

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: P318282

Luminaire Tested: **GLEON-SA8B-722-U-T2**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P318282  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-12)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA8B-722-U-T2  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(8) 70 CRI, 2200K, 800mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE II OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 33039 lumens  
Efficiency: N/A  
Efficacy: 98.9 lumens/watt  
Luminous Opening: Rectangular (W 2' x L: 1' x H: 0')  
IES Classification: Type III - Medium  
BUG Rating: B3 - U0 - G4

Input Watts (W): 334  
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

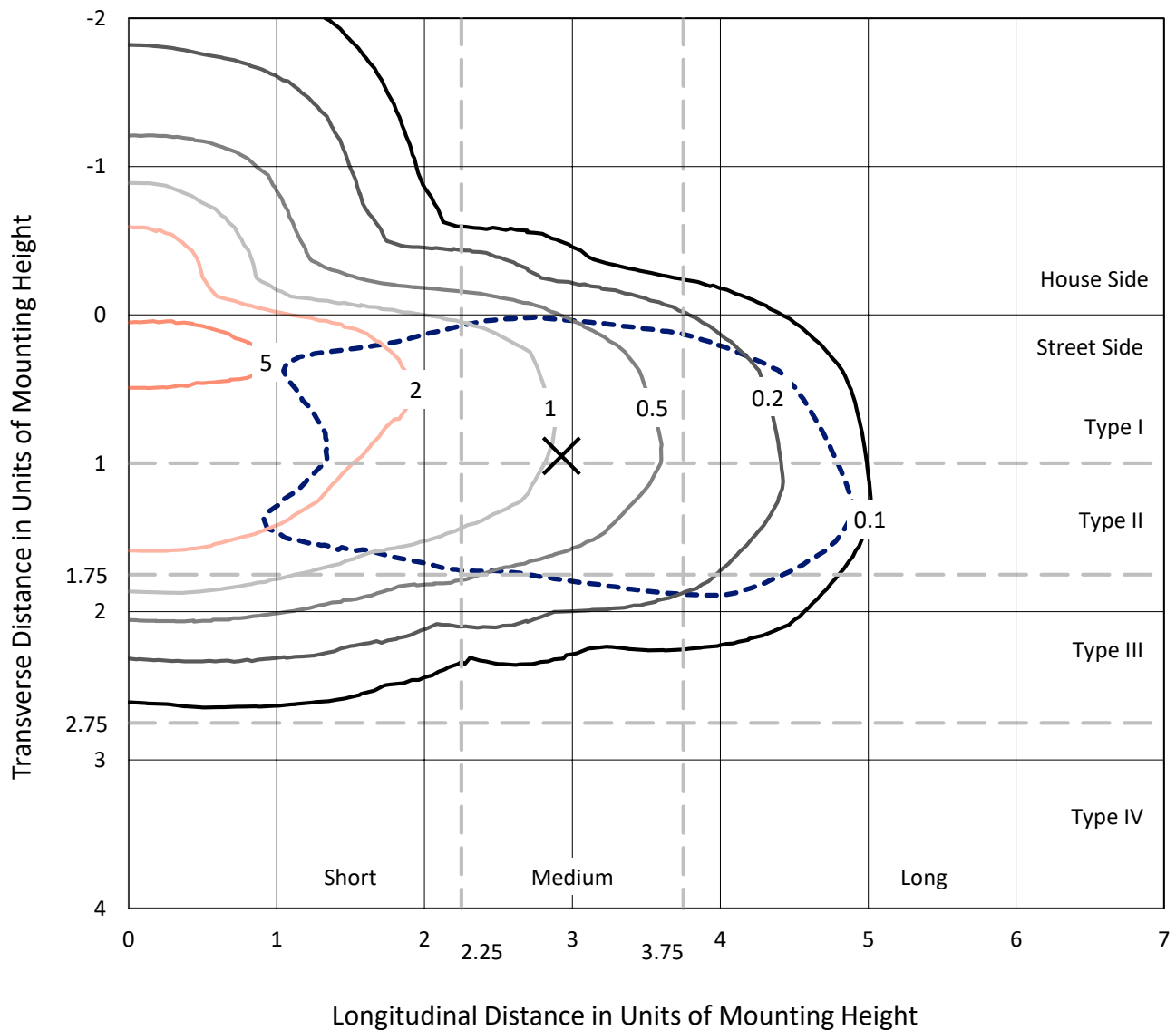


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## Iso-Footcandle Lines of Horizontal Illumination

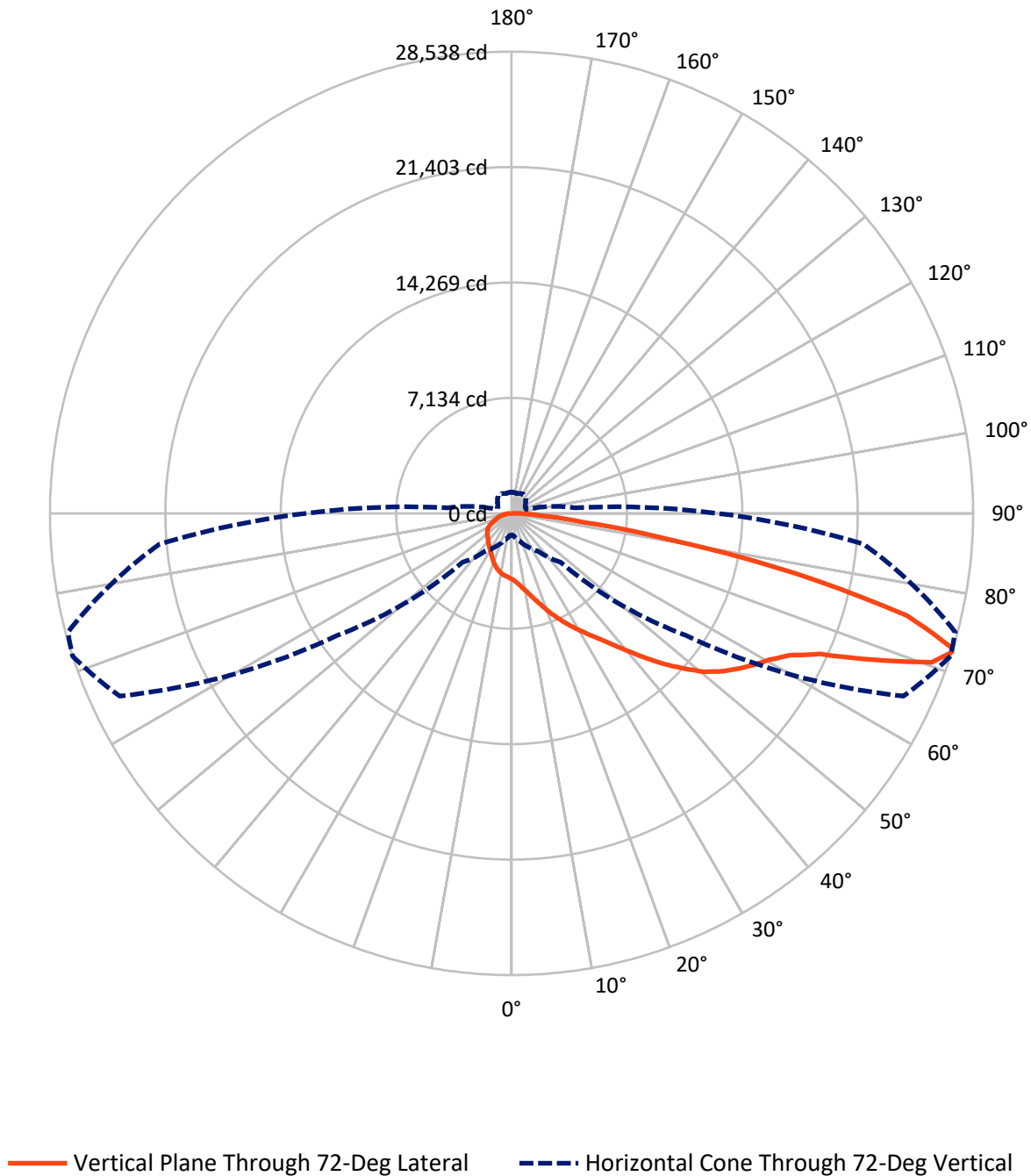
× Max cd  
- - - 1/2 Max cd



Based on 30 foot mounting height. Maximum calculated value = 6.2 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    | 6129.0   | 0.0    | 6129.0  |
|                    | % Fixture | 18.6     | 0.0    | 18.6    |
| <b>Street Side</b> | Lumens    | 26910.0  | 0.0    | 26910.0 |
|                    | % Fixture | 81.4     | 0.0    | 81.4    |
| <b>Total</b>       | Lumens    | 33039.0  | 0.0    | 33039.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 407.3   | 1.2       |
| 10°-20°   | 1316.2  | 4.0       |
| 20°-30°   | 2306.3  | 7.0       |
| 30°-40°   | 3419.6  | 10.4      |
| 40°-50°   | 5001.4  | 15.1      |
| 50°-60°   | 6881.9  | 20.8      |
| 60°-70°   | 7661.6  | 23.2      |
| 70°-80°   | 5191.5  | 15.7      |
| 80°-90°   | 853.3   | 2.6       |
| 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°    | 33039.0 | 100.0     |
| 0°-180°   | 33039.0 | 100.0     |

**Coefficient of Utilization**



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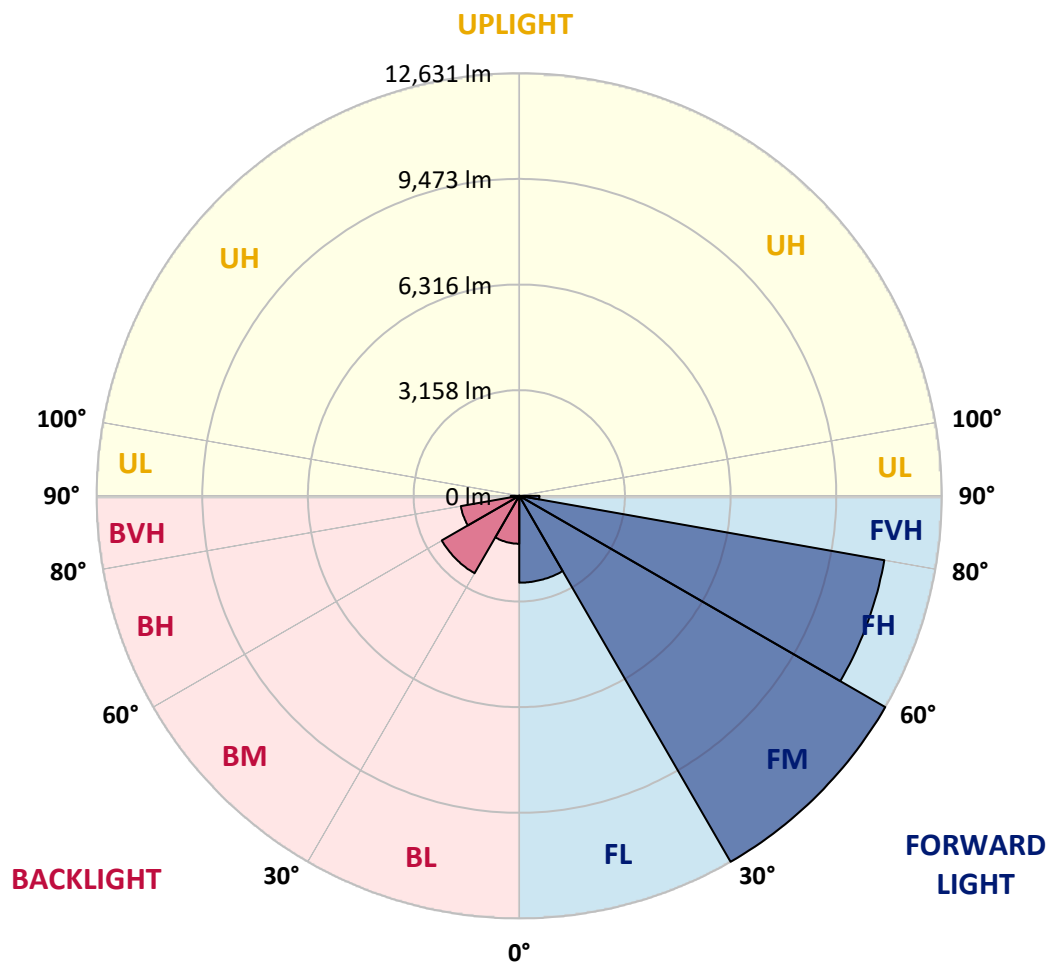
CATALOG NUMBER: GLEON-SA8B-722-U-T2

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |          |
|------|-------------|---------|-----------|-------------------------|------|----------|
|      |             |         |           | B                       | U    | G        |
| FL   | (0°-30°)    | 2597.1  | 7.9       |                         |      |          |
| FM   | (30°-60°)   | 12631.2 | 38.2      |                         |      |          |
| FH   | (60°-80°)   | 11079.9 | 33.5      |                         |      | G4/12000 |
| FVH  | (80°-90°)   | 601.9   | 1.8       |                         |      | G4/750   |
| BL   | (0°-30°)    | 1432.7  | 4.3       | B3/2500                 |      |          |
| BM   | (30°-60°)   | 2671.6  | 8.1       | B3/5000                 |      |          |
| BH   | (60°-80°)   | 1773.2  | 5.4       | B3/2500                 |      | G3/2500  |
| BVH  | (80°-90°)   | 251.4   | 0.8       |                         |      | G3/500   |
| UL   | (90°-100°)  | 0.0     | 0.0       |                         | U0/0 |          |
| UH   | (100°-180°) | 0.0     | 0.0       |                         | U0/0 |          |

**BUG Rating: B3-U0-G4**

Type III Medium





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 35°     | 45°     | 55°     | 65°     | 72°     | 75°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 4064.7  | 4064.7  | 4064.7  | 4064.7  | 4064.7  | 4064.7  | 4064.7  | 4064.7  | 4064.7  | 4064.7  | 4064.7  |
| 2.5°  | 4490.1  | 4483.3  | 4459.4  | 4459.4  | 4413.9  | 4375.2  | 4302.4  | 4253.5  | 4195.5  | 4175.0  | 4106.8  |
| 5°    | 4924.7  | 4927.0  | 4897.4  | 4876.9  | 4809.8  | 4727.9  | 4603.9  | 4491.3  | 4378.6  | 4333.1  | 4193.2  |
| 7.5°  | 5289.9  | 5285.3  | 5277.3  | 5260.3  | 5197.7  | 5113.5  | 4946.3  | 4779.1  | 4613.0  | 4544.7  | 4303.6  |
| 10°   | 5524.2  | 5534.4  | 5541.3  | 5549.2  | 5523.1  | 5462.8  | 5304.6  | 5101.0  | 4883.7  | 4790.5  | 4435.5  |
| 12.5° | 5642.5  | 5660.7  | 5692.6  | 5747.2  | 5790.4  | 5783.6  | 5668.7  | 5452.5  | 5194.3  | 5077.1  | 4600.5  |
| 15°   | 5711.9  | 5735.8  | 5785.9  | 5883.7  | 6005.4  | 6074.8  | 6044.1  | 5848.4  | 5560.6  | 5416.1  | 4801.8  |
| 17.5° | 5755.1  | 5774.5  | 5851.8  | 5982.7  | 6163.5  | 6347.8  | 6428.6  | 6264.8  | 5974.7  | 5809.7  | 5032.8  |
| 20°   | 5784.7  | 5799.5  | 5896.2  | 6049.8  | 6284.1  | 6577.6  | 6802.9  | 6761.9  | 6430.9  | 6217.0  | 5273.9  |
| 22.5° | 5850.7  | 5863.2  | 5955.4  | 6110.1  | 6369.4  | 6748.3  | 7163.5  | 7224.9  | 6912.1  | 6669.8  | 5532.2  |
| 25°   | 6035.0  | 6035.0  | 6112.3  | 6220.4  | 6463.9  | 6896.2  | 7468.4  | 7740.3  | 7403.5  | 7121.4  | 5771.1  |
| 27.5° | 6386.5  | 6383.1  | 6411.5  | 6449.1  | 6633.4  | 7046.3  | 7740.3  | 8195.3  | 7913.2  | 7604.9  | 6003.1  |
| 30°   | 6802.9  | 6825.6  | 6829.0  | 6810.8  | 6897.3  | 7234.0  | 7991.7  | 8675.4  | 8426.2  | 8094.1  | 6240.9  |
| 32.5° | 7338.7  | 7353.5  | 7336.4  | 7276.1  | 7263.6  | 7500.2  | 8238.5  | 9178.2  | 8981.4  | 8604.8  | 6458.2  |
| 35°   | 8019.0  | 7990.5  | 7937.1  | 7814.2  | 7697.0  | 7856.3  | 8520.7  | 9681.0  | 9604.8  | 9222.6  | 6757.4  |
| 37.5° | 8748.2  | 8749.3  | 8683.3  | 8404.6  | 8243.1  | 8311.3  | 8909.7  | 10250.9 | 10359.0 | 9957.4  | 7140.7  |
| 40°   | 9332.9  | 9363.6  | 9404.6  | 9038.3  | 8828.9  | 8923.4  | 9404.6  | 10911.9 | 11250.9 | 10828.9 | 7640.1  |
| 42.5° | 9741.3  | 9776.6  | 9892.6  | 9662.8  | 9445.5  | 9620.7  | 9987.0  | 11617.2 | 12252.0 | 11834.5 | 8224.9  |
| 45°   | 10173.6 | 10192.9 | 10274.8 | 10175.9 | 10037.1 | 10431.8 | 10643.4 | 12347.6 | 13311.1 | 12906.1 | 8879.0  |
| 47.5° | 10628.6 | 10649.1 | 10733.3 | 10667.3 | 10594.5 | 11189.5 | 11328.3 | 13035.8 | 14325.8 | 14083.5 | 9577.5  |
| 50°   | 11190.6 | 11204.3 | 11283.9 | 11164.4 | 11187.2 | 11760.5 | 11940.3 | 13667.2 | 15389.5 | 15141.5 | 10278.3 |
| 52.5° | 11957.4 | 11960.8 | 12071.1 | 11963.0 | 11856.1 | 12179.2 | 12467.0 | 14262.1 | 16223.4 | 16106.2 | 10979.0 |
| 55°   | 12558.0 | 12594.4 | 12956.2 | 12933.4 | 12872.0 | 12559.1 | 12907.3 | 14828.7 | 16967.4 | 17023.1 | 11723.0 |
| 57.5° | 12174.6 | 12316.8 | 13049.5 | 13565.9 | 14068.7 | 13504.5 | 13502.2 | 15466.9 | 17659.0 | 17923.0 | 12540.9 |
| 60°   | 10662.8 | 10856.2 | 11935.7 | 13081.3 | 14654.6 | 15149.5 | 14737.7 | 16246.1 | 18357.5 | 18814.8 | 13565.9 |
| 62.5° | 7615.1  | 7933.7  | 9396.6  | 11225.9 | 13851.5 | 16239.3 | 17251.8 | 17482.7 | 19307.4 | 19847.8 | 14898.1 |
| 65°   | 3849.7  | 4090.8  | 5317.2  | 7520.7  | 11066.6 | 15527.2 | 19984.3 | 20190.2 | 20958.1 | 21438.1 | 16949.2 |
| 67.5° | 2338.9  | 2429.9  | 3028.3  | 4183.0  | 6784.7  | 12095.0 | 20876.2 | 24703.1 | 24152.5 | 24407.3 | 19873.9 |
| 70°   | 1723.5  | 1790.6  | 2163.7  | 2778.0  | 3902.0  | 7097.5  | 18139.1 | 27923.6 | 27561.9 | 27533.4 | 22035.4 |
| 72°   | 1342.4  | 1391.3  | 1721.2  | 2244.5  | 2853.1  | 4258.1  | 13147.3 | 26734.8 | 28537.9 | 28394.6 | 21837.4 |
| 72.5° | 1273.0  | 1316.2  | 1616.5  | 2112.5  | 2696.1  | 3859.9  | 11820.8 | 25932.8 | 28467.4 | 28402.6 | 21581.5 |
| 75°   | 1002.2  | 1032.9  | 1196.8  | 1633.6  | 2110.3  | 2189.9  | 6477.5  | 20096.9 | 25253.7 | 26303.7 | 19410.9 |
| 77.5° | 829.3   | 833.9   | 920.3   | 1188.8  | 1645.0  | 1548.3  | 3181.9  | 13943.6 | 18083.4 | 19238.0 | 13750.2 |
| 80°   | 675.7   | 681.4   | 722.4   | 833.9   | 1244.5  | 1145.6  | 1510.7  | 8017.8  | 10124.7 | 10137.2 | 6538.9  |
| 82.5° | 538.1   | 539.2   | 584.7   | 609.8   | 894.2   | 819.1   | 865.7   | 3764.3  | 4424.1  | 4255.8  | 2350.3  |
| 85°   | 378.8   | 370.9   | 571.1   | 500.5   | 584.7   | 525.6   | 477.8   | 1490.3  | 1829.3  | 1749.6  | 736.0   |
| 87.5° | 126.3   | 130.8   | 253.7   | 324.2   | 341.3   | 298.1   | 212.7   | 571.1   | 690.5   | 684.8   | 233.2   |
| 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-SA8B-722-U-T2

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 4064.7  | 4064.7 | 4064.7 | 4064.7 | 4064.7 | 4064.7 | 4064.7 | 4064.7 | 4064.7 | 4064.7 | 4064.7 |
| 2.5°  | 4085.1  | 4048.7 | 3995.3 | 3936.1 | 3889.5 | 3841.7 | 3806.4 | 3788.2 | 3767.7 | 3750.7 | 3771.2 |
| 5°    | 4128.4  | 4060.1 | 3946.3 | 3834.9 | 3753.0 | 3680.1 | 3627.8 | 3600.5 | 3575.5 | 3558.4 | 3560.7 |
| 7.5°  | 4198.9  | 4088.5 | 3897.4 | 3734.8 | 3621.0 | 3542.5 | 3489.0 | 3470.8 | 3454.9 | 3450.4 | 3456.0 |
| 10°   | 4274.0  | 4111.3 | 3832.6 | 3616.4 | 3486.8 | 3421.9 | 3398.0 | 3410.5 | 3421.9 | 3432.2 | 3443.5 |
| 12.5° | 4359.3  | 4131.8 | 3738.2 | 3477.7 | 3367.3 | 3342.3 | 3366.2 | 3420.8 | 3460.6 | 3484.5 | 3499.3 |
| 15°   | 4470.8  | 4150.0 | 3629.0 | 3338.9 | 3264.9 | 3293.4 | 3374.1 | 3468.6 | 3537.9 | 3582.3 | 3589.1 |
| 17.5° | 4573.2  | 4148.8 | 3489.0 | 3198.9 | 3181.9 | 3264.9 | 3386.6 | 3519.7 | 3613.0 | 3675.6 | 3688.1 |
| 20°   | 4679.0  | 4118.1 | 3326.4 | 3062.4 | 3097.7 | 3234.2 | 3392.3 | 3552.7 | 3665.4 | 3738.2 | 3755.2 |
| 22.5° | 4777.9  | 4064.7 | 3147.8 | 2938.4 | 3027.2 | 3193.3 | 3370.7 | 3533.4 | 3646.0 | 3705.2 | 3723.4 |
| 25°   | 4845.1  | 3971.4 | 2966.9 | 2833.8 | 2964.6 | 3143.2 | 3300.2 | 3431.0 | 3515.2 | 3544.8 | 3549.3 |
| 27.5° | 4879.2  | 3849.7 | 2796.2 | 2742.8 | 2899.8 | 3061.3 | 3169.4 | 3234.2 | 3258.1 | 3255.8 | 3251.3 |
| 30°   | 4883.7  | 3689.2 | 2649.5 | 2668.8 | 2824.7 | 2940.7 | 2991.9 | 2979.4 | 2948.7 | 2896.3 | 2900.9 |
| 32.5° | 4868.9  | 3508.4 | 2526.6 | 2598.3 | 2729.1 | 2794.0 | 2796.2 | 2735.9 | 2654.0 | 2571.0 | 2548.2 |
| 35°   | 4873.5  | 3330.9 | 2418.5 | 2518.7 | 2613.1 | 2641.5 | 2615.4 | 2526.6 | 2415.1 | 2308.2 | 2285.4 |
| 37.5° | 4923.5  | 3176.2 | 2325.3 | 2426.5 | 2484.5 | 2491.4 | 2453.8 | 2360.5 | 2278.6 | 2174.0 | 2164.9 |
| 40°   | 5043.0  | 3065.8 | 2236.5 | 2323.0 | 2356.0 | 2359.4 | 2305.9 | 2239.9 | 2246.8 | 2191.0 | 2189.9 |
| 42.5° | 5258.0  | 3018.1 | 2158.0 | 2214.9 | 2235.4 | 2242.2 | 2201.3 | 2159.2 | 2218.3 | 2181.9 | 2169.4 |
| 45°   | 5535.6  | 3029.4 | 2092.1 | 2109.1 | 2146.7 | 2178.5 | 2153.5 | 2102.3 | 2125.0 | 1966.9 | 1914.6 |
| 47.5° | 5856.4  | 3102.2 | 2039.7 | 2018.1 | 2083.0 | 2143.2 | 2104.6 | 2027.2 | 1946.4 | 1789.5 | 1759.9 |
| 50°   | 6231.8  | 3214.9 | 1991.9 | 1928.2 | 2013.6 | 2095.5 | 2056.8 | 1946.4 | 1824.7 | 1748.5 | 1738.3 |
| 52.5° | 6623.1  | 3352.5 | 1944.2 | 1829.3 | 1926.0 | 2059.1 | 2039.7 | 1928.2 | 1778.1 | 1703.0 | 1689.3 |
| 55°   | 7066.8  | 3491.3 | 1883.9 | 1714.4 | 1831.5 | 2042.0 | 2031.8 | 1862.3 | 1742.8 | 1700.7 | 1690.5 |
| 57.5° | 7618.5  | 3649.4 | 1804.2 | 1594.9 | 1742.8 | 1980.6 | 1948.7 | 1822.4 | 1706.4 | 1674.6 | 1671.1 |
| 60°   | 8337.5  | 3882.6 | 1689.3 | 1467.5 | 1634.7 | 1886.1 | 1879.3 | 1764.4 | 1648.4 | 1625.6 | 1621.1 |
| 62.5° | 9415.9  | 4268.3 | 1531.2 | 1340.1 | 1514.2 | 1725.7 | 1788.3 | 1685.9 | 1587.0 | 1585.8 | 1588.1 |
| 65°   | 11088.2 | 4848.5 | 1359.4 | 1228.6 | 1392.4 | 1590.4 | 1682.5 | 1605.2 | 1524.4 | 1547.1 | 1550.6 |
| 67.5° | 13026.7 | 5329.7 | 1191.1 | 1119.4 | 1268.4 | 1461.8 | 1587.0 | 1524.4 | 1441.3 | 1500.5 | 1501.6 |
| 70°   | 13671.7 | 4899.7 | 1043.2 | 1011.3 | 1139.9 | 1337.8 | 1483.4 | 1435.7 | 1351.5 | 1410.6 | 1404.9 |
| 72°   | 12723.0 | 3955.4 | 947.6  | 929.4  | 1043.2 | 1235.4 | 1391.3 | 1352.6 | 1269.6 | 1309.4 | 1294.6 |
| 72.5° | 12423.8 | 3771.2 | 923.7  | 908.9  | 1017.0 | 1209.3 | 1367.4 | 1332.1 | 1249.1 | 1283.2 | 1269.6 |
| 75°   | 11082.5 | 3275.2 | 794.0  | 797.5  | 887.3  | 1081.9 | 1233.2 | 1221.8 | 1136.5 | 1139.9 | 1135.3 |
| 77.5° | 8038.3  | 2401.5 | 668.9  | 691.7  | 755.4  | 951.0  | 1097.8 | 1091.0 | 997.7  | 980.6  | 977.2  |
| 80°   | 3730.2  | 1225.2 | 544.9  | 555.2  | 621.1  | 795.2  | 936.2  | 927.1  | 852.1  | 830.5  | 817.9  |
| 82.5° | 1277.5  | 582.5  | 409.5  | 416.4  | 481.2  | 640.5  | 812.2  | 806.6  | 744.0  | 701.9  | 675.7  |
| 85°   | 456.2   | 290.1  | 286.7  | 279.9  | 343.6  | 504.0  | 707.6  | 676.9  | 584.7  | 498.3  | 496.0  |
| 87.5° | 147.9   | 124.0  | 147.9  | 146.8  | 200.2  | 341.3  | 514.2  | 438.0  | 424.3  | 352.7  | 345.8  |
| 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

REPORT NUMBER: SP1-1908-441-10-R4

| 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)