

Signify Classified - Internal  
Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



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: P383477

Luminaire Tested: **GLEON-SA7D-735-U-SL4**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P383477  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-24)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA7D-735-U-SL4  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(7) 70 CRI, 3500K, 1200mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE IV  
SPILL LIGHT ELIMINATOR OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 48578.3 lumens  
Efficiency: N/A  
Efficacy: 108.4 lumens/watt  
Luminous Opening: Rectangular (W 2' x L: 1' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B3 - U0 - G5

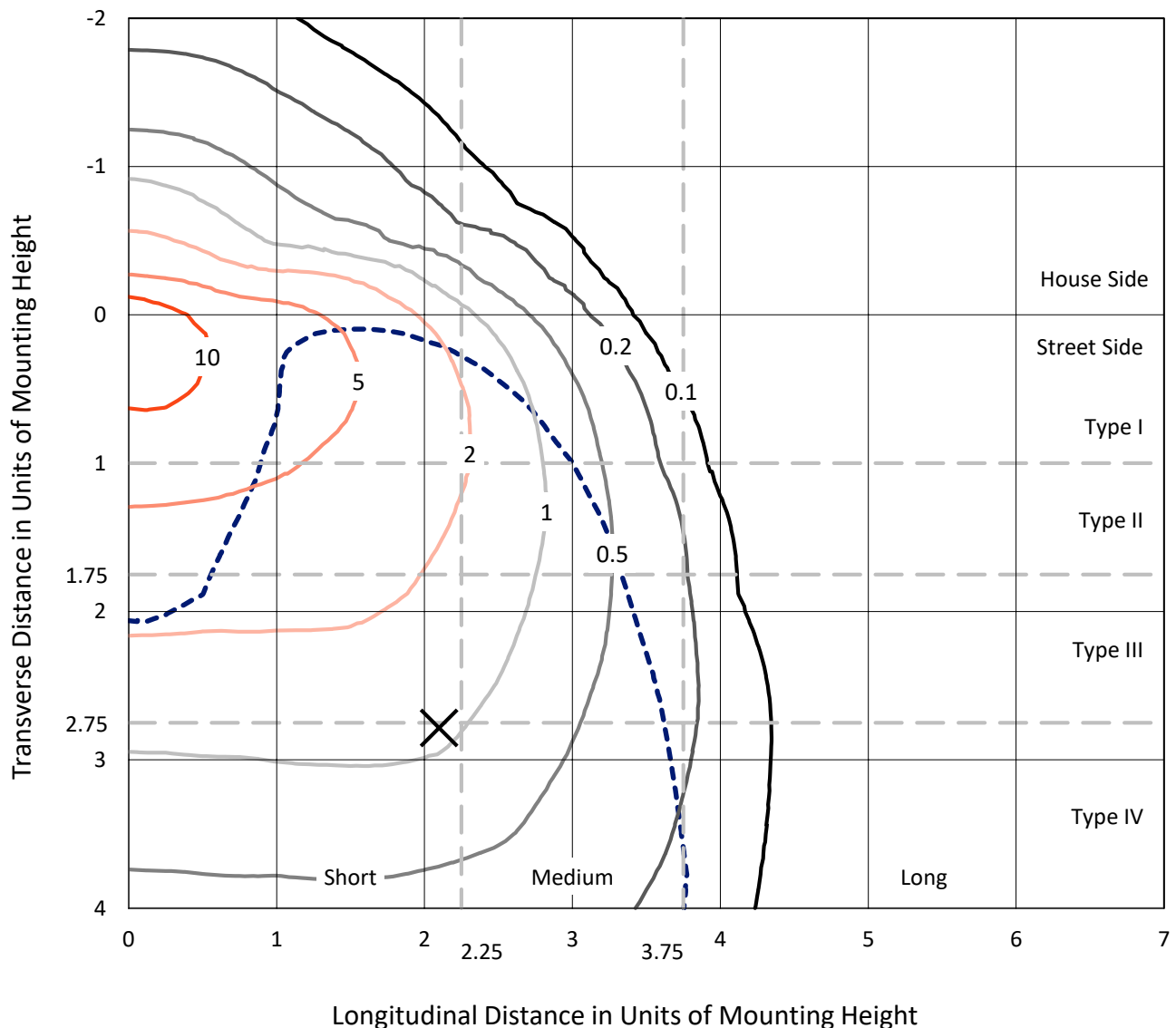
Input Watts (W): 448  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



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## Iso-Footcandle Lines of Horizontal Illumination

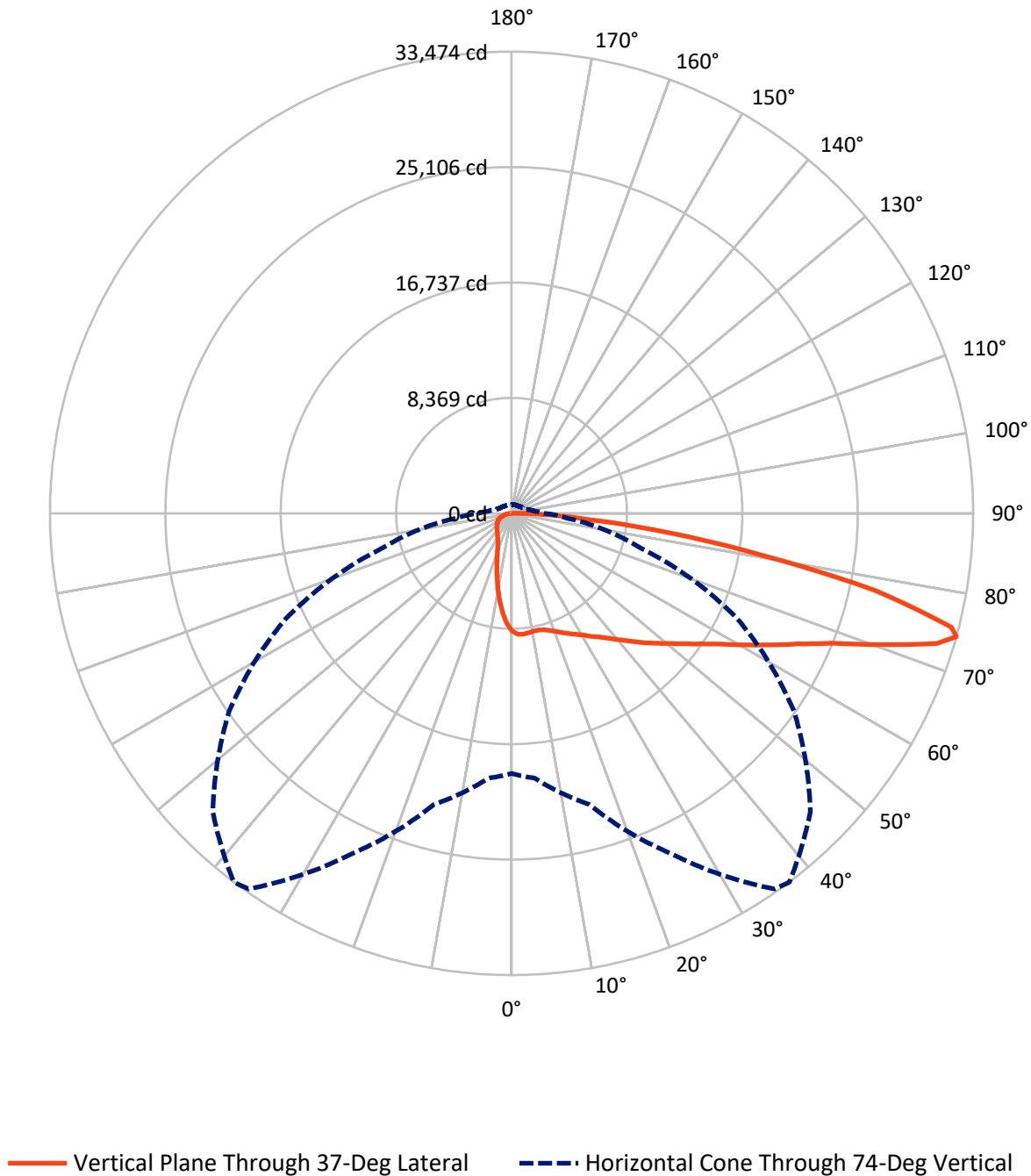
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 13.9 fc  
 Type IV - Short - N/A

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## Luminous Intensity Polar Plot



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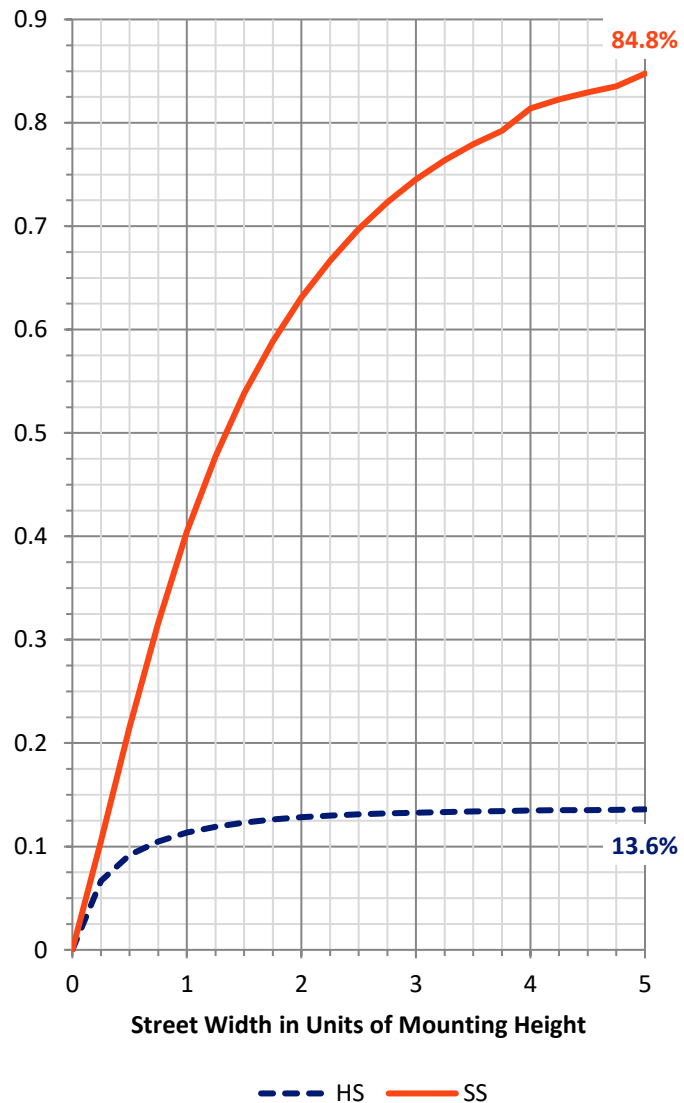
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 6684.0   | 0.0    | 6684.0  |
|                    | % Fixture | 13.8     | 0.0    | 13.8    |
| <b>Street Side</b> | Lumens    | 41894.3  | 0.0    | 41894.3 |
|                    | % Fixture | 86.2     | 0.0    | 86.2    |
| <b>Total</b>       | Lumens    | 48578.3  | 0.0    | 48578.3 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 753.7   | 1.6       |
| 10°-20°   | 1932.0  | 4.0       |
| 20°-30°   | 2976.9  | 6.1       |
| 30°-40°   | 4328.9  | 8.9       |
| 40°-50°   | 6371.3  | 13.1      |
| 50°-60°   | 8947.4  | 18.4      |
| 60°-70°   | 11324.6 | 23.3      |
| 70°-80°   | 9971.8  | 20.5      |
| 80°-90°   | 1971.6  | 4.1       |
| 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°    | 48578.3 | 100.0     |
| 0°-180°   | 48578.3 | 100.0     |

**Coefficient of Utilization**



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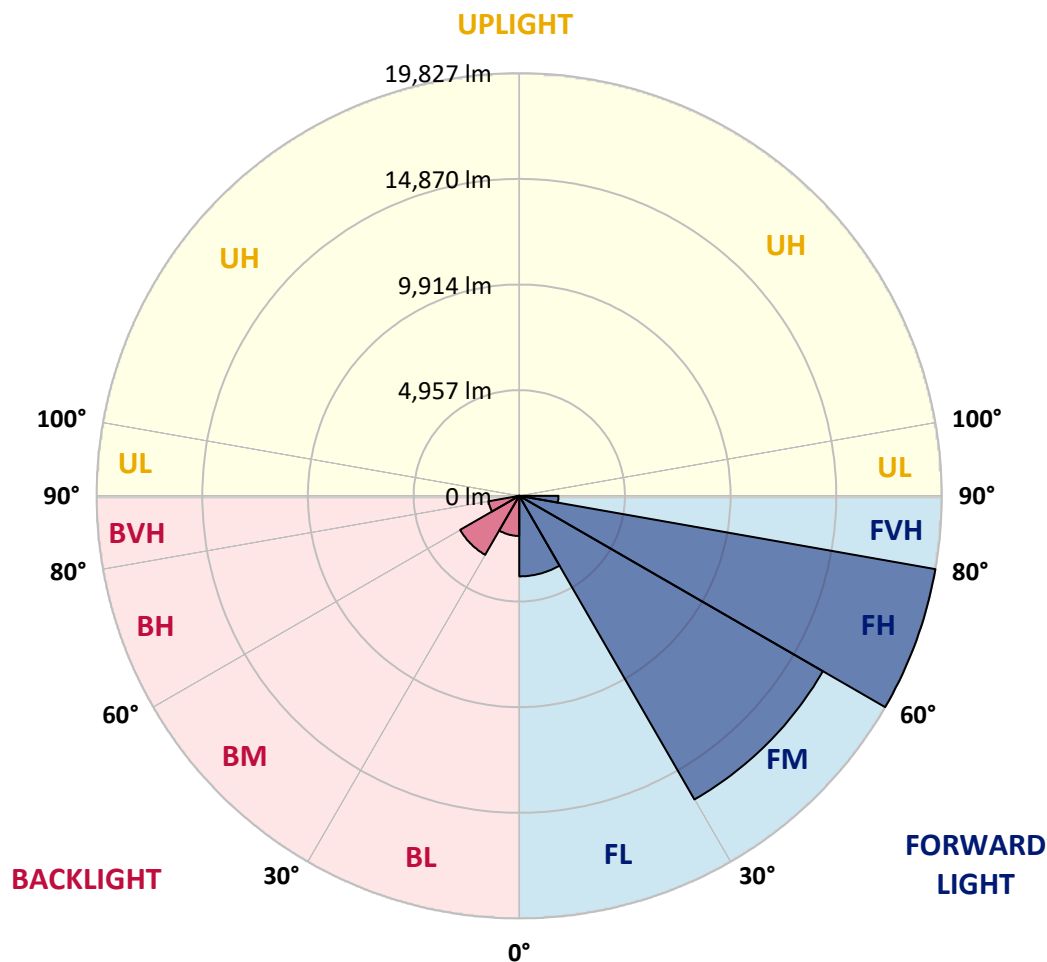
CATALOG NUMBER: GLEON-SA7D-735-U-SL4

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|---------|-----------|-------------------------|------|---------|
|      |             |         |           | B                       | U    | G       |
| FL   | (0°-30°)    | 3780.0  | 7.8       |                         |      |         |
| FM   | (30°-60°)   | 16449.0 | 33.9      |                         |      |         |
| FH   | (60°-80°)   | 19827.2 | 40.8      |                         |      | G5      |
| FVH  | (80°-90°)   | 1838.1  | 3.8       |                         |      | G5      |
| BL   | (0°-30°)    | 1882.7  | 3.9       | B3/2500                 |      |         |
| BM   | (30°-60°)   | 3198.6  | 6.6       | B3/5000                 |      |         |
| BH   | (60°-80°)   | 1469.2  | 3.0       | B3/2500                 |      | G3/2500 |
| BVH  | (80°-90°)   | 133.5   | 0.3       |                         |      | G2/225  |
| UL   | (90°-100°)  | 0.0     | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0     | 0.0       |                         | U0/0 |         |

**BUG Rating: B3-U0-G5**

Type IV Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 35°     | 37°     | 45°     | 55°     | 65°     | 75°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 8559.3  | 8559.3  | 8559.3  | 8559.3  | 8559.3  | 8559.3  | 8559.3  | 8559.3  | 8559.3  | 8559.3  | 8559.3  |
| 2.5°  | 8851.9  | 8853.6  | 8851.9  | 8838.2  | 8805.7  | 8778.3  | 8756.1  | 8723.6  | 8651.7  | 8597.0  | 8514.8  |
| 5°    | 8935.8  | 8925.5  | 8918.6  | 8893.0  | 8841.7  | 8810.9  | 8768.1  | 8706.5  | 8588.4  | 8478.9  | 8345.5  |
| 7.5°  | 8896.4  | 8884.4  | 8869.1  | 8838.2  | 8780.0  | 8754.4  | 8694.5  | 8614.1  | 8472.1  | 8328.3  | 8136.7  |
| 10°   | 8774.9  | 8771.5  | 8764.7  | 8757.9  | 8708.2  | 8687.6  | 8632.9  | 8547.3  | 8407.0  | 8232.5  | 8008.3  |
| 12.5° | 8639.7  | 8648.3  | 8675.7  | 8711.6  | 8689.4  | 8679.1  | 8644.9  | 8586.7  | 8443.0  | 8254.7  | 7984.4  |
| 15°   | 8554.2  | 8578.2  | 8651.7  | 8745.8  | 8764.7  | 8761.2  | 8752.6  | 8715.0  | 8562.7  | 8353.9  | 8039.2  |
| 17.5° | 8525.1  | 8564.5  | 8704.8  | 8860.5  | 8915.3  | 8927.2  | 8930.7  | 8865.6  | 8696.2  | 8475.5  | 8095.6  |
| 20°   | 8578.2  | 8627.8  | 8833.1  | 9047.0  | 9134.3  | 9141.1  | 9125.7  | 9012.8  | 8822.9  | 8579.8  | 8126.4  |
| 22.5° | 8739.0  | 8783.5  | 9040.2  | 9281.5  | 9380.7  | 9390.9  | 9344.7  | 9173.6  | 8956.3  | 8703.1  | 8169.2  |
| 25°   | 9048.7  | 9103.5  | 9360.2  | 9601.5  | 9652.8  | 9654.5  | 9587.8  | 9375.6  | 9130.8  | 8875.9  | 8261.6  |
| 27.5° | 9452.5  | 9507.3  | 9738.3  | 9974.5  | 9947.1  | 9931.7  | 9841.0  | 9628.8  | 9358.4  | 9113.7  | 8425.8  |
| 30°   | 9902.6  | 9962.5  | 10181.5 | 10349.2 | 10284.2 | 10253.4 | 10179.8 | 9906.0  | 9675.0  | 9438.9  | 8677.4  |
| 32.5° | 10368.0 | 10422.8 | 10614.4 | 10729.1 | 10646.9 | 10633.2 | 10522.0 | 10272.2 | 10087.4 | 9935.1  | 9084.6  |
| 35°   | 10845.4 | 10884.9 | 11073.0 | 11138.0 | 11028.6 | 11025.1 | 10994.3 | 10765.1 | 10648.7 | 10720.5 | 9676.7  |
| 37.5° | 11333.1 | 11343.4 | 11504.2 | 11507.7 | 11475.2 | 11488.9 | 11521.4 | 11377.6 | 11410.2 | 11634.3 | 10446.7 |
| 40°   | 11767.8 | 11795.2 | 11911.5 | 11947.5 | 12003.9 | 12051.8 | 12214.4 | 12120.3 | 12371.8 | 12768.8 | 11405.0 |
| 42.5° | 12089.4 | 12142.5 | 12329.0 | 12421.4 | 12604.6 | 12679.9 | 12909.1 | 12996.4 | 13502.9 | 14098.4 | 12544.7 |
| 45°   | 12361.5 | 12443.7 | 12743.1 | 12933.0 | 13242.8 | 13374.6 | 13703.2 | 13995.8 | 14781.1 | 15540.9 | 13744.1 |
| 47.5° | 12655.9 | 12760.2 | 13135.0 | 13497.8 | 13918.7 | 14067.6 | 14664.8 | 15102.9 | 16144.9 | 16992.0 | 14875.2 |
| 50°   | 13088.8 | 13169.2 | 13535.4 | 14105.2 | 14630.6 | 14822.2 | 15648.7 | 16276.7 | 17531.0 | 18374.7 | 15855.8 |
| 52.5° | 13692.8 | 13662.1 | 13971.8 | 14770.9 | 15475.9 | 15712.0 | 16699.4 | 17525.9 | 18935.9 | 19625.5 | 16684.0 |
| 55°   | 14300.3 | 14249.0 | 14466.3 | 15467.3 | 16461.6 | 16709.6 | 17856.2 | 18780.2 | 20272.3 | 20751.4 | 17318.9 |
| 57.5° | 14976.2 | 14878.7 | 15061.8 | 16252.8 | 17584.1 | 17880.1 | 19151.5 | 20113.2 | 21586.5 | 21661.8 | 17722.7 |
| 60°   | 15672.7 | 15540.9 | 15746.2 | 17226.5 | 19009.4 | 19358.6 | 20667.6 | 21413.7 | 22825.4 | 22390.8 | 17852.7 |
| 62.5° | 16281.9 | 16189.5 | 16506.0 | 18313.0 | 20616.3 | 20999.6 | 22156.3 | 22796.4 | 24047.2 | 22693.6 | 17383.9 |
| 65°   | 16814.1 | 16829.4 | 17377.0 | 19534.8 | 22407.9 | 22816.9 | 23864.1 | 24500.6 | 25008.9 | 22514.0 | 16287.0 |
| 67.5° | 17448.9 | 17536.2 | 18470.4 | 21143.3 | 24663.2 | 25111.5 | 26348.7 | 26359.0 | 25546.2 | 21459.9 | 14127.5 |
| 70°   | 18374.7 | 18554.3 | 19974.6 | 23374.7 | 27869.9 | 28486.0 | 29440.8 | 27450.8 | 24791.6 | 18602.3 | 11115.8 |
| 72.5° | 19196.0 | 19531.4 | 21574.5 | 25927.8 | 31778.3 | 32245.4 | 31249.5 | 26821.0 | 21637.9 | 13941.0 | 6925.1  |
| 74°   | 18862.3 | 19278.1 | 21865.5 | 27185.5 | 33249.9 | 33474.0 | 30638.7 | 24983.2 | 18041.0 | 9654.5  | 4024.7  |
| 75°   | 18143.7 | 18595.4 | 21441.1 | 27173.5 | 33063.4 | 32938.5 | 29163.6 | 22883.6 | 14858.2 | 6584.6  | 2678.0  |
| 77.5° | 14642.5 | 15119.9 | 18066.6 | 23289.2 | 27110.2 | 26992.2 | 22402.8 | 15351.0 | 6507.6  | 2159.5  | 1360.4  |
| 80°   | 8513.1  | 8877.6  | 11215.1 | 14789.7 | 18280.5 | 18494.4 | 14733.3 | 7595.9  | 2559.9  | 1213.2  | 922.3   |
| 82.5° | 3781.7  | 4033.2  | 5417.6  | 7549.7  | 11031.9 | 11307.5 | 7715.7  | 3980.2  | 1581.1  | 737.5   | 554.5   |
| 85°   | 2481.2  | 2667.8  | 3288.9  | 3595.2  | 5253.3  | 5441.5  | 3776.6  | 3099.0  | 1043.8  | 405.6   | 407.3   |
| 87.5° | 1784.8  | 1964.4  | 2443.5  | 2133.8  | 2411.0  | 2282.8  | 2055.1  | 2868.0  | 419.2   | 231.0   | 136.9   |
| 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-SA7D-735-U-SL4

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°     | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|---------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 8559.3  | 8559.3  | 8559.3 | 8559.3 | 8559.3 | 8559.3 | 8559.3 | 8559.3 | 8559.3 | 8559.3 | 8559.3 |
| 2.5°  | 8478.9  | 8451.5  | 8389.9 | 8273.5 | 8208.5 | 8153.7 | 8063.1 | 8010.0 | 7986.1 | 7984.4 | 7994.6 |
| 5°    | 8268.4  | 8205.1  | 8046.0 | 7850.9 | 7695.1 | 7553.2 | 7376.9 | 7270.8 | 7195.5 | 7151.0 | 7162.9 |
| 7.5°  | 8023.7  | 7924.5  | 7674.6 | 7363.2 | 7113.4 | 6837.8 | 6565.8 | 6403.3 | 6276.6 | 6182.5 | 6199.6 |
| 10°   | 7856.0  | 7719.1  | 7354.7 | 6906.3 | 6490.5 | 6090.1 | 5715.3 | 5491.2 | 5313.2 | 5176.3 | 5186.6 |
| 12.5° | 7799.6  | 7614.7  | 7109.9 | 6511.1 | 5927.5 | 5380.0 | 4890.5 | 4546.6 | 4363.5 | 4207.8 | 4219.7 |
| 15°   | 7808.1  | 7560.0  | 6904.6 | 6155.1 | 5421.0 | 4731.4 | 4137.7 | 3735.5 | 3487.3 | 3379.6 | 3381.3 |
| 17.5° | 7814.9  | 7496.6  | 6689.0 | 5773.5 | 4919.6 | 4125.6 | 3480.5 | 3073.3 | 2838.9 | 2739.6 | 2741.3 |
| 20°   | 7792.7  | 7394.0  | 6422.1 | 5335.4 | 4396.0 | 3569.5 | 2944.9 | 2599.3 | 2421.3 | 2344.3 | 2344.3 |
| 22.5° | 7763.6  | 7272.5  | 6120.9 | 4895.7 | 3879.2 | 3087.0 | 2561.7 | 2298.1 | 2195.5 | 2144.1 | 2142.4 |
| 25°   | 7777.3  | 7181.9  | 5812.9 | 4443.9 | 3403.5 | 2702.0 | 2306.7 | 2132.1 | 2063.7 | 2031.1 | 2029.5 |
| 27.5° | 7850.9  | 7139.0  | 5528.8 | 3993.9 | 2987.8 | 2412.8 | 2135.6 | 2012.3 | 1967.9 | 1947.3 | 1947.3 |
| 30°   | 7984.4  | 7139.0  | 5232.8 | 3610.6 | 2642.1 | 2198.8 | 2003.8 | 1919.9 | 1889.2 | 1875.5 | 1875.5 |
| 32.5° | 8217.1  | 7178.4  | 4947.0 | 3230.7 | 2366.6 | 2031.1 | 1894.3 | 1837.9 | 1813.8 | 1807.0 | 1807.0 |
| 35°   | 8617.5  | 7311.9  | 4668.1 | 2871.4 | 2144.1 | 1894.3 | 1789.9 | 1757.4 | 1740.2 | 1738.5 | 1743.7 |
| 37.5° | 9180.5  | 7583.9  | 4406.3 | 2606.1 | 1986.7 | 1783.1 | 1702.6 | 1677.0 | 1666.7 | 1675.2 | 1682.1 |
| 40°   | 9888.9  | 7953.6  | 4168.4 | 2366.6 | 1866.9 | 1694.1 | 1622.2 | 1605.1 | 1599.9 | 1611.9 | 1622.2 |
| 42.5° | 10744.5 | 8453.2  | 3973.3 | 2193.7 | 1774.5 | 1618.8 | 1553.7 | 1533.2 | 1528.1 | 1541.8 | 1555.5 |
| 45°   | 11670.2 | 8990.6  | 3836.5 | 2065.4 | 1702.6 | 1562.3 | 1493.8 | 1471.7 | 1461.3 | 1468.2 | 1483.6 |
| 47.5° | 12512.2 | 9498.7  | 3781.7 | 1974.7 | 1634.2 | 1514.4 | 1440.8 | 1413.4 | 1396.3 | 1392.9 | 1404.9 |
| 50°   | 13222.3 | 9876.9  | 3807.3 | 1919.9 | 1579.4 | 1461.3 | 1389.5 | 1358.7 | 1333.0 | 1317.6 | 1326.2 |
| 52.5° | 13739.0 | 10114.7 | 3831.4 | 1896.0 | 1536.7 | 1403.2 | 1333.0 | 1303.9 | 1269.7 | 1244.0 | 1244.0 |
| 55°   | 14113.8 | 10169.5 | 3778.3 | 1877.2 | 1504.2 | 1339.8 | 1269.7 | 1242.3 | 1208.1 | 1179.0 | 1175.6 |
| 57.5° | 14261.0 | 10015.5 | 3581.5 | 1849.8 | 1481.9 | 1279.9 | 1203.0 | 1182.4 | 1153.3 | 1119.1 | 1117.4 |
| 60°   | 14062.5 | 9539.8  | 3201.6 | 1791.6 | 1452.7 | 1230.3 | 1136.2 | 1122.5 | 1108.8 | 1076.3 | 1074.6 |
| 62.5° | 13265.1 | 8496.0  | 2710.5 | 1673.5 | 1394.6 | 1177.3 | 1074.6 | 1081.4 | 1083.2 | 1060.9 | 1057.5 |
| 65°   | 11819.1 | 7062.1  | 2231.3 | 1519.5 | 1307.3 | 1113.9 | 1011.3 | 1043.8 | 1062.6 | 1059.3 | 1054.0 |
| 67.5° | 9717.8  | 5496.3  | 1890.9 | 1357.0 | 1192.7 | 1026.8 | 942.8  | 980.5  | 995.9  | 1007.8 | 1004.5 |
| 70°   | 7212.6  | 3875.8  | 1564.0 | 1185.9 | 1054.0 | 924.0  | 853.9  | 872.7  | 862.4  | 876.1  | 881.2  |
| 72.5° | 4021.3  | 2325.5  | 1274.8 | 1014.7 | 910.3  | 804.3  | 754.6  | 751.2  | 728.9  | 728.9  | 728.9  |
| 74°   | 2412.8  | 1706.0  | 1120.8 | 908.6  | 823.1  | 725.6  | 682.7  | 667.4  | 646.9  | 648.5  | 646.9  |
| 75°   | 1940.5  | 1466.4  | 1028.4 | 838.5  | 761.4  | 679.4  | 636.5  | 616.0  | 600.7  | 600.7  | 598.9  |
| 77.5° | 1225.2  | 1113.9  | 828.2  | 667.4  | 609.1  | 559.6  | 530.4  | 503.1  | 503.1  | 501.4  | 499.7  |
| 80°   | 925.8   | 886.4   | 645.1  | 504.8  | 467.2  | 429.5  | 410.7  | 398.7  | 398.7  | 403.8  | 402.1  |
| 82.5° | 634.8   | 667.4   | 453.5  | 352.5  | 333.7  | 306.3  | 302.8  | 304.6  | 299.5  | 292.6  | 290.9  |
| 85°   | 463.7   | 501.4   | 306.3  | 222.5  | 203.6  | 186.5  | 200.2  | 207.1  | 198.5  | 183.1  | 176.2  |
| 87.5° | 177.9   | 328.6   | 164.2  | 92.4   | 85.5   | 73.6   | 85.5   | 89.0   | 95.9   | 75.3   | 77.0   |
| 90°   | 0.0     | 0.0     | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



LM-79-08: Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Report Prepared for

Cooper Lighting Solutions

All Brands

Data applicable to all product families using SA light engines

Report Number: SP1-2101-121-7

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

Test Date: 03/04/2021

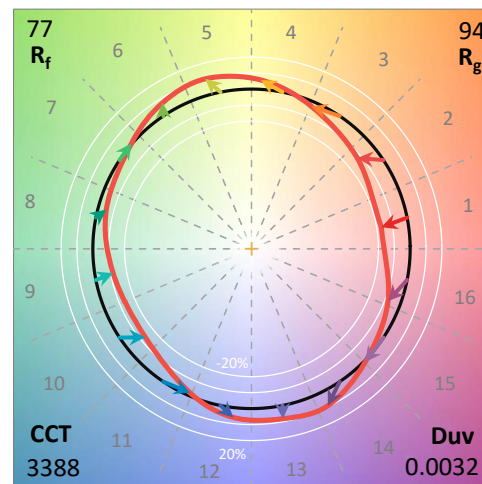
### Test Information

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

PROGRAMMED @ 615mA.

### Spectral Parameters

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



### Test Conditions

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

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| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 1/31/2021        | 7/31/2021            |
| Power Meter                    | IN0071                | 12/1/2020        | 12/1/2021            |
| AC Power Source                | IN0063                | 12/1/2020        | 12/1/2021            |
| DC Power Source                | IN0208                | 12/1/2020        | 12/1/2021            |
| Sphere Thermometer             | IN0085                | 12/1/2020        | 12/1/2021            |
| Room Thermometer               | IN0046                | 12/1/2020        | 12/1/2021            |

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**CIE 1931 Chromaticity Diagram**



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



Point lies inside the ANSI 3500K 4-step quadrangle

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### Photopic Flux vs. Wavelength



#####

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 2672             | 0.0              | 490       | 34553            | 4.9              | 620       | 136720           | 35.6             | 750       | 5870             | 0.0              | 880       | 4216             | 0.0              |
| 365       | 2252             | 0.0              | 495       | 44336            | 8.0              | 625       | 126308           | 27.9             | 755       | 5421             | 0.0              | 885       | 4132             | 0.0              |
| 370       | 2217             | 0.0              | 500       | 54643            | 12.1             | 630       | 114625           | 20.7             | 760       | 5097             | 0.0              | 890       | 3992             | 0.0              |
| 375       | 2697             | 0.0              | 505       | 64676            | 18.1             | 635       | 103216           | 15.5             | 765       | 4626             | 0.0              | 895       | 3214             | 0.0              |
| 380       | 3039             | 0.0              | 510       | 73825            | 25.4             | 640       | 92605            | 11.1             | 770       | 3782             | 0.0              | 900       | 2580             | 0.0              |
| 385       | 2655             | 0.0              | 515       | 81872            | 33.9             | 645       | 83234            | 8.0              | 775       | 3506             | 0.0              | 905       | 1776             | 0.0              |
| 390       | 2357             | 0.0              | 520       | 88574            | 43.0             | 650       | 73263            | 5.4              | 780       | 3507             | 0.0              | 910       | 3995             | 0.0              |
| 395       | 2186             | 0.0              | 525       | 93289            | 50.1             | 655       | 64627            | 3.7              | 785       | 3267             | 0.0              | 915       | 4288             | 0.0              |
| 400       | 2015             | 0.0              | 530       | 98393            | 57.9             | 660       | 56614            | 2.4              | 790       | 2849             | 0.0              | 920       | 2446             | 0.0              |
| 405       | 2234             | 0.0              | 535       | 103269           | 64.0             | 665       | 49537            | 1.6              | 795       | 3037             | 0.0              | 925       | 3009             | 0.0              |
| 410       | 3412             | 0.0              | 540       | 107316           | 69.9             | 670       | 42866            | 0.9              | 800       | 2716             | 0.0              | 930       | 3026             | 0.0              |
| 415       | 6135             | 0.0              | 545       | 113101           | 75.3             | 675       | 36708            | 0.6              | 805       | 2648             | 0.0              | 935       | 4734             | 0.0              |
| 420       | 12146            | 0.0              | 550       | 120690           | 82.0             | 680       | 31814            | 0.4              | 810       | 3187             | 0.0              | 940       | 3719             | 0.0              |
| 425       | 23983            | 0.1              | 555       | 128583           | 87.8             | 685       | 27485            | 0.2              | 815       | 2931             | 0.0              | 945       | 1480             | 0.0              |
| 430       | 42142            | 0.3              | 560       | 137796           | 93.6             | 690       | 23698            | 0.1              | 820       | 2717             | 0.0              | 950       | 3450             | 0.0              |
| 435       | 68228            | 0.8              | 565       | 146577           | 97.5             | 695       | 20309            | 0.1              | 825       | 2236             | 0.0              | 955       | 5051             | 0.0              |
| 440       | 99323            | 1.6              | 570       | 154581           | 100.5            | 700       | 17890            | 0.1              | 830       | 2628             | 0.0              | 960       | 3176             | 0.0              |
| 445       | 115584           | 2.4              | 575       | 162633           | 101.2            | 705       | 15500            | 0.0              | 835       | 3140             | 0.0              | 965       | 5178             | 0.0              |
| 450       | 94997            | 2.5              | 580       | 168101           | 99.9             | 710       | 13699            | 0.0              | 840       | 3675             | 0.0              | 970       | 6385             | 0.0              |
| 455       | 61433            | 2.1              | 585       | 173145           | 96.2             | 715       | 12398            | 0.0              | 845       | 3283             | 0.0              | 975       | 3810             | 0.0              |
| 460       | 43373            | 1.8              | 590       | 174675           | 90.3             | 720       | 11147            | 0.0              | 850       | 3055             | 0.0              | 980       | 4322             | 0.0              |
| 465       | 32472            | 1.7              | 595       | 173724           | 82.3             | 725       | 9761             | 0.0              | 855       | 2932             | 0.0              | 985       | 4200             | 0.0              |
| 470       | 24257            | 1.5              | 600       | 171241           | 73.8             | 730       | 8651             | 0.0              | 860       | 3382             | 0.0              | 990       | 4661             | 0.0              |
| 475       | 21690            | 1.7              | 605       | 165134           | 64.0             | 735       | 7730             | 0.0              | 865       | 2605             | 0.0              | 995       | 6746             | 0.0              |
| 480       | 23173            | 2.2              | 610       | 156652           | 53.8             | 740       | 6847             | 0.0              | 870       | 3325             | 0.0              | 1000      | 4150             | 0.0              |
| 485       | 27564            | 3.3              | 615       | 147879           | 44.6             | 745       | 6124             | 0.0              | 875       | 3325             | 0.0              |           |                  |                  |

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### Scotopic Flux vs. Wavelength



Scotopic Lumens: 12126

S/P: 1.36

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 2672             | 0.0              | 490       | 34553            | 53.2             | 620       | 136720           | 1.7              | 750       | 5870             | 0.0              | 880       | 4216             | 0.0              |
| 365       | 2252             | 0.0              | 495       | 44336            | 71.7             | 625       | 126308           | 1.1              | 755       | 5421             | 0.0              | 885       | 4132             | 0.0              |
| 370       | 2217             | 0.0              | 500       | 54643            | 91.4             | 630       | 114625           | 0.6              | 760       | 5097             | 0.0              | 890       | 3992             | 0.0              |
| 375       | 2697             | 0.0              | 505       | 64676            | 110.0            | 635       | 103216           | 0.4              | 765       | 4626             | 0.0              | 895       | 3214             | 0.0              |
| 380       | 3039             | 0.0              | 510       | 73825            | 125.1            | 640       | 92605            | 0.2              | 770       | 3782             | 0.0              | 900       | 2580             | 0.0              |
| 385       | 2655             | 0.0              | 515       | 81872            | 135.7            | 645       | 83234            | 0.1              | 775       | 3506             | 0.0              | 905       | 1776             | 0.0              |
| 390       | 2357             | 0.0              | 520       | 88574            | 140.8            | 650       | 73263            | 0.1              | 780       | 3507             | 0.0              | 910       | 3995             | 0.0              |
| 395       | 2186             | 0.0              | 525       | 93289            | 139.6            | 655       | 64627            | 0.1              | 785       | 3267             | 0.0              | 915       | 4288             | 0.0              |
| 400       | 2015             | 0.0              | 530       | 98393            | 135.7            | 660       | 56614            | 0.0              | 790       | 2849             | 0.0              | 920       | 2446             | 0.0              |
| 405       | 2234             | 0.1              | 535       | 103269           | 128.7            | 665       | 49537            | 0.0              | 795       | 3037             | 0.0              | 925       | 3009             | 0.0              |
| 410       | 3412             | 0.2              | 540       | 107316           | 118.6            | 670       | 42866            | 0.0              | 800       | 2716             | 0.0              | 930       | 3026             | 0.0              |
| 415       | 6135             | 0.6              | 545       | 113101           | 108.4            | 675       | 36708            | 0.0              | 805       | 2648             | 0.0              | 935       | 4734             | 0.0              |
| 420       | 12146            | 2.0              | 550       | 120690           | 98.7             | 680       | 31814            | 0.0              | 810       | 3187             | 0.0              | 940       | 3719             | 0.0              |
| 425       | 23983            | 5.9              | 555       | 128583           | 87.9             | 685       | 27485            | 0.0              | 815       | 2931             | 0.0              | 945       | 1480             | 0.0              |
| 430       | 42142            | 14.3             | 560       | 137796           | 77.0             | 690       | 23698            | 0.0              | 820       | 2717             | 0.0              | 950       | 3450             | 0.0              |
| 435       | 68228            | 30.5             | 565       | 146577           | 65.8             | 695       | 20309            | 0.0              | 825       | 2236             | 0.0              | 955       | 5051             | 0.0              |
| 440       | 99323            | 55.5             | 570       | 154581           | 54.6             | 700       | 17890            | 0.0              | 830       | 2628             | 0.0              | 960       | 3176             | 0.0              |
| 445       | 115584           | 77.4             | 575       | 162633           | 44.3             | 705       | 15500            | 0.0              | 835       | 3140             | 0.0              | 965       | 5178             | 0.0              |
| 450       | 94997            | 73.6             | 580       | 168101           | 34.6             | 710       | 13699            | 0.0              | 840       | 3675             | 0.0              | 970       | 6385             | 0.0              |
| 455       | 61433            | 53.7             | 585       | 173145           | 26.5             | 715       | 12398            | 0.0              | 845       | 3283             | 0.0              | 975       | 3810             | 0.0              |
| 460       | 43373            | 41.9             | 590       | 174675           | 19.5             | 720       | 11147            | 0.0              | 850       | 3055             | 0.0              | 980       | 4322             | 0.0              |
| 465       | 32472            | 34.3             | 595       | 173724           | 13.9             | 725       | 9761             | 0.0              | 855       | 2932             | 0.0              | 985       | 4200             | 0.0              |
| 470       | 24257            | 27.9             | 600       | 171241           | 9.7              | 730       | 8651             | 0.0              | 860       | 3382             | 0.0              | 990       | 4661             | 0.0              |
| 475       | 21690            | 27.1             | 605       | 165134           | 6.5              | 735       | 7730             | 0.0              | 865       | 2605             | 0.0              | 995       | 6746             | 0.0              |
| 480       | 23173            | 31.3             | 610       | 156652           | 4.2              | 740       | 6847             | 0.0              | 870       | 3325             | 0.0              | 1000      | 4150             | 0.0              |
| 485       | 27564            | 40.0             | 615       | 147879           | 2.7              | 745       | 6124             | 0.0              | 875       | 3325             | 0.0              |           |                  |                  |

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### Melanopic Flux vs. Wavelength



Melanopic Lumens: 4490.7

M/P: 0.5

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 2672             | 0.0              | 490       | 34553            | 28.8             | 620       | 136720           | 0.1              | 750       | 5870             | 0.0              | 880       | 4216             | 0.0              |
| 365       | 2252             | 0.0              | 495       | 44336            | 36.6             | 625       | 126308           | 0.1              | 755       | 5421             | 0.0              | 885       | 4132             | 0.0              |
| 370       | 2217             | 0.0              | 500       | 54643            | 43.9             | 630       | 114625           | 0.0              | 760       | 5097             | 0.0              | 890       | 3992             | 0.0              |
| 375       | 2697             | 0.0              | 505       | 64676            | 49.6             | 635       | 103216           | 0.0              | 765       | 4626             | 0.0              | 895       | 3214             | 0.0              |
| 380       | 3039             | 0.0              | 510       | 73825            | 53.0             | 640       | 92605            | 0.0              | 770       | 3782             | 0.0              | 900       | 2580             | 0.0              |
| 385       | 2655             | 0.0              | 515       | 81872            | 53.5             | 645       | 83234            | 0.0              | 775       | 3506             | 0.0              | 905       | 1776             | 0.0              |
| 390       | 2357             | 0.0              | 520       | 88574            | 51.6             | 650       | 73263            | 0.0              | 780       | 3507             | 0.0              | 910       | 3995             | 0.0              |
| 395       | 2186             | 0.0              | 525       | 93289            | 47.3             | 655       | 64627            | 0.0              | 785       | 3267             | 0.0              | 915       | 4288             | 0.0              |
| 400       | 2015             | 0.0              | 530       | 98393            | 42.5             | 660       | 56614            | 0.0              | 790       | 2849             | 0.0              | 920       | 2446             | 0.0              |
| 405       | 2234             | 0.0              | 535       | 103269           | 37.2             | 665       | 49537            | 0.0              | 795       | 3037             | 0.0              | 925       | 3009             | 0.0              |
| 410       | 3412             | 0.1              | 540       | 107316           | 31.4             | 670       | 42866            | 0.0              | 800       | 2716             | 0.0              | 930       | 3026             | 0.0              |
| 415       | 6135             | 0.4              | 545       | 113101           | 26.3             | 675       | 36708            | 0.0              | 805       | 2648             | 0.0              | 935       | 4734             | 0.0              |
| 420       | 12146            | 1.4              | 550       | 120690           | 21.7             | 680       | 31814            | 0.0              | 810       | 3187             | 0.0              | 940       | 3719             | 0.0              |
| 425       | 23983            | 3.7              | 555       | 128583           | 17.3             | 685       | 27485            | 0.0              | 815       | 2931             | 0.0              | 945       | 1480             | 0.0              |
| 430       | 42142            | 8.9              | 560       | 137796           | 13.6             | 690       | 23698            | 0.0              | 820       | 2717             | 0.0              | 950       | 3450             | 0.0              |
| 435       | 68228            | 18.2             | 565       | 146577           | 10.3             | 695       | 20309            | 0.0              | 825       | 2236             | 0.0              | 955       | 5051             | 0.0              |
| 440       | 99323            | 33.2             | 570       | 154581           | 7.6              | 700       | 17890            | 0.0              | 830       | 2628             | 0.0              | 960       | 3176             | 0.0              |
| 445       | 115584           | 45.6             | 575       | 162633           | 5.4              | 705       | 15500            | 0.0              | 835       | 3140             | 0.0              | 965       | 5178             | 0.0              |
| 450       | 94997            | 43.8             | 580       | 168101           | 3.8              | 710       | 13699            | 0.0              | 840       | 3675             | 0.0              | 970       | 6385             | 0.0              |
| 455       | 61433            | 32.2             | 585       | 173145           | 2.6              | 715       | 12398            | 0.0              | 845       | 3283             | 0.0              | 975       | 3810             | 0.0              |
| 460       | 43373            | 25.6             | 590       | 174675           | 1.7              | 720       | 11147            | 0.0              | 850       | 3055             | 0.0              | 980       | 4322             | 0.0              |
| 465       | 32472            | 21.2             | 595       | 173724           | 1.1              | 725       | 9761             | 0.0              | 855       | 2932             | 0.0              | 985       | 4200             | 0.0              |
| 470       | 24257            | 17.4             | 600       | 171241           | 0.7              | 730       | 8651             | 0.0              | 860       | 3382             | 0.0              | 990       | 4661             | 0.0              |
| 475       | 21690            | 16.6             | 605       | 165134           | 0.5              | 735       | 7730             | 0.0              | 865       | 2605             | 0.0              | 995       | 6746             | 0.0              |
| 480       | 23173            | 18.6             | 610       | 156652           | 0.3              | 740       | 6847             | 0.0              | 870       | 3325             | 0.0              | 1000      | 4150             | 0.0              |
| 485       | 27564            | 22.7             | 615       | 147879           | 0.2              | 745       | 6124             | 0.0              | 875       | 3325             | 0.0              |           |                  |                  |

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TM-30-18

### Summary

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

### Spectral Power Distribution Comparison



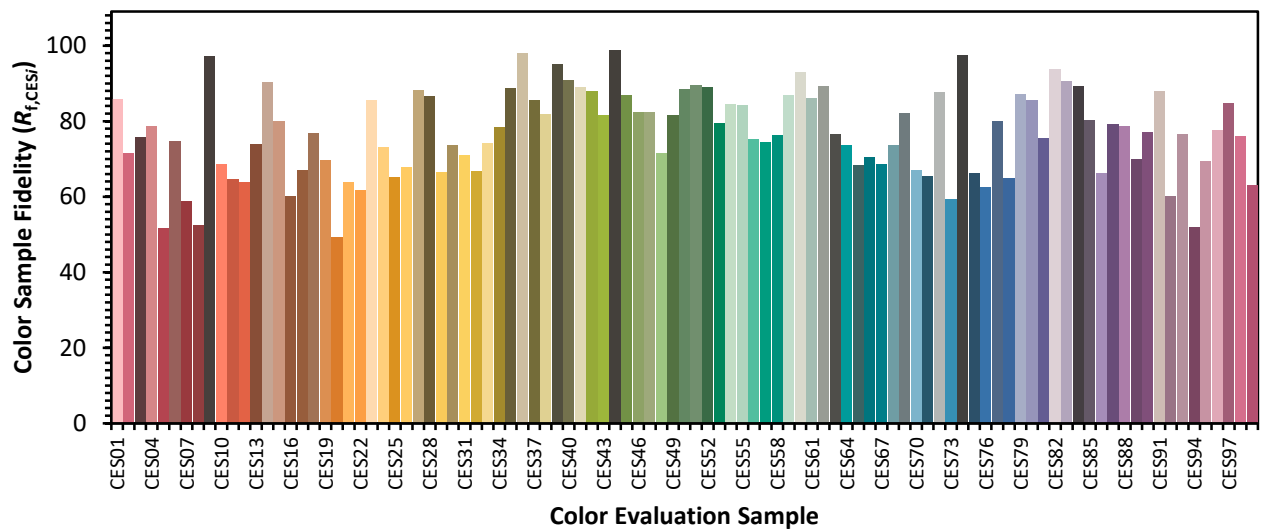
### Color Vector Graphics





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

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



Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)