

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: P319503

Luminaire Tested: **GLEON-SA9D-827-U-SL2**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P319503  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-20)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA9D-827-U-SL2  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(9) 80 CRI, 2700K, 1200mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE II  
SPILL LIGHT ELIMINATOR OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 49953 lumens  
Efficiency: N/A  
Efficacy: 86.9 lumens/watt  
Luminous Opening: Rectangular (W 2.5' x L: 1' x H: 0')  
IES Classification: Type III - Medium  
BUG Rating: B4 - U0 - G5

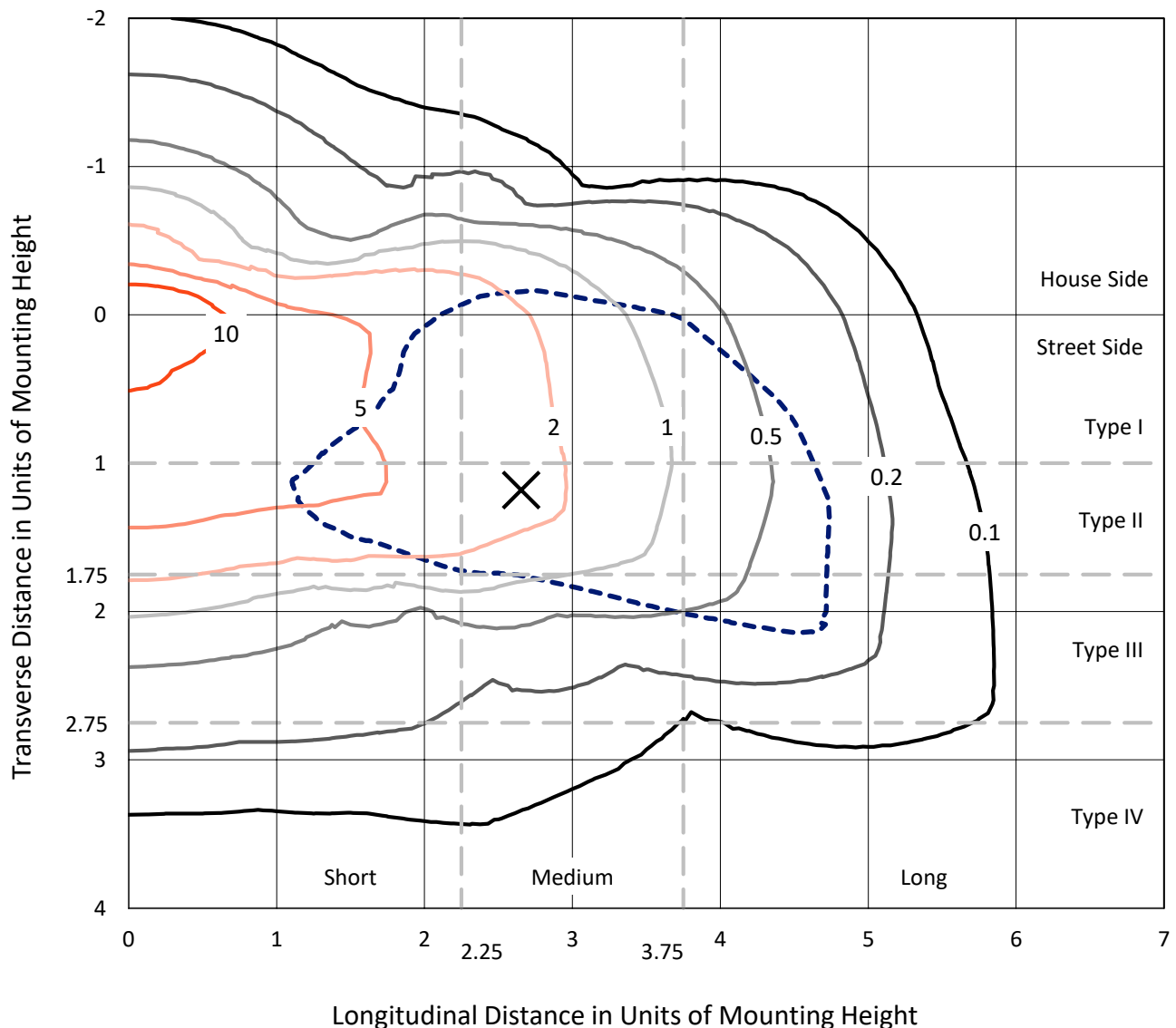
Input Watts (W): 575  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



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## Iso-Footcandle Lines of Horizontal Illumination

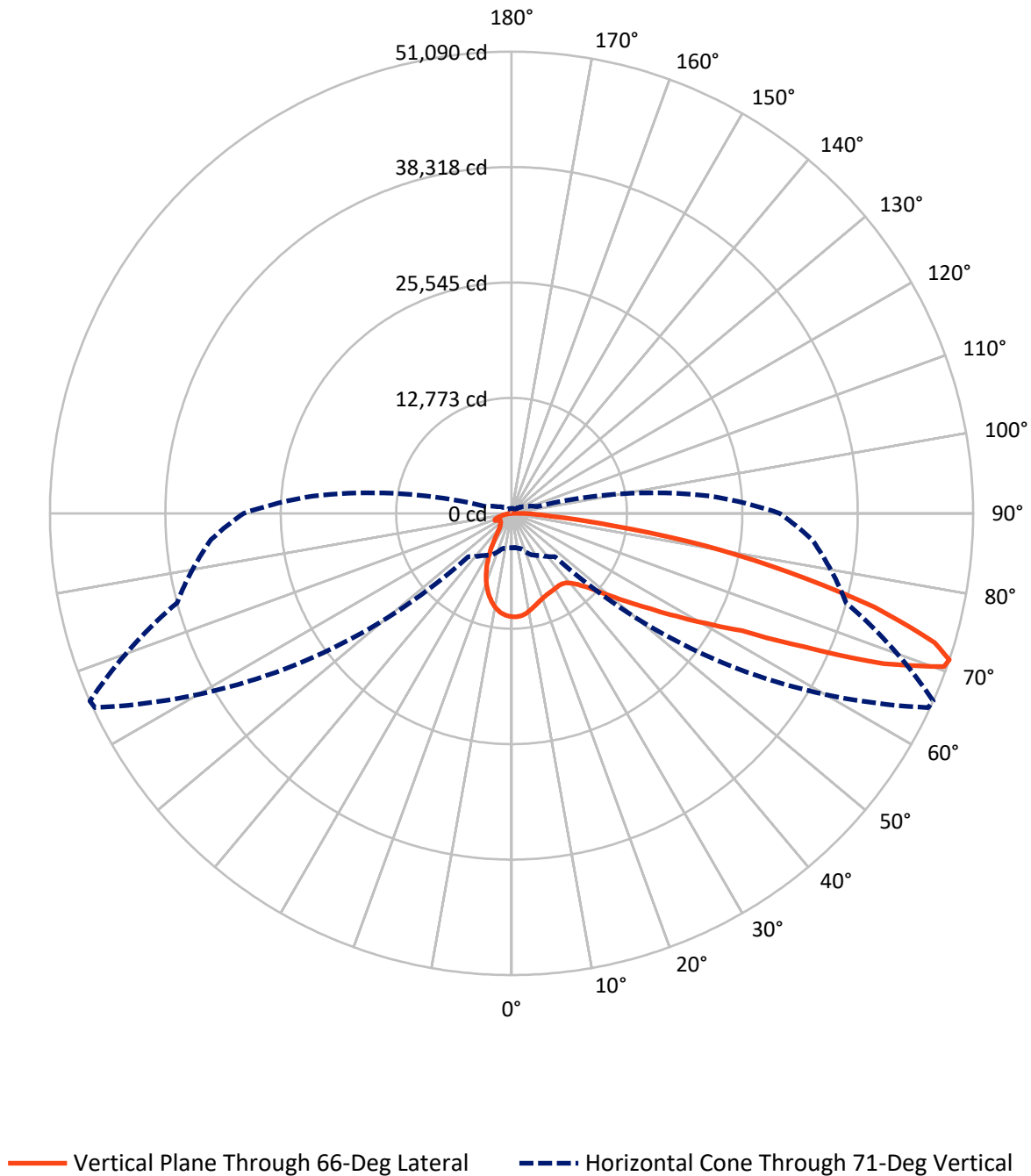
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 18.3 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    | 9257.7   | 0.0    | 9257.7  |
|                    | % Fixture | 18.5     | 0.0    | 18.5    |
| <b>Street Side</b> | Lumens    | 40695.4  | 0.0    | 40695.4 |
|                    | % Fixture | 81.5     | 0.0    | 81.5    |
| <b>Total</b>       | Lumens    | 49953.0  | 0.0    | 49953.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 1007.3  | 2.0       |
| 10°-20°   | 2415.9  | 4.8       |
| 20°-30°   | 3245.2  | 6.5       |
| 30°-40°   | 4268.9  | 8.5       |
| 40°-50°   | 6210.2  | 12.4      |
| 50°-60°   | 9701.0  | 19.4      |
| 60°-70°   | 12152.1 | 24.3      |
| 70°-80°   | 9269.3  | 18.6      |
| 80°-90°   | 1683.2  | 3.4       |
| 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°    | 49953.0 | 100.0     |
| 0°-180°   | 49953.0 | 100.0     |

**Coefficient of Utilization**



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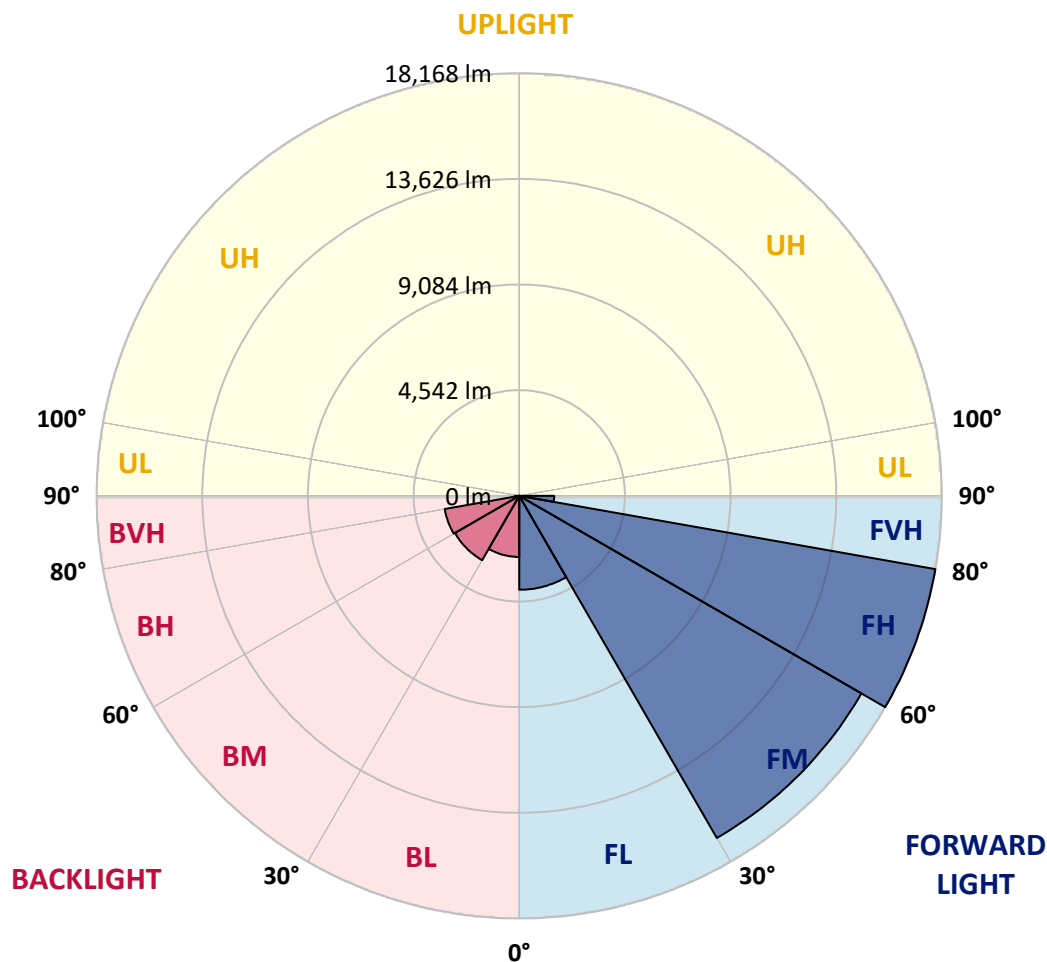
CATALOG NUMBER: GLEON-SA9D-827-U-SL2

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|---------|-----------|-------------------------|------|---------|
|      |             |         |           | B                       | U    | G       |
| FL   | (0°-30°)    | 4039.4  | 8.1       |                         |      |         |
| FM   | (30°-60°)   | 16986.5 | 34.0      |                         |      |         |
| FH   | (60°-80°)   | 18168.4 | 36.4      |                         |      | G5      |
| FVH  | (80°-90°)   | 1501.0  | 3.0       |                         |      | G5      |
| BL   | (0°-30°)    | 2628.9  | 5.3       | B4/5000                 |      |         |
| BM   | (30°-60°)   | 3193.6  | 6.4       | B3/5000                 |      |         |
| BH   | (60°-80°)   | 3252.9  | 6.5       | B4/5000                 |      | G4/5000 |
| BVH  | (80°-90°)   | 182.2   | 0.4       |                         |      | G2/225  |
| UL   | (90°-100°)  | 0.0     | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0     | 0.0       |                         | U0/0 |         |

**BUG Rating: B4-U0-G5**

Type III Medium





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 35°     | 45°     | 55°     | 65°     | 66°     | 75°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 11443.3 | 11443.3 | 11443.3 | 11443.3 | 11443.3 | 11443.3 | 11443.3 | 11443.3 | 11443.3 | 11443.3 | 11443.3 |
| 2.5°  | 11231.1 | 11213.9 | 11265.6 | 11319.1 | 11339.8 | 11374.3 | 11426.0 | 11455.3 | 11453.6 | 11458.8 | 11441.5 |
| 5°    | 10486.1 | 10463.6 | 10567.1 | 10651.6 | 10813.8 | 10996.6 | 11219.1 | 11377.7 | 11381.2 | 11470.9 | 11495.0 |
| 7.5°  | 9780.7  | 9765.1  | 9884.2  | 10020.4 | 10208.4 | 10487.8 | 10848.2 | 11189.7 | 11210.4 | 11453.6 | 11538.1 |
| 10°   | 9215.0  | 9211.5  | 9327.1  | 9475.4  | 9694.4  | 10006.6 | 10420.5 | 10920.7 | 10951.7 | 11370.8 | 11545.0 |
| 12.5° | 8773.5  | 8780.4  | 8880.4  | 9049.4  | 9280.5  | 9606.5  | 10054.9 | 10618.9 | 10668.9 | 11239.8 | 11505.4 |
| 15°   | 8447.5  | 8475.1  | 8556.1  | 8726.9  | 8954.5  | 9285.7  | 9746.2  | 10339.5 | 10415.4 | 11093.2 | 11482.9 |
| 17.5° | 8261.2  | 8292.3  | 8349.2  | 8490.6  | 8704.5  | 9023.5  | 9459.9  | 10110.1 | 10179.1 | 10981.1 | 11484.7 |
| 20°   | 8206.0  | 8231.9  | 8264.7  | 8350.9  | 8532.0  | 8821.7  | 9233.9  | 9903.1  | 9977.3  | 10891.4 | 11501.9 |
| 22.5° | 8314.7  | 8333.7  | 8337.1  | 8330.2  | 8440.6  | 8676.9  | 9070.1  | 9751.4  | 9830.7  | 10832.7 | 11514.0 |
| 25°   | 8547.5  | 8573.4  | 8554.4  | 8490.6  | 8454.4  | 8599.3  | 8985.6  | 9651.3  | 9730.7  | 10789.6 | 11489.8 |
| 27.5° | 8897.6  | 8901.1  | 8885.6  | 8802.8  | 8632.0  | 8607.9  | 8959.7  | 9592.7  | 9668.6  | 10739.6 | 11439.8 |
| 30°   | 9373.6  | 9396.1  | 9368.5  | 9256.4  | 8977.0  | 8745.9  | 8990.8  | 9535.8  | 9604.8  | 10675.8 | 11358.8 |
| 32.5° | 9930.7  | 9985.9  | 9984.2  | 9866.9  | 9466.8  | 9054.6  | 9118.4  | 9501.3  | 9554.7  | 10608.5 | 11260.4 |
| 35°   | 10508.5 | 10584.4 | 10725.8 | 10675.8 | 10180.8 | 9542.7  | 9363.3  | 9556.5  | 9592.7  | 10599.9 | 11191.5 |
| 37.5° | 11108.7 | 11184.6 | 11476.0 | 11610.6 | 11031.1 | 10241.2 | 9749.6  | 9751.4  | 9768.6  | 10705.1 | 11186.3 |
| 40°   | 11736.5 | 11817.5 | 12255.6 | 12605.7 | 12133.1 | 11125.9 | 10372.2 | 10158.4 | 10139.4 | 10963.8 | 11288.0 |
| 42.5° | 12616.0 | 12688.5 | 13214.5 | 13661.2 | 13355.9 | 12259.0 | 11232.9 | 10786.2 | 10746.5 | 11470.9 | 11614.0 |
| 45°   | 13728.5 | 13790.6 | 14349.4 | 14827.1 | 14670.1 | 13552.6 | 12314.2 | 11650.2 | 11643.3 | 12316.0 | 12274.6 |
| 47.5° | 15051.3 | 15099.6 | 15601.5 | 16063.7 | 16120.6 | 15041.0 | 13673.3 | 12983.4 | 12871.3 | 13474.9 | 13297.3 |
| 50°   | 16429.3 | 16482.8 | 16824.3 | 17321.0 | 17743.5 | 17033.0 | 15422.1 | 14616.7 | 14466.6 | 15004.7 | 14746.0 |
| 52.5° | 17341.7 | 17412.4 | 17709.0 | 18338.5 | 19568.2 | 19216.4 | 17490.0 | 16596.6 | 16369.0 | 16858.8 | 16660.4 |
| 55°   | 16934.7 | 17093.3 | 17546.9 | 18555.9 | 21027.3 | 22551.9 | 20040.8 | 18906.0 | 18649.0 | 19056.0 | 18938.7 |
| 57.5° | 15084.1 | 15301.4 | 15920.5 | 17477.9 | 21232.6 | 25490.8 | 23897.2 | 21625.8 | 21444.7 | 21327.4 | 21380.9 |
| 60°   | 11702.0 | 11910.7 | 12678.1 | 14708.1 | 19802.8 | 27636.3 | 29700.7 | 24978.6 | 24716.4 | 23607.4 | 23655.7 |
| 62.5° | 8281.9  | 8176.7  | 8702.7  | 10187.7 | 16091.3 | 27888.1 | 36304.6 | 29462.7 | 28600.4 | 26015.1 | 25803.0 |
| 65°   | 6315.8  | 6291.6  | 6527.9  | 7000.5  | 9746.2  | 24875.1 | 40238.6 | 36999.6 | 35652.6 | 28847.0 | 28346.9 |
| 67.5° | 5189.6  | 5146.5  | 5379.3  | 6067.4  | 6276.1  | 16048.2 | 40324.8 | 45743.7 | 44420.9 | 32372.3 | 31289.2 |
| 70°   | 4266.9  | 4218.6  | 4435.9  | 5324.1  | 5800.1  | 8138.8  | 33938.3 | 50864.3 | 50793.6 | 36835.8 | 33510.6 |
| 71°   | 3825.3  | 3790.9  | 4051.3  | 5037.8  | 5698.3  | 6783.2  | 29302.3 | 50878.1 | 51090.3 | 38346.6 | 33379.5 |
| 72.5° | 3114.8  | 3126.8  | 3402.8  | 4484.2  | 5622.5  | 5989.8  | 21536.1 | 48506.7 | 48955.1 | 39786.7 | 32187.7 |
| 75°   | 2069.6  | 2080.0  | 2442.1  | 3449.4  | 5451.7  | 5860.5  | 11836.5 | 40702.5 | 41526.9 | 38924.3 | 29371.3 |
| 77.5° | 1390.1  | 1386.6  | 1633.3  | 2366.3  | 4749.8  | 5860.5  | 6940.1  | 30442.4 | 31347.8 | 30971.8 | 22643.4 |
| 80°   | 957.2   | 950.3   | 1124.5  | 1633.3  | 3596.0  | 5931.2  | 5365.5  | 21334.3 | 21608.5 | 16726.0 | 9202.9  |
| 82.5° | 586.4   | 591.6   | 734.7   | 1153.8  | 2447.3  | 5337.9  | 5065.4  | 11633.0 | 11334.6 | 4691.1  | 2299.0  |
| 85°   | 336.3   | 334.6   | 469.1   | 781.3   | 1571.2  | 4504.9  | 4939.5  | 5006.8  | 4592.8  | 1412.5  | 831.3   |
| 87.5° | 120.7   | 129.4   | 251.8   | 432.9   | 900.3   | 3137.2  | 4191.0  | 2604.3  | 2347.3  | 638.1   | 376.0   |
| 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-SA9D-827-U-SL2

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°     | 105°    | 115°    | 125°    | 135°    | 145°    | 155°    | 165°    | 175°    | 180°    |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 11443.3 | 11443.3 | 11443.3 | 11443.3 | 11443.3 | 11443.3 | 11443.3 | 11443.3 | 11443.3 | 11443.3 | 11443.3 |
| 2.5°  | 11429.5 | 11439.8 | 11427.7 | 11358.8 | 11300.1 | 11205.3 | 11151.8 | 11077.6 | 11055.2 | 11044.9 | 11072.5 |
| 5°    | 11472.6 | 11476.0 | 11374.3 | 11193.2 | 10989.7 | 10749.9 | 10577.5 | 10365.3 | 10265.3 | 10222.2 | 10249.8 |
| 7.5°  | 11512.3 | 11496.7 | 11274.2 | 10927.6 | 10551.6 | 10134.2 | 9763.4  | 9423.7  | 9225.3  | 9144.3  | 9151.2  |
| 10°   | 11517.4 | 11451.9 | 11094.9 | 10558.5 | 9975.6  | 9363.3  | 8794.2  | 8269.9  | 7938.7  | 7723.1  | 7788.7  |
| 12.5° | 11464.0 | 11353.6 | 10831.0 | 10080.8 | 9271.9  | 8437.1  | 7667.9  | 6881.5  | 6408.9  | 6189.9  | 6196.8  |
| 15°   | 11422.6 | 11222.5 | 10506.8 | 9518.5  | 8432.0  | 7326.4  | 6276.1  | 5351.7  | 4848.1  | 4623.9  | 4518.7  |
| 17.5° | 11388.1 | 11081.1 | 10130.8 | 8885.6  | 7440.3  | 6038.1  | 4775.6  | 3951.2  | 3675.3  | 3609.8  | 3582.2  |
| 20°   | 11339.8 | 10931.0 | 9711.7  | 8152.6  | 6310.6  | 4596.3  | 3487.3  | 3080.3  | 3082.0  | 3157.9  | 3168.2  |
| 22.5° | 11272.5 | 10760.3 | 9265.0  | 7329.9  | 5098.2  | 3347.6  | 2733.6  | 2616.3  | 2735.3  | 2880.2  | 2906.1  |
| 25°   | 11172.5 | 10558.5 | 8768.3  | 6421.0  | 3887.4  | 2573.2  | 2335.2  | 2330.0  | 2474.9  | 2626.7  | 2649.1  |
| 27.5° | 11031.1 | 10294.6 | 8216.4  | 5444.8  | 2864.7  | 2186.9  | 2092.0  | 2128.3  | 2235.2  | 2345.6  | 2354.2  |
| 30°   | 10841.4 | 9987.6  | 7607.6  | 4415.2  | 2245.5  | 1947.2  | 1936.8  | 1969.6  | 2035.1  | 2112.7  | 2119.6  |
| 32.5° | 10632.7 | 9675.5  | 6957.4  | 3418.3  | 1923.0  | 1817.8  | 1828.2  | 1843.7  | 1874.7  | 1905.8  | 1912.7  |
| 35°   | 10442.9 | 9356.4  | 6291.6  | 2597.4  | 1769.5  | 1733.3  | 1726.4  | 1723.0  | 1726.4  | 1716.1  | 1717.8  |
| 37.5° | 10320.5 | 9092.5  | 5598.3  | 2067.9  | 1681.6  | 1659.1  | 1638.4  | 1612.6  | 1583.3  | 1566.0  | 1569.5  |
| 40°   | 10275.7 | 8895.9  | 4896.4  | 1786.8  | 1609.1  | 1593.6  | 1553.9  | 1498.7  | 1464.3  | 1453.9  | 1453.9  |
| 42.5° | 10396.4 | 8794.2  | 4218.6  | 1645.3  | 1548.8  | 1522.9  | 1457.4  | 1393.5  | 1367.7  | 1365.9  | 1364.2  |
| 45°   | 10765.5 | 8835.5  | 3573.5  | 1567.7  | 1493.6  | 1443.6  | 1357.3  | 1303.9  | 1286.6  | 1290.1  | 1288.3  |
| 47.5° | 11427.7 | 9096.0  | 3021.6  | 1516.0  | 1438.4  | 1372.8  | 1276.3  | 1233.1  | 1212.5  | 1212.5  | 1214.2  |
| 50°   | 12554.0 | 9704.8  | 2581.8  | 1472.9  | 1391.8  | 1307.3  | 1217.6  | 1164.2  | 1136.6  | 1134.8  | 1134.8  |
| 52.5° | 14194.1 | 10794.8 | 2307.6  | 1436.7  | 1340.1  | 1248.7  | 1159.0  | 1091.7  | 1059.0  | 1052.1  | 1048.6  |
| 55°   | 16250.0 | 12357.3 | 2231.7  | 1412.5  | 1271.1  | 1184.9  | 1088.3  | 1021.0  | 984.8   | 969.3   | 967.5   |
| 57.5° | 18549.0 | 14257.9 | 2381.8  | 1383.2  | 1200.4  | 1109.0  | 1010.7  | 946.9   | 908.9   | 889.9   | 888.2   |
| 60°   | 20875.6 | 16332.7 | 2994.0  | 1341.8  | 1141.7  | 1026.2  | 931.3   | 872.7   | 834.7   | 814.0   | 810.6   |
| 62.5° | 23205.6 | 18519.6 | 4244.4  | 1338.4  | 1100.3  | 946.9   | 850.3   | 800.3   | 764.0   | 741.6   | 736.4   |
| 65°   | 25834.0 | 20913.5 | 5665.6  | 1429.8  | 1086.5  | 874.4   | 767.5   | 727.8   | 696.8   | 676.1   | 674.4   |
| 67.5° | 28852.2 | 23616.1 | 5529.3  | 1617.8  | 1133.1  | 808.9   | 689.9   | 658.8   | 636.4   | 619.2   | 617.4   |
| 70°   | 30268.2 | 23193.5 | 3437.3  | 1750.6  | 1198.7  | 745.1   | 615.7   | 593.3   | 576.0   | 564.0   | 558.8   |
| 71°   | 29674.9 | 22022.5 | 2881.9  | 1735.0  | 1191.8  | 717.5   | 586.4   | 569.1   | 551.9   | 541.6   | 536.4   |
| 72.5° | 28057.1 | 20083.9 | 2404.2  | 1614.3  | 1114.1  | 667.5   | 548.4   | 531.2   | 515.7   | 503.6   | 500.2   |
| 75°   | 25176.9 | 17936.7 | 1924.7  | 1290.1  | 888.2   | 564.0   | 481.2   | 462.2   | 450.1   | 443.2   | 436.3   |
| 77.5° | 18507.6 | 12800.6 | 1488.4  | 1019.3  | 653.7   | 460.5   | 410.5   | 396.7   | 384.6   | 374.3   | 369.1   |
| 80°   | 7090.2  | 4958.5  | 1002.0  | 760.6   | 479.5   | 363.9   | 331.1   | 324.2   | 312.2   | 305.3   | 305.3   |
| 82.5° | 1909.2  | 1481.5  | 534.7   | 460.5   | 320.8   | 265.6   | 253.5   | 250.1   | 239.7   | 225.9   | 227.7   |
| 85°   | 772.7   | 653.7   | 300.1   | 253.5   | 196.6   | 156.9   | 170.7   | 172.5   | 160.4   | 143.1   | 144.9   |
| 87.5° | 339.8   | 277.7   | 167.3   | 112.1   | 86.2    | 60.4    | 77.6    | 77.6    | 70.7    | 58.6    | 53.5    |
| 90°   | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     |

Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



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**



REPORT NUMBER: SP1-2407-157-9

### 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



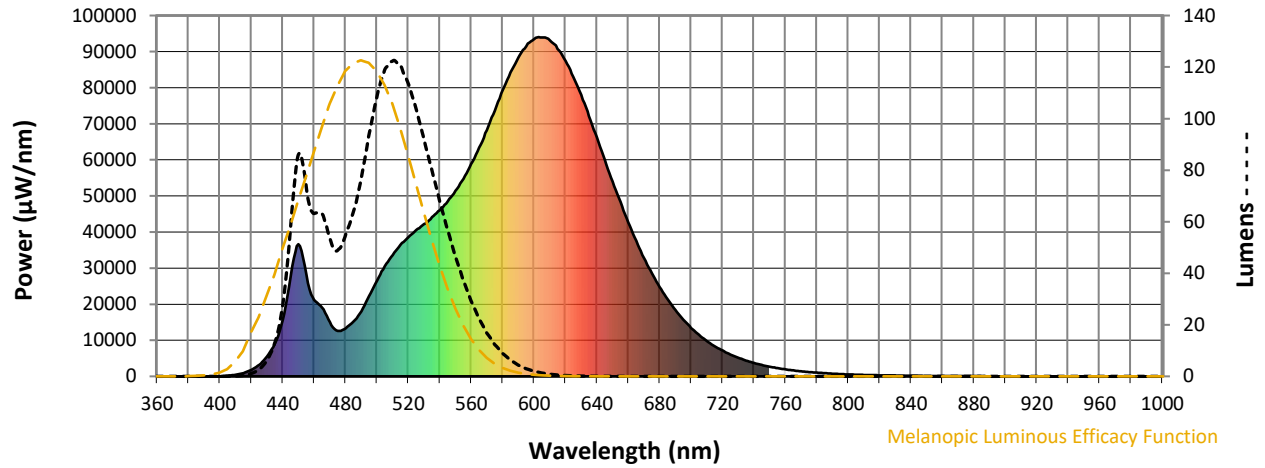
Scotopic Lumens: 5286.7

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**

| $\lambda$<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

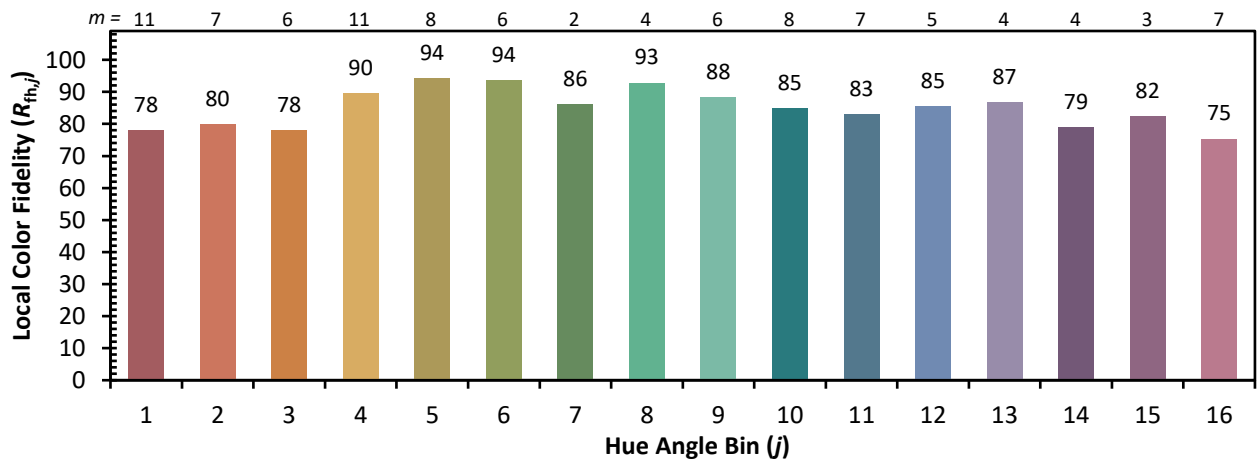


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

|            |            |            |            |
|------------|------------|------------|------------|
| 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)