

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: P318387

Luminaire Tested: **GLEON-SA3A-740-U-T3**

Issue Date: 3/3/2020

### Test Information

Test Method: LM-79-08  
Report Number: P318387  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-14)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA3A-740-U-T3  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(3) 70 CRI, 4000K, 615mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

### Summary

Lumens per Lamp: N/A  
Luminaire Lumens: 14231 lumens  
Efficiency: N/A  
Efficacy: 148.2 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 1' x H: 0')  
IES Classification: Type III - Short  
BUG Rating: B2 - U0 - G2

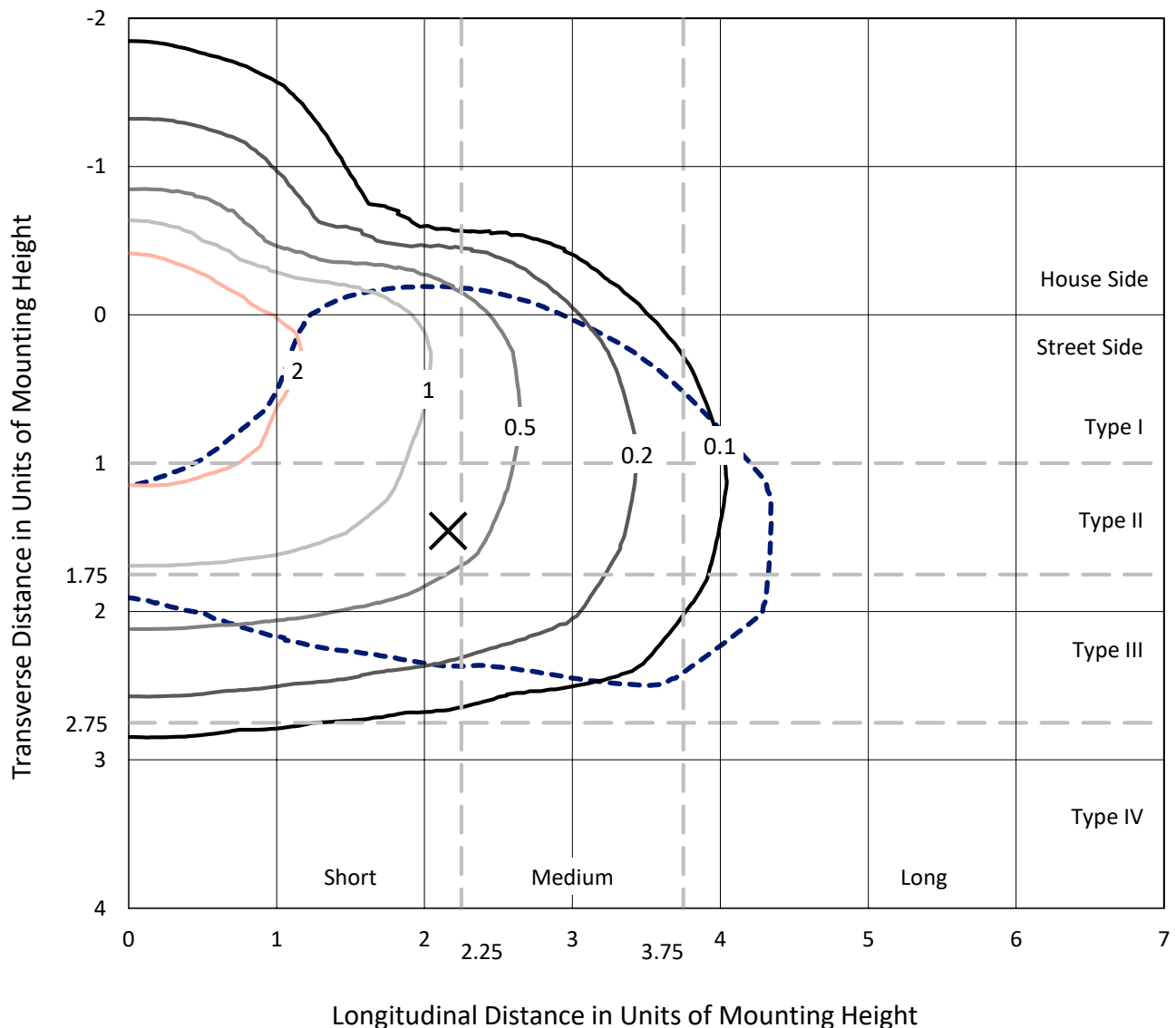
Input Watts (W): 96  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



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 CATALOG NUMBER: GLEON-SA3A-740-U-T3

## Iso-Footcandle Lines of Horizontal Illumination

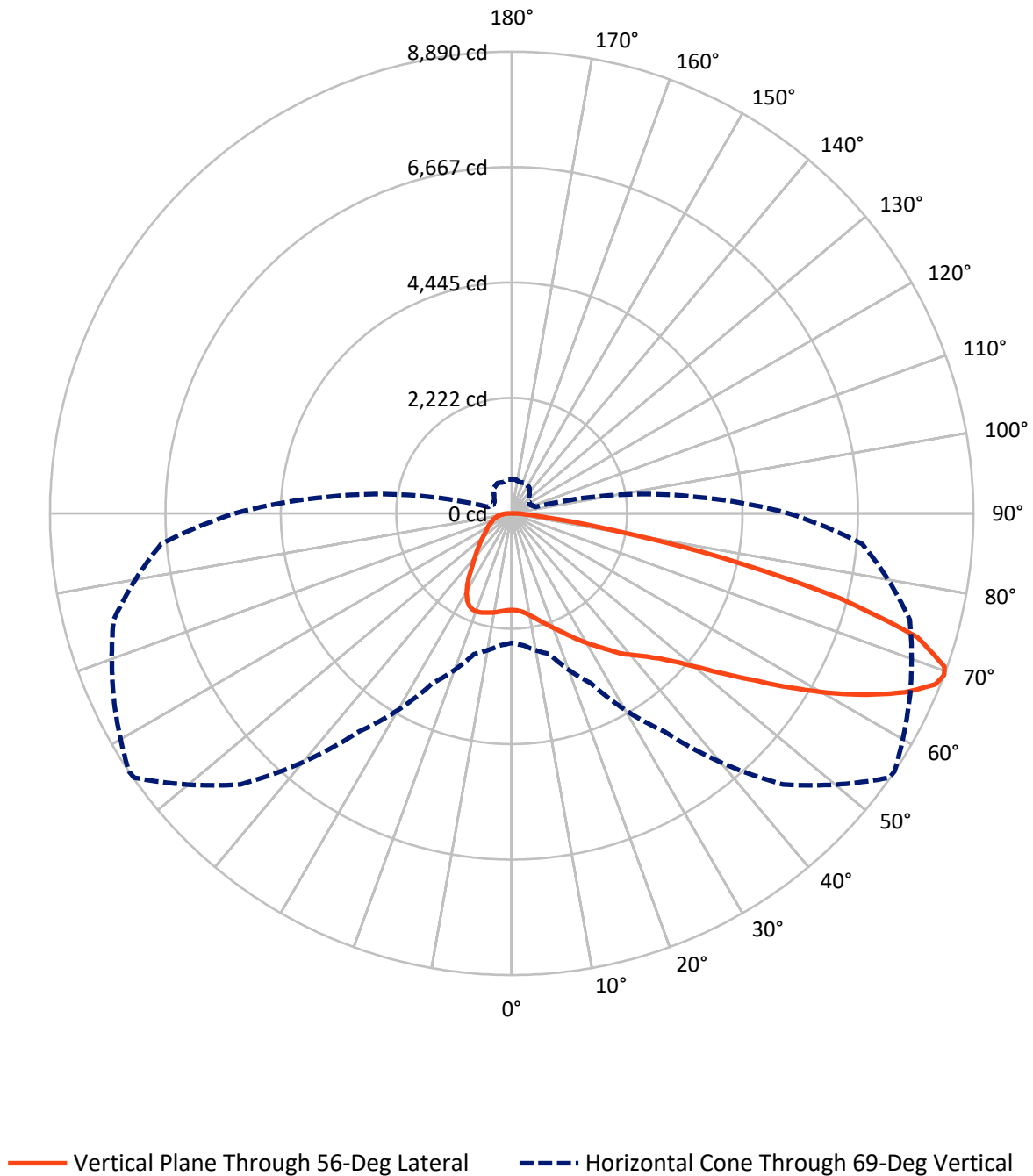
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 3.2 fc  
 Type III - Short - N/A

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## Luminous Intensity Polar Plot



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CATALOG NUMBER: GLEON-SA3A-740-U-T3

**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 3169.2   | 0.0    | 3169.2  |
|                    | % Fixture | 22.3     | 0.0    | 22.3    |
| <b>Street Side</b> | Lumens    | 11061.8  | 0.0    | 11061.8 |
|                    | % Fixture | 77.7     | 0.0    | 77.7    |
| <b>Total</b>       | Lumens    | 14231.0  | 0.0    | 14231.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 182.7   | 1.3       |
| 10°-20°   | 587.6   | 4.1       |
| 20°-30°   | 1025.7  | 7.2       |
| 30°-40°   | 1473.4  | 10.4      |
| 40°-50°   | 2039.1  | 14.3      |
| 50°-60°   | 2987.5  | 21.0      |
| 60°-70°   | 3642.4  | 25.6      |
| 70°-80°   | 2013.7  | 14.2      |
| 80°-90°   | 278.9   | 2.0       |
| 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°    | 14231.0 | 100.0     |
| 0°-180°   | 14231.0 | 100.0     |

**Coefficient of Utilization**



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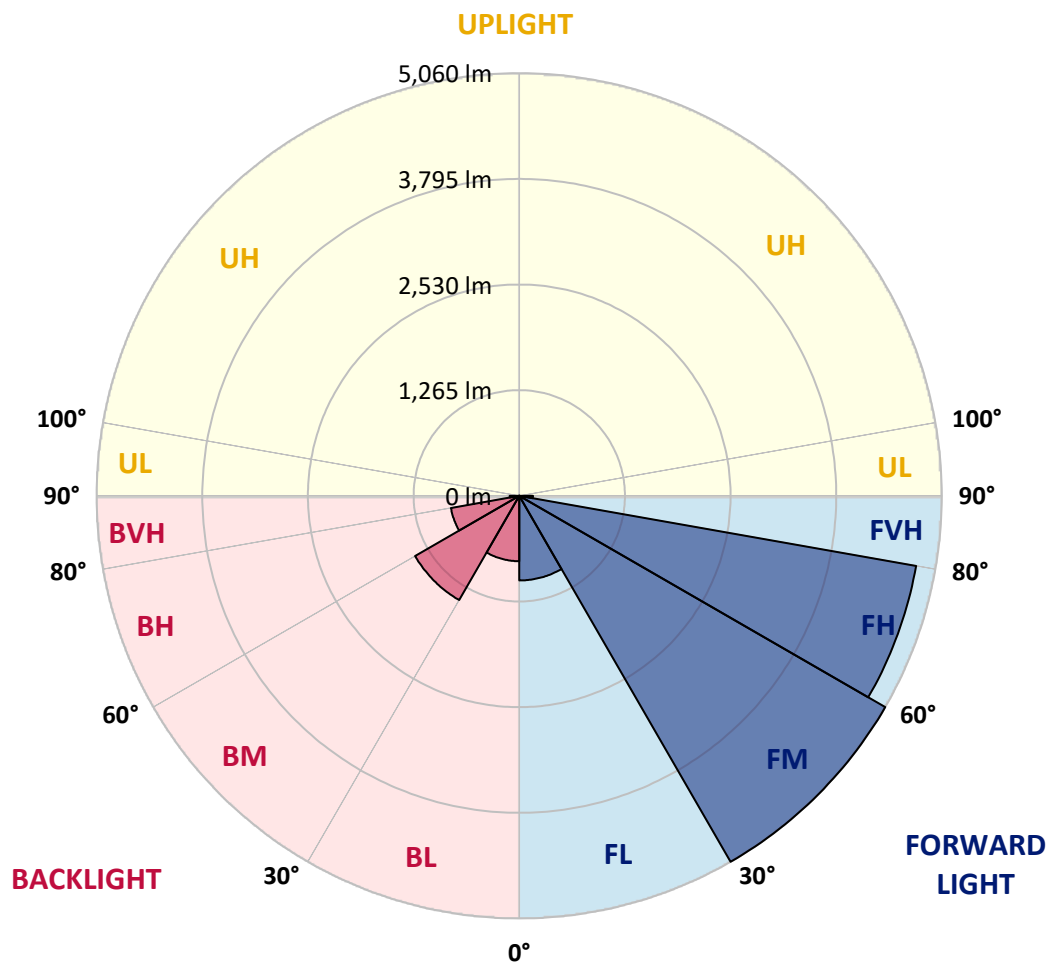
CATALOG NUMBER: GLEON-SA3A-740-U-T3

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 1012.8 | 7.1       |                         |      |         |
| FM   | (30°-60°)   | 5059.7 | 35.6      |                         |      |         |
| FH   | (60°-80°)   | 4825.0 | 33.9      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 164.3  | 1.2       |                         |      | G2/225  |
| BL   | (0°-30°)    | 783.2  | 5.5       | B2/1000                 |      |         |
| BM   | (30°-60°)   | 1440.3 | 10.1      | B2/2500                 |      |         |
| BH   | (60°-80°)   | 831.1  | 5.8       | B2/1000                 |      | G2/1000 |
| BVH  | (80°-90°)   | 114.6  | 0.8       |                         |      | G2/225  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B2-U0-G2**

Type III Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 56°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1860.5 | 1860.5 | 1860.5 | 1860.5 | 1860.5 | 1860.5 | 1860.5 | 1860.5 | 1860.5 | 1860.5 | 1860.5 |
| 2.5°  | 1872.3 | 1874.2 | 1872.7 | 1876.7 | 1872.3 | 1875.2 | 1872.7 | 1872.7 | 1871.3 | 1866.9 | 1862.0 |
| 5°    | 1901.7 | 1905.6 | 1903.1 | 1907.1 | 1901.7 | 1902.7 | 1898.2 | 1898.2 | 1893.8 | 1884.5 | 1874.7 |
| 7.5°  | 1947.8 | 1952.2 | 1950.2 | 1954.1 | 1946.8 | 1946.8 | 1940.9 | 1940.4 | 1931.6 | 1916.4 | 1905.1 |
| 10°   | 2002.7 | 2008.5 | 2006.6 | 2012.5 | 2006.6 | 2008.5 | 2002.7 | 2002.7 | 1990.9 | 1969.3 | 1955.1 |
| 12.5° | 2082.6 | 2089.9 | 2084.5 | 2084.0 | 2081.6 | 2085.5 | 2080.6 | 2079.6 | 2068.8 | 2039.4 | 2019.8 |
| 15°   | 2189.4 | 2197.3 | 2186.0 | 2185.0 | 2171.3 | 2169.8 | 2169.8 | 2168.4 | 2161.5 | 2126.2 | 2093.8 |
| 17.5° | 2312.5 | 2314.9 | 2305.1 | 2289.5 | 2271.8 | 2260.5 | 2259.1 | 2263.0 | 2263.0 | 2221.8 | 2170.3 |
| 20°   | 2433.1 | 2437.5 | 2429.7 | 2412.0 | 2389.5 | 2372.8 | 2361.0 | 2368.9 | 2368.4 | 2319.4 | 2246.3 |
| 22.5° | 2564.5 | 2574.8 | 2563.0 | 2540.5 | 2514.0 | 2495.4 | 2474.8 | 2481.6 | 2482.1 | 2421.8 | 2320.8 |
| 25°   | 2734.6 | 2725.3 | 2717.9 | 2686.1 | 2648.3 | 2629.2 | 2610.1 | 2616.9 | 2615.0 | 2532.1 | 2397.8 |
| 27.5° | 2885.1 | 2887.1 | 2877.3 | 2843.4 | 2799.8 | 2757.6 | 2756.7 | 2761.1 | 2753.7 | 2646.8 | 2470.4 |
| 30°   | 3060.1 | 3061.1 | 3047.4 | 3017.0 | 2969.4 | 2915.0 | 2902.3 | 2909.6 | 2893.9 | 2755.7 | 2546.8 |
| 32.5° | 3234.2 | 3239.1 | 3223.9 | 3187.1 | 3148.9 | 3082.7 | 3057.2 | 3062.1 | 3022.9 | 2867.0 | 2625.8 |
| 35°   | 3386.6 | 3393.5 | 3388.6 | 3364.1 | 3322.4 | 3265.5 | 3235.1 | 3232.2 | 3183.7 | 3003.3 | 2730.2 |
| 37.5° | 3542.0 | 3548.4 | 3543.0 | 3522.4 | 3505.8 | 3445.5 | 3429.3 | 3429.3 | 3345.0 | 3142.5 | 2863.0 |
| 40°   | 3701.9 | 3711.7 | 3705.3 | 3676.9 | 3662.6 | 3635.2 | 3596.5 | 3587.1 | 3496.0 | 3309.7 | 3079.7 |
| 42.5° | 3850.4 | 3863.1 | 3888.6 | 3872.0 | 3843.0 | 3847.0 | 3769.0 | 3764.1 | 3697.4 | 3556.7 | 3351.8 |
| 45°   | 4061.2 | 4079.8 | 4123.0 | 4110.2 | 4104.4 | 4082.8 | 3990.1 | 3985.7 | 3960.2 | 3889.1 | 3689.6 |
| 47.5° | 4291.1 | 4316.6 | 4394.6 | 4397.0 | 4460.3 | 4419.6 | 4293.6 | 4278.4 | 4284.3 | 4287.2 | 4101.9 |
| 50°   | 4502.9 | 4530.9 | 4658.8 | 4719.1 | 4868.2 | 4877.0 | 4675.5 | 4661.8 | 4684.8 | 4752.5 | 4582.3 |
| 52.5° | 4672.1 | 4707.4 | 4867.2 | 5053.5 | 5308.9 | 5381.4 | 5145.6 | 5135.3 | 5152.5 | 5269.2 | 5125.5 |
| 55°   | 4796.1 | 4834.3 | 5008.4 | 5347.6 | 5755.5 | 5883.5 | 5686.9 | 5677.1 | 5687.9 | 5836.4 | 5716.3 |
| 57.5° | 4825.0 | 4834.3 | 5086.8 | 5545.7 | 6132.5 | 6439.9 | 6349.2 | 6329.6 | 6276.6 | 6406.1 | 6368.3 |
| 60°   | 4689.2 | 4726.5 | 5022.1 | 5615.3 | 6424.2 | 6988.5 | 7041.4 | 7016.9 | 6868.4 | 6974.3 | 6943.9 |
| 62.5° | 4413.7 | 4480.4 | 4780.4 | 5509.4 | 6538.4 | 7436.6 | 7720.4 | 7691.0 | 7435.1 | 7503.7 | 7357.6 |
| 65°   | 3963.7 | 3992.1 | 4307.3 | 5144.2 | 6393.3 | 7723.4 | 8325.9 | 8311.2 | 7989.1 | 7881.7 | 7434.1 |
| 67.5° | 3158.7 | 3212.1 | 3479.8 | 4380.9 | 5799.6 | 7689.5 | 8794.1 | 8792.6 | 8350.9 | 8021.9 | 7163.0 |
| 69°   | 2495.4 | 2550.8 | 2805.7 | 3608.7 | 5131.9 | 7380.2 | 8872.5 | 8889.7 | 8452.8 | 7936.6 | 6775.7 |
| 70°   | 1989.4 | 2053.6 | 2228.7 | 3039.5 | 4539.2 | 6972.3 | 8807.3 | 8838.2 | 8433.2 | 7795.9 | 6418.3 |
| 72.5° | 846.7  | 898.6  | 1023.1 | 1566.8 | 2766.5 | 5206.4 | 8052.8 | 8169.5 | 7978.8 | 7135.1 | 5304.5 |
| 75°   | 369.6  | 385.8  | 442.2  | 638.8  | 1228.1 | 2833.6 | 6308.5 | 6524.2 | 6822.3 | 6031.0 | 3951.4 |
| 77.5° | 270.6  | 277.5  | 308.4  | 375.0  | 551.0  | 1070.2 | 4056.8 | 4182.3 | 4920.1 | 4388.7 | 2423.8 |
| 80°   | 209.3  | 214.2  | 238.3  | 275.5  | 359.8  | 432.9  | 1850.2 | 1958.0 | 2766.5 | 2254.2 | 1009.4 |
| 82.5° | 166.7  | 170.1  | 186.8  | 203.0  | 248.6  | 262.3  | 614.3  | 681.4  | 1021.2 | 622.6  | 267.2  |
| 85°   | 154.9  | 158.8  | 164.7  | 148.1  | 159.3  | 153.9  | 265.7  | 278.0  | 308.4  | 244.6  | 111.8  |
| 87.5° | 70.1   | 82.9   | 163.3  | 115.2  | 84.8   | 67.7   | 108.8  | 113.7  | 128.0  | 128.4  | 49.5   |
| 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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**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1860.5 | 1860.5 | 1860.5 | 1860.5 | 1860.5 | 1860.5 | 1860.5 | 1860.5 | 1860.5 | 1860.5 | 1860.5 |
| 2.5°  | 1864.9 | 1863.4 | 1865.9 | 1860.0 | 1867.4 | 1866.9 | 1864.4 | 1865.4 | 1870.3 | 1869.8 | 1870.3 |
| 5°    | 1876.2 | 1875.2 | 1878.1 | 1873.7 | 1882.6 | 1885.5 | 1886.0 | 1890.4 | 1895.8 | 1897.3 | 1897.3 |
| 7.5°  | 1904.6 | 1904.6 | 1906.1 | 1900.2 | 1906.1 | 1905.6 | 1903.1 | 1907.6 | 1912.9 | 1913.4 | 1912.9 |
| 10°   | 1953.6 | 1954.1 | 1951.7 | 1936.5 | 1931.6 | 1918.3 | 1906.1 | 1906.6 | 1913.4 | 1918.8 | 1920.3 |
| 12.5° | 2015.4 | 2013.4 | 2002.7 | 1974.7 | 1954.1 | 1927.2 | 1914.4 | 1913.9 | 1920.8 | 1925.2 | 1926.7 |
| 15°   | 2086.0 | 2080.6 | 2052.7 | 2007.1 | 1970.8 | 1944.3 | 1923.7 | 1918.8 | 1914.9 | 1910.0 | 1910.5 |
| 17.5° | 2152.7 | 2140.4 | 2093.8 | 2030.6 | 1992.4 | 1957.1 | 1917.4 | 1885.5 | 1863.4 | 1850.7 | 1846.8 |
| 20°   | 2220.3 | 2196.3 | 2129.1 | 2052.7 | 2004.1 | 1939.9 | 1863.4 | 1798.7 | 1758.5 | 1739.9 | 1736.5 |
| 22.5° | 2282.1 | 2243.4 | 2162.0 | 2075.7 | 1994.8 | 1882.1 | 1761.9 | 1667.8 | 1611.9 | 1586.9 | 1588.9 |
| 25°   | 2342.4 | 2288.5 | 2196.3 | 2091.9 | 1947.8 | 1780.1 | 1620.8 | 1505.1 | 1440.3 | 1412.4 | 1411.4 |
| 27.5° | 2395.3 | 2334.1 | 2233.6 | 2078.6 | 1860.0 | 1635.0 | 1453.6 | 1340.8 | 1286.9 | 1262.9 | 1259.0 |
| 30°   | 2456.1 | 2391.4 | 2283.1 | 2028.2 | 1731.6 | 1467.3 | 1290.3 | 1210.9 | 1172.7 | 1148.6 | 1144.2 |
| 32.5° | 2530.2 | 2469.4 | 2323.8 | 1936.5 | 1567.3 | 1292.3 | 1162.9 | 1107.5 | 1072.7 | 1045.7 | 1040.8 |
| 35°   | 2638.0 | 2572.3 | 2334.1 | 1805.1 | 1386.9 | 1154.0 | 1069.2 | 1012.4 | 965.3  | 930.5  | 927.1  |
| 37.5° | 2773.3 | 2701.3 | 2310.5 | 1635.0 | 1211.9 | 1064.3 | 991.3  | 921.2  | 859.9  | 810.9  | 803.0  |
| 40°   | 2968.4 | 2859.6 | 2245.3 | 1438.9 | 1083.0 | 995.2  | 915.3  | 835.4  | 759.4  | 702.0  | 690.8  |
| 42.5° | 3202.8 | 3045.4 | 2145.3 | 1243.8 | 988.3  | 925.1  | 839.8  | 740.8  | 668.2  | 627.5  | 621.6  |
| 45°   | 3500.9 | 3238.6 | 2006.6 | 1073.2 | 895.2  | 855.0  | 758.4  | 667.2  | 622.1  | 592.2  | 587.3  |
| 47.5° | 3841.1 | 3455.3 | 1861.0 | 934.4  | 816.3  | 789.3  | 693.2  | 634.4  | 598.6  | 575.1  | 570.6  |
| 50°   | 4259.3 | 3699.9 | 1706.6 | 820.7  | 736.8  | 710.4  | 662.3  | 616.2  | 587.8  | 569.7  | 565.3  |
| 52.5° | 4730.9 | 3975.9 | 1595.3 | 731.0  | 671.1  | 652.0  | 646.1  | 606.4  | 583.4  | 569.7  | 565.3  |
| 55°   | 5238.8 | 4256.8 | 1475.2 | 655.5  | 614.3  | 619.7  | 635.4  | 607.4  | 591.7  | 575.1  | 568.7  |
| 57.5° | 5747.2 | 4547.0 | 1341.3 | 591.7  | 569.2  | 595.7  | 628.0  | 609.4  | 596.1  | 580.0  | 574.1  |
| 60°   | 6149.2 | 4730.9 | 1133.9 | 538.3  | 533.4  | 569.2  | 610.4  | 594.7  | 577.5  | 578.0  | 577.0  |
| 62.5° | 6336.9 | 4721.1 | 905.0  | 490.7  | 497.6  | 533.4  | 581.9  | 571.6  | 557.4  | 576.5  | 578.0  |
| 65°   | 6231.5 | 4485.8 | 704.5  | 447.6  | 459.4  | 496.1  | 552.5  | 560.4  | 565.3  | 602.0  | 606.9  |
| 67.5° | 5789.3 | 4027.9 | 545.6  | 409.8  | 424.6  | 470.6  | 555.5  | 610.4  | 616.7  | 655.5  | 655.0  |
| 69°   | 5331.9 | 3598.4 | 474.1  | 390.2  | 407.4  | 477.0  | 593.7  | 642.2  | 618.2  | 659.4  | 653.5  |
| 70°   | 4948.6 | 3258.7 | 435.8  | 377.0  | 399.6  | 488.3  | 619.2  | 641.7  | 610.8  | 646.1  | 636.3  |
| 72.5° | 3811.2 | 2344.4 | 369.6  | 352.5  | 373.1  | 467.2  | 626.5  | 627.5  | 593.7  | 600.6  | 583.9  |
| 75°   | 2614.0 | 1481.5 | 322.6  | 319.2  | 332.9  | 421.1  | 603.0  | 599.6  | 549.1  | 539.3  | 525.5  |
| 77.5° | 1441.3 | 752.5  | 274.0  | 287.3  | 296.6  | 373.1  | 548.1  | 543.2  | 501.5  | 480.9  | 476.0  |
| 80°   | 555.9  | 329.4  | 231.4  | 255.4  | 261.3  | 323.1  | 480.4  | 476.0  | 441.2  | 414.7  | 407.4  |
| 82.5° | 209.8  | 172.6  | 191.2  | 221.1  | 219.1  | 266.7  | 406.9  | 404.5  | 370.6  | 331.9  | 320.1  |
| 85°   | 97.1   | 103.4  | 151.5  | 182.4  | 168.2  | 197.6  | 325.5  | 329.9  | 288.8  | 242.7  | 242.7  |
| 87.5° | 41.2   | 57.8   | 107.4  | 137.8  | 113.2  | 133.3  | 238.8  | 228.0  | 209.3  | 145.1  | 136.3  |
| 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

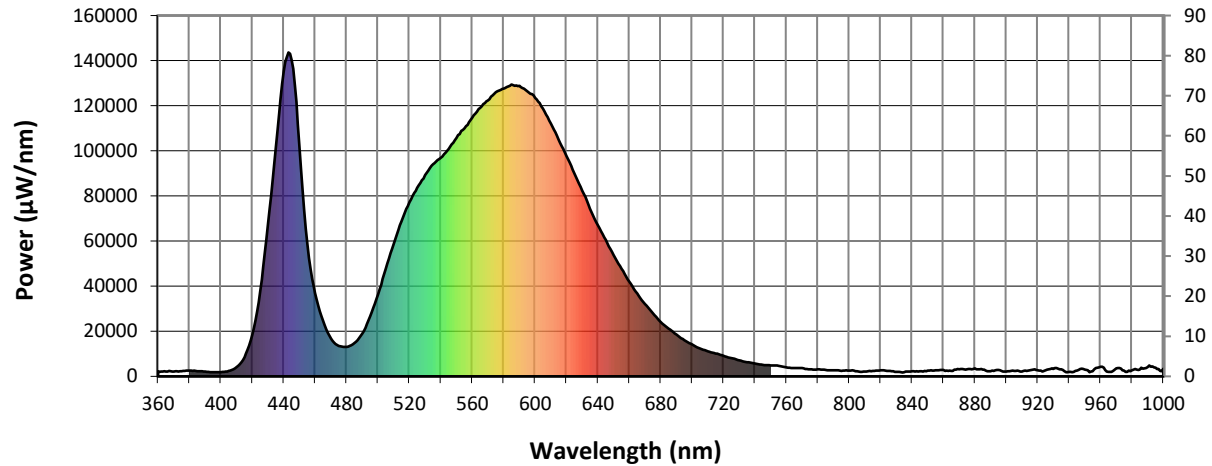
REPORT NUMBER: SP1-2101-121-2

| 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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### Photopic Flux vs. Wavelength



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| 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)