

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: P318622

Luminaire Tested: **GLEON-SA8D-722-U-T3**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P318622  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-14)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA8D-722-U-T3  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(8) 70 CRI, 2200K, 1200mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 45722 lumens  
Efficiency: N/A  
Efficacy: 89.5 lumens/watt  
Luminous Opening: Rectangular (W 2' x L: 1' x H: 0')  
IES Classification: Type III - Short  
BUG Rating: B4 - U0 - G5

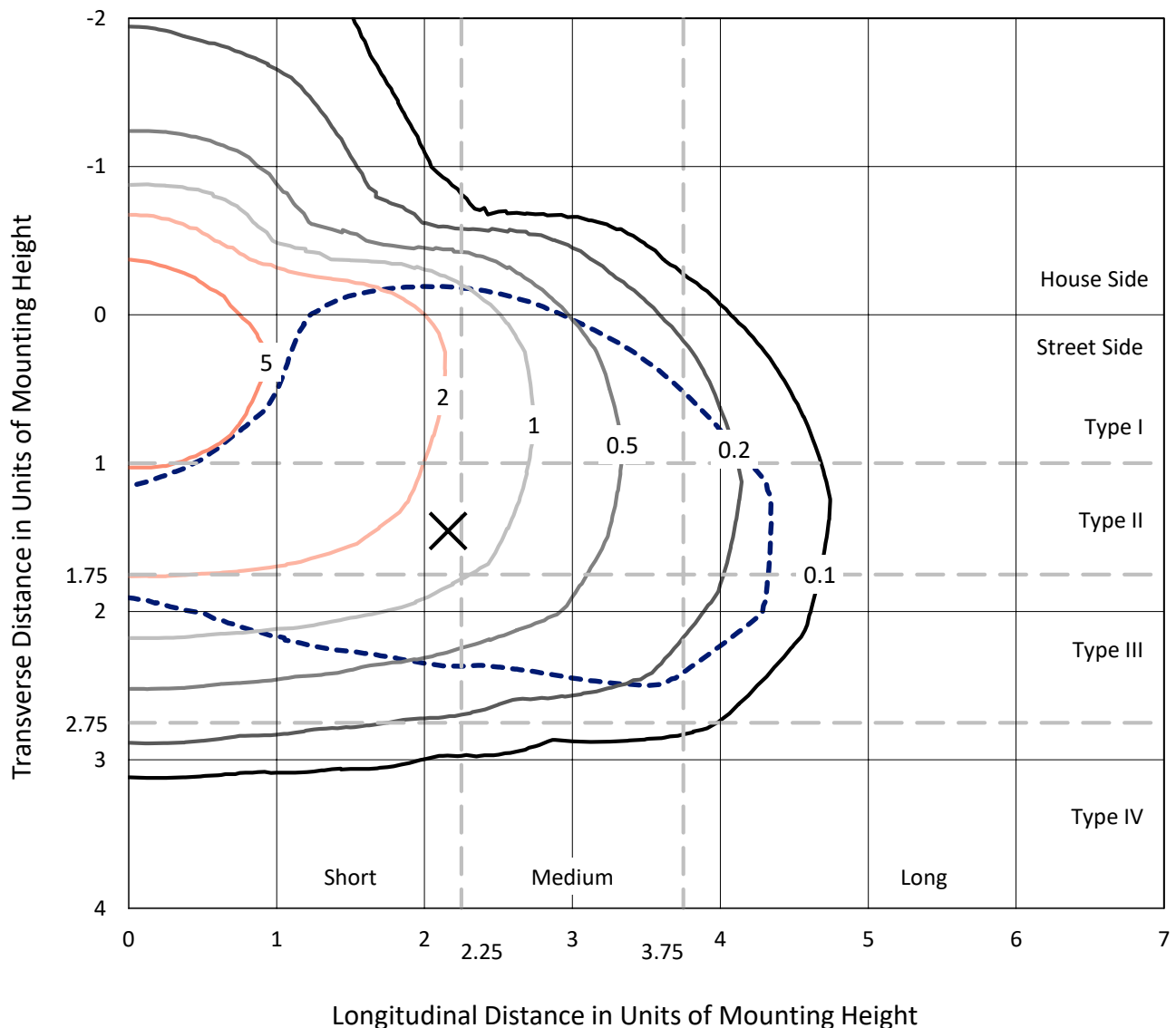
Input Watts (W): 511  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



REPORT NUMBER: P318622  
 CATALOG NUMBER: GLEON-SA8D-722-U-T3

## Iso-Footcandle Lines of Horizontal Illumination

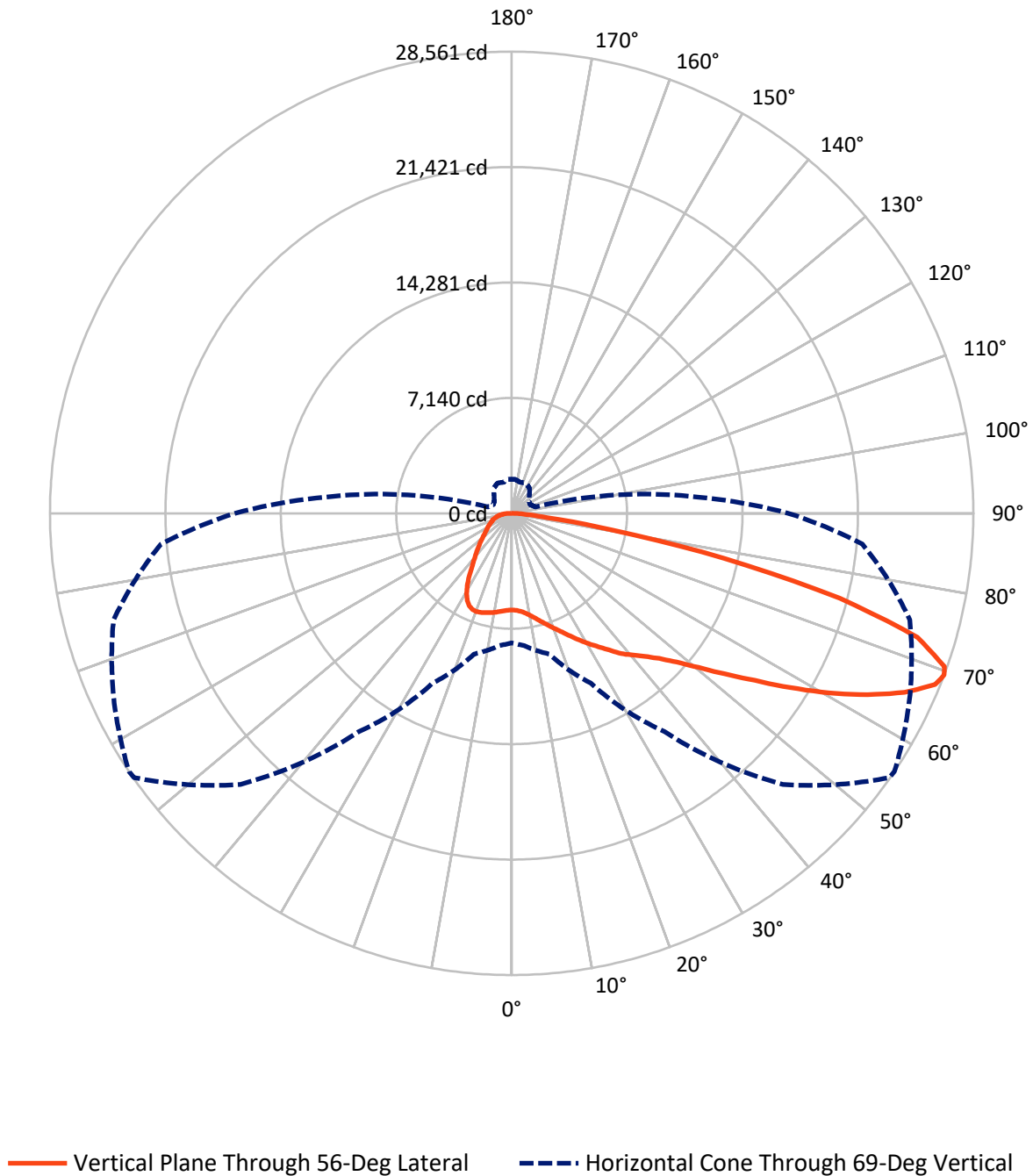
✕ Max cd  
 - - - 1/2 Max cd



Based on 30 foot mounting height. Maximum calculated value = 7.2 fc  
 Type III - Short - N/A

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## Luminous Intensity Polar Plot



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CATALOG NUMBER: GLEON-SA8D-722-U-T3

**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 10182.2  | 0.0    | 10182.2 |
|                    | % Fixture | 22.3     | 0.0    | 22.3    |
| <b>Street Side</b> | Lumens    | 35539.8  | 0.0    | 35539.8 |
|                    | % Fixture | 77.7     | 0.0    | 77.7    |
| <b>Total</b>       | Lumens    | 45722.0  | 0.0    | 45722.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 587.1   | 1.3       |
| 10°-20°   | 1887.8  | 4.1       |
| 20°-30°   | 3295.4  | 7.2       |
| 30°-40°   | 4733.7  | 10.4      |
| 40°-50°   | 6551.2  | 14.3      |
| 50°-60°   | 9598.5  | 21.0      |
| 60°-70°   | 11702.4 | 25.6      |
| 70°-80°   | 6469.8  | 14.2      |
| 80°-90°   | 896.1   | 2.0       |
| 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°    | 45722.0 | 100.0     |
| 0°-180°   | 45722.0 | 100.0     |

**Coefficient of Utilization**



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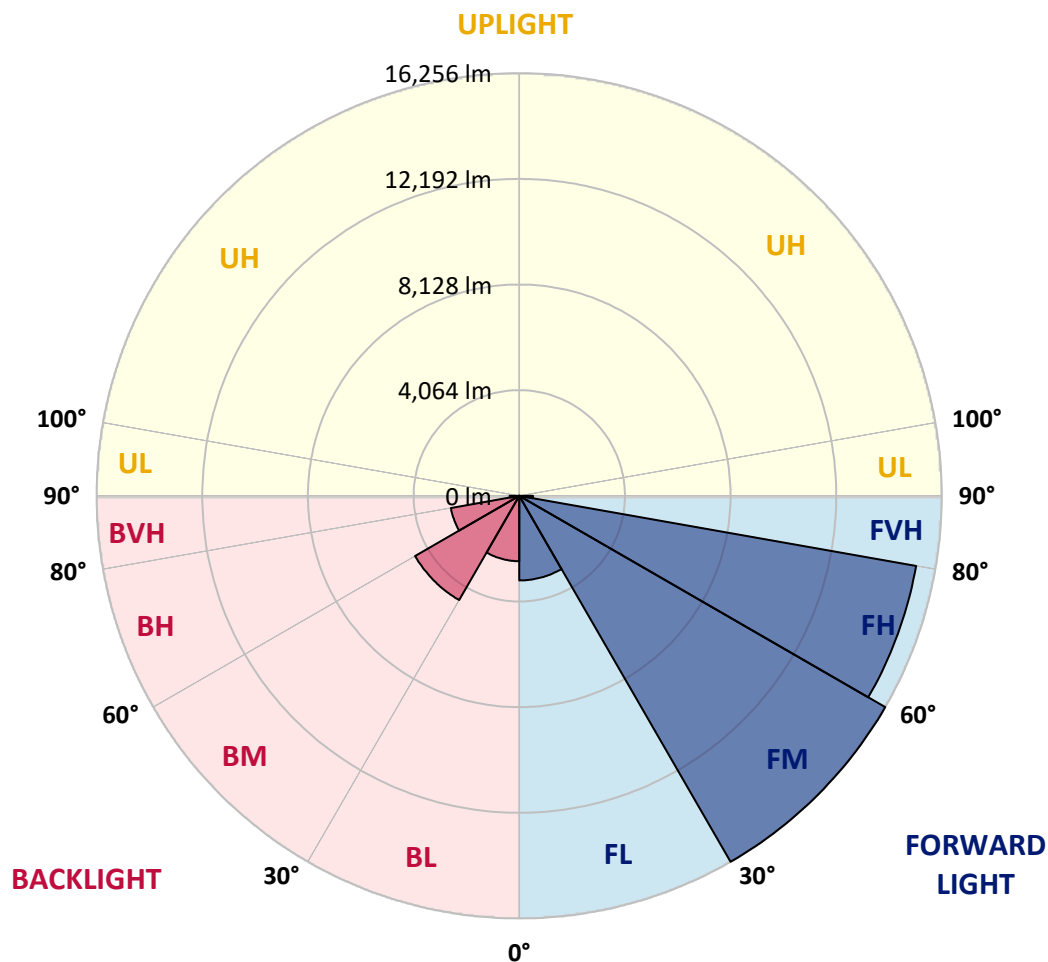
CATALOG NUMBER: GLEON-SA8D-722-U-T3

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|---------|-----------|-------------------------|------|---------|
|      |             |         |           | B                       | U    | G       |
| FL   | (0°-30°)    | 3254.1  | 7.1       |                         |      |         |
| FM   | (30°-60°)   | 16255.9 | 35.6      |                         |      |         |
| FH   | (60°-80°)   | 15502.1 | 33.9      |                         |      | G5      |
| FVH  | (80°-90°)   | 527.8   | 1.2       |                         |      | G4/750  |
| BL   | (0°-30°)    | 2516.3  | 5.5       | B4/5000                 |      |         |
| BM   | (30°-60°)   | 4627.6  | 10.1      | B3/5000                 |      |         |
| BH   | (60°-80°)   | 2670.1  | 5.8       | B4/5000                 |      | G4/5000 |
| BVH  | (80°-90°)   | 368.3   | 0.8       |                         |      | G3/500  |
| 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 Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 35°     | 45°     | 55°     | 56°     | 65°     | 75°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 5977.5  | 5977.5  | 5977.5  | 5977.5  | 5977.5  | 5977.5  | 5977.5  | 5977.5  | 5977.5  | 5977.5  | 5977.5  |
| 2.5°  | 6015.3  | 6021.6  | 6016.8  | 6029.4  | 6015.3  | 6024.7  | 6016.8  | 6016.8  | 6012.1  | 5997.9  | 5982.2  |
| 5°    | 6109.8  | 6122.4  | 6114.5  | 6127.1  | 6109.8  | 6112.9  | 6098.7  | 6098.7  | 6084.6  | 6054.6  | 6023.1  |
| 7.5°  | 6257.8  | 6272.0  | 6265.7  | 6278.3  | 6254.7  | 6254.7  | 6235.8  | 6234.2  | 6205.9  | 6157.0  | 6120.8  |
| 10°   | 6434.2  | 6453.1  | 6446.8  | 6465.7  | 6446.8  | 6453.1  | 6434.2  | 6434.2  | 6396.4  | 6327.1  | 6281.5  |
| 12.5° | 6691.0  | 6714.6  | 6697.3  | 6695.7  | 6687.8  | 6700.4  | 6684.7  | 6681.5  | 6646.9  | 6552.4  | 6489.4  |
| 15°   | 7034.3  | 7059.5  | 7023.3  | 7020.2  | 6976.1  | 6971.3  | 6971.3  | 6966.6  | 6944.6  | 6831.2  | 6727.2  |
| 17.5° | 7429.7  | 7437.6  | 7406.1  | 7355.7  | 7299.0  | 7262.7  | 7258.0  | 7270.6  | 7270.6  | 7138.3  | 6972.9  |
| 20°   | 7817.2  | 7831.3  | 7806.1  | 7749.4  | 7677.0  | 7623.4  | 7585.6  | 7610.8  | 7609.3  | 7451.7  | 7217.1  |
| 22.5° | 8239.3  | 8272.4  | 8234.6  | 8162.1  | 8077.1  | 8017.2  | 7951.0  | 7973.1  | 7974.7  | 7780.9  | 7456.5  |
| 25°   | 8785.8  | 8755.9  | 8732.3  | 8629.9  | 8508.6  | 8447.2  | 8385.8  | 8407.8  | 8401.5  | 8135.3  | 7703.8  |
| 27.5° | 9269.4  | 9275.7  | 9244.2  | 9135.5  | 8995.3  | 8859.9  | 8856.7  | 8870.9  | 8847.3  | 8503.9  | 7936.9  |
| 30°   | 9831.7  | 9834.9  | 9790.8  | 9693.1  | 9540.3  | 9365.5  | 9324.5  | 9348.2  | 9297.8  | 8853.6  | 8182.6  |
| 32.5° | 10390.9 | 10406.6 | 10357.8 | 10239.7 | 10116.8 | 9904.2  | 9822.3  | 9838.0  | 9712.0  | 9211.1  | 8436.2  |
| 35°   | 10880.7 | 10902.8 | 10887.0 | 10808.3 | 10674.4 | 10491.7 | 10394.0 | 10384.6 | 10228.6 | 9649.0  | 8771.7  |
| 37.5° | 11380.0 | 11400.5 | 11383.2 | 11317.0 | 11263.5 | 11069.7 | 11017.7 | 11017.7 | 10746.8 | 10096.3 | 9198.5  |
| 40°   | 11893.5 | 11925.0 | 11904.5 | 11813.2 | 11767.5 | 11679.3 | 11554.9 | 11524.9 | 11232.0 | 10633.4 | 9894.7  |
| 42.5° | 12370.8 | 12411.7 | 12493.6 | 12440.1 | 12347.1 | 12359.7 | 12109.3 | 12093.5 | 11879.3 | 11427.3 | 10768.9 |
| 45°   | 13048.0 | 13107.9 | 13246.5 | 13205.5 | 13186.6 | 13117.3 | 12819.7 | 12805.5 | 12723.6 | 12495.2 | 11854.1 |
| 47.5° | 13786.8 | 13868.7 | 14119.1 | 14127.0 | 14330.2 | 14199.4 | 13794.6 | 13745.8 | 13764.7 | 13774.2 | 13178.8 |
| 50°   | 14467.2 | 14557.0 | 14968.1 | 15161.8 | 15640.6 | 15669.0 | 15021.6 | 14977.5 | 15051.6 | 15268.9 | 14722.4 |
| 52.5° | 15010.6 | 15124.0 | 15637.5 | 16236.0 | 17056.6 | 17289.8 | 16532.1 | 16499.1 | 16554.2 | 16929.1 | 16467.6 |
| 55°   | 15409.1 | 15532.0 | 16091.1 | 17181.1 | 18491.5 | 18902.6 | 18271.0 | 18239.5 | 18274.2 | 18751.4 | 18365.5 |
| 57.5° | 15502.0 | 15532.0 | 16343.1 | 17817.4 | 19702.8 | 20690.4 | 20399.0 | 20336.0 | 20165.9 | 20581.7 | 20460.4 |
| 60°   | 15065.7 | 15185.4 | 16135.2 | 18041.1 | 20640.0 | 22452.9 | 22623.0 | 22544.3 | 22067.0 | 22407.2 | 22309.6 |
| 62.5° | 14180.5 | 14394.7 | 15358.7 | 17700.9 | 21007.0 | 23892.5 | 24804.5 | 24710.0 | 23887.8 | 24108.3 | 23638.9 |
| 65°   | 12734.6 | 12826.0 | 13838.7 | 16527.4 | 20540.7 | 24814.0 | 26749.7 | 26702.5 | 25667.7 | 25322.7 | 23884.7 |
| 67.5° | 10148.3 | 10320.0 | 11180.0 | 14075.0 | 18633.3 | 24705.3 | 28253.9 | 28249.2 | 26830.1 | 25773.2 | 23013.6 |
| 69°   | 8017.2  | 8195.2  | 9014.2  | 11594.2 | 16488.0 | 23711.4 | 28506.0 | 28561.1 | 27157.7 | 25499.1 | 21769.3 |
| 70°   | 6391.7  | 6598.0  | 7160.4  | 9765.6  | 14583.8 | 22400.9 | 28296.5 | 28395.7 | 27094.7 | 25047.1 | 20621.1 |
| 72.5° | 2720.2  | 2887.1  | 3287.2  | 5034.0  | 8888.2  | 16727.4 | 25872.4 | 26247.3 | 25634.6 | 22923.8 | 17042.5 |
| 75°   | 1187.6  | 1239.6  | 1420.7  | 2052.3  | 3945.6  | 9104.0  | 20268.2 | 20961.3 | 21918.9 | 19376.7 | 12695.2 |
| 77.5° | 869.4   | 891.5   | 990.7   | 1204.9  | 1770.4  | 3438.4  | 13033.9 | 13437.1 | 15807.6 | 14100.2 | 7787.2  |
| 80°   | 672.6   | 688.3   | 765.5   | 885.2   | 1156.1  | 1390.8  | 5944.4  | 6290.9  | 8888.2  | 7242.3  | 3243.1  |
| 82.5° | 535.5   | 546.6   | 600.1   | 652.1   | 798.6   | 842.7   | 1973.6  | 2189.4  | 3280.9  | 2000.4  | 858.4   |
| 85°   | 497.7   | 510.3   | 529.2   | 475.7   | 511.9   | 494.6   | 853.7   | 893.1   | 990.7   | 786.0   | 359.1   |
| 87.5° | 225.2   | 266.2   | 524.5   | 370.1   | 272.5   | 217.4   | 349.7   | 365.4   | 411.1   | 412.7   | 159.1   |
| 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-SA8D-722-U-T3

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°     | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|---------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 5977.5  | 5977.5  | 5977.5 | 5977.5 | 5977.5 | 5977.5 | 5977.5 | 5977.5 | 5977.5 | 5977.5 | 5977.5 |
| 2.5°  | 5991.6  | 5986.9  | 5994.8 | 5975.9 | 5999.5 | 5997.9 | 5990.1 | 5993.2 | 6009.0 | 6007.4 | 6009.0 |
| 5°    | 6027.9  | 6024.7  | 6034.2 | 6020.0 | 6048.3 | 6057.8 | 6059.4 | 6073.5 | 6090.9 | 6095.6 | 6095.6 |
| 7.5°  | 6119.2  | 6119.2  | 6123.9 | 6105.0 | 6123.9 | 6122.4 | 6114.5 | 6128.7 | 6146.0 | 6147.6 | 6146.0 |
| 10°   | 6276.7  | 6278.3  | 6270.4 | 6221.6 | 6205.9 | 6163.3 | 6123.9 | 6125.5 | 6147.6 | 6164.9 | 6169.6 |
| 12.5° | 6475.2  | 6468.9  | 6434.2 | 6344.5 | 6278.3 | 6191.7 | 6150.7 | 6149.1 | 6171.2 | 6185.4 | 6190.1 |
| 15°   | 6702.0  | 6684.7  | 6594.9 | 6448.4 | 6331.9 | 6246.8 | 6180.6 | 6164.9 | 6152.3 | 6136.5 | 6138.1 |
| 17.5° | 6916.2  | 6876.8  | 6727.2 | 6524.0 | 6401.2 | 6287.8 | 6160.2 | 6057.8 | 5986.9 | 5946.0 | 5933.4 |
| 20°   | 7133.6  | 7056.4  | 6840.6 | 6594.9 | 6439.0 | 6232.6 | 5986.9 | 5779.0 | 5649.8 | 5590.0 | 5579.0 |
| 22.5° | 7332.0  | 7207.6  | 6946.1 | 6668.9 | 6409.0 | 6046.8 | 5660.9 | 5358.5 | 5178.9 | 5098.6 | 5104.9 |
| 25°   | 7525.8  | 7352.5  | 7056.4 | 6720.9 | 6257.8 | 5719.1 | 5207.2 | 4835.5 | 4627.6 | 4537.8 | 4534.7 |
| 27.5° | 7695.9  | 7499.0  | 7176.1 | 6678.4 | 5975.9 | 5252.9 | 4670.1 | 4307.9 | 4134.6 | 4057.4 | 4044.8 |
| 30°   | 7891.2  | 7683.3  | 7335.2 | 6516.1 | 5563.2 | 4714.2 | 4145.6 | 3890.5 | 3767.6 | 3690.4 | 3676.3 |
| 32.5° | 8129.0  | 7933.7  | 7465.9 | 6221.6 | 5035.6 | 4151.9 | 3736.1 | 3558.1 | 3446.3 | 3359.7 | 3343.9 |
| 35°   | 8475.6  | 8264.5  | 7499.0 | 5799.5 | 4455.9 | 3707.8 | 3435.3 | 3252.6 | 3101.4 | 2989.5 | 2978.5 |
| 37.5° | 8910.3  | 8678.7  | 7423.4 | 5252.9 | 3893.6 | 3419.5 | 3184.8 | 2959.6 | 2762.7 | 2605.2 | 2580.0 |
| 40°   | 9537.2  | 9187.5  | 7213.9 | 4622.9 | 3479.4 | 3197.4 | 2940.7 | 2684.0 | 2439.8 | 2255.5 | 2219.3 |
| 42.5° | 10290.1 | 9784.5  | 6892.6 | 3996.0 | 3175.4 | 2972.2 | 2698.1 | 2380.0 | 2146.8 | 2016.1 | 1997.2 |
| 45°   | 11247.7 | 10405.0 | 6446.8 | 3447.9 | 2876.1 | 2747.0 | 2436.7 | 2143.7 | 1998.8 | 1902.7 | 1887.0 |
| 47.5° | 12340.8 | 11101.2 | 5979.0 | 3002.1 | 2622.5 | 2535.9 | 2227.2 | 2038.2 | 1923.2 | 1847.6 | 1833.4 |
| 50°   | 13684.4 | 11887.2 | 5482.9 | 2636.7 | 2367.4 | 2282.3 | 2127.9 | 1979.9 | 1888.5 | 1830.3 | 1816.1 |
| 52.5° | 15199.6 | 12774.0 | 5125.3 | 2348.5 | 2156.3 | 2094.9 | 2076.0 | 1948.4 | 1874.4 | 1830.3 | 1816.1 |
| 55°   | 16831.4 | 13676.5 | 4739.4 | 2105.9 | 1973.6 | 1990.9 | 2041.3 | 1951.5 | 1901.1 | 1847.6 | 1827.1 |
| 57.5° | 18464.8 | 14609.0 | 4309.4 | 1901.1 | 1828.7 | 1913.7 | 2017.7 | 1957.8 | 1915.3 | 1863.3 | 1844.4 |
| 60°   | 19756.3 | 15199.6 | 3643.2 | 1729.4 | 1713.7 | 1828.7 | 1961.0 | 1910.6 | 1855.5 | 1857.0 | 1853.9 |
| 62.5° | 20359.6 | 15168.1 | 2907.6 | 1576.7 | 1598.7 | 1713.7 | 1869.6 | 1836.6 | 1790.9 | 1852.3 | 1857.0 |
| 65°   | 20021.0 | 14412.1 | 2263.4 | 1438.1 | 1475.9 | 1594.0 | 1775.1 | 1800.3 | 1816.1 | 1934.2 | 1950.0 |
| 67.5° | 18600.2 | 12940.9 | 1753.1 | 1316.8 | 1364.0 | 1512.1 | 1784.6 | 1961.0 | 1981.5 | 2105.9 | 2104.3 |
| 69°   | 17130.7 | 11561.2 | 1523.1 | 1253.8 | 1308.9 | 1532.6 | 1907.4 | 2063.4 | 1986.2 | 2118.5 | 2099.6 |
| 70°   | 15898.9 | 10469.6 | 1400.3 | 1211.2 | 1283.7 | 1568.8 | 1989.3 | 2061.8 | 1962.6 | 2076.0 | 2044.5 |
| 72.5° | 12244.7 | 7532.1  | 1187.6 | 1132.5 | 1198.6 | 1501.1 | 2013.0 | 2016.1 | 1907.4 | 1929.5 | 1875.9 |
| 75°   | 8398.4  | 4759.9  | 1036.4 | 1025.4 | 1069.5 | 1353.0 | 1937.4 | 1926.3 | 1764.1 | 1732.6 | 1688.5 |
| 77.5° | 4630.8  | 2417.8  | 880.5  | 923.0  | 952.9  | 1198.6 | 1760.9 | 1745.2 | 1611.3 | 1545.2 | 1529.4 |
| 80°   | 1786.2  | 1058.5  | 743.4  | 820.6  | 839.5  | 1038.0 | 1543.6 | 1529.4 | 1417.6 | 1332.5 | 1308.9 |
| 82.5° | 674.1   | 554.4   | 614.3  | 710.4  | 704.1  | 856.8  | 1307.3 | 1299.4 | 1190.8 | 1066.3 | 1028.5 |
| 85°   | 311.9   | 332.3   | 486.7  | 585.9  | 540.3  | 634.8  | 1045.9 | 1060.0 | 927.7  | 779.7  | 779.7  |
| 87.5° | 132.3   | 185.9   | 344.9  | 442.6  | 363.8  | 428.4  | 767.1  | 732.4  | 672.6  | 466.2  | 437.9  |
| 90°   | 0.0     | 0.0     | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

LM-79-2008: Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Report Prepared for

Cooper Lighting Solutions

McGRAW-EDISON

Report Number: SP1-1908-441-10-R4

Test Date: 10/25/2019

Luminaire Tested: SA1C-722-U-5WQ

Data in this report applies to families of products SA1C-722-U-5WQ.

### Test Information

Test Method: LM-79-2008 Report  
 Number: SP1-1908-441-10-R4  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 10/28/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: MCGRAW-EDISON  
 Catalog Number: **SA1C-722-U-5WQ**  
 Description: MCGRAW EDISON ROADWAY AND AREA LUMINAIRE

\*\*\*THIS IS A REVISION OF SP1-1908-441-4-R3. TO UPDATE THE CATALOG INFORMATION.\*\*\*TESTED IN SITU. ROADWAY AND AREA LUMINAIRE. (1) 70 CRI, 5000K, 1050MA LIGHTSQUARE WITH 16 LEDS AND TYPE V WIDE OPTICS.

### Spectral Parameters

|                           |         |           |      |      |       |
|---------------------------|---------|-----------|------|------|-------|
| CCT (K):                  | 2237    | CRI (Ra): | 72.0 |      |       |
| CIE u':                   | 0.2876  | R1:       | 68.9 | R9:  | -17.4 |
| CIE v':                   | 0.5346  | R2:       | 83.0 | R10: | 61.3  |
| Duv:                      | -0.0006 | R3:       | 95.2 | R11: | 59.8  |
| CIE x:                    | 0.5005  | R4:       | 66.2 | R12: | 50.5  |
| CIE y:                    | 0.4134  | R5:       | 65.9 | R13: | 71.1  |
| CIE z:                    | 0.0860  | R6:       | 76.3 | R14: | 96.9  |
| Peak Wavelength (nm):     | 603     | R7:       | 76.7 |      |       |
| Dominant Wavelength (nm): | 587     | R8:       | 43.8 |      |       |
| Purity:                   | 74.5    |           |      |      |       |
| Rf:                       | 69.8    |           |      |      |       |
| Rg:                       | 99.2    |           |      |      |       |



### Test Conditions

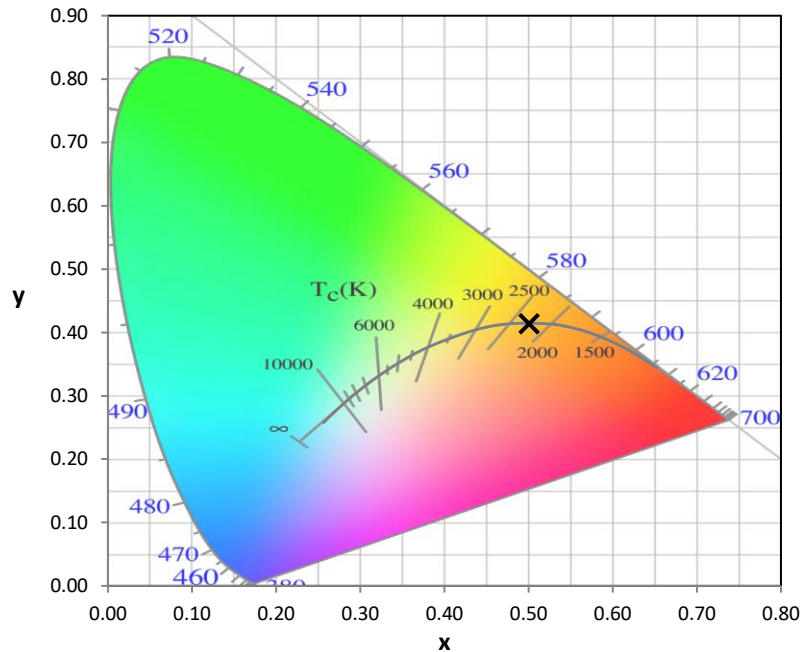
Stabilization Time: 71M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.7/41%  
 Sphere Temperature (°C): 25.6

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| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 6/28/2019        | 12/28/2019           |
| Power Meter                    | IN0071                | 12/5/2018        | 12/5/2019            |
| AC Power Source                | IN0063                | 12/5/2018        | 12/5/2019            |
| DC Power Source                | IN0208                | 12/5/2018        | 12/5/2019            |
| Sphere Thermometer             | IN0085                | 12/5/2018        | 12/5/2019            |
| Room Thermometer               | IN0046                | 12/5/2018        | 12/5/2019            |

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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 2200K 4-step quadrangle

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**Photopic Flux vs. Wavelength**



#####

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 1768             | NR               | 490       | 5206             | NR               | 620       | 130919           | NR               | 750       | 8553             | NR               | 880       | 2713             | NR               |
| 365       | 1569             | NR               | 495       | 7286             | NR               | 625       | 125335           | NR               | 755       | 7696             | NR               | 885       | 2316             | NR               |
| 370       | 1594             | NR               | 500       | 10654            | NR               | 630       | 118388           | NR               | 760       | 6978             | NR               | 890       | 2539             | NR               |
| 375       | 1744             | NR               | 505       | 15189            | NR               | 635       | 111855           | NR               | 765       | 6377             | NR               | 895       | 1933             | NR               |
| 380       | 1659             | NR               | 510       | 20541            | NR               | 640       | 104062           | NR               | 770       | 5600             | NR               | 900       | 2216             | NR               |
| 385       | 1504             | NR               | 515       | 26492            | NR               | 645       | 96365            | NR               | 775       | 5000             | NR               | 905       | 2067             | NR               |
| 390       | 1541             | NR               | 520       | 32294            | NR               | 650       | 88651            | NR               | 780       | 4709             | NR               | 910       | 1959             | NR               |
| 395       | 1355             | NR               | 525       | 38123            | NR               | 655       | 81152            | NR               | 785       | 4305             | NR               | 915       | 1874             | NR               |
| 400       | 1243             | NR               | 530       | 43232            | NR               | 660       | 73523            | NR               | 790       | 4040             | NR               | 920       | 1484             | NR               |
| 405       | 1417             | NR               | 535       | 48012            | NR               | 665       | 66123            | NR               | 795       | 3642             | NR               | 925       | 1914             | NR               |
| 410       | 2147             | NR               | 540       | 52623            | NR               | 670       | 58677            | NR               | 800       | 3594             | NR               | 930       | 1948             | NR               |
| 415       | 3837             | NR               | 545       | 57516            | NR               | 675       | 52349            | NR               | 805       | 3190             | NR               | 935       | 2079             | NR               |
| 420       | 7159             | NR               | 550       | 62613            | NR               | 680       | 46159            | NR               | 810       | 3241             | NR               | 940       | 2263             | NR               |
| 425       | 12599            | NR               | 555       | 68554            | NR               | 685       | 40525            | NR               | 815       | 2732             | NR               | 945       | 1688             | NR               |
| 430       | 19019            | NR               | 560       | 75325            | NR               | 690       | 35615            | NR               | 820       | 2612             | NR               | 950       | 1560             | NR               |
| 435       | 24875            | NR               | 565       | 82533            | NR               | 695       | 31158            | NR               | 825       | 2966             | NR               | 955       | 2826             | NR               |
| 440       | 29103            | NR               | 570       | 90909            | NR               | 700       | 27409            | NR               | 830       | 2574             | NR               | 960       | 1477             | NR               |
| 445       | 29901            | NR               | 575       | 99621            | NR               | 705       | 24204            | NR               | 835       | 2633             | NR               | 965       | 1568             | NR               |
| 450       | 24862            | NR               | 580       | 108484           | NR               | 710       | 21558            | NR               | 840       | 2526             | NR               | 970       | 2030             | NR               |
| 455       | 15942            | NR               | 585       | 116679           | NR               | 715       | 19222            | NR               | 845       | 2631             | NR               | 975       | 1986             | NR               |
| 460       | 9916             | NR               | 590       | 123752           | NR               | 720       | 17310            | NR               | 850       | 2079             | NR               | 980       | 2540             | NR               |
| 465       | 7051             | NR               | 595       | 129324           | NR               | 725       | 15280            | NR               | 855       | 2309             | NR               | 985       | 1139             | NR               |
| 470       | 5227             | NR               | 600       | 134082           | NR               | 730       | 13282            | NR               | 860       | 2528             | NR               | 990       | 2018             | NR               |
| 475       | 4257             | NR               | 605       | 135698           | NR               | 735       | 11753            | NR               | 865       | 2121             | NR               | 995       | 3445             | NR               |
| 480       | 4052             | NR               | 610       | 135144           | NR               | 740       | 10654            | NR               | 870       | 2751             | NR               | 1000      | 3704             | NR               |
| 485       | 4298             | NR               | 615       | 134180           | NR               | 745       | 9451             | NR               | 875       | 2317             | NR               |           |                  |                  |

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Scotopic Flux vs. Wavelength



Scotopic Lumens: 4696.9

S/P: 0.85

| 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       | 1768             | NR               | 490       | 5206             | NR               | 620       | 130919           | NR               | 750       | 8553             | NR               | 880       | 2713             | NR               |
| 365       | 1569             | NR               | 495       | 7286             | NR               | 625       | 125335           | NR               | 755       | 7696             | NR               | 885       | 2316             | NR               |
| 370       | 1594             | NR               | 500       | 10654            | NR               | 630       | 118388           | NR               | 760       | 6978             | NR               | 890       | 2539             | NR               |
| 375       | 1744             | NR               | 505       | 15189            | NR               | 635       | 111855           | NR               | 765       | 6377             | NR               | 895       | 1933             | NR               |
| 380       | 1659             | NR               | 510       | 20541            | NR               | 640       | 104062           | NR               | 770       | 5600             | NR               | 900       | 2216             | NR               |
| 385       | 1504             | NR               | 515       | 26492            | NR               | 645       | 96365            | NR               | 775       | 5000             | NR               | 905       | 2067             | NR               |
| 390       | 1541             | NR               | 520       | 32294            | NR               | 650       | 88651            | NR               | 780       | 4709             | NR               | 910       | 1959             | NR               |
| 395       | 1355             | NR               | 525       | 38123            | NR               | 655       | 81152            | NR               | 785       | 4305             | NR               | 915       | 1874             | NR               |
| 400       | 1243             | NR               | 530       | 43232            | NR               | 660       | 73523            | NR               | 790       | 4040             | NR               | 920       | 1484             | NR               |
| 405       | 1417             | NR               | 535       | 48012            | NR               | 665       | 66123            | NR               | 795       | 3642             | NR               | 925       | 1914             | NR               |
| 410       | 2147             | NR               | 540       | 52623            | NR               | 670       | 58677            | NR               | 800       | 3594             | NR               | 930       | 1948             | NR               |
| 415       | 3837             | NR               | 545       | 57516            | NR               | 675       | 52349            | NR               | 805       | 3190             | NR               | 935       | 2079             | NR               |
| 420       | 7159             | NR               | 550       | 62613            | NR               | 680       | 46159            | NR               | 810       | 3241             | NR               | 940       | 2263             | NR               |
| 425       | 12599            | NR               | 555       | 68554            | NR               | 685       | 40525            | NR               | 815       | 2732             | NR               | 945       | 1688             | NR               |
| 430       | 19019            | NR               | 560       | 75325            | NR               | 690       | 35615            | NR               | 820       | 2612             | NR               | 950       | 1560             | NR               |
| 435       | 24875            | NR               | 565       | 82533            | NR               | 695       | 31158            | NR               | 825       | 2966             | NR               | 955       | 2826             | NR               |
| 440       | 29103            | NR               | 570       | 90909            | NR               | 700       | 27409            | NR               | 830       | 2574             | NR               | 960       | 1477             | NR               |
| 445       | 29901            | NR               | 575       | 99621            | NR               | 705       | 24204            | NR               | 835       | 2633             | NR               | 965       | 1568             | NR               |
| 450       | 24862            | NR               | 580       | 108484           | NR               | 710       | 21558            | NR               | 840       | 2526             | NR               | 970       | 2030             | NR               |
| 455       | 15942            | NR               | 585       | 116679           | NR               | 715       | 19222            | NR               | 845       | 2631             | NR               | 975       | 1986             | NR               |
| 460       | 9916             | NR               | 590       | 123752           | NR               | 720       | 17310            | NR               | 850       | 2079             | NR               | 980       | 2540             | NR               |
| 465       | 7051             | NR               | 595       | 129324           | NR               | 725       | 15280            | NR               | 855       | 2309             | NR               | 985       | 1139             | NR               |
| 470       | 5227             | NR               | 600       | 134082           | NR               | 730       | 13282            | NR               | 860       | 2528             | NR               | 990       | 2018             | NR               |
| 475       | 4257             | NR               | 605       | 135698           | NR               | 735       | 11753            | NR               | 865       | 2121             | NR               | 995       | 3445             | NR               |
| 480       | 4052             | NR               | 610       | 135144           | NR               | 740       | 10654            | NR               | 870       | 2751             | NR               | 1000      | 3704             | NR               |
| 485       | 4298             | NR               | 615       | 134180           | NR               | 745       | 9451             | NR               | 875       | 2317             | NR               |           |                  |                  |

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**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 1470.8 M/P: 0.27**

| 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       | 1768             | NR               | 490       | 5206             | NR               | 620       | 130919           | NR               | 750       | 8553             | NR               | 880       | 2713             | NR               |
| 365       | 1569             | NR               | 495       | 7286             | NR               | 625       | 125335           | NR               | 755       | 7696             | NR               | 885       | 2316             | NR               |
| 370       | 1594             | NR               | 500       | 10654            | NR               | 630       | 118388           | NR               | 760       | 6978             | NR               | 890       | 2539             | NR               |
| 375       | 1744             | NR               | 505       | 15189            | NR               | 635       | 111855           | NR               | 765       | 6377             | NR               | 895       | 1933             | NR               |
| 380       | 1659             | NR               | 510       | 20541            | NR               | 640       | 104062           | NR               | 770       | 5600             | NR               | 900       | 2216             | NR               |
| 385       | 1504             | NR               | 515       | 26492            | NR               | 645       | 96365            | NR               | 775       | 5000             | NR               | 905       | 2067             | NR               |
| 390       | 1541             | NR               | 520       | 32294            | NR               | 650       | 88651            | NR               | 780       | 4709             | NR               | 910       | 1959             | NR               |
| 395       | 1355             | NR               | 525       | 38123            | NR               | 655       | 81152            | NR               | 785       | 4305             | NR               | 915       | 1874             | NR               |
| 400       | 1243             | NR               | 530       | 43232            | NR               | 660       | 73523            | NR               | 790       | 4040             | NR               | 920       | 1484             | NR               |
| 405       | 1417             | NR               | 535       | 48012            | NR               | 665       | 66123            | NR               | 795       | 3642             | NR               | 925       | 1914             | NR               |
| 410       | 2147             | NR               | 540       | 52623            | NR               | 670       | 58677            | NR               | 800       | 3594             | NR               | 930       | 1948             | NR               |
| 415       | 3837             | NR               | 545       | 57516            | NR               | 675       | 52349            | NR               | 805       | 3190             | NR               | 935       | 2079             | NR               |
| 420       | 7159             | NR               | 550       | 62613            | NR               | 680       | 46159            | NR               | 810       | 3241             | NR               | 940       | 2263             | NR               |
| 425       | 12599            | NR               | 555       | 68554            | NR               | 685       | 40525            | NR               | 815       | 2732             | NR               | 945       | 1688             | NR               |
| 430       | 19019            | NR               | 560       | 75325            | NR               | 690       | 35615            | NR               | 820       | 2612             | NR               | 950       | 1560             | NR               |
| 435       | 24875            | NR               | 565       | 82533            | NR               | 695       | 31158            | NR               | 825       | 2966             | NR               | 955       | 2826             | NR               |
| 440       | 29103            | NR               | 570       | 90909            | NR               | 700       | 27409            | NR               | 830       | 2574             | NR               | 960       | 1477             | NR               |
| 445       | 29901            | NR               | 575       | 99621            | NR               | 705       | 24204            | NR               | 835       | 2633             | NR               | 965       | 1568             | NR               |
| 450       | 24862            | NR               | 580       | 108484           | NR               | 710       | 21558            | NR               | 840       | 2526             | NR               | 970       | 2030             | NR               |
| 455       | 15942            | NR               | 585       | 116679           | NR               | 715       | 19222            | NR               | 845       | 2631             | NR               | 975       | 1986             | NR               |
| 460       | 9916             | NR               | 590       | 123752           | NR               | 720       | 17310            | NR               | 850       | 2079             | NR               | 980       | 2540             | NR               |
| 465       | 7051             | NR               | 595       | 129324           | NR               | 725       | 15280            | NR               | 855       | 2309             | NR               | 985       | 1139             | NR               |
| 470       | 5227             | NR               | 600       | 134082           | NR               | 730       | 13282            | NR               | 860       | 2528             | NR               | 990       | 2018             | NR               |
| 475       | 4257             | NR               | 605       | 135698           | NR               | 735       | 11753            | NR               | 865       | 2121             | NR               | 995       | 3445             | NR               |
| 480       | 4052             | NR               | 610       | 135144           | NR               | 740       | 10654            | NR               | 870       | 2751             | NR               | 1000      | 3704             | NR               |
| 485       | 4298             | NR               | 615       | 134180           | NR               | 745       | 9451             | NR               | 875       | 2317             | NR               |           |                  |                  |

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**Summary**

$R_f = 69.8$   
 $R_g = 99.2$   
 CIE  $R_a = 72.0$   
 $R_g = -17.4$



**Color Vector Graphics**



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 87 | CES26 = 56 | CES51 = 74 | CES76 = 56 |
| CES02 = 65 | CES27 = 76 | CES52 = 76 | CES77 = 81 |
| CES03 = 32 | CES28 = 83 | CES53 = 65 | CES78 = 63 |
| CES04 = 72 | CES29 = 46 | CES54 = 78 | CES79 = 84 |
| CES05 = 52 | CES30 = 48 | CES55 = 75 | CES80 = 84 |
| CES06 = 52 | CES31 = 51 | CES56 = 65 | CES81 = 63 |
| CES07 = 44 | CES32 = 51 | CES57 = 62 | CES82 = 92 |
| CES08 = 42 | CES33 = 53 | CES58 = 66 | CES83 = 83 |
| CES09 = 29 | CES34 = 70 | CES59 = 84 | CES84 = 92 |
| CES10 = 78 | CES35 = 85 | CES60 = 90 | CES85 = 81 |
| CES11 = 61 | CES36 = 78 | CES61 = 84 | CES86 = 56 |
| CES12 = 68 | CES37 = 80 | CES62 = 70 | CES87 = 78 |
| CES13 = 45 | CES38 = 53 | CES63 = 68 | CES88 = 72 |
| CES14 = 75 | CES39 = 90 | CES64 = 69 | CES89 = 62 |
| CES15 = 72 | CES40 = 84 | CES65 = 67 | CES90 = 67 |
| CES16 = 49 | CES41 = 75 | CES66 = 64 | CES91 = 90 |
| CES17 = 51 | CES42 = 79 | CES67 = 63 | CES92 = 67 |
| CES18 = 57 | CES43 = 64 | CES68 = 69 | CES93 = 79 |
| CES19 = 74 | CES44 = 98 | CES69 = 80 | CES94 = 52 |
| CES20 = 68 | CES45 = 73 | CES70 = 63 | CES95 = 76 |
| CES21 = 89 | CES46 = 67 | CES71 = 63 | CES96 = 78 |
| CES22 = 81 | CES47 = 60 | CES72 = 87 | CES97 = 77 |
| CES23 = 92 | CES48 = 48 | CES73 = 56 | CES98 = 71 |
| CES24 = 92 | CES49 = 64 | CES74 = 87 | CES99 = 65 |
| CES25 = 74 | CES50 = 74 | CES75 = 66 |            |



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Color Rendition by Hue-Angle Bin



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**Measure Comparisons**



(END OF REPORT)