

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: P640529

Luminaire Tested: GWS-SA5E-722-U-T2R-W-HSS

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P640529  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-14)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA5E-722-U-T2R-W-HSS  
Description: GALLEON WALL SLIM LUMINAIRE. (5) LIGHTSQUARES WITH 16 LEDS EACH AND  
TYPE II ROADWAY OPTICS WITH HOUSE SIDE SHIELD  
Light Source: (80) 2200K CCT, 70 CRI LEDS  
Ballast/Driver: -

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 22301 lumens  
Efficiency: N/A  
Efficacy: 82.7 lumens/watt  
Luminous Opening: Rectangular (W 1.5' x L: 1' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B1 - U0 - G3

Input Watts (W): 269.6  
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



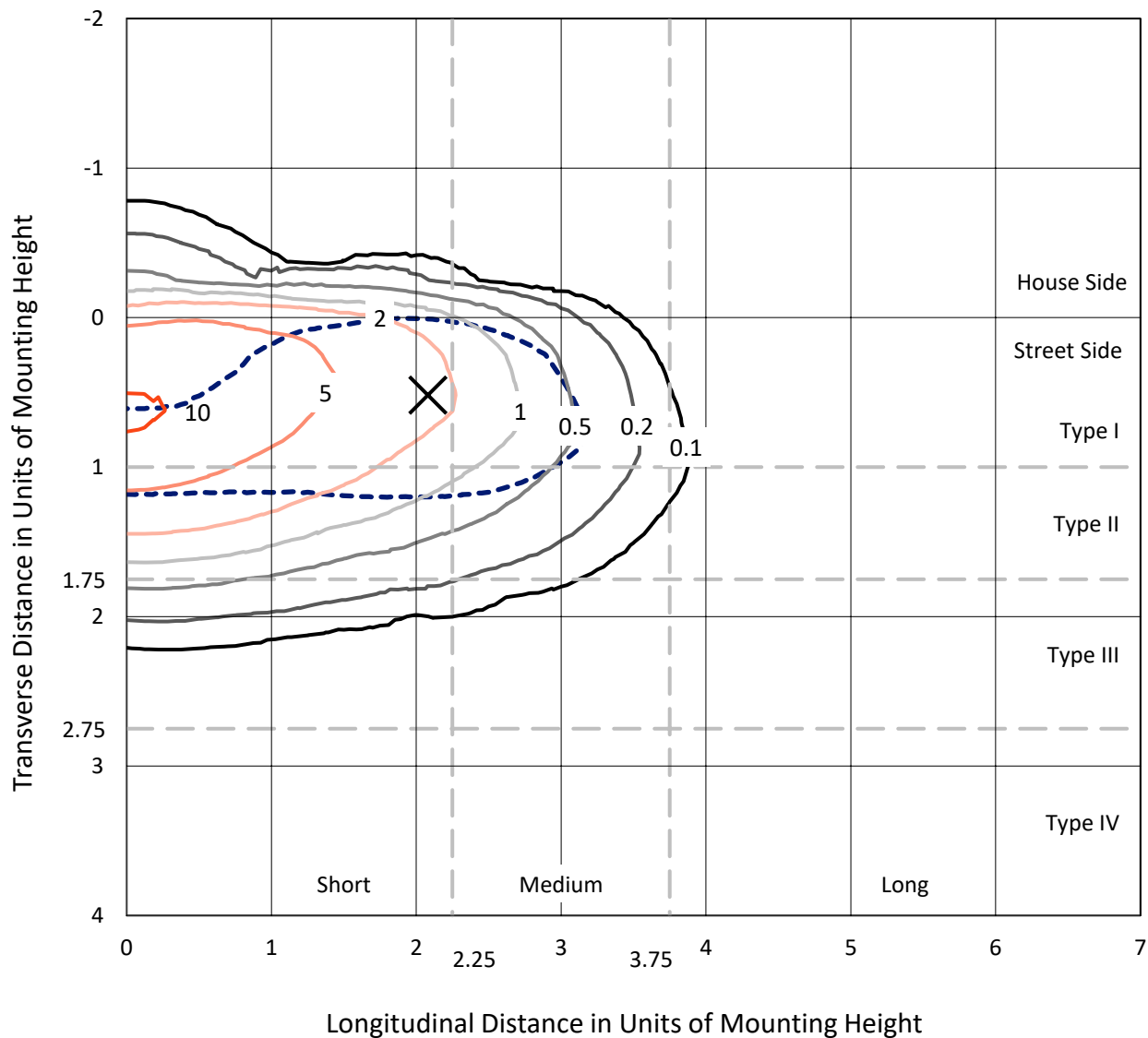
REPORT NUMBER: P640529

CATALOG NUMBER: GWS-SA5E-722-U-T2R-W-HSS

## Iso-Footcandle Lines of Horizontal Illumination

✕ Max cd

--- 1/2 Max cd

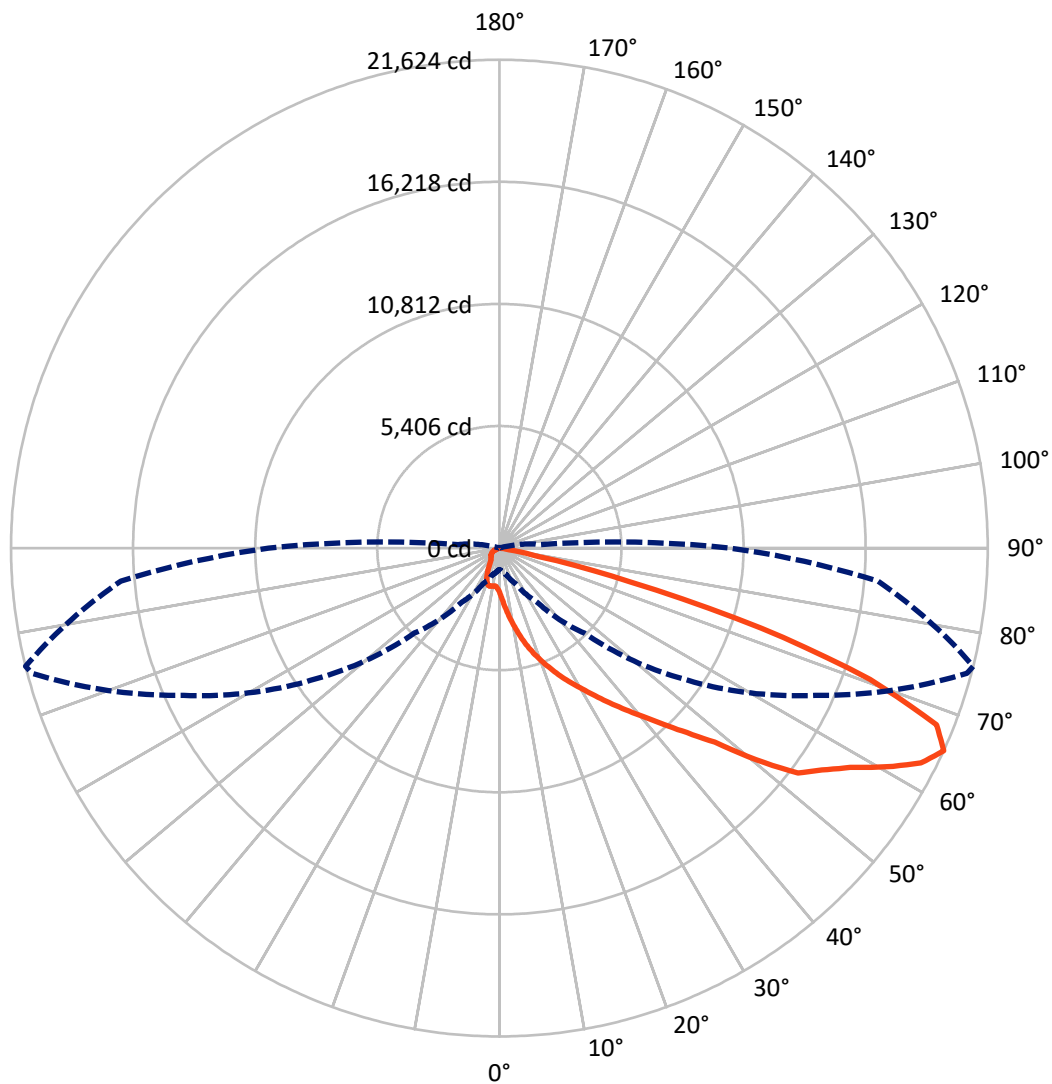


Based on 25 foot mounting height. Maximum calculated value = 10.7 fc  
 Type II - Short - N/A

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## Luminous Intensity Polar Plot



— Vertical Plane Through 76-Deg Lateral    - - - Horizontal Cone Through 65-Deg Vertical

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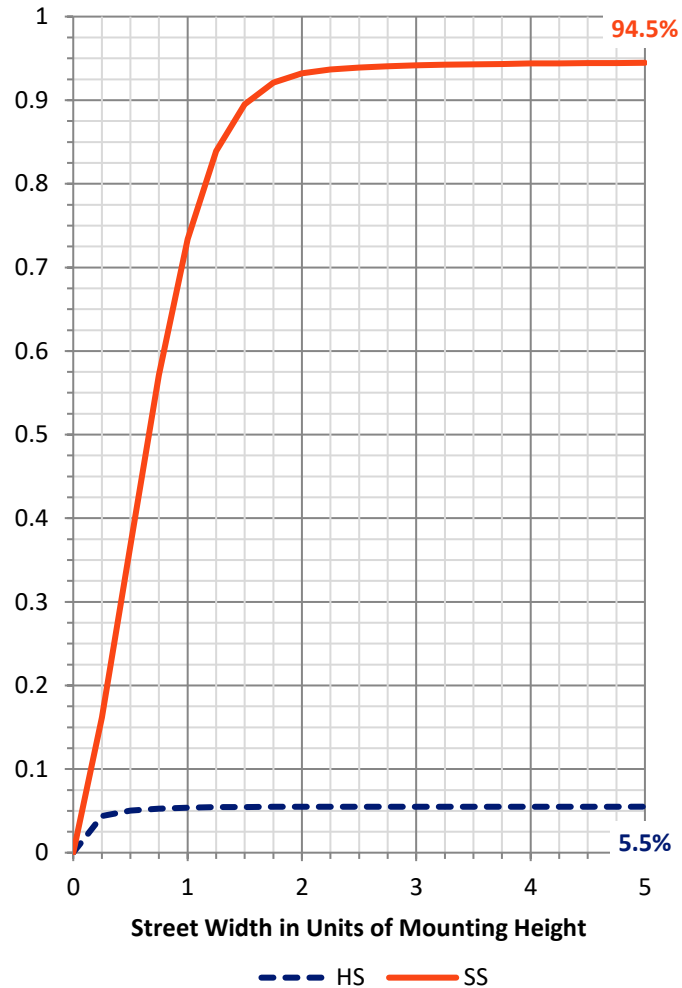
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 1233.1   | 0.0    | 1233.1  |
|                    | % Fixture | 5.5      | 0.0    | 5.5     |
| <b>Street Side</b> | Lumens    | 21067.9  | 0.0    | 21067.9 |
|                    | % Fixture | 94.5     | 0.0    | 94.5    |
| <b>Total</b>       | Lumens    | 22301.0  | 0.0    | 22301.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 240.2   | 1.1       |
| 10°-20°   | 911.4   | 4.1       |
| 20°-30°   | 1859.5  | 8.3       |
| 30°-40°   | 3307.1  | 14.8      |
| 40°-50°   | 4888.7  | 21.9      |
| 50°-60°   | 5597.2  | 25.1      |
| 60°-70°   | 4270.4  | 19.1      |
| 70°-80°   | 1196.2  | 5.4       |
| 80°-90°   | 30.1    | 0.1       |
| 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°    | 22301.0 | 100.0     |
| 0°-180°   | 22301.0 | 100.0     |

**Coefficient of Utilization**



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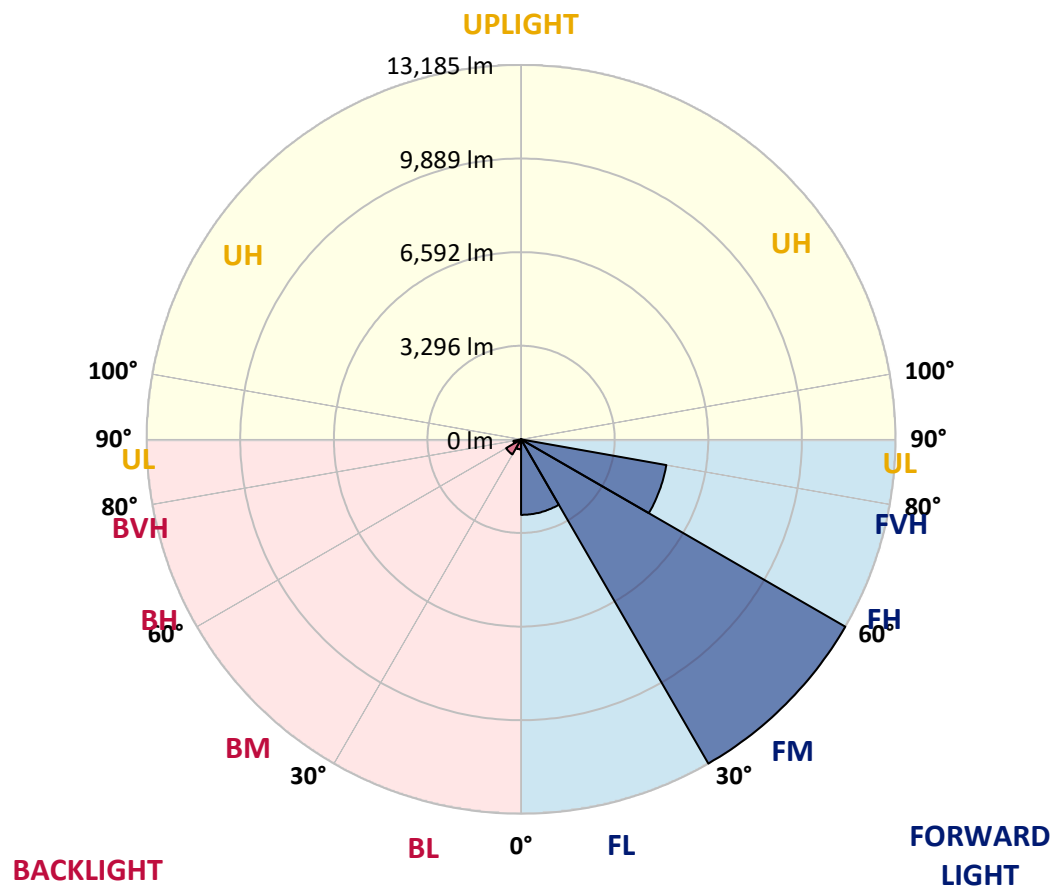
CATALOG NUMBER: GWS-SA5E-722-U-T2R-W-HSS

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|---------|-----------|-------------------------|------|---------|
|      |             |         |           | B                       | U    | G       |
| FL   | (0°-30°)    | 2659.2  | 11.9      |                         |      |         |
| FM   | (30°-60°)   | 13184.7 | 59.1      |                         |      |         |
| FH   | (60°-80°)   | 5195.6  | 23.3      |                         |      | G3/7500 |
| FVH  | (80°-90°)   | 28.4    | 0.1       |                         |      | G1/100  |
| BL   | (0°-30°)    | 351.9   | 1.6       | B1/500                  |      |         |
| BM   | (30°-60°)   | 608.4   | 2.7       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 271.1   | 1.2       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 1.7     | 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-G3**

Type II Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 35°     | 45°     | 55°     | 65°     | 75°     | 76°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 1974.5  | 1974.5  | 1974.5  | 1974.5  | 1974.5  | 1974.5  | 1974.5  | 1974.5  | 1974.5  | 1974.5  | 1974.5  |
| 2.5°  | 3043.0  | 3088.6  | 3052.9  | 2993.4  | 2878.4  | 2767.4  | 2624.7  | 2428.4  | 2271.8  | 2252.0  | 2105.3  |
| 5°    | 4109.5  | 4105.5  | 4028.2  | 3950.9  | 3830.0  | 3639.7  | 3352.2  | 2987.4  | 2636.6  | 2606.8  | 2277.8  |
| 7.5°  | 4743.8  | 4749.8  | 4706.2  | 4646.7  | 4527.8  | 4331.5  | 4032.2  | 3592.1  | 3078.6  | 3019.2  | 2513.7  |
| 10°   | 5277.1  | 5275.1  | 5243.4  | 5215.6  | 5108.6  | 4977.8  | 4656.6  | 4172.9  | 3554.4  | 3461.2  | 2777.3  |
| 12.5° | 5677.5  | 5691.4  | 5707.3  | 5735.0  | 5689.4  | 5560.6  | 5257.3  | 4730.0  | 4036.1  | 3933.0  | 3078.6  |
| 15°   | 5994.7  | 5998.7  | 6058.2  | 6165.2  | 6202.9  | 6135.5  | 5859.9  | 5269.2  | 4511.9  | 4422.7  | 3425.6  |
| 17.5° | 6089.9  | 6097.8  | 6198.9  | 6395.2  | 6593.4  | 6631.1  | 6422.9  | 5812.3  | 4979.7  | 4884.6  | 3762.6  |
| 20°   | 6290.1  | 6307.9  | 6383.3  | 6555.7  | 6805.5  | 7007.7  | 6926.4  | 6361.5  | 5447.6  | 5322.7  | 4107.5  |
| 22.5° | 6920.5  | 6930.4  | 6904.6  | 6926.4  | 7055.3  | 7289.2  | 7338.8  | 6892.7  | 5927.3  | 5794.5  | 4480.2  |
| 25°   | 8004.9  | 8008.8  | 7828.4  | 7657.9  | 7560.8  | 7604.4  | 7713.4  | 7382.4  | 6403.1  | 6272.3  | 4827.1  |
| 27.5° | 9130.8  | 9144.7  | 8928.6  | 8639.2  | 8292.3  | 8094.1  | 8062.3  | 7830.4  | 6882.8  | 6738.1  | 5170.1  |
| 30°   | 10191.4 | 10191.4 | 9963.4  | 9610.6  | 9146.7  | 8760.1  | 8532.2  | 8282.4  | 7396.3  | 7237.7  | 5520.9  |
| 32.5° | 11144.9 | 11137.0 | 10845.6 | 10463.0 | 10005.1 | 9580.8  | 9101.1  | 8754.2  | 7967.2  | 7790.8  | 5925.3  |
| 35°   | 11932.0 | 11912.1 | 11581.1 | 11214.3 | 10724.7 | 10409.5 | 9874.2  | 9261.7  | 8585.7  | 8409.3  | 6341.6  |
| 37.5° | 12526.7 | 12504.9 | 12201.6 | 11813.0 | 11359.0 | 11154.9 | 10706.8 | 9870.3  | 9237.9  | 9077.3  | 6803.5  |
| 40°   | 12849.8 | 12806.2 | 12596.1 | 12306.6 | 11926.0 | 11747.6 | 11561.2 | 10625.6 | 10005.1 | 9804.9  | 7348.7  |
| 42.5° | 12945.0 | 12893.4 | 12754.6 | 12619.8 | 12389.9 | 12249.1 | 12449.4 | 11478.0 | 10847.6 | 10675.1 | 7971.2  |
| 45°   | 12663.5 | 12633.7 | 12621.8 | 12719.0 | 12760.6 | 12800.2 | 13293.8 | 12421.6 | 11777.3 | 11646.5 | 8754.2  |
| 47.5° | 11985.5 | 11977.5 | 12082.6 | 12487.0 | 12927.1 | 13345.4 | 14211.7 | 13585.3 | 12982.6 | 12841.9 | 9848.5  |
| 50°   | 10732.6 | 10813.9 | 11107.3 | 11817.0 | 12697.2 | 13654.6 | 15070.1 | 15198.9 | 14933.3 | 14727.1 | 11275.8 |
| 52.5° | 8774.0  | 8930.6  | 9588.8  | 10667.2 | 11932.0 | 13567.4 | 15466.5 | 16491.4 | 16763.0 | 16548.9 | 12298.7 |
| 55°   | 6884.8  | 7031.5  | 7618.3  | 8986.1  | 10673.1 | 12903.3 | 15484.4 | 16937.5 | 17530.2 | 17332.0 | 12990.5 |
| 57.5° | 5128.4  | 5263.2  | 5796.5  | 7104.9  | 8960.4  | 11596.9 | 15060.2 | 17185.3 | 18440.1 | 18313.2 | 14082.8 |
| 60°   | 3352.2  | 3485.0  | 3966.7  | 5110.6  | 6950.2  | 9693.8  | 14015.4 | 17133.7 | 19679.1 | 19667.2 | 15424.9 |
| 62.5° | 1859.5  | 1964.5  | 2313.4  | 3205.5  | 4850.9  | 7507.3  | 12374.0 | 16616.3 | 20878.4 | 20953.8 | 16531.1 |
| 65°   | 951.5   | 1018.9  | 1231.1  | 1762.3  | 2935.9  | 5322.7  | 10215.2 | 15430.9 | 21433.5 | 21623.8 | 16822.5 |
| 67.5° | 622.5   | 644.3   | 695.8   | 915.9   | 1572.0  | 3348.2  | 7687.7  | 13529.8 | 20652.4 | 20874.5 | 15845.2 |
| 70°   | 505.5   | 523.3   | 553.1   | 610.6   | 810.8   | 1778.2  | 5049.1  | 10806.0 | 17256.6 | 17407.3 | 12617.9 |
| 72.5° | 370.7   | 394.5   | 452.0   | 489.6   | 584.8   | 975.3   | 2626.7  | 7093.0  | 11850.7 | 12116.3 | 7929.5  |
| 75°   | 273.6   | 287.4   | 335.0   | 386.6   | 477.8   | 616.5   | 1005.1  | 3728.9  | 6119.6  | 5965.0  | 3330.4  |
| 77.5° | 164.5   | 174.4   | 214.1   | 247.8   | 341.0   | 384.6   | 350.9   | 1377.8  | 1861.5  | 1750.4  | 804.8   |
| 80°   | 81.3    | 91.2    | 140.7   | 186.3   | 218.1   | 154.6   | 146.7   | 384.6   | 414.3   | 414.3   | 202.2   |
| 82.5° | 27.8    | 35.7    | 75.3    | 122.9   | 107.0   | 59.5    | 69.4    | 99.1    | 111.0   | 117.0   | 59.5    |
| 85°   | 0.0     | 0.0     | 17.8    | 35.7    | 15.9    | 7.9     | 17.8    | 21.8    | 27.8    | 29.7    | 19.8    |
| 87.5° | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 2.0     | 5.9     | 7.9     | 7.9     |
| 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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**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1974.5  | 1974.5 | 1974.5 | 1974.5 | 1974.5 | 1974.5 | 1974.5 | 1974.5 | 1974.5 | 1974.5 | 1974.5 |
| 2.5°  | 2026.0  | 1932.8 | 1792.1 | 1665.2 | 1568.1 | 1476.9 | 1407.5 | 1352.0 | 1342.1 | 1310.4 | 1314.3 |
| 5°    | 2117.2  | 1948.7 | 1689.0 | 1488.8 | 1348.0 | 1252.9 | 1173.6 | 1114.1 | 1088.3 | 1062.6 | 1042.7 |
| 7.5°  | 2257.9  | 2014.1 | 1649.3 | 1405.5 | 1241.0 | 1094.3 | 971.4  | 872.2  | 824.7  | 794.9  | 775.1  |
| 10°   | 2430.4  | 2105.3 | 1651.3 | 1355.9 | 1112.1 | 888.1  | 719.6  | 610.6  | 559.0  | 543.2  | 541.2  |
| 12.5° | 2636.6  | 2220.3 | 1667.2 | 1274.7 | 925.8  | 660.1  | 533.3  | 483.7  | 467.8  | 454.0  | 454.0  |
| 15°   | 2854.6  | 2349.1 | 1667.2 | 1126.0 | 705.7  | 515.4  | 461.9  | 430.2  | 410.4  | 402.4  | 398.5  |
| 17.5° | 3084.6  | 2470.0 | 1627.5 | 921.8  | 541.2  | 454.0  | 410.4  | 380.6  | 364.8  | 352.9  | 348.9  |
| 20°   | 3330.4  | 2585.0 | 1528.4 | 705.7  | 463.9  | 406.4  | 364.8  | 335.0  | 319.2  | 307.3  | 307.3  |
| 22.5° | 3580.2  | 2692.1 | 1367.8 | 543.2  | 410.4  | 360.8  | 321.1  | 293.4  | 277.5  | 265.6  | 265.6  |
| 25°   | 3812.1  | 2763.4 | 1161.7 | 448.0  | 370.7  | 321.1  | 285.5  | 257.7  | 239.9  | 231.9  | 228.0  |
| 27.5° | 4028.2  | 2809.0 | 933.7  | 394.5  | 333.0  | 287.4  | 249.8  | 224.0  | 210.1  | 204.2  | 200.2  |
| 30°   | 4252.2  | 2820.9 | 713.7  | 358.8  | 301.3  | 253.7  | 218.1  | 198.2  | 186.3  | 178.4  | 178.4  |
| 32.5° | 4470.3  | 2807.1 | 545.2  | 329.1  | 273.6  | 224.0  | 194.3  | 176.4  | 166.5  | 160.6  | 158.6  |
| 35°   | 4692.3  | 2743.6 | 442.1  | 303.3  | 245.8  | 196.3  | 172.5  | 158.6  | 152.6  | 144.7  | 144.7  |
| 37.5° | 4934.1  | 2658.4 | 384.6  | 277.5  | 218.1  | 176.4  | 154.6  | 144.7  | 136.8  | 130.8  | 128.9  |
| 40°   | 5235.5  | 2559.3 | 352.9  | 255.7  | 192.3  | 158.6  | 138.8  | 128.9  | 122.9  | 117.0  | 115.0  |
| 42.5° | 5592.3  | 2462.1 | 337.0  | 231.9  | 172.5  | 140.7  | 124.9  | 113.0  | 107.0  | 99.1   | 97.1   |
| 45°   | 6097.8  | 2440.3 | 319.2  | 206.2  | 154.6  | 126.9  | 109.0  | 97.1   | 89.2   | 83.3   | 81.3   |
| 47.5° | 6910.6  | 2501.8 | 289.4  | 178.4  | 136.8  | 111.0  | 93.2   | 83.3   | 73.3   | 67.4   | 63.4   |
| 50°   | 7717.4  | 2485.9 | 259.7  | 154.6  | 120.9  | 95.2   | 79.3   | 69.4   | 59.5   | 53.5   | 51.5   |
| 52.5° | 8157.5  | 2410.6 | 231.9  | 136.8  | 105.1  | 81.3   | 67.4   | 55.5   | 49.6   | 43.6   | 41.6   |
| 55°   | 8556.0  | 2380.8 | 204.2  | 118.9  | 89.2   | 71.4   | 55.5   | 45.6   | 41.6   | 35.7   | 33.7   |
| 57.5° | 9337.0  | 2450.2 | 180.4  | 103.1  | 77.3   | 61.5   | 47.6   | 37.7   | 33.7   | 27.8   | 25.8   |
| 60°   | 10153.8 | 2458.2 | 154.6  | 89.2   | 67.4   | 51.5   | 37.7   | 29.7   | 25.8   | 19.8   | 17.8   |
| 62.5° | 10580.0 | 2257.9 | 126.9  | 75.3   | 55.5   | 43.6   | 31.7   | 23.8   | 19.8   | 11.9   | 11.9   |
| 65°   | 10223.1 | 1825.8 | 107.0  | 61.5   | 43.6   | 33.7   | 23.8   | 17.8   | 11.9   | 5.9    | 2.0    |
| 67.5° | 9047.6  | 1298.5 | 89.2   | 49.6   | 31.7   | 23.8   | 17.8   | 11.9   | 2.0    | 0.0    | 0.0    |
| 70°   | 6625.1  | 741.4  | 69.4   | 35.7   | 23.8   | 15.9   | 11.9   | 5.9    | 0.0    | 0.0    | 0.0    |
| 72.5° | 4071.8  | 396.5  | 51.5   | 23.8   | 17.8   | 11.9   | 9.9    | 4.0    | 0.0    | 0.0    | 0.0    |
| 75°   | 1544.3  | 190.3  | 31.7   | 15.9   | 13.9   | 9.9    | 5.9    | 2.0    | 0.0    | 0.0    | 0.0    |
| 77.5° | 418.3   | 93.2   | 17.8   | 11.9   | 9.9    | 5.9    | 4.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 80°   | 109.0   | 43.6   | 11.9   | 7.9    | 5.9    | 4.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 82.5° | 37.7    | 19.8   | 5.9    | 5.9    | 4.0    | 2.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 85°   | 15.9    | 7.9    | 4.0    | 4.0    | 2.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 87.5° | 5.9     | 2.0    | 2.0    | 2.0    | 2.0    | 0.0    | 0.0    | 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

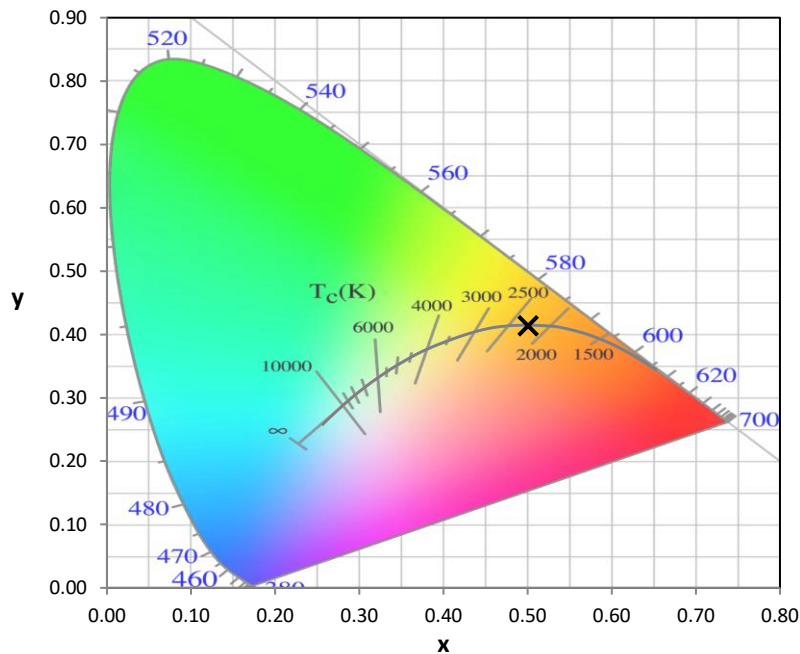
Stabilization Time: 71M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.7/41%  
 Sphere Temperature (°C): 25.6

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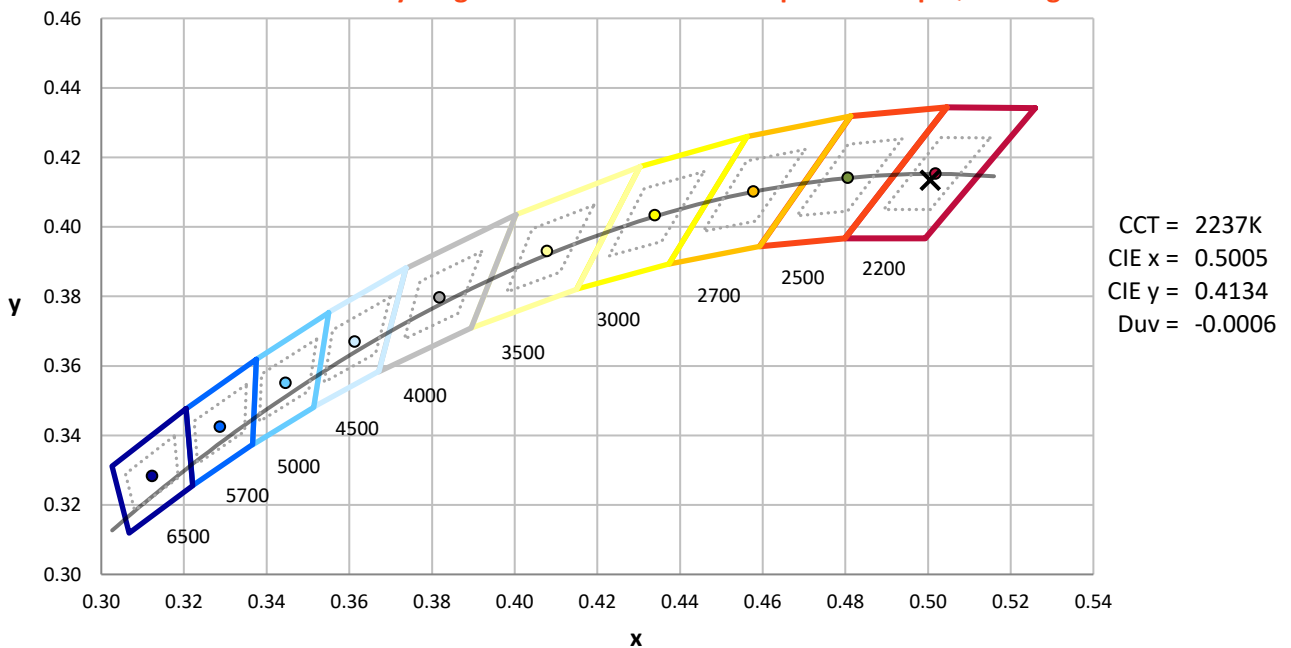
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date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

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**CIE 1931 Chromaticity Diagram**



**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 2200K 4-step quadrangle

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**Photopic Flux vs. Wavelength**



#####

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

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Scotopic Flux vs. Wavelength



Scotopic Lumens: 4696.9

S/P: 0.85

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

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**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 1470.8**

**M/P: 0.27**

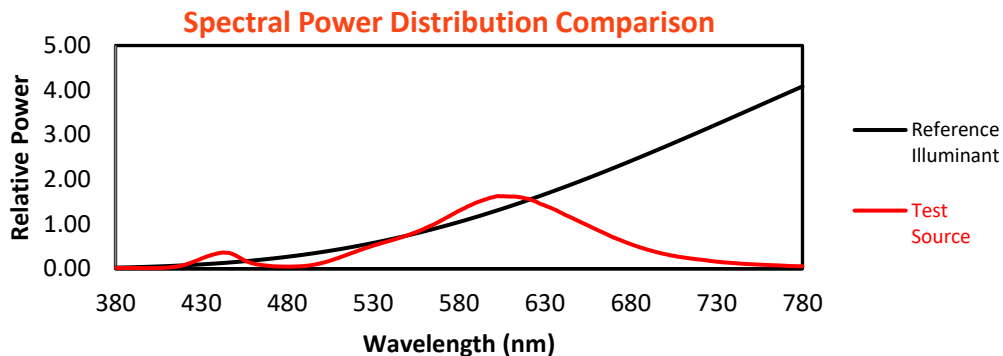
| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------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

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### Summary

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



### Color Vector Graphics





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

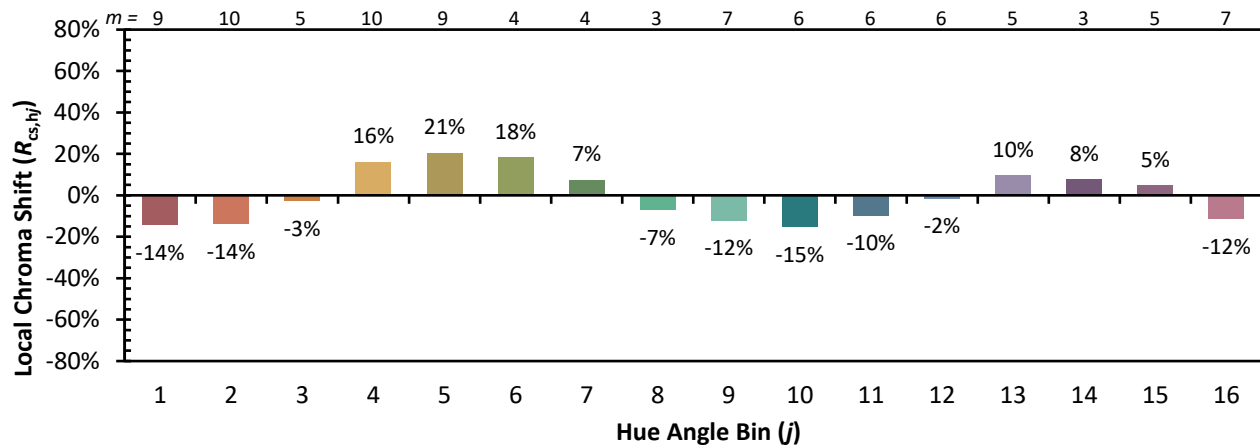
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 87 | CES26 = 56 | CES51 = 74 | CES76 = 56 |
| CES02 = 65 | CES27 = 76 | CES52 = 76 | CES77 = 81 |
| CES03 = 32 | CES28 = 83 | CES53 = 65 | CES78 = 63 |
| CES04 = 72 | CES29 = 46 | CES54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



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Color Rendition by Hue-Angle Bin



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**Measure Comparisons**



(END OF REPORT)