

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: P322226

Luminaire Tested: **GLEON-SA2A-740-U-T3-HSS**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P322226  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-15)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA2A-740-U-T3-HSS  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(2) 70 CRI, 4000K, 615mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III  
OPTICS WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 6949 lumens  
Efficiency: N/A  
Efficacy: 105.3 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 1' x H: 0')  
IES Classification: Type III - Short  
BUG Rating: B1 - U0 - G2

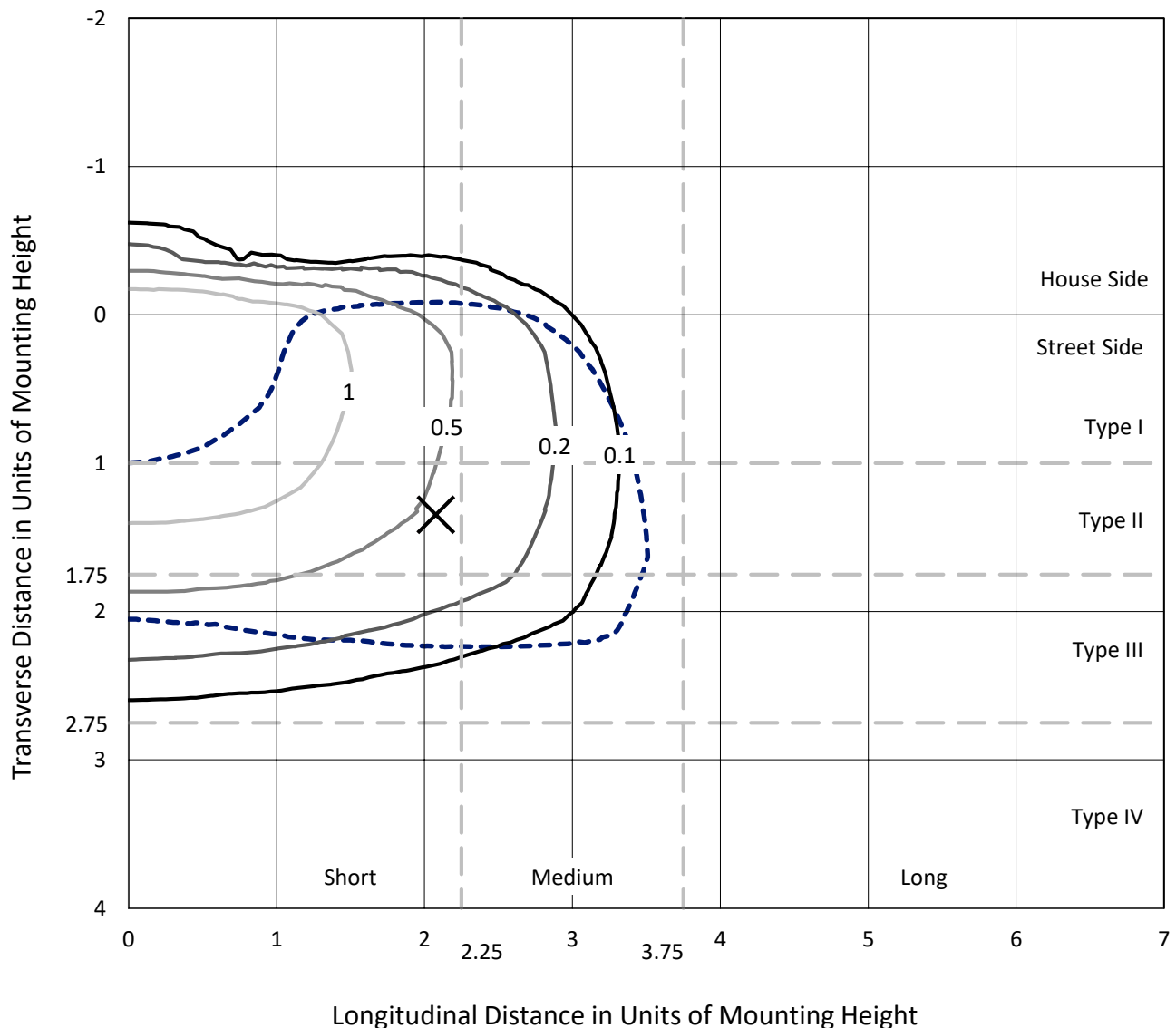
Input Watts (W): 66  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



REPORT NUMBER: P322226  
CATALOG NUMBER: GLEON-SA2A-740-U-T3-HSS

## Iso-Footcandle Lines of Horizontal Illumination

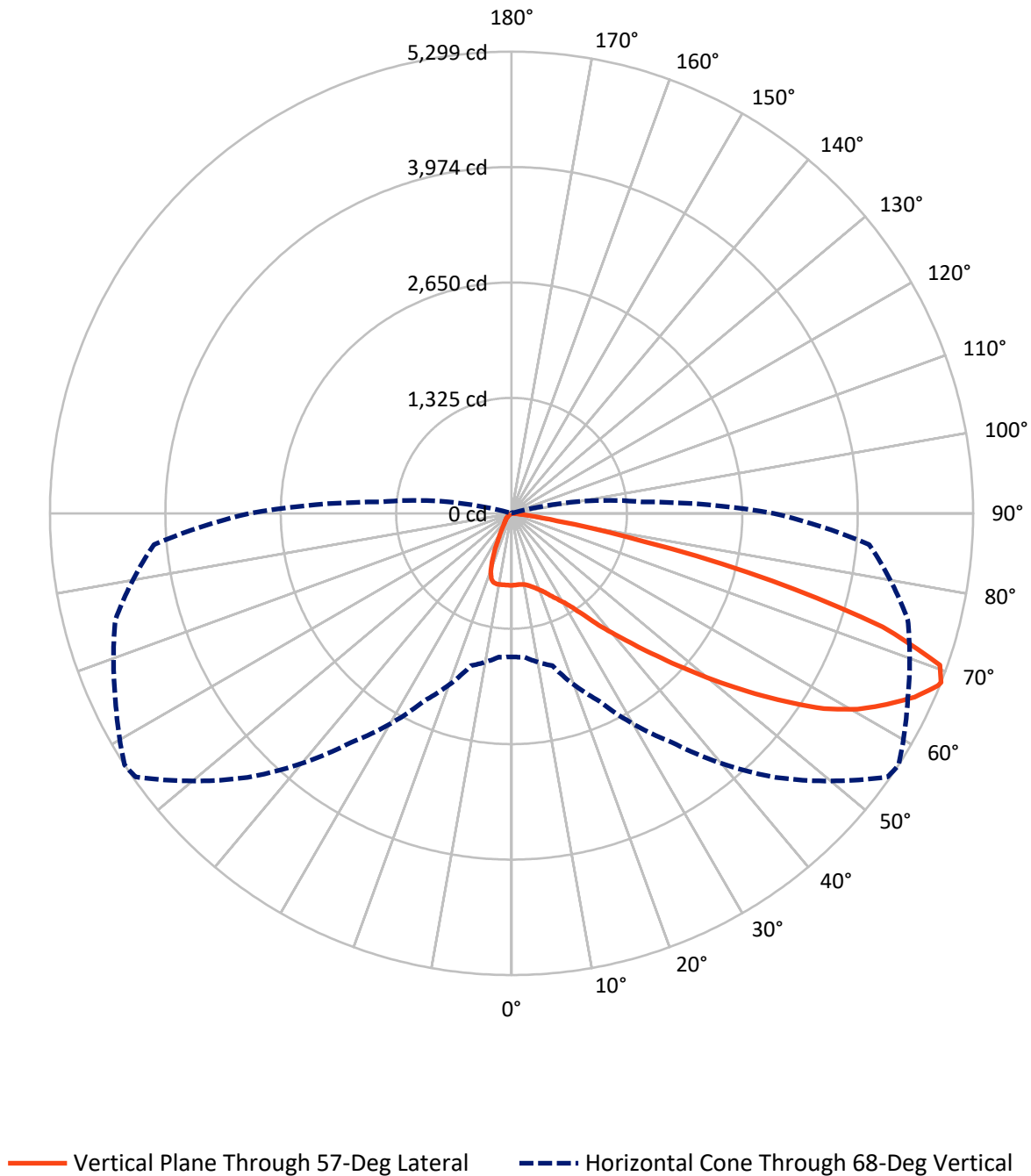
× Max cd  
- - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 1.7 fc  
Type III - Short - N/A

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## Luminous Intensity Polar Plot



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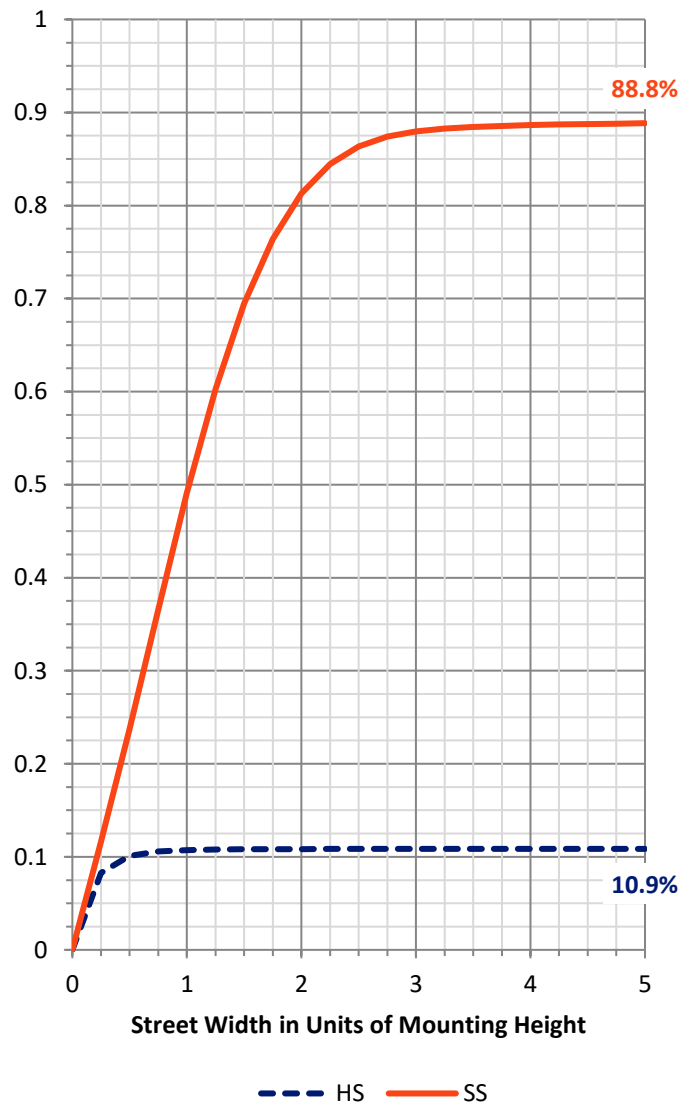
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 762.0    | 0.0    | 762.0  |
|                    | % Fixture | 11.0     | 0.0    | 11.0   |
| <b>Street Side</b> | Lumens    | 6187.0   | 0.0    | 6187.0 |
|                    | % Fixture | 89.0     | 0.0    | 89.0   |
| <b>Total</b>       | Lumens    | 6949.0   | 0.0    | 6949.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 77.3   | 1.1       |
| 10°-20°   | 214.1  | 3.1       |
| 20°-30°   | 369.4  | 5.3       |
| 30°-40°   | 637.6  | 9.2       |
| 40°-50°   | 1090.6 | 15.7      |
| 50°-60°   | 1744.8 | 25.1      |
| 60°-70°   | 2016.0 | 29.0      |
| 70°-80°   | 770.3  | 11.1      |
| 80°-90°   | 28.9   | 0.4       |
| 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°    | 6949.0 | 100.0     |
| 0°-180°   | 6949.0 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P322226

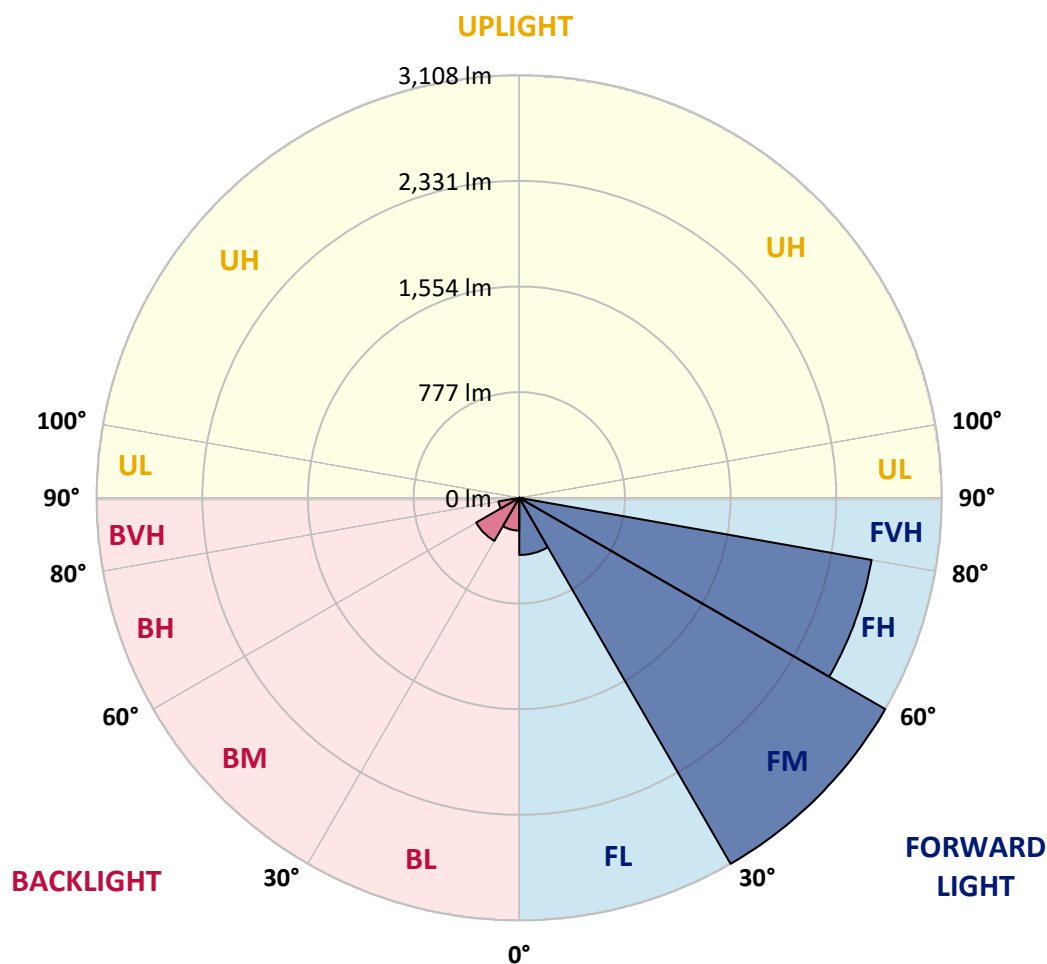
CATALOG NUMBER: GLEON-SA2A-740-U-T3-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 420.0  | 6.0       |                         |      |         |
| FM   | (30°-60°)   | 3107.5 | 44.7      |                         |      |         |
| FH   | (60°-80°)   | 2631.1 | 37.9      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 28.3   | 0.4       |                         |      | G1/100  |
| BL   | (0°-30°)    | 240.8  | 3.5       | B1/500                  |      |         |
| BM   | (30°-60°)   | 365.5  | 5.3       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 155.2  | 2.2       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 0.5    | 0.0       |                         |      | G0/10   |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B1-U0-G2**

Type III Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 57°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 825.7  | 825.7  | 825.7  | 825.7  | 825.7  | 825.7  | 825.7  | 825.7  | 825.7  | 825.7  | 825.7  |
| 2.5°  | 806.3  | 810.0  | 812.6  | 814.2  | 816.2  | 820.5  | 821.8  | 823.8  | 824.7  | 824.7  | 827.0  |
| 5°    | 774.5  | 778.4  | 784.0  | 788.6  | 797.8  | 809.6  | 818.2  | 821.5  | 827.4  | 832.6  | 835.6  |
| 7.5°  | 744.9  | 749.5  | 756.1  | 766.9  | 782.7  | 801.7  | 819.5  | 824.1  | 835.6  | 846.8  | 852.3  |
| 10°   | 725.8  | 729.5  | 738.0  | 753.4  | 774.1  | 800.8  | 825.7  | 831.3  | 851.0  | 869.8  | 880.3  |
| 12.5° | 719.3  | 722.5  | 731.4  | 748.8  | 774.5  | 805.7  | 840.2  | 848.4  | 877.3  | 904.6  | 919.4  |
| 15°   | 728.8  | 729.5  | 739.0  | 755.4  | 780.7  | 817.8  | 864.2  | 874.0  | 910.5  | 946.0  | 964.4  |
| 17.5° | 765.6  | 762.6  | 767.6  | 774.8  | 794.8  | 833.9  | 889.5  | 904.3  | 952.9  | 994.6  | 1012.0 |
| 20°   | 857.6  | 857.6  | 846.4  | 826.7  | 827.0  | 858.9  | 923.6  | 940.4  | 999.9  | 1048.2 | 1063.9 |
| 22.5° | 1015.0 | 1012.0 | 989.7  | 941.4  | 897.0  | 902.0  | 965.4  | 987.1  | 1056.4 | 1108.0 | 1113.2 |
| 25°   | 1204.2 | 1200.6 | 1166.1 | 1098.1 | 1021.2 | 971.6  | 1021.9 | 1046.9 | 1123.7 | 1169.4 | 1158.6 |
| 27.5° | 1404.7 | 1401.7 | 1367.6 | 1283.1 | 1173.7 | 1082.7 | 1089.2 | 1112.9 | 1192.4 | 1237.4 | 1202.9 |
| 30°   | 1598.9 | 1599.9 | 1566.0 | 1479.3 | 1355.4 | 1224.3 | 1174.7 | 1188.5 | 1259.1 | 1304.8 | 1255.5 |
| 32.5° | 1783.5 | 1784.9 | 1755.6 | 1658.7 | 1543.0 | 1388.9 | 1293.0 | 1289.4 | 1336.7 | 1381.7 | 1325.2 |
| 35°   | 1948.2 | 1951.4 | 1931.4 | 1856.2 | 1733.6 | 1572.3 | 1446.4 | 1437.9 | 1446.7 | 1497.7 | 1432.0 |
| 37.5° | 2106.9 | 2108.8 | 2093.7 | 2030.3 | 1927.8 | 1773.7 | 1640.3 | 1628.1 | 1609.1 | 1648.2 | 1572.9 |
| 40°   | 2280.7 | 2275.8 | 2258.3 | 2200.8 | 2112.8 | 1996.1 | 1848.6 | 1827.6 | 1794.4 | 1829.2 | 1758.2 |
| 42.5° | 2442.3 | 2436.8 | 2439.7 | 2374.7 | 2300.4 | 2224.8 | 2091.4 | 2055.3 | 2035.9 | 2076.0 | 1985.6 |
| 45°   | 2644.4 | 2641.5 | 2651.3 | 2594.8 | 2534.7 | 2479.8 | 2369.7 | 2330.3 | 2321.8 | 2368.7 | 2260.6 |
| 47.5° | 2843.9 | 2851.1 | 2881.7 | 2857.7 | 2833.4 | 2785.1 | 2664.5 | 2646.7 | 2652.0 | 2708.8 | 2550.8 |
| 50°   | 3010.1 | 3018.7 | 3102.5 | 3130.1 | 3165.2 | 3137.0 | 3016.0 | 3005.2 | 3025.9 | 3077.2 | 2862.9 |
| 52.5° | 3130.4 | 3147.8 | 3252.0 | 3379.1 | 3507.3 | 3526.3 | 3405.7 | 3395.9 | 3423.8 | 3431.7 | 3104.1 |
| 55°   | 3213.9 | 3229.3 | 3347.3 | 3579.9 | 3840.8 | 3922.9 | 3848.0 | 3809.9 | 3804.6 | 3726.8 | 3357.8 |
| 57.5° | 3228.6 | 3227.0 | 3396.5 | 3709.7 | 4102.3 | 4314.3 | 4267.0 | 4229.5 | 4121.7 | 3999.5 | 3648.6 |
| 60°   | 3145.2 | 3154.7 | 3351.5 | 3754.7 | 4266.6 | 4610.3 | 4613.9 | 4565.3 | 4397.4 | 4264.7 | 3930.5 |
| 62.5° | 2888.2 | 2927.0 | 3125.8 | 3636.7 | 4264.7 | 4729.6 | 4868.3 | 4831.1 | 4630.4 | 4481.8 | 4216.4 |
| 65°   | 2471.6 | 2485.4 | 2675.0 | 3232.6 | 3976.5 | 4679.7 | 5097.3 | 5083.5 | 4840.3 | 4692.8 | 4363.2 |
| 67.5° | 1804.9 | 1775.0 | 1974.1 | 2545.5 | 3366.6 | 4388.5 | 5261.6 | 5279.0 | 5002.3 | 4736.2 | 4206.8 |
| 68°   | 1647.2 | 1656.0 | 1811.1 | 2375.6 | 3207.0 | 4285.7 | 5272.4 | 5299.0 | 5018.4 | 4707.9 | 4121.4 |
| 70°   | 981.8  | 998.9  | 1137.2 | 1635.7 | 2439.7 | 3703.8 | 5155.4 | 5216.2 | 4922.5 | 4416.5 | 3564.8 |
| 72.5° | 250.7  | 271.1  | 401.9  | 732.1  | 1393.5 | 2609.6 | 4352.1 | 4454.9 | 4273.9 | 3582.8 | 2406.5 |
| 75°   | 103.2  | 108.4  | 143.6  | 241.2  | 519.2  | 1175.7 | 2868.5 | 3088.7 | 2962.8 | 2145.0 | 1087.6 |
| 77.5° | 71.3   | 74.9   | 92.3   | 133.7  | 224.7  | 398.6  | 1406.3 | 1565.4 | 1410.3 | 732.1  | 237.2  |
| 80°   | 51.3   | 54.2   | 66.0   | 89.0   | 129.1  | 142.3  | 458.4  | 530.0  | 420.9  | 160.7  | 58.8   |
| 82.5° | 30.6   | 32.9   | 49.3   | 63.4   | 78.5   | 68.0   | 114.0  | 129.5  | 121.9  | 79.8   | 26.3   |
| 85°   | 15.1   | 17.7   | 33.2   | 45.3   | 42.4   | 28.6   | 34.8   | 38.8   | 48.0   | 48.6   | 14.1   |
| 87.5° | 1.0    | 2.0    | 19.4   | 27.3   | 11.8   | 6.6    | 10.2   | 12.5   | 17.1   | 24.0   | 5.9    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

REPORT NUMBER: P322226

CATALOG NUMBER: GLEON-SA2A-740-U-T3-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 825.7  | 825.7  | 825.7  | 825.7 | 825.7 | 825.7 | 825.7 | 825.7 | 825.7 | 825.7 | 825.7 |
| 2.5°  | 828.0  | 828.4  | 826.1  | 825.1 | 825.7 | 821.8 | 820.1 | 820.8 | 820.8 | 821.8 | 820.1 |
| 5°    | 836.2  | 836.2  | 832.3  | 827.0 | 824.1 | 816.5 | 811.6 | 810.3 | 809.3 | 808.6 | 807.3 |
| 7.5°  | 854.0  | 852.0  | 845.1  | 833.6 | 823.8 | 807.3 | 794.8 | 788.3 | 785.0 | 783.7 | 782.7 |
| 10°   | 882.6  | 879.0  | 867.5  | 846.1 | 823.4 | 794.2 | 766.9 | 747.5 | 731.4 | 724.8 | 720.9 |
| 12.5° | 921.0  | 915.8  | 896.4  | 860.9 | 821.1 | 767.2 | 708.1 | 651.2 | 598.3 | 576.7 | 565.8 |
| 15°   | 965.4  | 957.8  | 927.3  | 873.4 | 807.7 | 706.4 | 578.0 | 478.4 | 405.1 | 377.5 | 365.7 |
| 17.5° | 1010.4 | 1000.5 | 954.2  | 881.3 | 767.2 | 580.6 | 405.5 | 306.2 | 257.3 | 244.1 | 239.5 |
| 20°   | 1055.7 | 1041.3 | 977.5  | 875.3 | 675.9 | 418.6 | 267.5 | 223.8 | 209.6 | 205.7 | 204.4 |
| 22.5° | 1098.8 | 1076.4 | 998.6  | 852.3 | 535.3 | 280.9 | 211.6 | 197.8 | 193.2 | 190.9 | 190.2 |
| 25°   | 1136.2 | 1105.0 | 1017.0 | 781.4 | 378.9 | 212.3 | 190.6 | 186.0 | 180.1 | 175.8 | 176.1 |
| 27.5° | 1171.4 | 1133.6 | 1028.1 | 664.4 | 252.7 | 181.4 | 176.4 | 170.2 | 159.4 | 153.1 | 153.1 |
| 30°   | 1213.8 | 1171.7 | 1036.3 | 511.3 | 186.0 | 160.3 | 156.4 | 146.9 | 132.1 | 123.9 | 123.9 |
| 32.5° | 1277.5 | 1229.6 | 1031.1 | 358.8 | 154.1 | 141.0 | 131.8 | 118.6 | 102.5 | 94.6  | 94.3  |
| 35°   | 1375.1 | 1318.9 | 993.6  | 235.3 | 136.0 | 122.6 | 107.8 | 91.7  | 77.5  | 71.0  | 70.6  |
| 37.5° | 1506.5 | 1438.5 | 909.5  | 168.2 | 121.9 | 105.5 | 87.7  | 70.0  | 59.5  | 55.2  | 54.9  |
| 40°   | 1677.1 | 1577.5 | 789.3  | 136.4 | 108.8 | 89.0  | 67.7  | 54.2  | 47.0  | 43.7  | 44.0  |
| 42.5° | 1881.8 | 1726.4 | 645.0  | 117.6 | 95.9  | 73.3  | 52.9  | 42.7  | 38.1  | 35.8  | 35.2  |
| 45°   | 2109.2 | 1873.2 | 493.9  | 104.8 | 83.1  | 59.1  | 41.4  | 33.8  | 30.2  | 28.9  | 28.9  |
| 47.5° | 2359.2 | 2016.2 | 361.4  | 93.6  | 69.3  | 45.7  | 33.2  | 27.6  | 24.6  | 23.7  | 23.3  |
| 50°   | 2586.3 | 2115.4 | 260.6  | 81.8  | 56.8  | 36.1  | 26.9  | 23.0  | 21.0  | 19.7  | 19.7  |
| 52.5° | 2775.5 | 2146.6 | 191.9  | 69.0  | 46.0  | 28.9  | 22.3  | 19.7  | 17.7  | 16.8  | 16.8  |
| 55°   | 2942.1 | 2133.8 | 142.6  | 56.8  | 37.1  | 23.7  | 19.1  | 16.8  | 15.1  | 14.1  | 14.1  |
| 57.5° | 3101.8 | 2092.4 | 106.5  | 46.3  | 29.9  | 19.1  | 16.1  | 14.1  | 12.5  | 11.8  | 11.8  |
| 60°   | 3232.3 | 2023.4 | 79.2   | 37.5  | 24.0  | 15.4  | 13.5  | 11.5  | 10.2  | 9.2   | 9.2   |
| 62.5° | 3338.1 | 1947.2 | 58.2   | 30.9  | 19.1  | 12.2  | 10.5  | 9.5   | 7.6   | 6.6   | 6.6   |
| 65°   | 3338.7 | 1820.7 | 43.7   | 25.6  | 14.8  | 9.5   | 7.9   | 7.6   | 4.9   | 3.9   | 3.6   |
| 67.5° | 3097.2 | 1569.6 | 33.5   | 22.0  | 11.5  | 7.2   | 5.9   | 6.2   | 2.6   | 1.6   | 1.3   |
| 68°   | 3009.5 | 1505.9 | 31.5   | 21.7  | 10.8  | 6.9   | 5.6   | 6.2   | 2.3   | 1.3   | 1.0   |
| 70°   | 2537.3 | 1198.0 | 25.3   | 21.0  | 9.5   | 5.3   | 4.6   | 6.2   | 2.0   | 1.0   | 0.7   |
| 72.5° | 1622.9 | 695.3  | 18.7   | 16.8  | 7.2   | 3.9   | 3.0   | 5.6   | 2.0   | 0.7   | 0.3   |
| 75°   | 690.7  | 215.5  | 12.8   | 11.8  | 4.3   | 3.0   | 2.0   | 3.6   | 1.3   | 0.3   | 0.0   |
| 77.5° | 145.6  | 48.6   | 7.6    | 7.2   | 3.0   | 2.0   | 1.3   | 1.0   | 0.3   | 0.0   | 0.0   |
| 80°   | 37.5   | 14.1   | 3.9    | 3.6   | 1.6   | 1.0   | 0.7   | 0.0   | 0.0   | 0.0   | 0.0   |
| 82.5° | 11.8   | 5.6    | 2.3    | 1.6   | 0.7   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 85°   | 5.9    | 3.3    | 1.3    | 0.7   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 87.5° | 3.3    | 1.0    | 0.3    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |

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

Report Prepared for

Cooper Lighting Solutions

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)