

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: P319810

Luminaire Tested: **GLEON-SA6C-827-U-SL3**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P319810  
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-SA6C-827-U-SL3  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(6) 80 CRI, 2700K, 1050mA 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: 31101 lumens  
Efficiency: N/A  
Efficacy: 93.4 lumens/watt  
Luminous Opening: Rectangular (W 1.5' x L: 1' x H: 0')  
IES Classification: Type III - Medium  
BUG Rating: B3 - U0 - G5

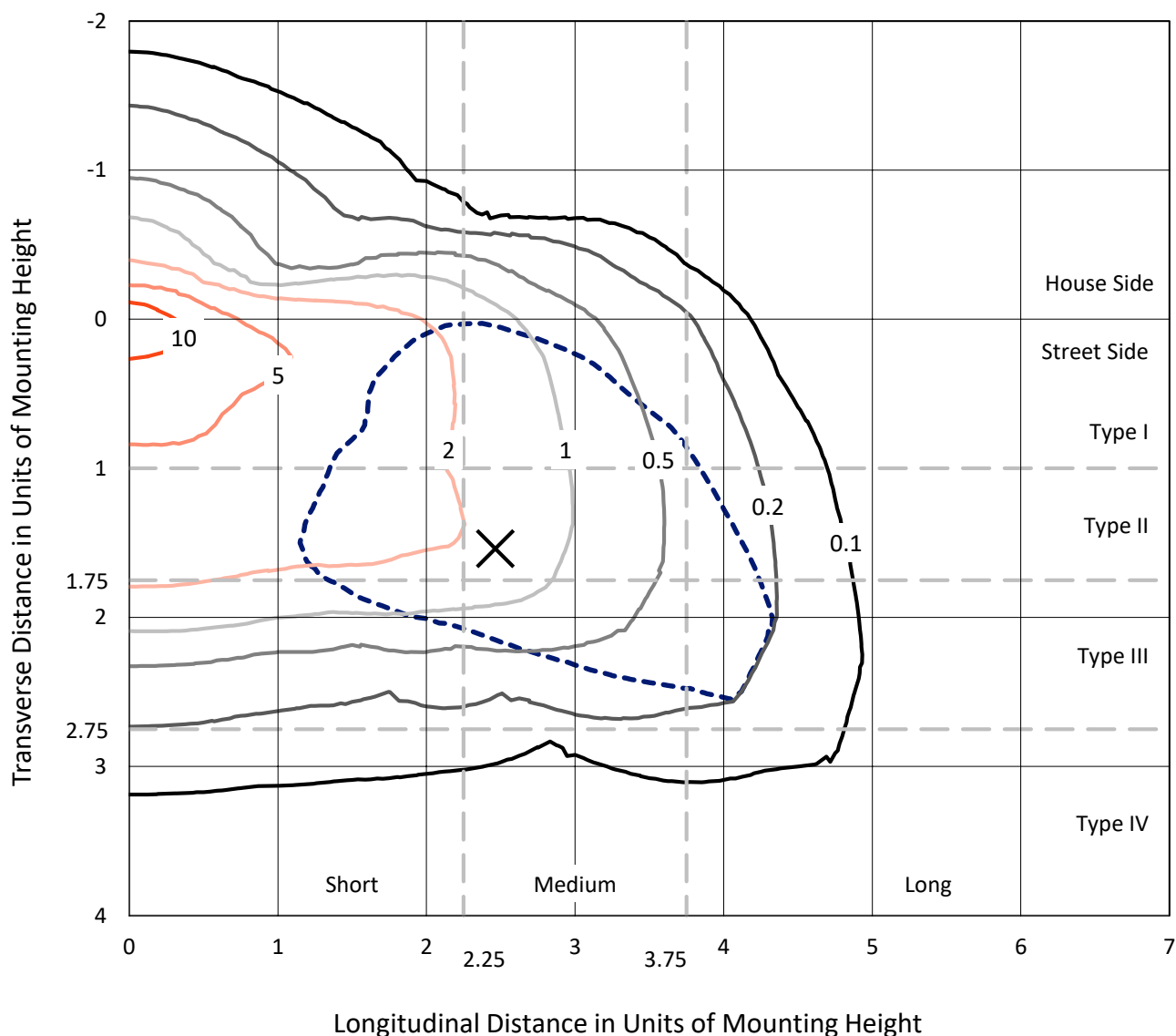
Input Watts (W): 333  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



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## Iso-Footcandle Lines of Horizontal Illumination

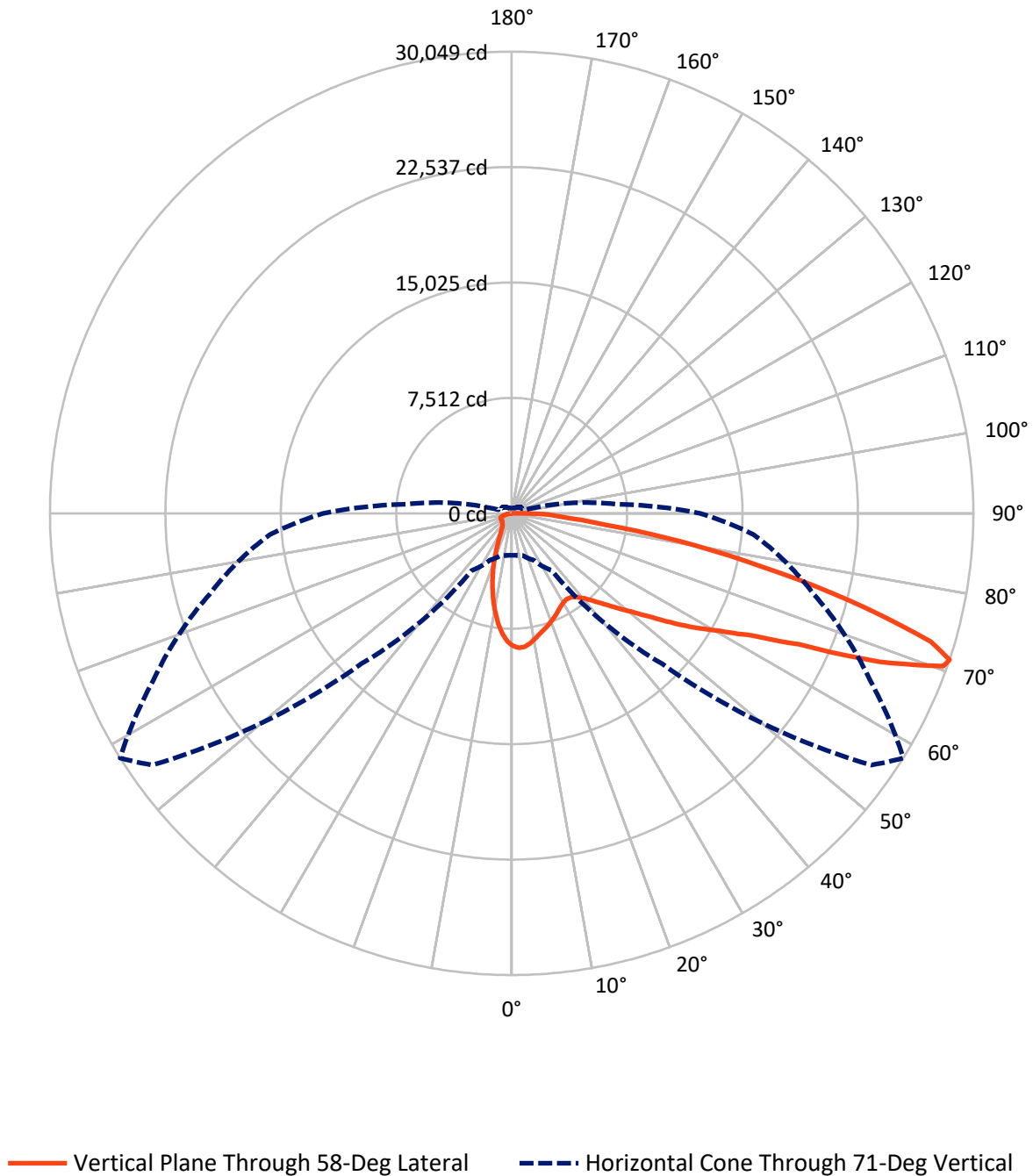
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 13.8 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    | 4649.8   | 0.0    | 4649.8  |
|                    | % Fixture | 15.0     | 0.0    | 15.0    |
| <b>Street Side</b> | Lumens    | 26451.2  | 0.0    | 26451.2 |
|                    | % Fixture | 85.0     | 0.0    | 85.0    |
| <b>Total</b>       | Lumens    | 31101.0  | 0.0    | 31101.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 743.4   | 2.4       |
| 10°-20°   | 1653.0  | 5.3       |
| 20°-30°   | 2100.8  | 6.8       |
| 30°-40°   | 2676.0  | 8.6       |
| 40°-50°   | 3794.7  | 12.2      |
| 50°-60°   | 5872.5  | 18.9      |
| 60°-70°   | 7994.7  | 25.7      |
| 70°-80°   | 5333.4  | 17.1      |
| 80°-90°   | 932.5   | 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°    | 31101.0 | 100.0     |
| 0°-180°   | 31101.0 | 100.0     |

**Coefficient of Utilization**



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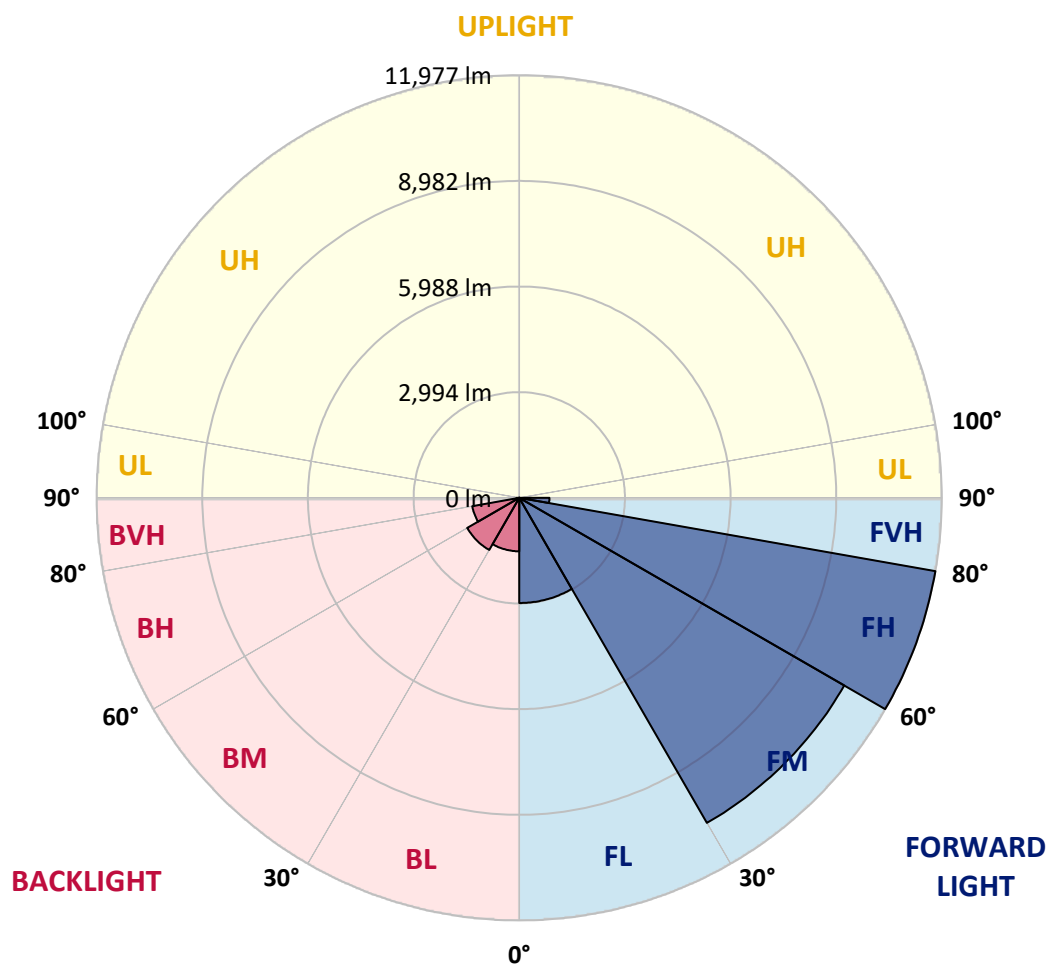
CATALOG NUMBER: GLEON-SA6C-827-U-SL3

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |          |
|------|-------------|---------|-----------|-------------------------|------|----------|
|      |             |         |           | B                       | U    | G        |
| FL   | (0°-30°)    | 2981.5  | 9.6       |                         |      |          |
| FM   | (30°-60°)   | 10638.1 | 34.2      |                         |      |          |
| FH   | (60°-80°)   | 11976.6 | 38.5      |                         |      | G4/12000 |
| FVH  | (80°-90°)   | 855.0   | 2.7       |                         |      | G5       |
| BL   | (0°-30°)    | 1515.7  | 4.9       | B3/2500                 |      |          |
| BM   | (30°-60°)   | 1705.2  | 5.5       | B2/2500                 |      |          |
| BH   | (60°-80°)   | 1351.4  | 4.3       | B3/2500                 |      | G3/2500  |
| BVH  | (80°-90°)   | 77.5    | 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°    | 8617.1  | 8617.1  | 8617.1  | 8617.1  | 8617.1  | 8617.1  | 8617.1  | 8617.1  | 8617.1  | 8617.1  | 8617.1  |
| 2.5°  | 8845.6  | 8833.7  | 8838.1  | 8829.4  | 8808.8  | 8788.2  | 8757.9  | 8763.3  | 8721.1  | 8658.2  | 8580.2  |
| 5°    | 8678.8  | 8674.5  | 8707.0  | 8725.4  | 8740.6  | 8728.6  | 8720.0  | 8730.8  | 8669.1  | 8582.4  | 8447.0  |
| 7.5°  | 8328.9  | 8281.2  | 8322.4  | 8384.1  | 8442.6  | 8487.1  | 8545.6  | 8553.1  | 8514.1  | 8423.1  | 8245.5  |
| 10°   | 7831.6  | 7786.1  | 7846.8  | 7943.2  | 8060.2  | 8166.4  | 8284.5  | 8306.1  | 8313.7  | 8231.4  | 8015.8  |
| 12.5° | 7315.9  | 7281.3  | 7341.9  | 7477.4  | 7671.3  | 7834.9  | 8023.4  | 8055.9  | 8123.0  | 8067.8  | 7803.5  |
| 15°   | 6854.4  | 6841.4  | 6915.1  | 7048.3  | 7271.5  | 7521.8  | 7793.7  | 7853.3  | 7967.0  | 7948.6  | 7637.7  |
| 17.5° | 6455.8  | 6452.5  | 6508.8  | 6648.6  | 6895.6  | 7211.9  | 7565.1  | 7665.9  | 7834.9  | 7856.5  | 7501.2  |
| 20°   | 6158.9  | 6152.4  | 6191.4  | 6294.3  | 6548.9  | 6907.5  | 7318.1  | 7456.8  | 7700.5  | 7776.4  | 7360.4  |
| 22.5° | 5999.7  | 5998.6  | 5999.7  | 6048.4  | 6256.4  | 6590.1  | 7077.6  | 7246.6  | 7569.4  | 7712.4  | 7204.4  |
| 25°   | 5972.6  | 5969.3  | 5945.5  | 5940.1  | 6058.2  | 6324.7  | 6839.3  | 7025.6  | 7444.9  | 7668.0  | 7055.9  |
| 27.5° | 6043.0  | 6047.3  | 6015.9  | 5965.0  | 5988.8  | 6150.2  | 6632.3  | 6831.7  | 7345.2  | 7659.4  | 6953.0  |
| 30°   | 6189.2  | 6187.1  | 6160.0  | 6106.9  | 6060.3  | 6085.2  | 6485.0  | 6684.3  | 7278.0  | 7697.3  | 6882.6  |
| 32.5° | 6350.7  | 6362.6  | 6357.2  | 6327.9  | 6258.6  | 6158.9  | 6440.6  | 6635.6  | 7258.5  | 7788.3  | 6852.3  |
| 35°   | 6544.6  | 6557.6  | 6596.6  | 6619.3  | 6538.1  | 6377.7  | 6535.9  | 6704.9  | 7314.9  | 7959.5  | 6901.0  |
| 37.5° | 6728.8  | 6762.3  | 6871.8  | 6968.2  | 6898.8  | 6720.1  | 6789.4  | 6909.7  | 7489.3  | 8229.2  | 7032.1  |
| 40°   | 6941.1  | 6970.3  | 7149.1  | 7353.9  | 7343.0  | 7157.8  | 7197.9  | 7278.0  | 7797.0  | 8616.0  | 7269.4  |
| 42.5° | 7150.2  | 7208.7  | 7467.6  | 7758.0  | 7841.4  | 7677.8  | 7741.7  | 7784.0  | 8230.3  | 9128.4  | 7683.2  |
| 45°   | 7428.6  | 7491.4  | 7851.1  | 8201.0  | 8396.1  | 8304.0  | 8405.8  | 8422.1  | 8775.2  | 9826.1  | 8284.5  |
| 47.5° | 7850.0  | 7921.5  | 8340.8  | 8708.1  | 9006.0  | 9015.7  | 9183.7  | 9177.2  | 9455.6  | 10624.5 | 9041.7  |
| 50°   | 8506.6  | 8609.5  | 8952.9  | 9296.3  | 9658.2  | 9859.7  | 10083.9 | 10052.5 | 10271.3 | 11475.0 | 9913.8  |
| 52.5° | 9366.7  | 9414.4  | 9669.0  | 9922.5  | 10372.1 | 10823.9 | 11145.6 | 11117.5 | 11196.5 | 12349.2 | 10904.0 |
| 55°   | 10258.3 | 10294.1 | 10399.2 | 10537.9 | 11142.4 | 11879.1 | 12559.4 | 12515.0 | 12314.6 | 13257.1 | 11882.3 |
| 57.5° | 11060.0 | 11132.6 | 11205.2 | 11262.6 | 11918.1 | 12981.9 | 14005.7 | 14008.9 | 13527.9 | 14236.5 | 12893.1 |
| 60°   | 11184.6 | 11248.5 | 11728.5 | 12181.3 | 13245.2 | 14453.1 | 15553.8 | 15521.3 | 14783.5 | 15299.2 | 14019.8 |
| 62.5° | 9886.8  | 10030.8 | 10832.5 | 12037.2 | 14523.5 | 17144.2 | 17528.8 | 17488.7 | 16285.1 | 16609.0 | 15331.7 |
| 65°   | 7085.2  | 7248.8  | 8216.2  | 10026.5 | 13903.9 | 20109.4 | 21093.0 | 20553.5 | 18332.6 | 18220.0 | 16867.9 |
| 67.5° | 4087.5  | 4126.5  | 4545.8  | 5999.7  | 10586.6 | 20264.3 | 26530.4 | 25775.3 | 21512.3 | 20047.6 | 17619.8 |
| 70°   | 3022.6  | 3021.5  | 3121.2  | 3692.1  | 5728.8  | 16538.6 | 29116.4 | 29793.5 | 24859.9 | 20648.9 | 16557.0 |
| 71°   | 2733.3  | 2736.6  | 2848.2  | 3360.6  | 4537.1  | 13843.2 | 28567.2 | 30049.2 | 25741.7 | 20352.0 | 15787.8 |
| 72.5° | 2337.9  | 2348.7  | 2503.6  | 3013.9  | 3816.7  | 9546.6  | 26201.1 | 28515.2 | 26159.9 | 19619.7 | 14584.2 |
| 75°   | 1773.5  | 1798.4  | 2012.9  | 2540.5  | 3488.4  | 4841.5  | 19229.7 | 22770.1 | 23239.2 | 17312.1 | 10836.9 |
| 77.5° | 1265.4  | 1293.5  | 1536.2  | 2136.4  | 3316.2  | 3648.8  | 12877.9 | 16609.0 | 17101.9 | 11094.7 | 4888.1  |
| 80°   | 799.5   | 833.1   | 1016.2  | 1699.8  | 3115.7  | 3464.6  | 8092.7  | 11164.0 | 9325.6  | 3550.2  | 1243.7  |
| 82.5° | 469.1   | 495.1   | 630.5   | 1110.4  | 2544.8  | 3336.8  | 4761.4  | 6188.2  | 3629.3  | 1072.5  | 565.5   |
| 85°   | 271.9   | 283.8   | 393.3   | 707.4   | 1848.2  | 3149.3  | 3498.2  | 3459.2  | 1575.2  | 524.3   | 267.6   |
| 87.5° | 126.8   | 140.8   | 232.9   | 369.4   | 1025.9  | 2282.6  | 2764.7  | 2388.8  | 979.4   | 245.9   | 125.7   |
| 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-SA6C-827-U-SL3

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 8617.1  | 8617.1 | 8617.1 | 8617.1 | 8617.1 | 8617.1 | 8617.1 | 8617.1 | 8617.1 | 8617.1 | 8617.1 |
| 2.5°  | 8542.3  | 8523.9 | 8447.0 | 8378.7 | 8307.2 | 8214.0 | 8111.1 | 8098.1 | 8035.3 | 8047.2 | 8025.5 |
| 5°    | 8373.3  | 8326.7 | 8141.5 | 7973.5 | 7775.3 | 7597.6 | 7404.8 | 7315.9 | 7188.1 | 7179.4 | 7146.9 |
| 7.5°  | 8131.7  | 8045.0 | 7758.0 | 7439.4 | 7120.9 | 6817.6 | 6517.5 | 6320.3 | 6118.8 | 6033.2 | 6025.7 |
| 10°   | 7859.8  | 7712.4 | 7289.9 | 6818.7 | 6359.3 | 5916.2 | 5487.2 | 5169.8 | 4883.8 | 4748.4 | 4743.0 |
| 12.5° | 7601.9  | 7384.2 | 6804.6 | 6163.2 | 5534.9 | 4960.7 | 4372.4 | 3955.4 | 3596.8 | 3476.5 | 3425.6 |
| 15°   | 7383.1  | 7076.5 | 6332.2 | 5512.1 | 4749.5 | 3952.1 | 3282.6 | 2843.8 | 2512.3 | 2397.5 | 2375.8 |
| 17.5° | 7170.8  | 6776.4 | 5848.0 | 4854.5 | 3932.6 | 3056.2 | 2385.6 | 2059.5 | 1882.9 | 1836.3 | 1835.2 |
| 20°   | 6959.5  | 6467.7 | 5342.1 | 4181.8 | 3142.8 | 2285.9 | 1834.1 | 1687.9 | 1628.3 | 1622.9 | 1614.2 |
| 22.5° | 6720.1  | 6140.5 | 4810.1 | 3506.8 | 2452.7 | 1797.3 | 1559.0 | 1500.5 | 1492.9 | 1512.4 | 1512.4 |
| 25°   | 6495.8  | 5815.5 | 4270.6 | 2846.0 | 1907.8 | 1499.4 | 1392.1 | 1380.2 | 1400.8 | 1435.5 | 1438.7 |
| 27.5° | 6286.7  | 5502.4 | 3744.1 | 2258.8 | 1528.6 | 1320.6 | 1276.2 | 1290.3 | 1327.1 | 1367.2 | 1368.3 |
| 30°   | 6114.5  | 5206.6 | 3232.8 | 1780.0 | 1291.4 | 1187.4 | 1179.8 | 1207.9 | 1248.0 | 1279.4 | 1287.0 |
| 32.5° | 5981.2  | 4954.2 | 2738.7 | 1431.1 | 1136.4 | 1087.7 | 1094.2 | 1118.0 | 1142.9 | 1160.3 | 1172.2 |
| 35°   | 5919.5  | 4737.5 | 2282.6 | 1206.9 | 1037.9 | 1010.8 | 1019.4 | 1032.4 | 1043.3 | 1056.3 | 1066.0 |
| 37.5° | 5930.3  | 4569.6 | 1875.3 | 1067.1 | 971.8  | 957.7  | 957.7  | 957.7  | 957.7  | 964.2  | 965.3  |
| 40°   | 6031.1  | 4473.2 | 1543.8 | 978.3  | 927.4  | 912.2  | 900.3  | 889.4  | 880.8  | 885.1  | 882.9  |
| 42.5° | 6288.9  | 4464.5 | 1301.1 | 921.9  | 891.6  | 866.7  | 842.9  | 827.7  | 816.9  | 821.2  | 823.4  |
| 45°   | 6726.6  | 4572.9 | 1137.5 | 881.9  | 858.0  | 820.1  | 789.8  | 773.5  | 765.9  | 780.0  | 782.2  |
| 47.5° | 7293.2  | 4809.0 | 1037.9 | 852.6  | 826.6  | 776.8  | 744.3  | 729.1  | 731.3  | 751.9  | 757.3  |
| 50°   | 8023.4  | 5192.6 | 990.2  | 834.2  | 804.9  | 739.9  | 706.4  | 693.4  | 699.9  | 729.1  | 735.6  |
| 52.5° | 8825.1  | 5745.1 | 995.6  | 828.8  | 790.9  | 712.9  | 677.1  | 661.9  | 672.8  | 699.9  | 705.3  |
| 55°   | 9750.3  | 6409.2 | 1085.5 | 836.4  | 770.3  | 695.5  | 653.3  | 627.3  | 635.9  | 660.9  | 665.2  |
| 57.5° | 10778.4 | 7169.7 | 1266.4 | 834.2  | 744.3  | 679.3  | 628.3  | 589.3  | 595.8  | 611.0  | 615.3  |
| 60°   | 11848.7 | 8088.4 | 1547.0 | 840.7  | 732.4  | 659.8  | 594.8  | 546.0  | 543.8  | 556.8  | 559.0  |
| 62.5° | 13133.6 | 9151.2 | 1867.7 | 845.0  | 739.9  | 634.8  | 550.3  | 502.7  | 496.2  | 499.4  | 501.6  |
| 65°   | 14457.5 | 9920.3 | 1747.5 | 827.7  | 763.8  | 614.3  | 511.3  | 460.4  | 448.5  | 446.3  | 447.4  |
| 67.5° | 14498.6 | 9095.9 | 1225.3 | 793.0  | 773.5  | 603.4  | 482.1  | 424.7  | 405.2  | 397.6  | 396.5  |
| 70°   | 13002.5 | 7389.6 | 954.4  | 756.2  | 734.5  | 586.1  | 455.0  | 395.4  | 366.2  | 354.3  | 353.2  |
| 71°   | 12272.3 | 6802.4 | 904.6  | 737.8  | 705.3  | 568.8  | 443.1  | 382.4  | 352.1  | 339.1  | 336.9  |
| 72.5° | 11127.2 | 6098.2 | 843.9  | 708.5  | 648.9  | 524.3  | 420.3  | 364.0  | 332.6  | 317.4  | 314.2  |
| 75°   | 7985.5  | 3987.9 | 724.8  | 631.6  | 537.3  | 418.2  | 368.3  | 327.2  | 300.1  | 281.7  | 279.5  |
| 77.5° | 3076.7  | 1587.1 | 548.2  | 525.4  | 411.7  | 327.2  | 303.3  | 282.8  | 263.3  | 244.8  | 243.8  |
| 80°   | 951.2   | 709.6  | 399.8  | 395.4  | 297.9  | 243.8  | 236.2  | 230.8  | 223.2  | 203.7  | 199.3  |
| 82.5° | 508.1   | 407.3  | 275.2  | 255.7  | 195.0  | 162.5  | 171.2  | 173.3  | 174.4  | 153.8  | 151.7  |
| 85°   | 242.7   | 215.6  | 154.9  | 145.2  | 113.8  | 91.0   | 105.1  | 113.8  | 114.8  | 94.3   | 87.8   |
| 87.5° | 115.9   | 112.7  | 72.6   | 55.3   | 42.3   | 30.3   | 36.8   | 45.5   | 49.8   | 35.8   | 31.4   |
| 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

REPORT NUMBER: SP1-2407-157-9

| 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 (nm) | Power (μW/nm) | Lumens (φ/nm) | λ (nm) | Power (μW/nm) | Lumens (φ/nm) | λ (nm) | Power (μW/nm) | Lumens (φ/nm) | λ (nm) | Power (μW/nm) | Lumens (φ/nm) | λ (nm) | Power (μW/nm) | Lumens (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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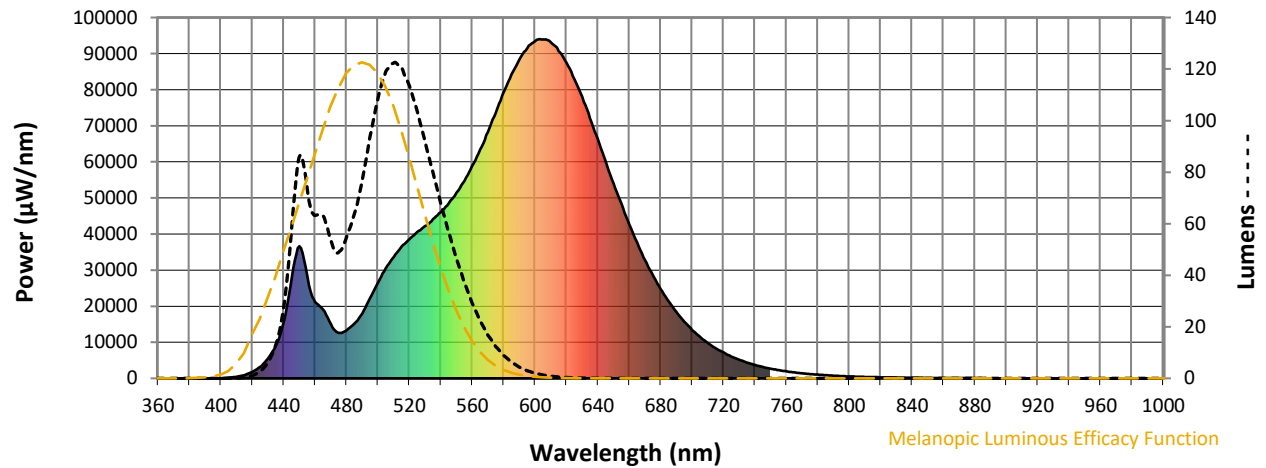
### Scotopic Flux vs. Wavelength


**Scotopic Lumens: 5286.7**
**S/P: 1.22**

| λ (nm) | Power (μW/nm) | Lumens (φ/nm) | λ (nm) | Power (μW/nm) | Lumens (φ/nm) | λ (nm) | Power (μW/nm) | Lumens (φ/nm) | λ (nm) | Power (μW/nm) | Lumens (φ/nm) | λ (nm) | Power (μW/nm) | Lumens (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**

| $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|
| 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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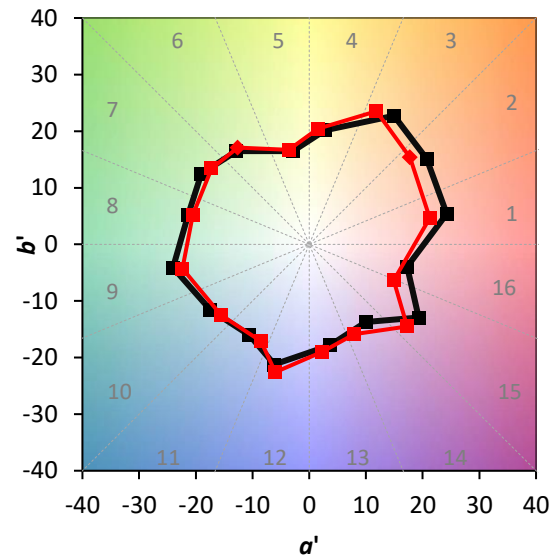
TM-30-18

### 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)