

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: P319803

Luminaire Tested: **GLEON-SA9B-827-U-SL3**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P319803  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-22)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA9B-827-U-SL3  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(9) 80 CRI, 2700K, 800mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III  
SPILL LIGHT ELIMINATOR OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 37559 lumens  
Efficiency: N/A  
Efficacy: 100.4 lumens/watt  
Luminous Opening: Rectangular (W 2.5' x L: 1' x H: 0')  
IES Classification: Type III - Medium  
BUG Rating: B3 - U0 - G5

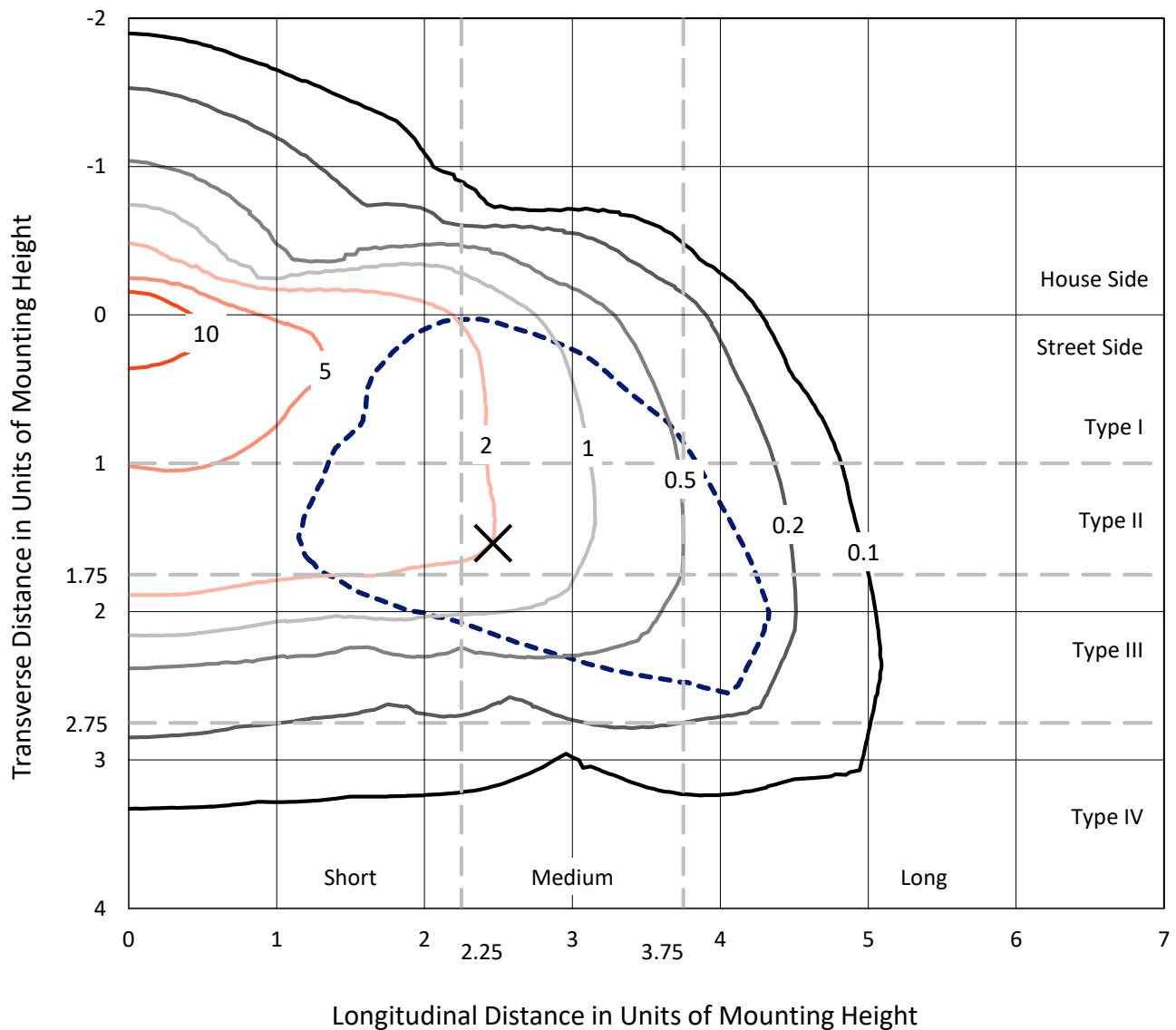
Input Watts (W): 374  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



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## Iso-Footcandle Lines of Horizontal Illumination

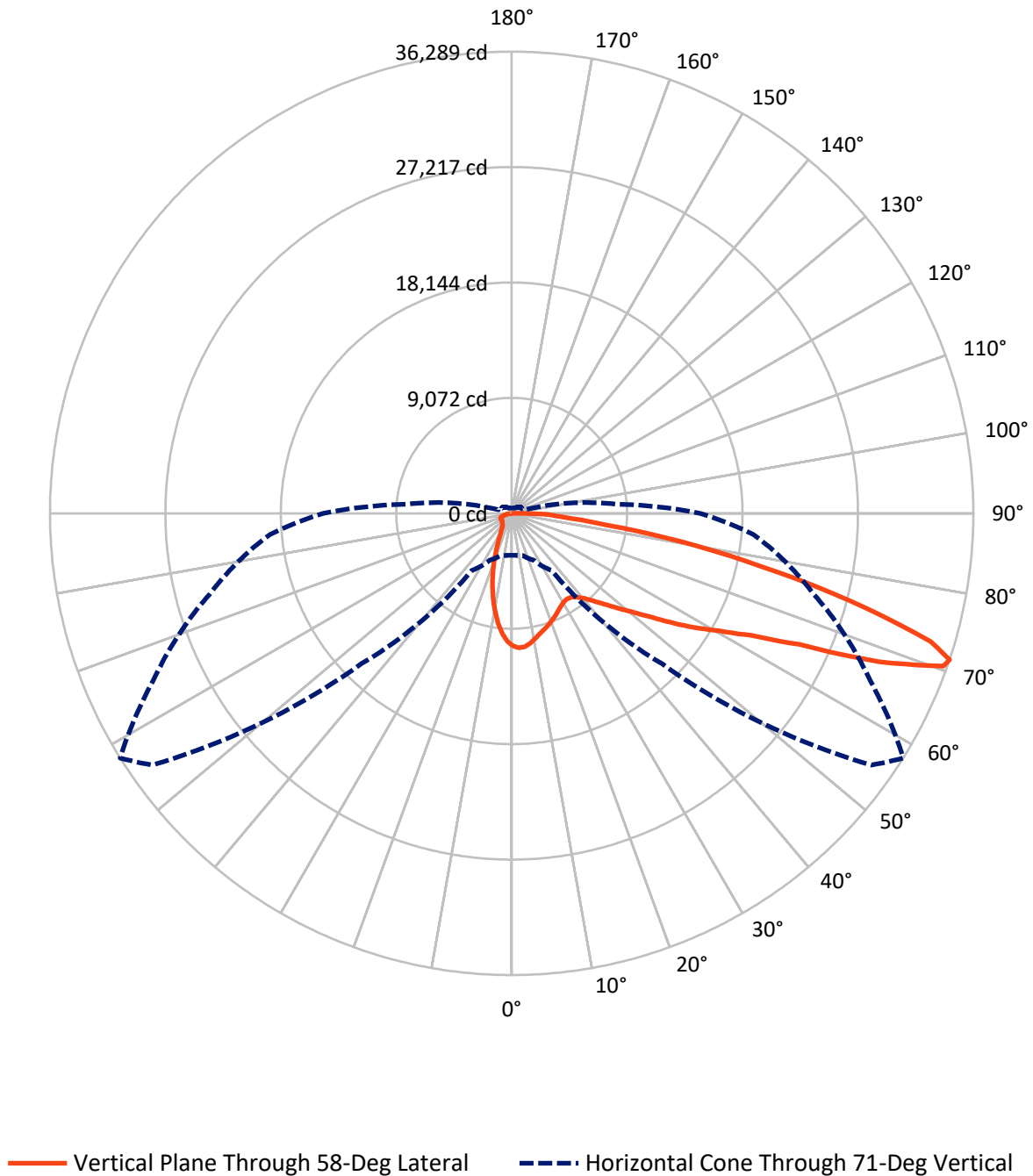
× Max cd  
- - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 16.7 fc  
Type III - Medium - N/A

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## Luminous Intensity Polar Plot



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**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 5615.3   | 0.0    | 5615.3  |
|                    | % Fixture | 15.0     | 0.0    | 15.0    |
| <b>Street Side</b> | Lumens    | 31943.7  | 0.0    | 31943.7 |
|                    | % Fixture | 85.0     | 0.0    | 85.0    |
| <b>Total</b>       | Lumens    | 37559.0  | 0.0    | 37559.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 897.8   | 2.4       |
| 10°-20°   | 1996.3  | 5.3       |
| 20°-30°   | 2537.1  | 6.8       |
| 30°-40°   | 3231.7  | 8.6       |
| 40°-50°   | 4582.7  | 12.2      |
| 50°-60°   | 7091.9  | 18.9      |
| 60°-70°   | 9654.7  | 25.7      |
| 70°-80°   | 6440.8  | 17.1      |
| 80°-90°   | 1126.1  | 3.0       |
| 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°    | 37559.0 | 100.0     |
| 0°-180°   | 37559.0 | 100.0     |

**Coefficient of Utilization**



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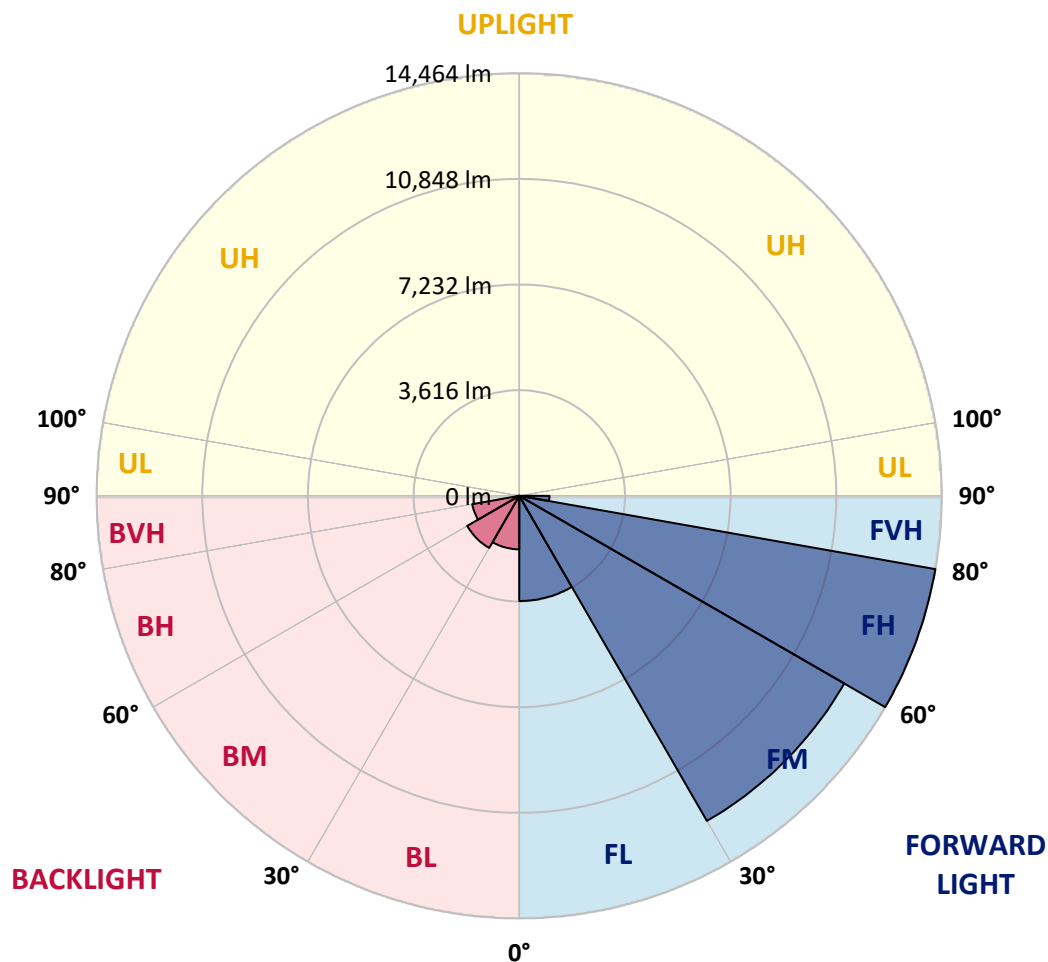
CATALOG NUMBER: GLEON-SA9B-827-U-SL3

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|---------|-----------|-------------------------|------|---------|
|      |             |         |           | B                       | U    | G       |
| FL   | (0°-30°)    | 3600.6  | 9.6       |                         |      |         |
| FM   | (30°-60°)   | 12847.0 | 34.2      |                         |      |         |
| FH   | (60°-80°)   | 14463.5 | 38.5      |                         |      | G5      |
| FVH  | (80°-90°)   | 1032.5  | 2.7       |                         |      | G5      |
| BL   | (0°-30°)    | 1830.4  | 4.9       | B3/2500                 |      |         |
| BM   | (30°-60°)   | 2059.3  | 5.5       | B2/2500                 |      |         |
| BH   | (60°-80°)   | 1632.0  | 4.3       | B3/2500                 |      | G3/2500 |
| BVH  | (80°-90°)   | 93.6    | 0.2       |                         |      | G1/100  |
| UL   | (90°-100°)  | 0.0     | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0     | 0.0       |                         | U0/0 |         |

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

Type III Medium





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 35°     | 45°     | 55°     | 58°     | 65°     | 75°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 10406.4 | 10406.4 | 10406.4 | 10406.4 | 10406.4 | 10406.4 | 10406.4 | 10406.4 | 10406.4 | 10406.4 | 10406.4 |
| 2.5°  | 10682.4 | 10668.0 | 10673.3 | 10662.8 | 10637.9 | 10613.1 | 10576.4 | 10583.0 | 10532.0 | 10456.1 | 10361.9 |
| 5°    | 10480.9 | 10475.7 | 10514.9 | 10537.2 | 10555.5 | 10541.1 | 10530.6 | 10543.7 | 10469.2 | 10364.5 | 10200.9 |
| 7.5°  | 10058.3 | 10000.8 | 10050.5 | 10125.1 | 10195.7 | 10249.4 | 10320.0 | 10329.2 | 10282.1 | 10172.2 | 9957.6  |
| 10°   | 9457.8  | 9402.9  | 9476.1  | 9592.6  | 9733.9  | 9862.1  | 10004.7 | 10030.9 | 10040.0 | 9940.6  | 9680.2  |
| 12.5° | 8835.1  | 8793.2  | 8866.5  | 9030.0  | 9264.2  | 9461.7  | 9689.4  | 9728.6  | 9809.8  | 9743.0  | 9423.8  |
| 15°   | 8277.7  | 8262.0  | 8351.0  | 8511.9  | 8781.4  | 9083.6  | 9412.0  | 9484.0  | 9621.4  | 9599.1  | 9223.6  |
| 17.5° | 7796.3  | 7792.3  | 7860.4  | 8029.1  | 8327.4  | 8709.5  | 9136.0  | 9257.7  | 9461.7  | 9487.9  | 9058.8  |
| 20°   | 7437.8  | 7429.9  | 7477.0  | 7601.3  | 7908.8  | 8341.8  | 8837.7  | 9005.1  | 9299.5  | 9391.1  | 8888.7  |
| 22.5° | 7245.5  | 7244.2  | 7245.5  | 7304.3  | 7555.5  | 7958.5  | 8547.2  | 8751.3  | 9141.2  | 9313.9  | 8700.3  |
| 25°   | 7212.8  | 7208.8  | 7180.0  | 7173.5  | 7316.1  | 7638.0  | 8259.4  | 8484.4  | 8990.8  | 9260.3  | 8521.1  |
| 27.5° | 7297.8  | 7303.0  | 7265.1  | 7203.6  | 7232.4  | 7427.3  | 8009.5  | 8250.2  | 8870.4  | 9249.8  | 8396.8  |
| 30°   | 7474.4  | 7471.8  | 7439.1  | 7375.0  | 7318.7  | 7348.8  | 7831.6  | 8072.3  | 8789.3  | 9295.6  | 8311.7  |
| 32.5° | 7669.4  | 7683.7  | 7677.2  | 7641.9  | 7558.1  | 7437.8  | 7777.9  | 8013.4  | 8765.7  | 9405.5  | 8275.1  |
| 35°   | 7903.5  | 7919.2  | 7966.3  | 7993.8  | 7895.7  | 7702.1  | 7893.1  | 8097.2  | 8833.8  | 9612.2  | 8334.0  |
| 37.5° | 8126.0  | 8166.5  | 8298.7  | 8415.1  | 8331.4  | 8115.5  | 8199.2  | 8344.4  | 9044.4  | 9938.0  | 8492.3  |
| 40°   | 8382.4  | 8417.7  | 8633.6  | 8880.9  | 8867.8  | 8644.1  | 8692.5  | 8789.3  | 9416.0  | 10405.0 | 8778.8  |
| 42.5° | 8634.9  | 8705.5  | 9018.2  | 9368.9  | 9469.6  | 9272.0  | 9349.2  | 9400.3  | 9939.3  | 11023.9 | 9278.6  |
| 45°   | 8971.1  | 9047.0  | 9481.4  | 9904.0  | 10139.5 | 10028.3 | 10151.2 | 10170.9 | 10597.4 | 11866.4 | 10004.7 |
| 47.5° | 9480.1  | 9566.4  | 10072.7 | 10516.3 | 10876.0 | 10887.8 | 11090.6 | 11082.8 | 11419.0 | 12830.7 | 10919.2 |
| 50°   | 10272.9 | 10397.2 | 10811.9 | 11226.7 | 11663.6 | 11907.0 | 12177.8 | 12139.9 | 12404.2 | 13857.7 | 11972.4 |
| 52.5° | 11311.7 | 11369.3 | 11676.7 | 11982.9 | 12525.8 | 13071.4 | 13460.0 | 13425.9 | 13521.5 | 14913.5 | 13168.2 |
| 55°   | 12388.5 | 12431.6 | 12558.5 | 12726.0 | 13456.0 | 14345.7 | 15167.3 | 15113.7 | 14871.6 | 16009.9 | 14349.6 |
| 57.5° | 13356.6 | 13444.3 | 13531.9 | 13601.3 | 14392.8 | 15677.6 | 16913.9 | 16917.8 | 16337.0 | 17192.6 | 15570.3 |
| 60°   | 13507.1 | 13584.3 | 14163.8 | 14710.7 | 15995.5 | 17454.3 | 18783.5 | 18744.3 | 17853.3 | 18476.1 | 16930.9 |
| 62.5° | 11939.7 | 12113.7 | 13081.9 | 14536.7 | 17539.3 | 20704.1 | 21168.6 | 21120.2 | 19666.6 | 20057.8 | 18515.3 |
| 65°   | 8556.4  | 8753.9  | 9922.3  | 12108.5 | 16790.9 | 24285.0 | 25472.9 | 24821.4 | 22139.3 | 22003.3 | 20370.5 |
| 67.5° | 4936.3  | 4983.4  | 5489.7  | 7245.5  | 12784.9 | 24472.1 | 32039.4 | 31127.5 | 25979.3 | 24210.4 | 21278.5 |
| 70°   | 3650.2  | 3648.9  | 3769.3  | 4458.7  | 6918.4  | 19972.8 | 35162.3 | 35980.0 | 30022.0 | 24936.5 | 19995.0 |
| 71°   | 3300.9  | 3304.8  | 3439.6  | 4058.4  | 5479.2  | 16717.7 | 34499.0 | 36288.8 | 31086.9 | 24578.0 | 19066.1 |
| 72.5° | 2823.3  | 2836.4  | 3023.5  | 3639.7  | 4609.2  | 11528.9 | 31641.6 | 34436.2 | 31591.9 | 23693.6 | 17612.6 |
| 75°   | 2141.7  | 2171.8  | 2430.9  | 3068.0  | 4212.8  | 5846.9  | 23222.6 | 27498.2 | 28064.7 | 20906.9 | 13087.1 |
| 77.5° | 1528.1  | 1562.1  | 1855.2  | 2580.0  | 4004.8  | 4406.4  | 15552.0 | 20057.8 | 20653.1 | 13398.5 | 5903.1  |
| 80°   | 965.5   | 1006.1  | 1227.2  | 2052.7  | 3762.7  | 4184.0  | 9773.1  | 13482.2 | 11262.0 | 4287.4  | 1501.9  |
| 82.5° | 566.5   | 597.9   | 761.4   | 1341.0  | 3073.2  | 4029.6  | 5750.1  | 7473.1  | 4382.9  | 1295.2  | 682.9   |
| 85°   | 328.4   | 342.8   | 474.9   | 854.3   | 2232.0  | 3803.3  | 4224.6  | 4177.5  | 1902.3  | 633.2   | 323.2   |
| 87.5° | 153.1   | 170.1   | 281.3   | 446.1   | 1239.0  | 2756.6  | 3338.8  | 2884.8  | 1182.7  | 297.0   | 151.8   |
| 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-SA9B-827-U-SL3

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°     | 105°    | 115°    | 125°    | 135°    | 145°    | 155°    | 165°    | 175°    | 180°    |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 10406.4 | 10406.4 | 10406.4 | 10406.4 | 10406.4 | 10406.4 | 10406.4 | 10406.4 | 10406.4 | 10406.4 | 10406.4 |
| 2.5°  | 10316.1 | 10293.8 | 10200.9 | 10118.5 | 10032.2 | 9919.7  | 9795.4  | 9779.7  | 9703.8  | 9718.2  | 9692.0  |
| 5°    | 10112.0 | 10055.7 | 9832.0  | 9629.2  | 9389.8  | 9175.2  | 8942.3  | 8835.1  | 8680.7  | 8670.2  | 8631.0  |
| 7.5°  | 9820.2  | 9715.6  | 9368.9  | 8984.2  | 8599.6  | 8233.2  | 7870.8  | 7632.7  | 7389.4  | 7286.0  | 7276.9  |
| 10°   | 9491.8  | 9313.9  | 8803.7  | 8234.5  | 7679.8  | 7144.7  | 6626.6  | 6243.3  | 5897.9  | 5734.4  | 5727.8  |
| 12.5° | 9180.5  | 8917.5  | 8217.5  | 7443.0  | 6684.2  | 5990.8  | 5280.4  | 4776.7  | 4343.6  | 4198.4  | 4136.9  |
| 15°   | 8916.2  | 8545.9  | 7647.1  | 6656.7  | 5735.7  | 4772.7  | 3964.2  | 3434.3  | 3034.0  | 2895.3  | 2869.1  |
| 17.5° | 8659.8  | 8183.5  | 7062.3  | 5862.6  | 4749.2  | 3690.8  | 2880.9  | 2487.1  | 2273.9  | 2217.6  | 2216.3  |
| 20°   | 8404.6  | 7810.7  | 6451.3  | 5050.1  | 3795.4  | 2760.5  | 2215.0  | 2038.4  | 1966.4  | 1959.9  | 1949.4  |
| 22.5° | 8115.5  | 7415.5  | 5808.9  | 4235.0  | 2962.0  | 2170.5  | 1882.7  | 1812.0  | 1802.9  | 1826.4  | 1826.4  |
| 25°   | 7844.7  | 7023.0  | 5157.4  | 3436.9  | 2303.9  | 1810.7  | 1681.2  | 1666.8  | 1691.7  | 1733.5  | 1737.4  |
| 27.5° | 7592.2  | 6644.9  | 4521.5  | 2727.8  | 1846.0  | 1594.8  | 1541.2  | 1558.2  | 1602.7  | 1651.1  | 1652.4  |
| 30°   | 7384.1  | 6287.8  | 3904.0  | 2149.6  | 1559.5  | 1433.9  | 1424.8  | 1458.8  | 1507.2  | 1545.1  | 1554.3  |
| 32.5° | 7223.2  | 5982.9  | 3307.4  | 1728.3  | 1372.4  | 1313.6  | 1321.4  | 1350.2  | 1380.3  | 1401.2  | 1415.6  |
| 35°   | 7148.6  | 5721.3  | 2756.6  | 1457.5  | 1253.4  | 1220.7  | 1231.1  | 1246.8  | 1259.9  | 1275.6  | 1287.4  |
| 37.5° | 7161.7  | 5518.5  | 2264.7  | 1288.7  | 1173.6  | 1156.6  | 1156.6  | 1156.6  | 1156.6  | 1164.4  | 1165.7  |
| 40°   | 7283.4  | 5402.0  | 1864.4  | 1181.4  | 1119.9  | 1101.6  | 1087.2  | 1074.1  | 1063.7  | 1068.9  | 1066.3  |
| 42.5° | 7594.8  | 5391.6  | 1571.3  | 1113.4  | 1076.7  | 1046.7  | 1017.9  | 999.6   | 986.5   | 991.7   | 994.3   |
| 45°   | 8123.3  | 5522.4  | 1373.7  | 1065.0  | 1036.2  | 990.4   | 953.8   | 934.1   | 925.0   | 942.0   | 944.6   |
| 47.5° | 8807.6  | 5807.6  | 1253.4  | 1029.6  | 998.2   | 938.1   | 898.8   | 880.5   | 883.1   | 908.0   | 914.5   |
| 50°   | 9689.4  | 6270.8  | 1195.8  | 1007.4  | 972.1   | 893.6   | 853.0   | 837.3   | 845.2   | 880.5   | 888.3   |
| 52.5° | 10657.6 | 6938.0  | 1202.3  | 1000.9  | 955.1   | 860.9   | 817.7   | 799.4   | 812.5   | 845.2   | 851.7   |
| 55°   | 11774.9 | 7740.0  | 1310.9  | 1010.0  | 930.2   | 839.9   | 788.9   | 757.5   | 768.0   | 798.1   | 803.3   |
| 57.5° | 13016.4 | 8658.4  | 1529.4  | 1007.4  | 898.8   | 820.3   | 758.8   | 711.7   | 719.6   | 737.9   | 743.1   |
| 60°   | 14309.1 | 9767.9  | 1868.3  | 1015.3  | 884.4   | 796.8   | 718.3   | 659.4   | 656.8   | 672.5   | 675.1   |
| 62.5° | 15860.7 | 11051.4 | 2255.5  | 1020.5  | 893.6   | 766.7   | 664.6   | 607.1   | 599.2   | 603.1   | 605.8   |
| 65°   | 17459.5 | 11980.3 | 2110.3  | 999.6   | 922.4   | 741.8   | 617.5   | 556.0   | 541.6   | 539.0   | 540.3   |
| 67.5° | 17509.2 | 10984.6 | 1479.7  | 957.7   | 934.1   | 728.7   | 582.2   | 512.9   | 489.3   | 480.2   | 478.8   |
| 70°   | 15702.4 | 8924.0  | 1152.6  | 913.2   | 887.0   | 707.8   | 549.5   | 477.5   | 442.2   | 427.8   | 426.5   |
| 71°   | 14820.6 | 8214.9  | 1092.4  | 891.0   | 851.7   | 686.9   | 535.1   | 461.8   | 425.2   | 409.5   | 406.9   |
| 72.5° | 13437.7 | 7364.5  | 1019.2  | 855.6   | 783.7   | 633.2   | 507.6   | 439.6   | 401.7   | 383.3   | 379.4   |
| 75°   | 9643.6  | 4815.9  | 875.3   | 762.7   | 648.9   | 505.0   | 444.8   | 395.1   | 362.4   | 340.2   | 337.5   |
| 77.5° | 3715.6  | 1916.7  | 662.0   | 634.5   | 497.2   | 395.1   | 366.3   | 341.5   | 317.9   | 295.7   | 294.4   |
| 80°   | 1148.7  | 856.9   | 482.8   | 477.5   | 359.8   | 294.4   | 285.2   | 278.7   | 269.5   | 246.0   | 240.7   |
| 82.5° | 613.6   | 491.9   | 332.3   | 308.8   | 235.5   | 196.2   | 206.7   | 209.3   | 210.6   | 185.8   | 183.2   |
| 85°   | 293.1   | 260.4   | 187.1   | 175.3   | 137.4   | 109.9   | 126.9   | 137.4   | 138.7   | 113.8   | 106.0   |
| 87.5° | 140.0   | 136.1   | 87.7    | 66.7    | 51.0    | 36.6    | 44.5    | 54.9    | 60.2    | 43.2    | 37.9    |
| 90°   | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     |

LM-79-2019: Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Report Prepared for

Cooper Lighting Solutions

Invue

Report Number: SP1-2407-157-9

Test Date: 10/03/2024

Luminaire Tested: EMM2-HTN-SA1A-827-U-5WQ

Data applicable to all product families utilizing light square engine

### Test Information

Test Method: LM-79-2019  
 Report Number: SP1-2407-157-9  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 10/03/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: Invue  
 Catalog Number: **EMM2-HTN-SA1A-827-U-5WQ**  
 Description: Epic Modern Light Square 40W 5WQ Optic

### Spectral Parameters

CCT (K): 2764  
 CIE  $u'$ : 0.2591  
 CIE  $v'$ : 0.5290  
 Duv: 0.0020  
 CIE x: 0.4581  
 CIE y: 0.4156  
 CIE z: 0.1263  
 Peak Wavelength (nm): 603  
 Dominant Wavelength (nm): 583  
 Purity: 62.2537  
 R<sub>f</sub>: 84.7  
 R<sub>g</sub>: 94.6

CRI (Ra): 80.9  
 R1: 78.8  
 R2: 89.9  
 R3: 96.2  
 R4: 79.1  
 R5: 79.1  
 R6: 88.8  
 R7: 81.3  
 R8: 54.3  
 R9: -1.5  
 R10: 77.9  
 R11: 78.9  
 R12: 71.6  
 R13: 81.2  
 R14: 98.5  
 R15: 69.9



### Test Conditions

Stabilization Time: 81M  
 Operation Time: 2H 21M  
 Sphere Temperature (°C): 25.2

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| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 6/18/2024        | 12/18/2024           |
| Power Meter                    | INXT2011004           | 2/8/2024         | 2/8/2025             |
| AC Power Source                | IN0063                | 10/24/2023       | 10/24/2024           |
| DC Power Source                | IN0208                | 10/24/2023       | 10/24/2024           |
| Sphere Thermometer             | IN0085                | 10/24/2023       | 10/24/2024           |
| Room Thermometer               | IN0046                | 10/24/2023       | 10/24/2024           |

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**CIE 1931 Chromaticity Diagram**



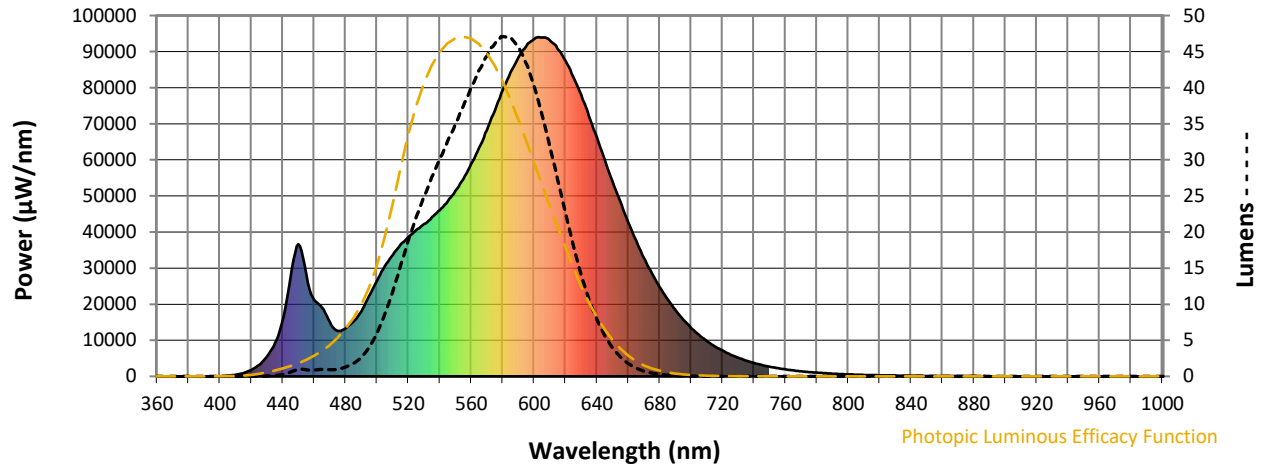
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 2700K 4-step quadrangle

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### Photopic Flux vs. Wavelength


**Photopic Lumens: 4337.9**

| 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       | 0                | 0.0              | 490       | 18018            | 2.6              | 620       | 87426            | 22.8             | 750       | 2680             | 0.0              | 880       | 58               | 0.0              |
| 365       | 0                | 0.0              | 495       | 22295            | 3.9              | 625       | 83013            | 18.2             | 755       | 2287             | 0.0              | 885       | 46               | 0.0              |
| 370       | 0                | 0.0              | 500       | 26478            | 5.8              | 630       | 78077            | 14.1             | 760       | 1944             | 0.0              | 890       | 45               | 0.0              |
| 375       | 0                | 0.0              | 505       | 30524            | 8.5              | 635       | 72080            | 10.7             | 765       | 1653             | 0.0              | 895       | 41               | 0.0              |
| 380       | 0                | 0.0              | 510       | 33611            | 11.5             | 640       | 66249            | 7.9              | 770       | 1413             | 0.0              | 900       | 38               | 0.0              |
| 385       | 0                | 0.0              | 515       | 36490            | 15.2             | 645       | 59973            | 5.7              | 775       | 1198             | 0.0              | 905       | 33               | 0.0              |
| 390       | 0                | 0.0              | 520       | 38610            | 18.7             | 650       | 53972            | 3.9              | 780       | 1025             | 0.0              | 910       | 30               | 0.0              |
| 395       | 0                | 0.0              | 525       | 40511            | 21.9             | 655       | 48369            | 2.7              | 785       | 874              | 0.0              | 915       | 23               | 0.0              |
| 400       | 48               | 0.0              | 530       | 42223            | 24.9             | 660       | 42641            | 1.8              | 790       | 747              | 0.0              | 920       | 24               | 0.0              |
| 405       | 201              | 0.0              | 535       | 44137            | 27.6             | 665       | 37602            | 1.1              | 795       | 639              | 0.0              | 925       | 22               | 0.0              |
| 410       | 457              | 0.0              | 540       | 46032            | 30.0             | 670       | 32798            | 0.7              | 800       | 547              | 0.0              | 930       | 22               | 0.0              |
| 415       | 925              | 0.0              | 545       | 48553            | 32.5             | 675       | 28558            | 0.5              | 805       | 473              | 0.0              | 935       | 17               | 0.0              |
| 420       | 1816             | 0.0              | 550       | 51408            | 34.9             | 680       | 24782            | 0.3              | 810       | 401              | 0.0              | 940       | 13               | 0.0              |
| 425       | 3217             | 0.0              | 555       | 54711            | 37.4             | 685       | 21386            | 0.2              | 815       | 351              | 0.0              | 945       | 6                | 0.0              |
| 430       | 5520             | 0.0              | 560       | 58847            | 40.0             | 690       | 18413            | 0.1              | 820       | 307              | 0.0              | 950       | 10               | 0.0              |
| 435       | 9225             | 0.1              | 565       | 63386            | 42.4             | 695       | 15721            | 0.1              | 825       | 261              | 0.0              | 955       | 11               | 0.0              |
| 440       | 15522            | 0.2              | 570       | 68196            | 44.3             | 700       | 13432            | 0.0              | 830       | 228              | 0.0              | 960       | 8                | 0.0              |
| 445       | 27642            | 0.6              | 575       | 73613            | 46.0             | 705       | 11513            | 0.0              | 835       | 193              | 0.0              | 965       | 12               | 0.0              |
| 450       | 36602            | 0.9              | 580       | 79207            | 47.1             | 710       | 9780             | 0.0              | 840       | 174              | 0.0              | 970       | 3                | 0.0              |
| 455       | 28292            | 0.9              | 585       | 84248            | 47.0             | 715       | 8356             | 0.0              | 845       | 151              | 0.0              | 975       | 8                | 0.0              |
| 460       | 21166            | 0.9              | 590       | 88397            | 45.7             | 720       | 7161             | 0.0              | 850       | 123              | 0.0              | 980       | 2                | 0.0              |
| 465       | 19092            | 1.0              | 595       | 91428            | 43.4             | 725       | 6067             | 0.0              | 855       | 106              | 0.0              | 985       | 13               | 0.0              |
| 470       | 14951            | 0.9              | 600       | 93452            | 40.3             | 730       | 5164             | 0.0              | 860       | 95               | 0.0              | 990       | 16               | 0.0              |
| 475       | 12606            | 1.0              | 605       | 93959            | 36.4             | 735       | 4393             | 0.0              | 865       | 82               | 0.0              | 995       | 20               | 0.0              |
| 480       | 13323            | 1.3              | 610       | 93079            | 32.0             | 740       | 3694             | 0.0              | 870       | 77               | 0.0              | 1000      | 0                | 0.0              |
| 485       | 15164            | 1.8              | 615       | 90707            | 27.3             | 745       | 3157             | 0.0              | 875       | 65               | 0.0              |           |                  |                  |

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### Scotopic Flux vs. Wavelength



Scotopic Lumens: 5286.7

S/P: 1.22

| 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       | 0                | 0.0              | 490       | 18018            | 75.9             | 620       | 87426            | 0.4              | 750       | 2680             | 0.0              | 880       | 58               | 0.0              |
| 365       | 0                | 0.0              | 495       | 22295            | 93.2             | 625       | 83013            | 0.2              | 755       | 2287             | 0.0              | 885       | 46               | 0.0              |
| 370       | 0                | 0.0              | 500       | 26478            | 107.8            | 630       | 78077            | 0.1              | 760       | 1944             | 0.0              | 890       | 45               | 0.0              |
| 375       | 0                | 0.0              | 505       | 30524            | 118.7            | 635       | 72080            | 0.1              | 765       | 1653             | 0.0              | 895       | 41               | 0.0              |
| 380       | 0                | 0.0              | 510       | 33611            | 122.2            | 640       | 66249            | 0.1              | 770       | 1413             | 0.0              | 900       | 38               | 0.0              |
| 385       | 0                | 0.0              | 515       | 36490            | 120.8            | 645       | 59973            | 0.0              | 775       | 1198             | 0.0              | 905       | 33               | 0.0              |
| 390       | 0                | 0.0              | 520       | 38610            | 113.9            | 650       | 53972            | 0.0              | 780       | 1025             | 0.0              | 910       | 30               | 0.0              |
| 395       | 0                | 0.0              | 525       | 40511            | 104.1            | 655       | 48369            | 0.0              | 785       | 874              | 0.0              | 915       | 23               | 0.0              |
| 400       | 48               | 0.0              | 530       | 42223            | 92.4             | 660       | 42641            | 0.0              | 790       | 747              | 0.0              | 920       | 24               | 0.0              |
| 405       | 201              | 0.0              | 535       | 44137            | 80.5             | 665       | 37602            | 0.0              | 795       | 639              | 0.0              | 925       | 22               | 0.0              |
| 410       | 457              | 0.1              | 540       | 46032            | 68.2             | 670       | 32798            | 0.0              | 800       | 547              | 0.0              | 930       | 22               | 0.0              |
| 415       | 925              | 0.3              | 545       | 48553            | 57.1             | 675       | 28558            | 0.0              | 805       | 473              | 0.0              | 935       | 17               | 0.0              |
| 420       | 1816             | 1.1              | 550       | 51408            | 46.7             | 680       | 24782            | 0.0              | 810       | 401              | 0.0              | 940       | 13               | 0.0              |
| 425       | 3217             | 2.5              | 555       | 54711            | 37.4             | 685       | 21386            | 0.0              | 815       | 351              | 0.0              | 945       | 6                | 0.0              |
| 430       | 5520             | 5.9              | 560       | 58847            | 29.4             | 690       | 18413            | 0.0              | 820       | 307              | 0.0              | 950       | 10               | 0.0              |
| 435       | 9225             | 12.5             | 565       | 63386            | 22.5             | 695       | 15721            | 0.0              | 825       | 261              | 0.0              | 955       | 11               | 0.0              |
| 440       | 15522            | 26.3             | 570       | 68196            | 16.9             | 700       | 13432            | 0.0              | 830       | 228              | 0.0              | 960       | 8                | 0.0              |
| 445       | 27642            | 55.2             | 575       | 73613            | 12.4             | 705       | 11513            | 0.0              | 835       | 193              | 0.0              | 965       | 12               | 0.0              |
| 450       | 36602            | 85.4             | 580       | 79207            | 9.0              | 710       | 9780             | 0.0              | 840       | 174              | 0.0              | 970       | 3                | 0.0              |
| 455       | 28292            | 75.1             | 585       | 84248            | 6.3              | 715       | 8356             | 0.0              | 845       | 151              | 0.0              | 975       | 8                | 0.0              |
| 460       | 21166            | 63.2             | 590       | 88397            | 4.4              | 720       | 7161             | 0.0              | 850       | 123              | 0.0              | 980       | 2                | 0.0              |
| 465       | 19092            | 63.2             | 595       | 91428            | 3.0              | 725       | 6067             | 0.0              | 855       | 106              | 0.0              | 985       | 13               | 0.0              |
| 470       | 14951            | 54.2             | 600       | 93452            | 2.0              | 730       | 5164             | 0.0              | 860       | 95               | 0.0              | 990       | 16               | 0.0              |
| 475       | 12606            | 48.8             | 605       | 93959            | 1.3              | 735       | 4393             | 0.0              | 865       | 82               | 0.0              | 995       | 20               | 0.0              |
| 480       | 13323            | 54.2             | 610       | 93079            | 0.9              | 740       | 3694             | 0.0              | 870       | 77               | 0.0              | 1000      | 0                | 0.0              |
| 485       | 15164            | 63.3             | 615       | 90707            | 0.5              | 745       | 3157             | 0.0              | 875       | 65               | 0.0              |           |                  |                  |

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### Melanopic Flux vs. Wavelength



**Melanopic Lumens: 9797**

**M/P: 2.26**

| 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       | 0                | 0.0              | 490       | 18018            | 27.7             | 620       | 87426            | 1.1              | 750       | 2680             | 0.0              | 880       | 58               | 0.0              |
| 365       | 0                | 0.0              | 495       | 22295            | 36.0             | 625       | 83013            | 0.7              | 755       | 2287             | 0.0              | 885       | 46               | 0.0              |
| 370       | 0                | 0.0              | 500       | 26478            | 44.2             | 630       | 78077            | 0.4              | 760       | 1944             | 0.0              | 890       | 45               | 0.0              |
| 375       | 0                | 0.0              | 505       | 30524            | 51.8             | 635       | 72080            | 0.3              | 765       | 1653             | 0.0              | 895       | 41               | 0.0              |
| 380       | 0                | 0.0              | 510       | 33611            | 57.0             | 640       | 66249            | 0.2              | 770       | 1413             | 0.0              | 900       | 38               | 0.0              |
| 385       | 0                | 0.0              | 515       | 36490            | 60.5             | 645       | 59973            | 0.1              | 775       | 1198             | 0.0              | 905       | 33               | 0.0              |
| 390       | 0                | 0.0              | 520       | 38610            | 61.4             | 650       | 53972            | 0.1              | 780       | 1025             | 0.0              | 910       | 30               | 0.0              |
| 395       | 0                | 0.0              | 525       | 40511            | 60.6             | 655       | 48369            | 0.0              | 785       | 874              | 0.0              | 915       | 23               | 0.0              |
| 400       | 48               | 0.0              | 530       | 42223            | 58.2             | 660       | 42641            | 0.0              | 790       | 747              | 0.0              | 920       | 24               | 0.0              |
| 405       | 201              | 0.0              | 535       | 44137            | 55.0             | 665       | 37602            | 0.0              | 795       | 639              | 0.0              | 925       | 22               | 0.0              |
| 410       | 457              | 0.0              | 540       | 46032            | 50.9             | 670       | 32798            | 0.0              | 800       | 547              | 0.0              | 930       | 22               | 0.0              |
| 415       | 925              | 0.1              | 545       | 48553            | 46.6             | 675       | 28558            | 0.0              | 805       | 473              | 0.0              | 935       | 17               | 0.0              |
| 420       | 1816             | 0.3              | 550       | 51408            | 42.0             | 680       | 24782            | 0.0              | 810       | 401              | 0.0              | 940       | 13               | 0.0              |
| 425       | 3217             | 0.8              | 555       | 54711            | 37.4             | 685       | 21386            | 0.0              | 815       | 351              | 0.0              | 945       | 6                | 0.0              |
| 430       | 5520             | 1.9              | 560       | 58847            | 32.9             | 690       | 18413            | 0.0              | 820       | 307              | 0.0              | 950       | 10               | 0.0              |
| 435       | 9225             | 4.1              | 565       | 63386            | 28.4             | 695       | 15721            | 0.0              | 825       | 261              | 0.0              | 955       | 11               | 0.0              |
| 440       | 15522            | 8.7              | 570       | 68196            | 24.1             | 700       | 13432            | 0.0              | 830       | 228              | 0.0              | 960       | 8                | 0.0              |
| 445       | 27642            | 18.5             | 575       | 73613            | 20.0             | 705       | 11513            | 0.0              | 835       | 193              | 0.0              | 965       | 12               | 0.0              |
| 450       | 36602            | 28.3             | 580       | 79207            | 16.3             | 710       | 9780             | 0.0              | 840       | 174              | 0.0              | 970       | 3                | 0.0              |
| 455       | 28292            | 24.7             | 585       | 84248            | 12.9             | 715       | 8356             | 0.0              | 845       | 151              | 0.0              | 975       | 8                | 0.0              |
| 460       | 21166            | 20.4             | 590       | 88397            | 9.8              | 720       | 7161             | 0.0              | 850       | 123              | 0.0              | 980       | 2                | 0.0              |
| 465       | 19092            | 20.1             | 595       | 91428            | 7.3              | 725       | 6067             | 0.0              | 855       | 106              | 0.0              | 985       | 13               | 0.0              |
| 470       | 14951            | 17.2             | 600       | 93452            | 5.3              | 730       | 5164             | 0.0              | 860       | 95               | 0.0              | 990       | 16               | 0.0              |
| 475       | 12606            | 15.7             | 605       | 93959            | 3.7              | 735       | 4393             | 0.0              | 865       | 82               | 0.0              | 995       | 20               | 0.0              |
| 480       | 13323            | 18.0             | 610       | 93079            | 2.5              | 740       | 3694             | 0.0              | 870       | 77               | 0.0              | 1000      | 0                | 0.0              |
| 485       | 15164            | 21.9             | 615       | 90707            | 1.7              | 745       | 3157             | 0.0              | 875       | 65               | 0.0              |           |                  |                  |

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TM-30-18

### Summary

$R_f = 84.7$   
 $R_g = 94.6$   
 $CIE R_a = 80.9$   
 $R_g = -1.5$



### Color Vector Graphics



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 84 | CES51 = 95 | CES76 = 81 |
| CES02 = 63 | CES27 = 95 | CES52 = 94 | CES77 = 84 |
| CES03 = 31 | CES28 = 94 | CES53 = 89 | CES78 = 81 |
| CES04 = 71 | CES29 = 87 | CES54 = 91 | CES79 = 89 |
| CES05 = 50 | CES30 = 94 | CES55 = 90 | CES80 = 89 |
| CES06 = 52 | CES31 = 89 | CES56 = 86 | CES81 = 69 |
| CES07 = 43 | CES32 = 82 | CES57 = 85 | CES82 = 96 |
| CES08 = 41 | CES33 = 91 | CES58 = 86 | CES83 = 93 |
| CES09 = 29 | CES34 = 92 | CES59 = 91 | CES84 = 92 |
| CES10 = 77 | CES35 = 96 | CES60 = 94 | CES85 = 76 |
| CES11 = 60 | CES36 = 90 | CES61 = 89 | CES86 = 65 |
| CES12 = 66 | CES37 = 96 | CES62 = 94 | CES87 = 84 |
| CES13 = 44 | CES38 = 98 | CES63 = 87 | CES88 = 86 |
| CES14 = 74 | CES39 = 98 | CES64 = 82 | CES89 = 73 |
| CES15 = 72 | CES40 = 95 | CES65 = 78 | CES90 = 88 |
| CES16 = 48 | CES41 = 96 | CES66 = 81 | CES91 = 82 |
| CES17 = 50 | CES42 = 97 | CES67 = 80 | CES92 = 64 |
| CES18 = 57 | CES43 = 91 | CES68 = 83 | CES93 = 78 |
| CES19 = 73 | CES44 = 99 | CES69 = 88 | CES94 = 59 |
| CES20 = 67 | CES45 = 93 | CES70 = 80 | CES95 = 74 |
| CES21 = 87 | CES46 = 89 | CES71 = 79 | CES96 = 83 |
| CES22 = 79 | CES47 = 92 | CES72 = 92 | CES97 = 88 |
| CES23 = 92 | CES48 = 83 | CES73 = 75 | CES98 = 83 |
| CES24 = 91 | CES49 = 90 | CES74 = 91 | CES99 = 74 |
| CES25 = 72 | CES50 = 94 | CES75 = 81 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)