

Scaled data based on original data using  
LM-79-2019 Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Test Report Prepared for

Cooper Lighting Solutions

Brand: McGRAW-EDISON

Report Number: P639535

Luminaire Tested: GWS-SA5C-722-U-T2-W-HSS

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P639535  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-22)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA5C-722-U-T2-W-HSS  
Description: GALLEON WALL SLIM LUMINAIRE. (5) LIGHTSQUARES WITH 16 LEDS EACH AND  
TYPE II OPTICS WITH HOUSE SIDE SHIELD  
Light Source: (80) 2200K CCT, 70 CRI LEDS  
Ballast/Driver: -

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 13138.6 lumens  
Efficiency: N/A  
Efficacy: 83.4 lumens/watt  
Luminous Opening: Rectangular (W 1.5' x L: 1' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B1 - U0 - G2

Input Watts (W): 157.5  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 0  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT

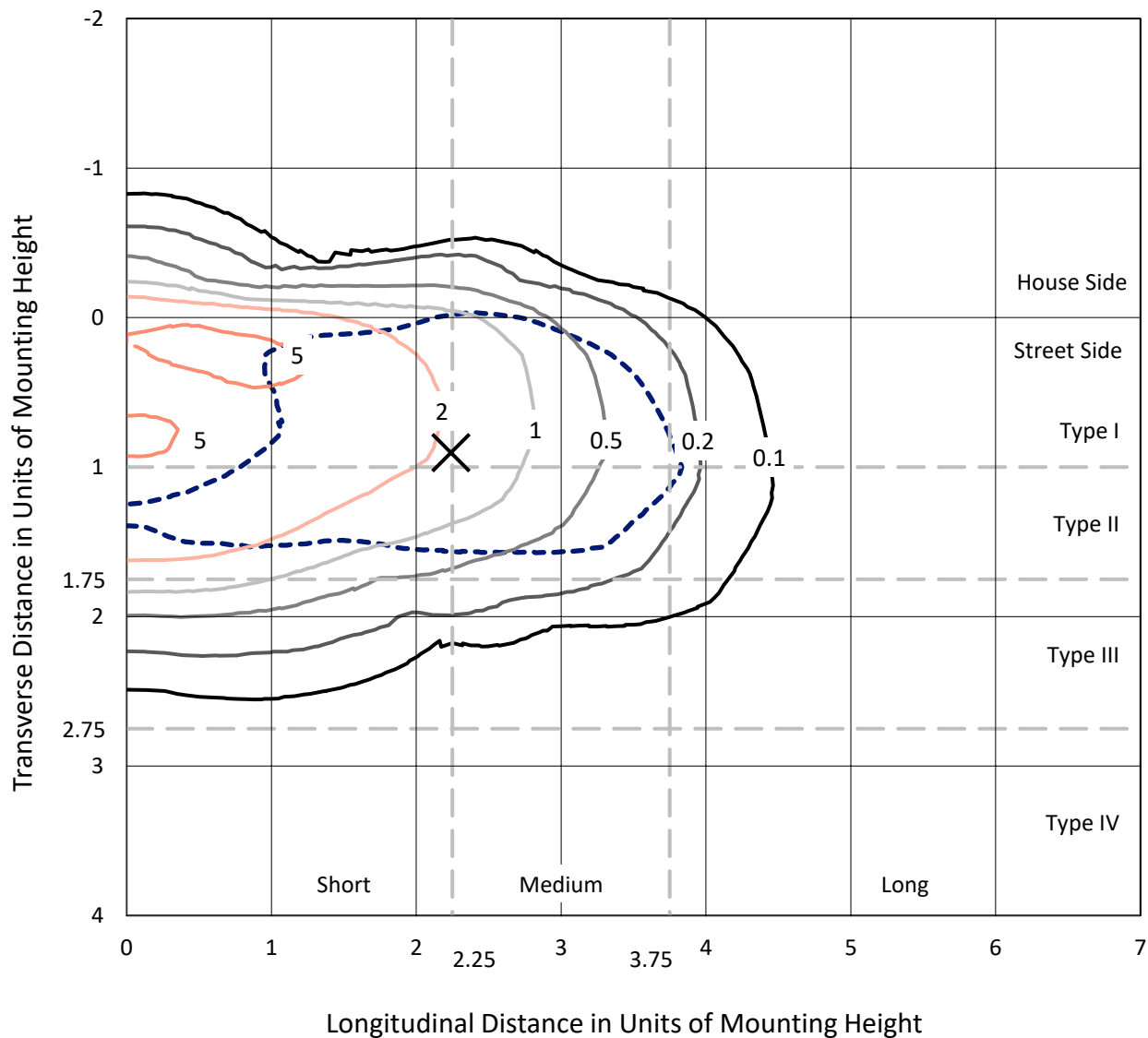


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## Iso-Footcandle Lines of Horizontal Illumination

✕ Max cd

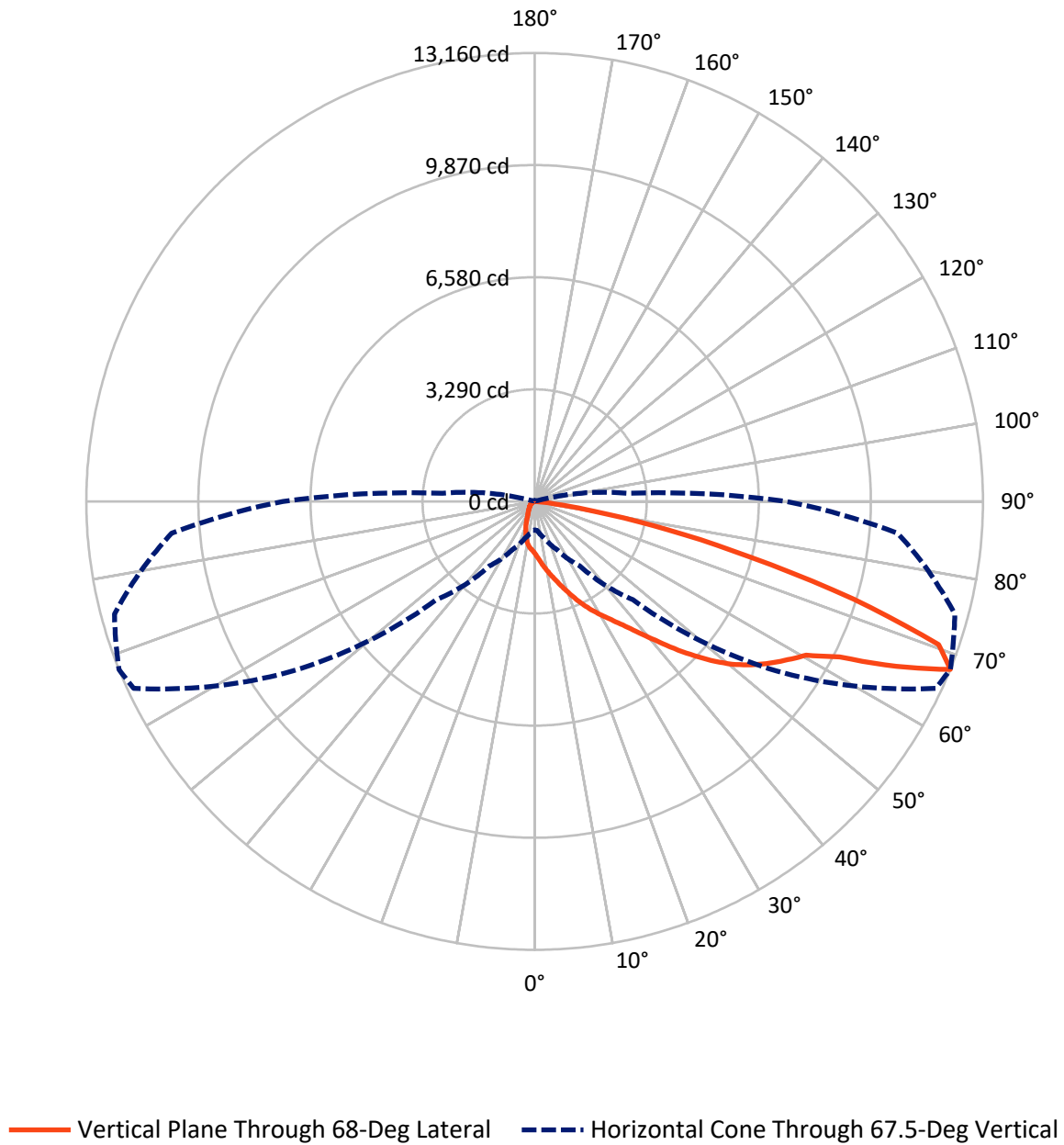
--- 1/2 Max cd



Based on 20 foot mounting height. Maximum calculated value = 6.2 fc  
 Type II - Short - N/A

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## Luminous Intensity Polar Plot



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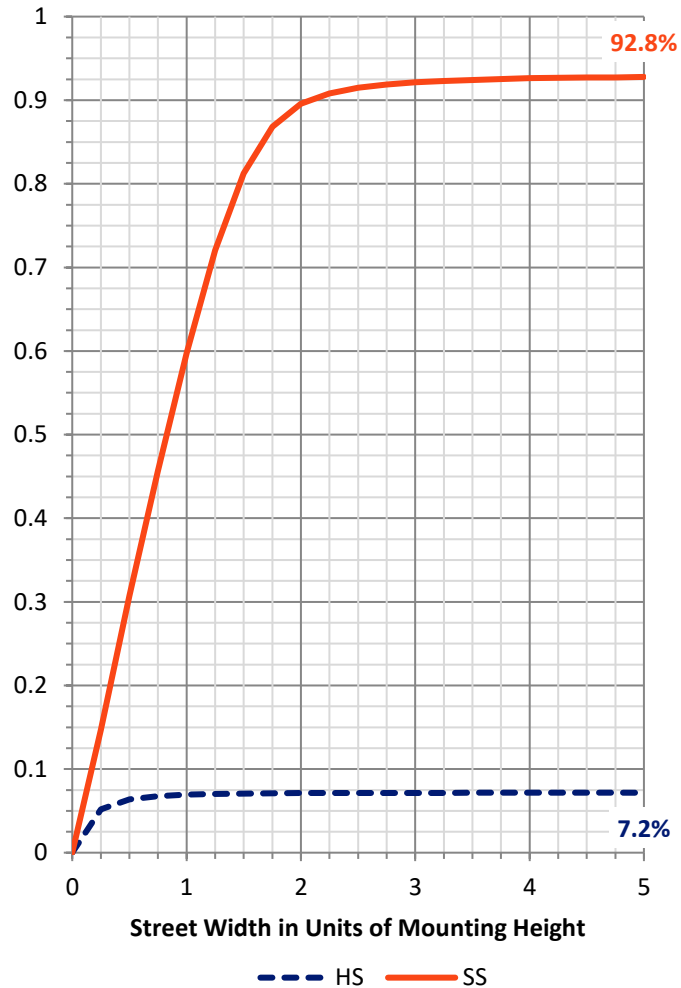
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 948.8    | 0.0    | 948.8   |
|                    | % Fixture | 7.2      | 0.0    | 7.2     |
| <b>Street Side</b> | Lumens    | 12189.8  | 0.0    | 12189.8 |
|                    | % Fixture | 92.8     | 0.0    | 92.8    |
| <b>Total</b>       | Lumens    | 13138.6  | 0.0    | 13138.6 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 149.1   | 1.1       |
| 10°-20°   | 428.2   | 3.3       |
| 20°-30°   | 735.9   | 5.6       |
| 30°-40°   | 1279.5  | 9.7       |
| 40°-50°   | 2232.6  | 17.0      |
| 50°-60°   | 3367.3  | 25.6      |
| 60°-70°   | 3376.6  | 25.7      |
| 70°-80°   | 1489.7  | 11.3      |
| 80°-90°   | 79.6    | 0.6       |
| 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°    | 13138.6 | 100.0     |
| 0°-180°   | 13138.6 | 100.0     |

**Coefficient of Utilization**



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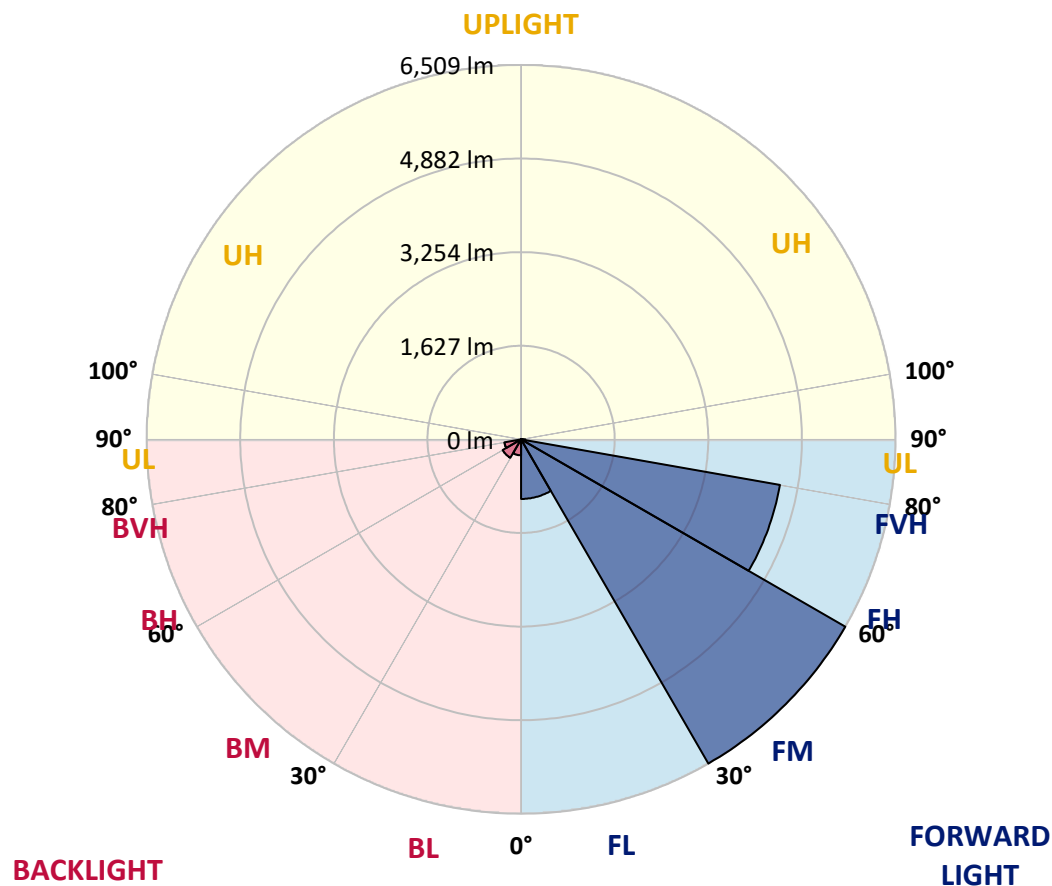
CATALOG NUMBER: GWS-SA5C-722-U-T2-W-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 1035.7 | 7.9       |                         |      |         |
| FM   | (30°-60°)   | 6508.8 | 49.5      |                         |      |         |
| FH   | (60°-80°)   | 4570.2 | 34.8      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 75.1   | 0.6       |                         |      | G1/100  |
| BL   | (0°-30°)    | 277.6  | 2.1       | B1/500                  |      |         |
| BM   | (30°-60°)   | 370.6  | 2.8       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 296.1  | 2.3       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 4.5    | 0.0       |                         |      | G0/10   |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B1-U0-G2**

Type II Short



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°     | 68°     | 75°     | 85°     |
|-------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|
| 0°    | 1529.0 | 1529.0 | 1529.0 | 1529.0 | 1529.0 | 1529.0 | 1529.0 | 1529.0  | 1529.0  | 1529.0  | 1529.0  |
| 2.5°  | 1780.5 | 1791.8 | 1780.5 | 1783.0 | 1750.3 | 1735.2 | 1702.5 | 1657.3  | 1645.9  | 1617.0  | 1573.0  |
| 5°    | 1998.0 | 2008.1 | 1996.8 | 1994.2 | 1956.5 | 1928.9 | 1874.8 | 1796.8  | 1774.2  | 1717.6  | 1630.8  |
| 7.5°  | 2116.2 | 2122.5 | 2126.3 | 2132.6 | 2118.7 | 2096.1 | 2047.0 | 1950.2  | 1926.3  | 1834.5  | 1712.6  |
| 10°   | 2128.8 | 2133.8 | 2152.7 | 2190.4 | 2218.1 | 2231.9 | 2204.2 | 2114.9  | 2077.2  | 1988.0  | 1813.2  |
| 12.5° | 2093.6 | 2101.1 | 2131.3 | 2194.2 | 2270.9 | 2341.3 | 2358.9 | 2280.9  | 2247.0  | 2132.6  | 1931.4  |
| 15°   | 2047.0 | 2053.3 | 2094.8 | 2180.3 | 2296.0 | 2425.5 | 2498.5 | 2464.5  | 2426.8  | 2307.3  | 2062.1  |
| 17.5° | 1975.4 | 1984.2 | 2042.0 | 2157.7 | 2307.3 | 2492.2 | 2649.3 | 2660.7  | 2634.3  | 2504.7  | 2206.7  |
| 20°   | 1935.1 | 1941.4 | 1993.0 | 2112.4 | 2299.8 | 2541.2 | 2790.2 | 2897.1  | 2868.1  | 2732.3  | 2372.7  |
| 22.5° | 1969.1 | 1974.1 | 2008.1 | 2101.1 | 2274.6 | 2568.9 | 2920.9 | 3133.4  | 3117.1  | 2976.3  | 2547.5  |
| 25°   | 2147.6 | 2164.0 | 2143.9 | 2160.2 | 2286.0 | 2584.0 | 3026.6 | 3369.8  | 3373.6  | 3231.5  | 2728.6  |
| 27.5° | 2509.8 | 2488.4 | 2440.6 | 2358.9 | 2374.0 | 2624.2 | 3117.1 | 3592.4  | 3625.1  | 3480.5  | 2889.5  |
| 30°   | 2878.2 | 2865.6 | 2836.7 | 2709.7 | 2604.1 | 2713.5 | 3193.8 | 3820.0  | 3871.5  | 3725.7  | 3032.8  |
| 32.5° | 3291.9 | 3304.4 | 3252.9 | 3100.7 | 2920.9 | 2894.5 | 3273.0 | 4036.3  | 4133.1  | 4003.6  | 3201.3  |
| 35°   | 3786.0 | 3789.8 | 3688.0 | 3519.5 | 3315.8 | 3193.8 | 3415.1 | 4275.2  | 4453.7  | 4358.2  | 3426.4  |
| 37.5° | 4267.6 | 4290.3 | 4234.9 | 3969.6 | 3788.5 | 3566.0 | 3650.2 | 4582.0  | 4833.4  | 4795.7  | 3709.3  |
| 40°   | 4693.9 | 4729.1 | 4711.5 | 4455.0 | 4217.3 | 4030.0 | 4014.9 | 4941.6  | 5292.4  | 5335.2  | 4082.8  |
| 42.5° | 5033.4 | 5056.0 | 5069.8 | 4887.5 | 4677.5 | 4571.9 | 4465.0 | 5359.0  | 5834.3  | 6009.1  | 4540.5  |
| 45°   | 5391.7 | 5399.3 | 5428.2 | 5305.0 | 5121.4 | 5130.2 | 4996.9 | 5865.8  | 6405.2  | 6756.0  | 5066.1  |
| 47.5° | 5848.2 | 5873.3 | 5859.5 | 5730.0 | 5564.0 | 5663.3 | 5546.4 | 6387.6  | 6968.5  | 7553.2  | 5604.2  |
| 50°   | 6403.9 | 6430.3 | 6417.8 | 6266.9 | 6082.0 | 6123.5 | 6050.6 | 6894.3  | 7511.7  | 8305.1  | 6051.9  |
| 52.5° | 6690.6 | 6712.0 | 6867.9 | 6935.8 | 6839.0 | 6574.9 | 6480.6 | 7451.4  | 7970.7  | 8923.8  | 6463.0  |
| 55°   | 6552.3 | 6567.4 | 6906.9 | 7193.6 | 7548.2 | 7284.1 | 6913.2 | 7881.4  | 8375.5  | 9406.6  | 6768.6  |
| 57.5° | 5978.9 | 6060.7 | 6522.1 | 7007.5 | 7753.1 | 7984.5 | 7614.8 | 8349.1  | 8765.3  | 9742.3  | 7069.1  |
| 60°   | 4803.3 | 4799.5 | 5460.9 | 6332.3 | 7353.3 | 8176.9 | 8605.6 | 8981.6  | 9156.4  | 10000.1 | 7471.5  |
| 62.5° | 2654.4 | 2678.3 | 3558.4 | 4706.4 | 6241.7 | 7678.9 | 9348.8 | 10074.3 | 10047.9 | 10450.3 | 8101.4  |
| 65°   | 1321.5 | 1369.3 | 1847.1 | 2695.9 | 4153.2 | 6346.1 | 9477.0 | 11741.6 | 11666.2 | 11510.2 | 9402.8  |
| 67.5° | 838.7  | 857.5  | 1121.6 | 1566.7 | 2308.6 | 4079.0 | 8678.6 | 12985.2 | 13160.0 | 12767.6 | 10694.2 |
| 70°   | 543.2  | 574.6  | 779.6  | 1071.3 | 1393.2 | 2102.4 | 6357.4 | 12179.2 | 12580.3 | 12629.3 | 9889.5  |
| 72.5° | 295.5  | 318.1  | 497.9  | 764.5  | 1005.9 | 1051.2 | 3571.0 | 9140.0  | 9785.1  | 10713.1 | 7736.8  |
| 75°   | 168.5  | 184.8  | 272.9  | 519.3  | 738.1  | 640.0  | 1583.1 | 6118.5  | 6529.7  | 7656.3  | 5543.9  |
| 77.5° | 101.8  | 115.7  | 153.4  | 252.7  | 462.7  | 427.5  | 598.5  | 3724.4  | 3986.0  | 4568.1  | 2909.6  |
| 80°   | 46.5   | 55.3   | 96.8   | 139.6  | 252.7  | 202.4  | 228.8  | 1736.5  | 1793.1  | 1874.8  | 963.2   |
| 82.5° | 21.4   | 25.1   | 44.0   | 83.0   | 143.3  | 116.9  | 88.0   | 401.1   | 564.6   | 534.4   | 245.2   |
| 85°   | 2.5    | 2.5    | 16.3   | 33.9   | 40.2   | 30.2   | 36.5   | 90.5    | 114.4   | 160.9   | 70.4    |
| 87.5° | 0.0    | 0.0    | 1.3    | 1.3    | 2.5    | 3.8    | 7.5    | 11.3    | 16.3    | 26.4    | 17.6    |
| 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: GWS-SA5C-722-U-T2-W-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1529.0 | 1529.0 | 1529.0 | 1529.0 | 1529.0 | 1529.0 | 1529.0 | 1529.0 | 1529.0 | 1529.0 | 1529.0 |
| 2.5°  | 1552.9 | 1517.7 | 1486.2 | 1439.7 | 1408.3 | 1373.1 | 1349.2 | 1320.3 | 1309.0 | 1300.2 | 1287.6 |
| 5°    | 1588.1 | 1531.5 | 1454.8 | 1369.3 | 1298.9 | 1232.3 | 1170.6 | 1130.4 | 1095.2 | 1090.2 | 1072.6 |
| 7.5°  | 1645.9 | 1561.7 | 1432.2 | 1292.6 | 1173.2 | 1062.5 | 975.7  | 905.3  | 870.1  | 858.8  | 838.7  |
| 10°   | 1722.6 | 1607.0 | 1398.2 | 1184.5 | 1012.2 | 880.2  | 782.1  | 702.9  | 647.6  | 627.4  | 612.4  |
| 12.5° | 1808.1 | 1648.5 | 1344.2 | 1051.2 | 855.0  | 704.1  | 579.7  | 495.4  | 460.2  | 447.6  | 436.3  |
| 15°   | 1906.2 | 1687.4 | 1258.7 | 917.9  | 701.6  | 518.0  | 430.0  | 393.6  | 378.5  | 374.7  | 370.9  |
| 17.5° | 2000.5 | 1712.6 | 1156.8 | 779.6  | 539.4  | 402.4  | 360.9  | 347.0  | 343.3  | 339.5  | 337.0  |
| 20°   | 2107.4 | 1730.2 | 1037.4 | 648.8  | 418.7  | 340.8  | 320.6  | 310.6  | 303.0  | 295.5  | 294.2  |
| 22.5° | 2216.8 | 1730.2 | 907.8  | 520.6  | 350.8  | 305.5  | 282.9  | 264.1  | 250.2  | 242.7  | 240.2  |
| 25°   | 2321.2 | 1706.3 | 779.6  | 416.2  | 309.3  | 271.6  | 242.7  | 221.3  | 202.4  | 193.6  | 191.1  |
| 27.5° | 2395.3 | 1644.7 | 667.7  | 352.1  | 280.4  | 241.4  | 206.2  | 182.3  | 167.2  | 158.4  | 157.2  |
| 30°   | 2441.9 | 1552.9 | 564.6  | 314.4  | 255.3  | 210.0  | 174.8  | 154.7  | 143.3  | 137.1  | 134.5  |
| 32.5° | 2477.1 | 1439.7 | 472.8  | 287.9  | 231.4  | 182.3  | 152.1  | 135.8  | 125.7  | 120.7  | 119.5  |
| 35°   | 2547.5 | 1332.8 | 404.9  | 264.1  | 206.2  | 159.7  | 133.3  | 120.7  | 113.2  | 106.9  | 105.6  |
| 37.5° | 2645.6 | 1243.6 | 350.8  | 242.7  | 182.3  | 142.1  | 120.7  | 109.4  | 103.1  | 96.8   | 95.6   |
| 40°   | 2790.2 | 1187.0 | 310.6  | 221.3  | 160.9  | 128.3  | 110.7  | 100.6  | 91.8   | 85.5   | 84.2   |
| 42.5° | 3012.7 | 1160.6 | 284.2  | 199.9  | 142.1  | 115.7  | 101.8  | 89.3   | 80.5   | 74.2   | 72.9   |
| 45°   | 3278.0 | 1174.4 | 261.5  | 178.6  | 129.5  | 106.9  | 90.5   | 78.0   | 69.2   | 62.9   | 61.6   |
| 47.5° | 3562.2 | 1223.5 | 242.7  | 158.4  | 116.9  | 98.1   | 80.5   | 66.6   | 59.1   | 52.8   | 51.6   |
| 50°   | 3859.0 | 1303.9 | 226.3  | 139.6  | 106.9  | 88.0   | 69.2   | 57.8   | 50.3   | 45.3   | 44.0   |
| 52.5° | 4116.7 | 1413.3 | 210.0  | 125.7  | 98.1   | 78.0   | 60.4   | 50.3   | 42.8   | 37.7   | 36.5   |
| 55°   | 4363.2 | 1516.4 | 197.4  | 113.2  | 88.0   | 67.9   | 52.8   | 42.8   | 36.5   | 31.4   | 30.2   |
| 57.5° | 4631.0 | 1625.8 | 182.3  | 101.8  | 79.2   | 60.4   | 46.5   | 36.5   | 31.4   | 26.4   | 25.1   |
| 60°   | 5020.8 | 1788.0 | 159.7  | 93.0   | 69.2   | 52.8   | 40.2   | 32.7   | 27.7   | 21.4   | 20.1   |
| 62.5° | 5582.9 | 2083.5 | 134.5  | 80.5   | 59.1   | 45.3   | 33.9   | 27.7   | 22.6   | 17.6   | 15.1   |
| 65°   | 6634.0 | 2586.5 | 110.7  | 66.6   | 47.8   | 37.7   | 28.9   | 22.6   | 17.6   | 12.6   | 11.3   |
| 67.5° | 7391.0 | 2717.2 | 89.3   | 54.1   | 39.0   | 28.9   | 23.9   | 17.6   | 12.6   | 8.8    | 7.5    |
| 70°   | 6461.8 | 1951.5 | 69.2   | 44.0   | 32.7   | 22.6   | 18.9   | 13.8   | 8.8    | 6.3    | 5.0    |
| 72.5° | 4868.7 | 1275.0 | 51.6   | 33.9   | 25.1   | 18.9   | 13.8   | 11.3   | 7.5    | 5.0    | 3.8    |
| 75°   | 3431.4 | 736.8  | 37.7   | 25.1   | 17.6   | 13.8   | 11.3   | 8.8    | 6.3    | 3.8    | 3.8    |
| 77.5° | 1759.1 | 304.3  | 26.4   | 17.6   | 12.6   | 8.8    | 7.5    | 5.0    | 5.0    | 3.8    | 2.5    |
| 80°   | 534.4  | 100.6  | 15.1   | 11.3   | 8.8    | 6.3    | 3.8    | 3.8    | 3.8    | 2.5    | 1.3    |
| 82.5° | 122.0  | 32.7   | 8.8    | 8.8    | 6.3    | 5.0    | 3.8    | 1.3    | 1.3    | 0.0    | 0.0    |
| 85°   | 31.4   | 10.1   | 7.5    | 6.3    | 6.3    | 5.0    | 2.5    | 1.3    | 0.0    | 0.0    | 0.0    |
| 87.5° | 11.3   | 6.3    | 6.3    | 6.3    | 5.0    | 3.8    | 2.5    | 0.0    | 0.0    | 0.0    | 0.0    |
| 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)