | 3408.1  | 3331.2  | 3357.7  |
| 60°   | 21580.9 | 9410.0  | 3187.9  | 3657.4  | 4906.6  | 4606.9  | 4519.3  | 4057.9  | 3241.0  | 3108.4  | 3111.0  |
| 62.5° | 22389.8 | 9616.9  | 3185.3  | 3500.9  | 4551.2  | 4323.1  | 4458.3  | 3927.9  | 3156.1  | 3079.2  | 3108.4  |
| 65°   | 22655.1 | 9407.3  | 3058.0  | 3325.9  | 4150.7  | 3983.6  | 4346.9  | 3790.0  | 3092.5  | 2975.8  | 2970.5  |
| 67.5° | 22299.7 | 8757.6  | 2800.7  | 3042.1  | 3691.9  | 3588.4  | 4201.1  | 3625.6  | 2991.7  | 2896.2  | 2880.3  |
| 70°   | 21244.1 | 7306.8  | 2482.5  | 2668.1  | 3169.4  | 3142.9  | 3970.3  | 3434.6  | 2856.4  | 2774.2  | 2705.2  |
| 72.5° | 18403.6 | 5206.3  | 2092.6  | 2219.9  | 2580.6  | 2665.5  | 3652.1  | 3185.3  | 2665.5  | 2487.8  | 2381.7  |
| 75°   | 15114.9 | 3853.6  | 1718.6  | 1745.1  | 1960.0  | 2190.7  | 3214.5  | 2893.5  | 2440.0  | 2137.7  | 2055.5  |
| 77.5° | 9256.2  | 2357.8  | 1368.5  | 1379.1  | 1405.7  | 1747.8  | 2646.9  | 2567.3  | 2153.6  | 1782.3  | 1723.9  |
| 80°   | 2997.0  | 1286.3  | 989.3   | 1039.7  | 960.1   | 1281.0  | 2047.5  | 2185.4  | 1848.6  | 1490.5  | 1426.9  |
| 82.5° | 1140.4  | 750.6   | 668.4   | 702.8   | 665.7   | 859.3   | 1493.2  | 1750.4  | 1514.4  | 1225.3  | 997.2   |
| 85°   | 551.7   | 424.4   | 395.2   | 442.9   | 411.1   | 440.3   | 954.8   | 1289.0  | 1148.4  | 798.3   | 742.6   |
| 87.5° | 196.3   | 188.3   | 151.2   | 204.2   | 175.0   | 156.5   | 291.7   | 649.8   | 758.5   | 549.0   | 490.7   |
| 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)