

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: P642489

Luminaire Tested: GWS-SA6D-722-U-SL3-W-GRSWH

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P642489  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-33)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA6D-722-U-SL3-W-GRSWH  
Description: GALLEON WALL SLIM LUMINAIRE. (6) LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III SPILL LIGHT ELIMINATOR OPTICS W/ FACTORY INSTALLED GLARE SHIELD, WH  
Light Source: (96) 2200K CCT, 70 CRI LEDS  
Ballast/Driver: -

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 22097 lumens  
Efficiency: N/A  
Efficacy: 89.9 lumens/watt  
Luminous Opening: Rectangular (W 2' x L: 1' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B3 - U0 - G3

Input Watts (W): 245.7  
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



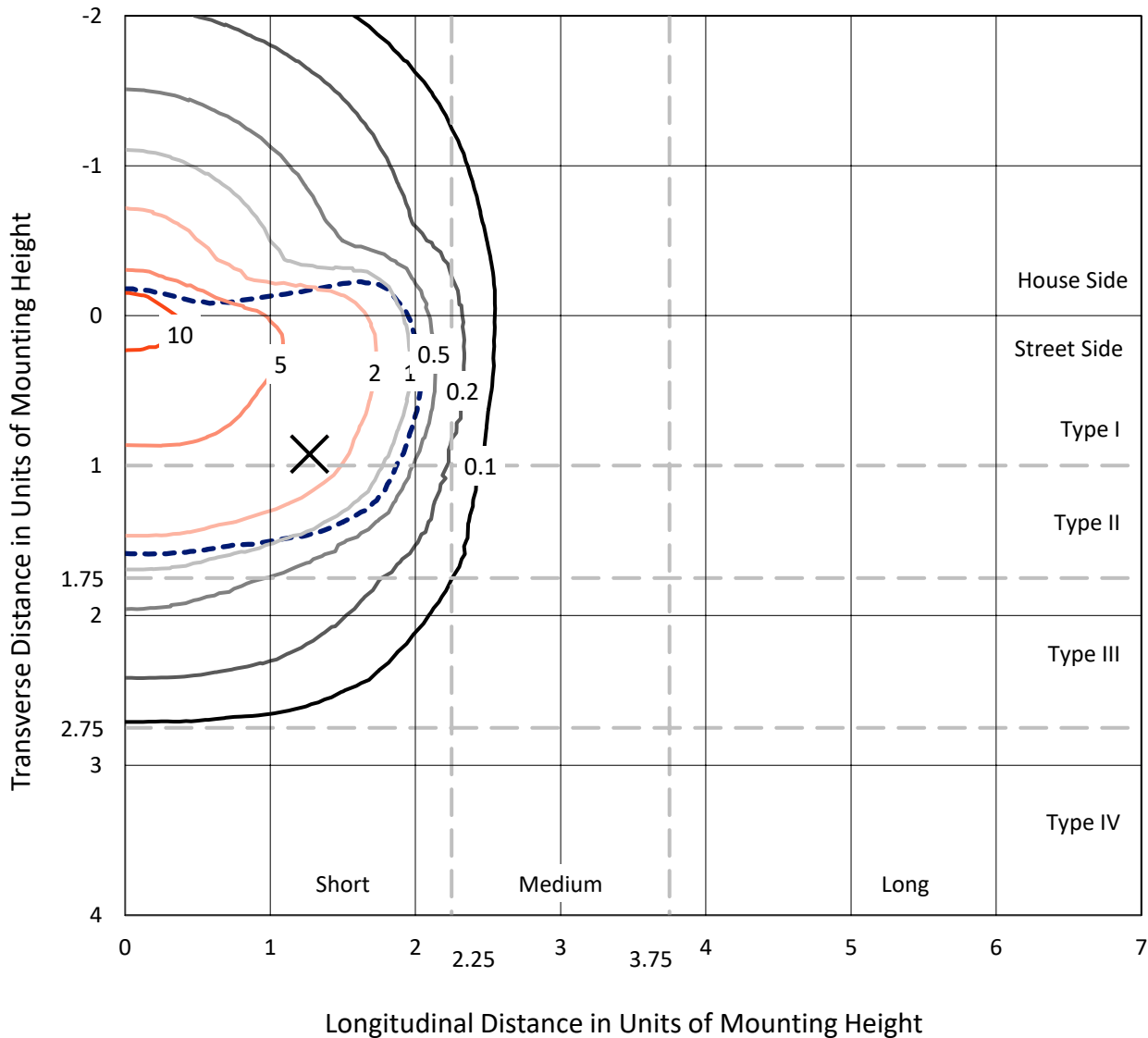
REPORT NUMBER: P642489

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## Iso-Footcandle Lines of Horizontal Illumination

✕ Max cd

--- 1/2 Max cd

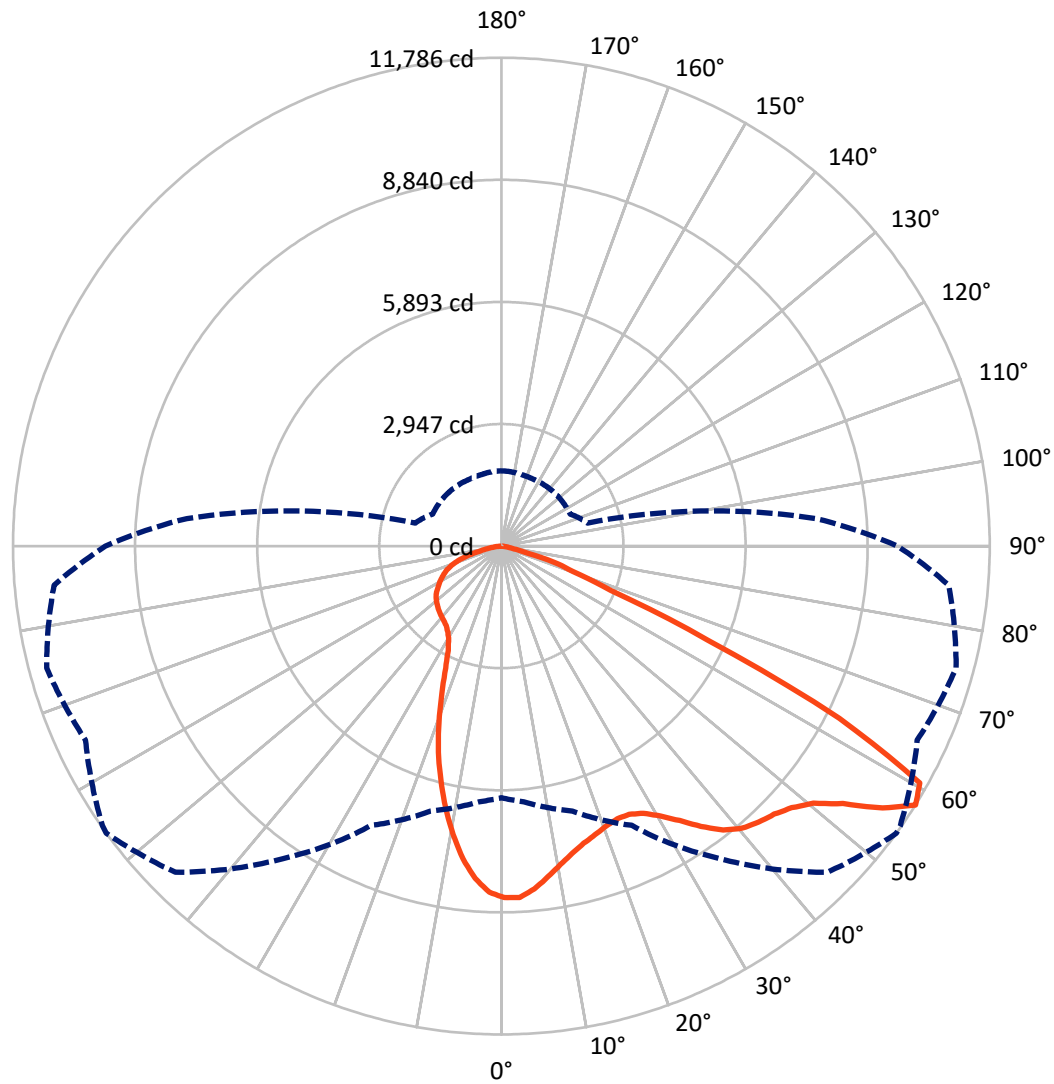


Based on 25 foot mounting height. Maximum calculated value = 13.6 fc  
 Type II - Short - N/A

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## Luminous Intensity Polar Plot



— Vertical Plane Through 54-Deg Lateral    - - - Horizontal Cone Through 57.5-Deg Vertical

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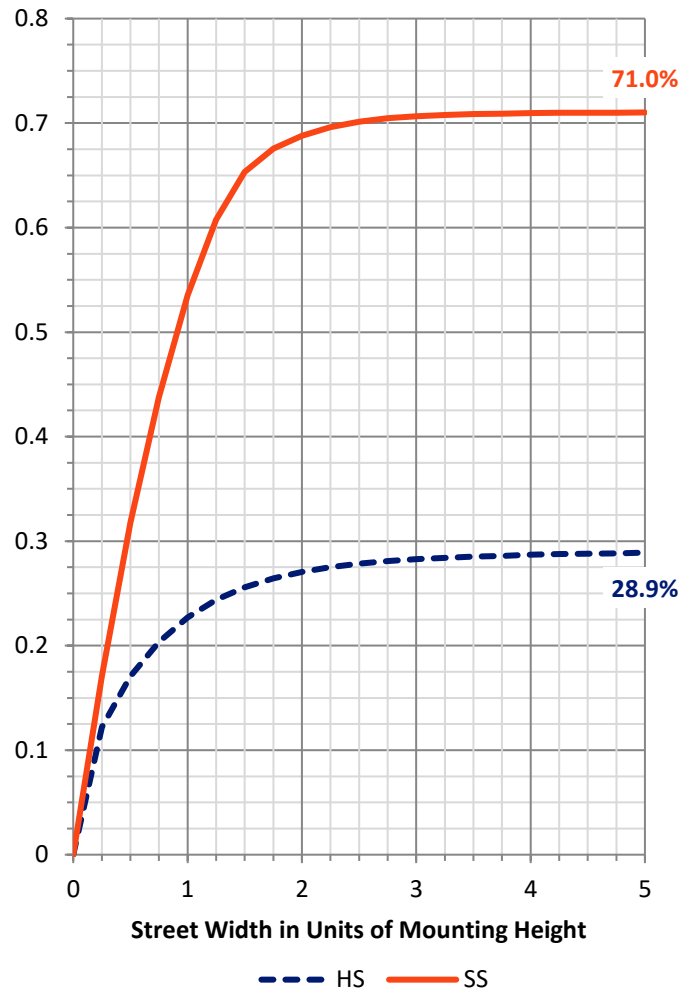
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 6423.8   | 0.0    | 6423.8  |
|                    | % Fixture | 29.1     | 0.0    | 29.1    |
| <b>Street Side</b> | Lumens    | 15673.1  | 0.0    | 15673.1 |
|                    | % Fixture | 70.9     | 0.0    | 70.9    |
| <b>Total</b>       | Lumens    | 22097.0  | 0.0    | 22097.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 745.7   | 3.4       |
| 10°-20°   | 1779.3  | 8.1       |
| 20°-30°   | 2462.3  | 11.1      |
| 30°-40°   | 3421.4  | 15.5      |
| 40°-50°   | 4518.6  | 20.4      |
| 50°-60°   | 5369.7  | 24.3      |
| 60°-70°   | 2974.9  | 13.5      |
| 70°-80°   | 740.8   | 3.4       |
| 80°-90°   | 84.2    | 0.4       |
| 90°-100°  | 0.0     | 0.0       |
| 100°-110° | 0.0     | 0.0       |
| 110°-120° | 0.0     | 0.0       |
| 120°-130° | 0.0     | 0.0       |
| 130°-140° | 0.0     | 0.0       |
| 140°-150° | 0.0     | 0.0       |
| 150°-160° | 0.0     | 0.0       |
| 160°-170° | 0.0     | 0.0       |
| 170°-180° | 0.0     | 0.0       |
| 0°-90°    | 22097.0 | 100.0     |
| 0°-180°   | 22097.0 | 100.0     |

**Coefficient of Utilization**



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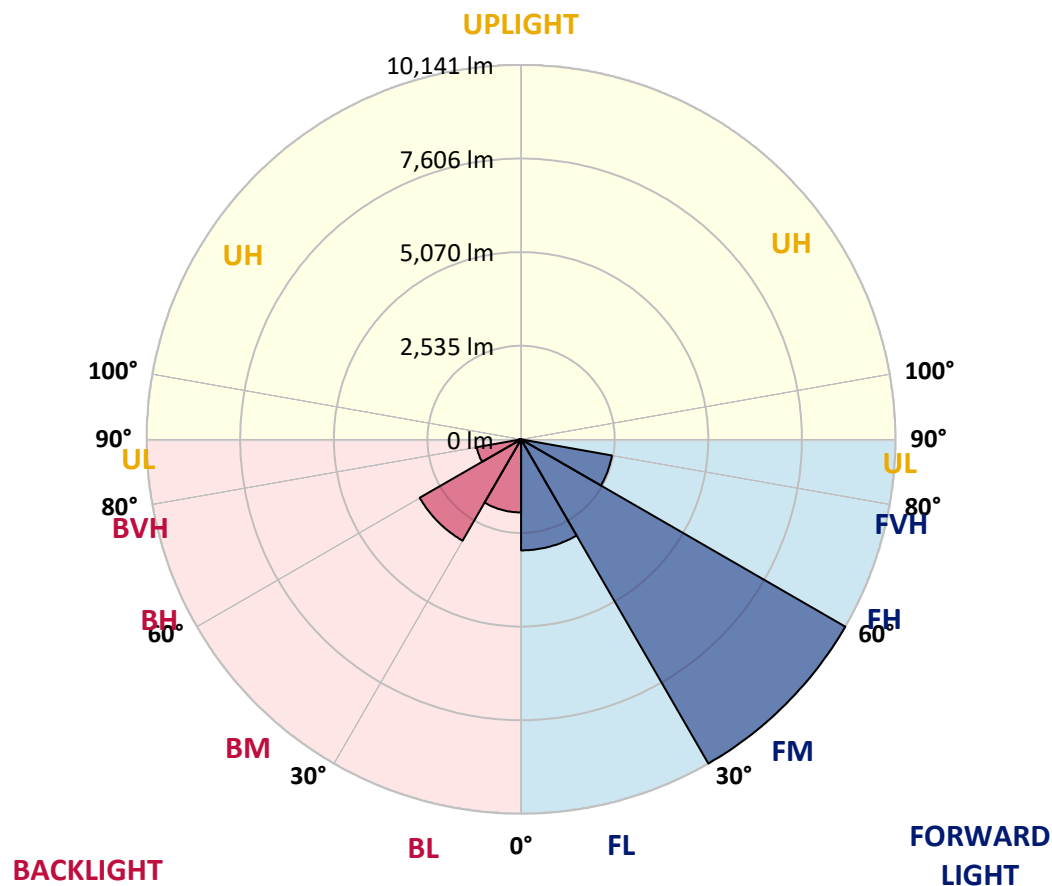
CATALOG NUMBER: GWS-SA6D-722-U-SL3-W-GRSWH

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|---------|-----------|-------------------------|------|---------|
|      |             |         |           | B                       | U    | G       |
| FL   | (0°-30°)    | 3007.8  | 13.6      |                         |      |         |
| FM   | (30°-60°)   | 10140.7 | 45.9      |                         |      |         |
| FH   | (60°-80°)   | 2498.4  | 11.3      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 26.4    | 0.1       |                         |      | G1/100  |
| BL   | (0°-30°)    | 1979.6  | 9.0       | B3/2500                 |      |         |
| BM   | (30°-60°)   | 3169.0  | 14.3      | B3/5000                 |      |         |
| BH   | (60°-80°)   | 1217.4  | 5.5       | B3/2500                 |      | G3/2500 |
| BVH  | (80°-90°)   | 57.9    | 0.3       |                         |      | G1/100  |
| UL   | (90°-100°)  | 0.0     | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0     | 0.0       |                         | U0/0 |         |

**BUG Rating: B3-U0-G3**

Type II Short



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CATALOG NUMBER: GWS-SA6D-722-U-SL3-W-GRSWH

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°     | 54°     | 55°     | 65°     | 75°     | 85°     |
|-------|--------|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|
| 0°    | 8483.5 | 8483.5 | 8483.5 | 8483.5 | 8483.5 | 8483.5  | 8483.5  | 8483.5  | 8483.5  | 8483.5  | 8483.5  |
| 2.5°  | 8324.7 | 8341.7 | 8353.0 | 8392.7 | 8426.8 | 8457.1  | 8489.2  | 8489.2  | 8487.3  | 8481.6  | 8470.3  |
| 5°    | 7995.5 | 8014.4 | 8040.9 | 8095.8 | 8169.5 | 8222.5  | 8309.5  | 8317.1  | 8354.9  | 8370.0  | 8362.5  |
| 7.5°  | 7613.4 | 7619.1 | 7653.2 | 7725.0 | 7842.3 | 7936.9  | 8061.7  | 8076.9  | 8167.7  | 8220.6  | 8211.2  |
| 10°   | 7195.4 | 7176.5 | 7237.0 | 7342.9 | 7496.2 | 7655.0  | 7815.8  | 7829.1  | 7974.7  | 8075.0  | 8067.4  |
| 12.5° | 6813.3 | 6815.2 | 6875.7 | 7004.4 | 7195.4 | 7392.1  | 7607.8  | 7638.0  | 7817.7  | 7946.3  | 7933.1  |
| 15°   | 6493.6 | 6501.2 | 6575.0 | 6720.6 | 6938.2 | 7172.7  | 7441.3  | 7469.7  | 7696.7  | 7866.9  | 7829.1  |
| 17.5° | 6238.3 | 6245.9 | 6310.2 | 6476.6 | 6709.3 | 6993.0  | 7320.2  | 7348.6  | 7630.5  | 7832.9  | 7755.3  |
| 20°   | 6062.4 | 6058.6 | 6121.0 | 6279.9 | 6520.1 | 6828.4  | 7214.3  | 7255.9  | 7609.7  | 7846.1  | 7706.1  |
| 22.5° | 5990.5 | 5988.6 | 6034.0 | 6164.5 | 6389.6 | 6701.7  | 7150.0  | 7206.8  | 7632.3  | 7904.7  | 7675.9  |
| 25°   | 6026.4 | 6018.9 | 6058.6 | 6155.1 | 6334.8 | 6652.5  | 7168.9  | 7229.5  | 7728.8  | 8025.8  | 7681.5  |
| 27.5° | 6138.0 | 6128.6 | 6162.6 | 6249.6 | 6385.8 | 6703.6  | 7301.3  | 7371.3  | 7933.1  | 8247.1  | 7757.2  |
| 30°   | 6308.3 | 6302.6 | 6336.6 | 6419.9 | 6539.0 | 6873.8  | 7554.8  | 7634.2  | 8249.0  | 8591.4  | 7921.8  |
| 32.5° | 6506.9 | 6497.4 | 6558.0 | 6654.4 | 6792.5 | 7184.1  | 7895.3  | 7999.3  | 8623.5  | 9034.0  | 8197.9  |
| 35°   | 6730.1 | 6722.5 | 6805.7 | 6945.7 | 7144.3 | 7615.3  | 8307.6  | 8421.1  | 9005.6  | 9535.2  | 8564.9  |
| 37.5° | 6947.6 | 6947.6 | 7108.4 | 7316.5 | 7566.1 | 8084.4  | 8695.4  | 8767.3  | 9270.4  | 9979.7  | 8958.3  |
| 40°   | 7140.5 | 7151.9 | 7394.0 | 7706.1 | 8023.9 | 8508.1  | 8950.7  | 9011.3  | 9387.7  | 10286.2 | 9300.7  |
| 42.5° | 7354.3 | 7363.8 | 7645.6 | 8054.2 | 8432.5 | 8850.5  | 9105.9  | 9136.1  | 9410.4  | 10439.4 | 9542.8  |
| 45°   | 7524.5 | 7537.8 | 7887.7 | 8324.7 | 8788.1 | 9107.7  | 9228.8  | 9255.3  | 9442.5  | 10522.6 | 9718.7  |
| 47.5° | 7613.4 | 7632.3 | 8033.4 | 8542.2 | 9028.3 | 9338.5  | 9431.2  | 9442.5  | 9575.0  | 10668.3 | 9930.6  |
| 50°   | 7598.3 | 7636.1 | 8088.2 | 8650.0 | 9206.1 | 9571.2  | 9756.5  | 9775.5  | 9845.4  | 10882.0 | 10178.4 |
| 52.5° | 7732.6 | 7749.6 | 8205.5 | 8778.6 | 9459.6 | 10000.6 | 10322.1 | 10348.6 | 10316.4 | 11042.8 | 10325.9 |
| 55°   | 7509.4 | 7590.7 | 8059.8 | 8759.7 | 9845.4 | 10664.5 | 11160.1 | 11146.8 | 10743.9 | 11222.5 | 10571.8 |
| 57.5° | 6073.7 | 6192.9 | 6622.3 | 7435.6 | 9209.9 | 11129.8 | 11786.2 | 11754.0 | 11074.9 | 11360.6 | 10838.5 |
| 60°   | 4204.9 | 4223.8 | 4611.6 | 5188.5 | 7108.4 | 9832.2  | 11602.7 | 11672.7 | 11135.5 | 11186.5 | 10344.8 |
| 62.5° | 3363.2 | 3357.5 | 3393.4 | 3408.5 | 4520.8 | 6911.7  | 9158.8  | 9414.2  | 9251.5  | 8716.2  | 7331.6  |
| 65°   | 2871.4 | 2892.2 | 2998.1 | 2943.2 | 2950.8 | 3892.8  | 5472.2  | 5508.2  | 5394.7  | 5201.7  | 3877.6  |
| 67.5° | 2247.1 | 2283.1 | 2470.3 | 2684.1 | 2616.0 | 2506.3  | 2839.2  | 2822.2  | 2224.4  | 1721.3  | 1422.4  |
| 70°   | 1407.3 | 1430.0 | 1630.5 | 2107.2 | 2277.4 | 2058.0  | 1825.3  | 1817.8  | 1191.7  | 979.8   | 1074.4  |
| 72.5° | 820.9  | 824.7  | 881.5  | 1174.6 | 1511.3 | 1407.3  | 1343.0  | 1293.8  | 766.1   | 781.2   | 856.9   |
| 75°   | 452.1  | 452.1  | 450.2  | 506.9  | 595.8  | 527.7   | 510.7   | 497.5   | 512.6   | 580.7   | 637.4   |
| 77.5° | 94.6   | 96.5   | 102.1  | 134.3  | 174.0  | 211.9   | 266.7   | 268.6   | 334.8   | 387.8   | 433.2   |
| 80°   | 43.5   | 45.4   | 56.7   | 71.9   | 92.7   | 122.9   | 162.7   | 164.6   | 202.4   | 244.0   | 274.3   |
| 82.5° | 22.7   | 24.6   | 30.3   | 37.8   | 49.2   | 64.3    | 90.8    | 90.8    | 121.1   | 143.8   | 162.7   |
| 85°   | 7.6    | 7.6    | 11.3   | 15.1   | 20.8   | 26.5    | 35.9    | 35.9    | 53.0    | 70.0    | 81.3    |
| 87.5° | 0.0    | 0.0    | 0.0    | 0.0    | 1.9    | 3.8     | 7.6     | 7.6     | 9.5     | 11.3    | 18.9    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     |



REPORT NUMBER: P642489

CATALOG NUMBER: GWS-SA6D-722-U-SL3-W-GRSWH

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 8483.5 | 8483.5 | 8483.5 | 8483.5 | 8483.5 | 8483.5 | 8483.5 | 8483.5 | 8483.5 | 8483.5 | 8483.5 |
| 2.5°  | 8445.7 | 8387.1 | 8389.0 | 8400.3 | 8364.4 | 8309.5 | 8273.6 | 8228.2 | 8199.8 | 8194.1 | 8214.9 |
| 5°    | 8324.7 | 8256.6 | 8209.3 | 8160.1 | 8057.9 | 7936.9 | 7842.3 | 7764.8 | 7713.7 | 7694.8 | 7672.1 |
| 7.5°  | 8158.2 | 8069.3 | 7950.1 | 7812.0 | 7626.7 | 7411.0 | 7259.7 | 7117.9 | 7019.5 | 6991.1 | 6977.9 |
| 10°   | 7991.7 | 7863.1 | 7651.3 | 7394.0 | 7085.7 | 6794.4 | 6520.1 | 6310.2 | 6143.7 | 6049.1 | 6079.4 |
| 12.5° | 7819.6 | 7660.7 | 7329.7 | 6934.4 | 6505.0 | 6066.2 | 5706.8 | 5358.7 | 5090.1 | 4955.8 | 4916.1 |
| 15°   | 7668.3 | 7452.7 | 6991.1 | 6455.8 | 5884.6 | 5332.2 | 4812.1 | 4290.0 | 3949.5 | 3764.2 | 3713.1 |
| 17.5° | 7539.7 | 7259.7 | 6633.6 | 5967.8 | 5285.0 | 4498.1 | 3858.7 | 3374.5 | 3141.8 | 3039.7 | 3032.1 |
| 20°   | 7412.9 | 7070.6 | 6279.9 | 5441.9 | 4592.7 | 3711.2 | 3140.0 | 2913.0 | 2829.7 | 2793.8 | 2791.9 |
| 22.5° | 7299.4 | 6872.0 | 5907.3 | 4916.1 | 3904.1 | 3119.1 | 2805.1 | 2706.8 | 2684.1 | 2684.1 | 2680.3 |
| 25°   | 7203.0 | 6673.3 | 5525.2 | 4358.1 | 3281.8 | 2776.8 | 2631.1 | 2589.5 | 2599.0 | 2616.0 | 2617.9 |
| 27.5° | 7163.2 | 6518.2 | 5156.3 | 3785.0 | 2852.4 | 2578.2 | 2512.0 | 2506.3 | 2532.8 | 2559.2 | 2563.0 |
| 30°   | 7204.9 | 6412.3 | 4778.0 | 3236.4 | 2595.2 | 2457.1 | 2426.8 | 2438.2 | 2470.3 | 2496.8 | 2496.8 |
| 32.5° | 7333.5 | 6359.3 | 4392.1 | 2835.4 | 2445.8 | 2372.0 | 2362.5 | 2373.9 | 2398.5 | 2413.6 | 2415.5 |
| 35°   | 7551.0 | 6380.2 | 3993.0 | 2564.9 | 2349.3 | 2309.6 | 2307.7 | 2315.2 | 2324.7 | 2334.2 | 2336.0 |
| 37.5° | 7825.3 | 6472.8 | 3565.5 | 2407.9 | 2286.9 | 2264.2 | 2260.4 | 2258.5 | 2260.4 | 2260.4 | 2262.3 |
| 40°   | 8093.9 | 6612.8 | 3183.5 | 2315.2 | 2243.4 | 2224.4 | 2215.0 | 2201.7 | 2199.9 | 2196.1 | 2194.2 |
| 42.5° | 8292.5 | 6720.6 | 2878.9 | 2249.0 | 2203.6 | 2180.9 | 2169.6 | 2148.8 | 2146.9 | 2145.0 | 2143.1 |
| 45°   | 8441.9 | 6811.4 | 2625.5 | 2184.7 | 2162.0 | 2141.2 | 2116.6 | 2097.7 | 2101.5 | 2105.3 | 2105.3 |
| 47.5° | 8610.3 | 6890.9 | 2440.1 | 2124.2 | 2111.0 | 2090.1 | 2059.9 | 2046.6 | 2059.9 | 2073.1 | 2073.1 |
| 50°   | 8814.6 | 7002.5 | 2288.8 | 2063.7 | 2058.0 | 2033.4 | 2006.9 | 2001.2 | 2016.4 | 2035.3 | 2035.3 |
| 52.5° | 8964.0 | 7098.9 | 2180.9 | 2003.1 | 2003.1 | 1971.0 | 1948.3 | 1946.4 | 1963.4 | 1982.3 | 1984.2 |
| 55°   | 9243.9 | 7324.0 | 2143.1 | 1933.2 | 1925.6 | 1901.0 | 1884.0 | 1870.7 | 1891.5 | 1908.6 | 1908.6 |
| 57.5° | 9559.8 | 7622.9 | 2152.6 | 1832.9 | 1823.4 | 1815.9 | 1802.6 | 1787.5 | 1793.2 | 1812.1 | 1814.0 |
| 60°   | 8890.2 | 7044.1 | 2048.5 | 1732.6 | 1727.0 | 1723.2 | 1706.2 | 1679.7 | 1687.3 | 1702.4 | 1704.3 |
| 62.5° | 6209.9 | 4681.6 | 1657.0 | 1607.8 | 1626.7 | 1624.8 | 1602.1 | 1571.9 | 1573.8 | 1594.6 | 1594.6 |
| 65°   | 3223.2 | 2532.8 | 1454.6 | 1494.3 | 1522.7 | 1511.3 | 1473.5 | 1447.0 | 1443.2 | 1469.7 | 1464.0 |
| 67.5° | 1390.3 | 1382.7 | 1324.1 | 1375.1 | 1405.4 | 1380.8 | 1341.1 | 1297.6 | 1301.4 | 1310.8 | 1303.3 |
| 70°   | 1119.8 | 1153.8 | 1178.4 | 1233.3 | 1257.9 | 1212.5 | 1169.0 | 1144.4 | 1123.6 | 1121.7 | 1108.4 |
| 72.5° | 894.7  | 942.0  | 996.8  | 1053.6 | 1061.2 | 1015.8 | 960.9  | 938.2  | 906.0  | 904.2  | 890.9  |
| 75°   | 673.4  | 713.1  | 756.6  | 802.0  | 802.0  | 758.5  | 722.6  | 711.2  | 673.4  | 662.0  | 650.7  |
| 77.5° | 459.6  | 484.2  | 518.3  | 529.6  | 541.0  | 524.0  | 488.0  | 469.1  | 425.6  | 414.2  | 399.1  |
| 80°   | 289.4  | 306.4  | 327.2  | 334.8  | 346.2  | 325.3  | 297.0  | 276.2  | 245.9  | 236.4  | 228.9  |
| 82.5° | 174.0  | 185.4  | 198.6  | 202.4  | 211.9  | 196.7  | 170.2  | 155.1  | 138.1  | 130.5  | 124.8  |
| 85°   | 88.9   | 94.6   | 102.1  | 104.0  | 102.1  | 87.0   | 77.6   | 70.0   | 58.6   | 56.7   | 53.0   |
| 87.5° | 22.7   | 26.5   | 28.4   | 26.5   | 24.6   | 18.9   | 13.2   | 9.5    | 3.8    | 3.8    | 1.9    |
| 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

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 ( $R_{f,i}$ )**

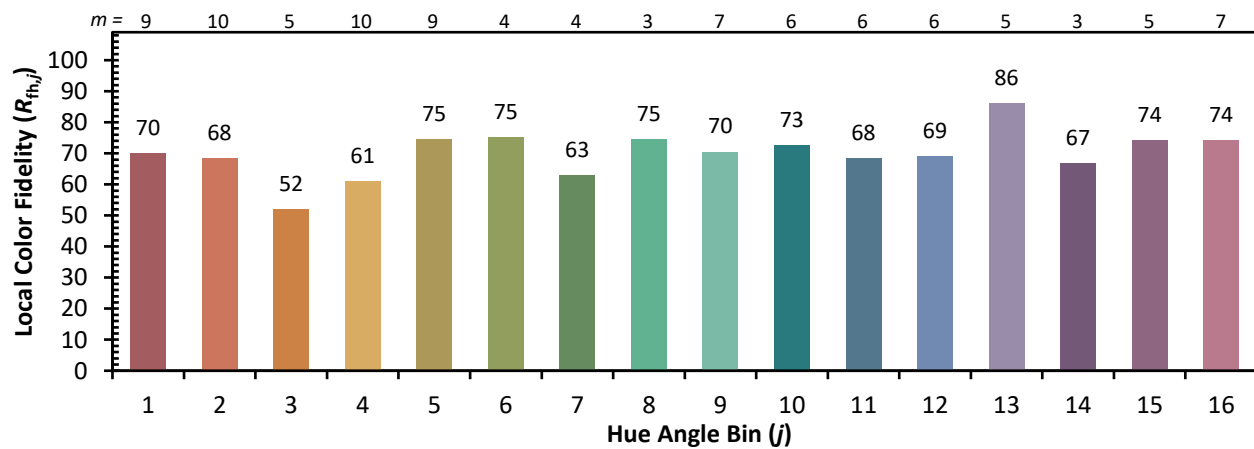
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 87 | CES26 = 56 | CES51 = 74 | CES76 = 56 |
| CES02 = 65 | CES27 = 76 | CES52 = 76 | CES77 = 81 |
| CES03 = 32 | CES28 = 83 | CES53 = 65 | CES78 = 63 |
| CES04 = 72 | CES29 = 46 | CES54 = 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)