

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: P636051

Luminaire Tested: GWS-SA3F-722-U-SL2-W-HSS

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P636051  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-30)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA3F-722-U-SL2-W-HSS  
Description: GALLEON WALL SLIM LUMINAIRE. (3) LIGHTSQUARES WITH 16 LEDS EACH AND  
TYPE II SPILL LIGHT ELIMINATOR OPTICS WITH HOUSE SIDE SHIELD  
Light Source: (48) 2200K CCT, 70 CRI LEDS  
Ballast/Driver: -

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 14277 lumens  
Efficiency: N/A  
Efficacy: 77.9 lumens/watt  
Luminous Opening: Rectangular (W 1.5' x L: 0.5' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B2 - U0 - G2

Input Watts (W): 183.2  
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



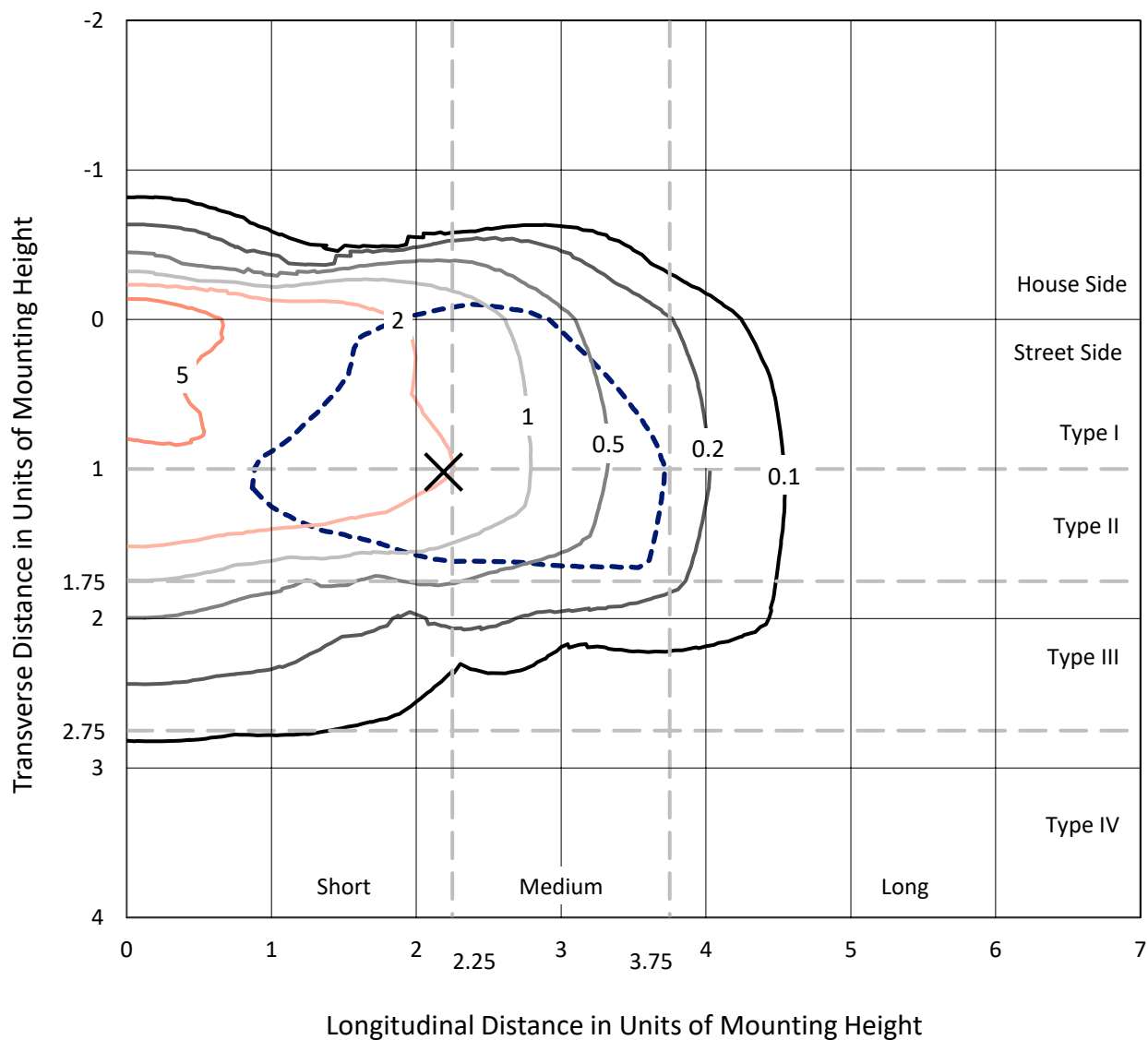
REPORT NUMBER: P636051

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## Iso-Footcandle Lines of Horizontal Illumination

✕ Max cd

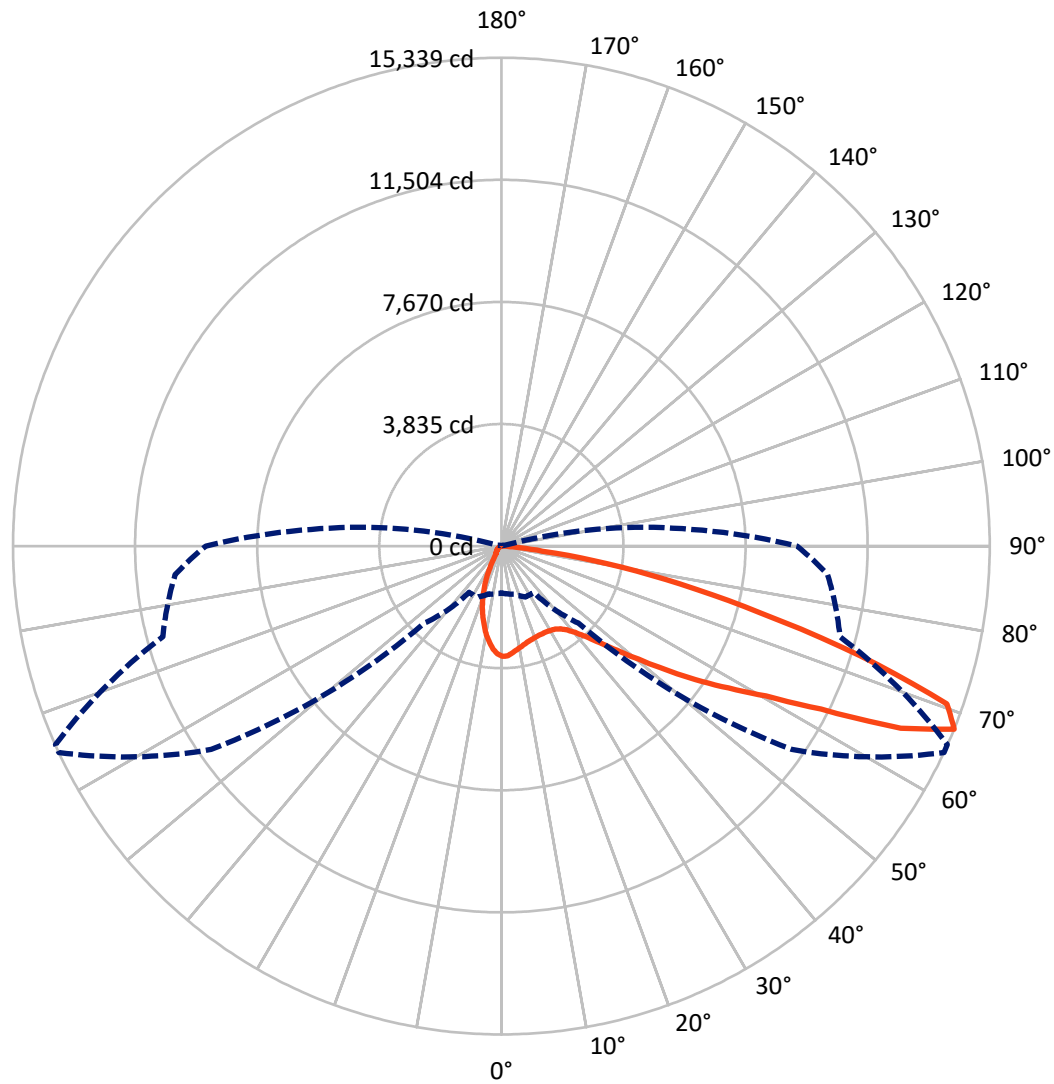
--- 1/2 Max cd



Based on 20 foot mounting height. Maximum calculated value = 8.7 fc  
 Type II - Short - N/A

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## Luminous Intensity Polar Plot



— Vertical Plane Through 65-Deg Lateral    - - - Horizontal Cone Through 67.5-Deg Vertical

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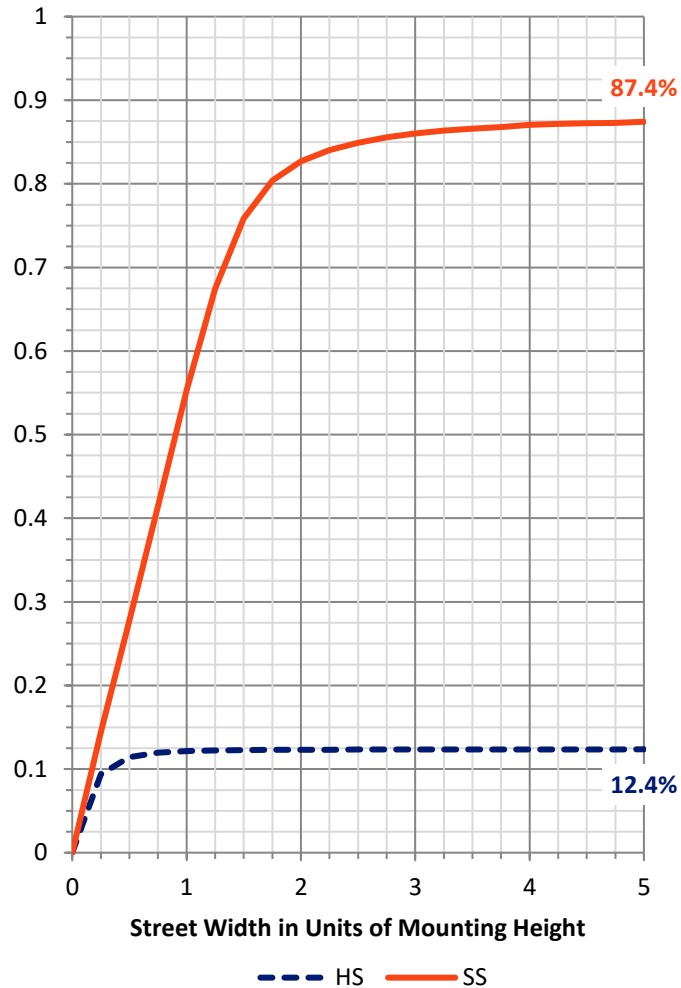
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 1782.8   | 0.0    | 1782.8  |
|                    | % Fixture | 12.5     | 0.0    | 12.5    |
| <b>Street Side</b> | Lumens    | 12494.2  | 0.0    | 12494.2 |
|                    | % Fixture | 87.5     | 0.0    | 87.5    |
| <b>Total</b>       | Lumens    | 14277.0  | 0.0    | 14277.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 287.6   | 2.0       |
| 10°-20°   | 646.5   | 4.5       |
| 20°-30°   | 923.8   | 6.5       |
| 30°-40°   | 1344.0  | 9.4       |
| 40°-50°   | 2104.9  | 14.7      |
| 50°-60°   | 3283.7  | 23.0      |
| 60°-70°   | 3607.0  | 25.3      |
| 70°-80°   | 1919.6  | 13.4      |
| 80°-90°   | 159.8   | 1.1       |
| 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°    | 14277.0 | 100.0     |
| 0°-180°   | 14277.0 | 100.0     |

**Coefficient of Utilization**



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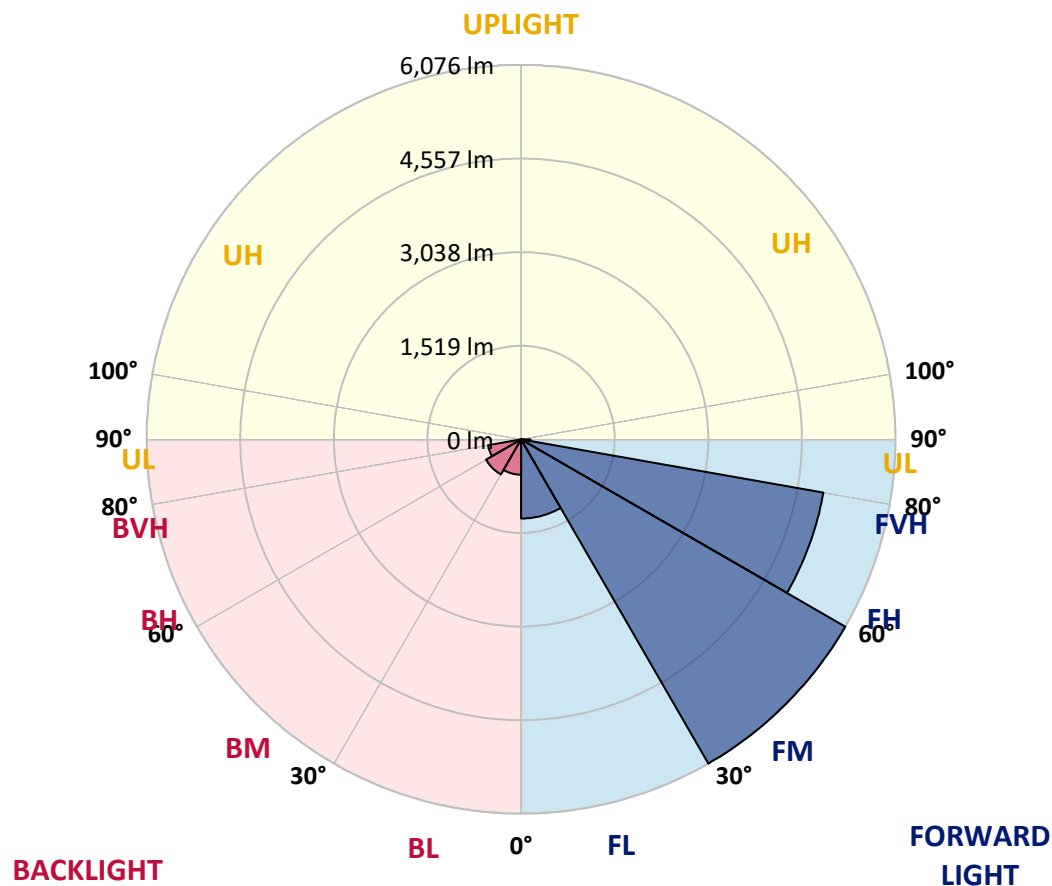
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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 1284.8 | 9.0       |                         |      |         |
| FM   | (30°-60°)   | 6076.0 | 42.6      |                         |      |         |
| FH   | (60°-80°)   | 4982.1 | 34.9      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 151.3  | 1.1       |                         |      | G2/225  |
| BL   | (0°-30°)    | 573.0  | 4.0       | B2/1000                 |      |         |
| BM   | (30°-60°)   | 656.7  | 4.6       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 544.5  | 3.8       | B2/1000                 |      | G2/1000 |
| BVH  | (80°-90°)   | 8.5    | 0.1       |                         |      | G0/10   |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B2-U0-G2**

Type II Short



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°     | 65°     | 66°     | 75°     | 85°     |
|-------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|---------|
| 0°    | 3462.6 | 3462.6 | 3462.6 | 3462.6 | 3462.6 | 3462.6 | 3462.6  | 3462.6  | 3462.6  | 3462.6  | 3462.6  |
| 2.5°  | 3342.6 | 3352.9 | 3338.7 | 3373.5 | 3380.0 | 3418.7 | 3440.7  | 3456.2  | 3454.9  | 3474.2  | 3474.2  |
| 5°    | 3146.3 | 3156.6 | 3148.9 | 3186.3 | 3216.0 | 3276.7 | 3327.1  | 3385.2  | 3387.7  | 3447.1  | 3469.1  |
| 7.5°  | 2979.8 | 2981.1 | 2981.1 | 3027.5 | 3066.3 | 3141.1 | 3216.0  | 3305.1  | 3315.4  | 3407.1  | 3465.2  |
| 10°   | 2842.9 | 2846.8 | 2848.1 | 2901.0 | 2943.6 | 3034.0 | 3129.5  | 3236.7  | 3248.3  | 3372.2  | 3462.6  |
| 12.5° | 2748.7 | 2750.0 | 2755.1 | 2810.6 | 2857.1 | 2951.4 | 3048.2  | 3170.8  | 3186.3  | 3332.2  | 3451.0  |
| 15°   | 2703.5 | 2700.9 | 2703.5 | 2750.0 | 2796.4 | 2886.8 | 2986.2  | 3117.9  | 3134.7  | 3298.7  | 3452.3  |
| 17.5° | 2700.9 | 2697.0 | 2694.4 | 2729.3 | 2759.0 | 2839.0 | 2939.7  | 3083.1  | 3101.1  | 3283.2  | 3466.5  |
| 20°   | 2738.3 | 2735.8 | 2722.8 | 2738.3 | 2744.8 | 2810.6 | 2910.0  | 3055.9  | 3074.0  | 3280.6  | 3497.5  |
| 22.5° | 2836.5 | 2830.0 | 2810.6 | 2796.4 | 2761.6 | 2800.3 | 2889.4  | 3036.6  | 3057.2  | 3287.0  | 3537.5  |
| 25°   | 2982.3 | 2979.8 | 2955.2 | 2920.4 | 2831.3 | 2815.8 | 2890.7  | 3036.6  | 3055.9  | 3294.8  | 3580.1  |
| 27.5° | 3201.8 | 3186.3 | 3155.4 | 3094.7 | 2966.9 | 2876.5 | 2916.5  | 3044.3  | 3063.7  | 3305.1  | 3615.0  |
| 30°   | 3425.2 | 3423.9 | 3413.6 | 3351.6 | 3161.8 | 2992.7 | 2970.7  | 3065.0  | 3083.1  | 3314.2  | 3647.2  |
| 32.5° | 3656.3 | 3660.2 | 3686.0 | 3638.2 | 3430.3 | 3165.7 | 3068.8  | 3107.6  | 3120.5  | 3332.2  | 3675.6  |
| 35°   | 3875.8 | 3883.5 | 3951.9 | 3968.7 | 3757.0 | 3427.8 | 3228.9  | 3192.8  | 3194.1  | 3372.2  | 3713.1  |
| 37.5° | 4086.2 | 4112.0 | 4221.8 | 4303.1 | 4163.7 | 3745.4 | 3460.0  | 3337.4  | 3327.1  | 3452.3  | 3769.9  |
| 40°   | 4325.1 | 4374.1 | 4512.3 | 4650.4 | 4606.5 | 4165.0 | 3775.1  | 3559.5  | 3537.5  | 3599.5  | 3871.9  |
| 42.5° | 4589.7 | 4642.7 | 4826.0 | 5019.6 | 5040.3 | 4672.3 | 4168.8  | 3883.5  | 3846.1  | 3847.4  | 4063.0  |
| 45°   | 4873.8 | 4944.8 | 5157.8 | 5436.7 | 5561.9 | 5237.8 | 4654.3  | 4321.2  | 4283.7  | 4228.2  | 4370.2  |
| 47.5° | 5246.9 | 5308.8 | 5514.1 | 5835.6 | 6075.7 | 5844.6 | 5290.8  | 4884.1  | 4815.7  | 4734.3  | 4847.9  |
| 50°   | 5568.3 | 5622.6 | 5799.4 | 6202.3 | 6701.9 | 6627.0 | 6012.5  | 5587.7  | 5521.9  | 5383.7  | 5478.0  |
| 52.5° | 5639.3 | 5682.0 | 5844.6 | 6297.8 | 7180.9 | 7614.7 | 6896.8  | 6438.5  | 6392.0  | 6136.4  | 6172.6  |
| 55°   | 5320.5 | 5385.0 | 5530.9 | 6034.4 | 7306.1 | 8580.4 | 8044.6  | 7397.8  | 7300.9  | 6893.0  | 6957.5  |
| 57.5° | 4514.8 | 4629.7 | 4766.6 | 5421.2 | 6966.6 | 9094.2 | 9648.1  | 8413.8  | 8326.0  | 7621.1  | 7622.4  |
| 60°   | 3309.0 | 3401.9 | 3493.6 | 4092.7 | 6160.9 | 9059.4 | 11103.1 | 9555.1  | 9395.0  | 8216.3  | 8194.4  |
| 62.5° | 2406.5 | 2454.3 | 2453.0 | 2666.0 | 4230.8 | 8462.9 | 11867.4 | 11274.8 | 10901.7 | 8852.8  | 8727.6  |
| 65°   | 1892.7 | 1891.4 | 1946.9 | 2016.6 | 2362.6 | 6532.8 | 11961.7 | 13785.9 | 13383.1 | 9706.2  | 9445.4  |
| 67.5° | 1473.1 | 1501.5 | 1557.0 | 1762.3 | 1775.2 | 3418.7 | 11132.8 | 15339.1 | 15331.3 | 11008.9 | 10285.9 |
| 70°   | 1136.1 | 1174.9 | 1253.6 | 1553.1 | 1639.6 | 1913.4 | 8329.9  | 14847.2 | 14972.4 | 11591.1 | 9690.7  |
| 72.5° | 729.4  | 726.9  | 843.1  | 1254.9 | 1575.1 | 1594.5 | 4606.5  | 11793.8 | 11935.8 | 10498.9 | 7835.4  |
| 75°   | 408.0  | 410.6  | 476.4  | 768.2  | 1467.9 | 1500.2 | 2281.3  | 8410.0  | 8522.3  | 8185.3  | 6020.2  |
| 77.5° | 160.1  | 165.3  | 223.4  | 404.1  | 968.3  | 1340.1 | 1355.6  | 5734.9  | 5751.7  | 5072.6  | 3692.4  |
| 80°   | 64.6   | 68.4   | 113.6  | 250.5  | 590.0  | 902.5  | 968.3   | 3378.7  | 3310.3  | 1963.7  | 1074.2  |
| 82.5° | 19.4   | 20.7   | 45.2   | 142.0  | 308.6  | 641.7  | 653.3   | 1296.2  | 1223.9  | 422.2   | 273.7   |
| 85°   | 1.3    | 1.3    | 10.3   | 43.9   | 109.7  | 161.4  | 435.1   | 422.2   | 374.4   | 105.9   | 121.4   |
| 87.5° | 0.0    | 0.0    | 1.3    | 1.3    | 2.6    | 5.2    | 46.5    | 77.5    | 78.8    | 19.4    | 54.2    |
| 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: P636051

CATALOG NUMBER: GWS-SA3F-722-U-SL2-W-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 3462.6 | 3462.6 | 3462.6 | 3462.6 | 3462.6 | 3462.6 | 3462.6 | 3462.6 | 3462.6 | 3462.6 | 3462.6 |
| 2.5°  | 3474.2 | 3427.8 | 3423.9 | 3387.7 | 3351.6 | 3306.4 | 3253.5 | 3214.7 | 3187.6 | 3139.9 | 3130.8 |
| 5°    | 3469.1 | 3407.1 | 3349.0 | 3245.7 | 3130.8 | 3006.9 | 2898.4 | 2797.7 | 2734.5 | 2691.9 | 2673.8 |
| 7.5°  | 3458.7 | 3380.0 | 3245.7 | 3050.8 | 2858.4 | 2641.5 | 2472.4 | 2317.5 | 2211.6 | 2149.6 | 2122.5 |
| 10°   | 3451.0 | 3345.1 | 3126.9 | 2831.3 | 2533.1 | 2233.5 | 1976.6 | 1746.8 | 1619.0 | 1518.3 | 1501.5 |
| 12.5° | 3435.5 | 3294.8 | 2974.6 | 2574.4 | 2189.6 | 1792.0 | 1464.1 | 1182.6 | 987.7  | 899.9  | 868.9  |
| 15°   | 3420.0 | 3241.9 | 2822.3 | 2303.3 | 1815.2 | 1324.6 | 927.0  | 655.9  | 521.6  | 480.3  | 477.7  |
| 17.5° | 3417.4 | 3194.1 | 2657.0 | 2046.3 | 1422.7 | 867.6  | 528.0  | 424.8  | 396.4  | 386.0  | 386.0  |
| 20°   | 3425.2 | 3154.1 | 2494.3 | 1750.7 | 1036.7 | 528.0  | 393.8  | 368.0  | 351.2  | 342.1  | 342.1  |
| 22.5° | 3432.9 | 3112.7 | 2338.1 | 1452.4 | 688.1  | 386.0  | 347.3  | 325.3  | 306.0  | 295.7  | 290.5  |
| 25°   | 3438.1 | 3067.6 | 2165.1 | 1152.9 | 449.3  | 335.7  | 304.7  | 276.3  | 253.0  | 240.1  | 240.1  |
| 27.5° | 3436.8 | 3013.3 | 1990.8 | 859.8  | 348.6  | 298.2  | 260.8  | 231.1  | 207.9  | 193.7  | 195.0  |
| 30°   | 3426.5 | 2953.9 | 1810.1 | 600.3  | 304.7  | 260.8  | 223.4  | 192.4  | 169.1  | 157.5  | 156.2  |
| 32.5° | 3418.7 | 2890.7 | 1600.9 | 422.2  | 273.7  | 228.5  | 189.8  | 160.1  | 140.7  | 131.7  | 130.4  |
| 35°   | 3409.7 | 2828.7 | 1402.1 | 321.5  | 246.6  | 197.5  | 160.1  | 135.6  | 120.1  | 112.3  | 112.3  |
| 37.5° | 3412.3 | 2764.2 | 1186.5 | 276.3  | 219.5  | 171.7  | 136.9  | 116.2  | 103.3  | 95.5   | 94.2   |
| 40°   | 3452.3 | 2725.4 | 974.8  | 250.5  | 195.0  | 148.5  | 118.8  | 100.7  | 87.8   | 80.0   | 78.8   |
| 42.5° | 3551.7 | 2726.7 | 772.1  | 231.1  | 173.0  | 126.5  | 103.3  | 86.5   | 74.9   | 65.8   | 64.6   |
| 45°   | 3750.5 | 2780.9 | 592.6  | 210.4  | 149.8  | 109.7  | 89.1   | 73.6   | 62.0   | 54.2   | 52.9   |
| 47.5° | 4075.9 | 2942.3 | 449.3  | 192.4  | 130.4  | 95.5   | 76.2   | 62.0   | 51.6   | 45.2   | 43.9   |
| 50°   | 4593.6 | 3234.1 | 353.8  | 170.4  | 109.7  | 82.6   | 64.6   | 51.6   | 42.6   | 36.1   | 34.9   |
| 52.5° | 5215.9 | 3671.8 | 303.4  | 151.1  | 94.2   | 72.3   | 55.5   | 42.6   | 34.9   | 29.7   | 28.4   |
| 55°   | 5931.1 | 4194.7 | 280.2  | 131.7  | 80.0   | 62.0   | 45.2   | 34.9   | 28.4   | 24.5   | 21.9   |
| 57.5° | 6587.0 | 4665.9 | 278.9  | 112.3  | 68.4   | 52.9   | 37.4   | 29.7   | 24.5   | 19.4   | 18.1   |
| 60°   | 7226.1 | 5059.7 | 262.1  | 93.0   | 59.4   | 43.9   | 32.3   | 24.5   | 20.7   | 16.8   | 15.5   |
| 62.5° | 7805.7 | 5379.8 | 219.5  | 74.9   | 50.4   | 36.1   | 27.1   | 21.9   | 18.1   | 14.2   | 14.2   |
| 65°   | 8533.9 | 5787.8 | 167.8  | 60.7   | 41.3   | 29.7   | 23.2   | 19.4   | 16.8   | 12.9   | 12.9   |
| 67.5° | 9286.6 | 6003.4 | 120.1  | 50.4   | 33.6   | 25.8   | 20.7   | 18.1   | 14.2   | 11.6   | 11.6   |
| 70°   | 8411.3 | 5072.6 | 86.5   | 41.3   | 28.4   | 21.9   | 18.1   | 16.8   | 14.2   | 11.6   | 10.3   |
| 72.5° | 6568.9 | 3657.6 | 64.6   | 32.3   | 24.5   | 20.7   | 16.8   | 15.5   | 12.9   | 10.3   | 10.3   |
| 75°   | 4871.2 | 2132.8 | 49.1   | 25.8   | 19.4   | 16.8   | 16.8   | 15.5   | 12.9   | 10.3   | 9.0    |
| 77.5° | 2648.0 | 743.7  | 37.4   | 20.7   | 15.5   | 12.9   | 14.2   | 14.2   | 11.6   | 9.0    | 7.7    |
| 80°   | 701.0  | 204.0  | 25.8   | 15.5   | 12.9   | 10.3   | 10.3   | 12.9   | 10.3   | 7.7    | 7.7    |
| 82.5° | 204.0  | 59.4   | 18.1   | 12.9   | 10.3   | 9.0    | 9.0    | 9.0    | 7.7    | 6.5    | 5.2    |
| 85°   | 99.4   | 21.9   | 12.9   | 10.3   | 9.0    | 7.7    | 6.5    | 6.5    | 5.2    | 3.9    | 3.9    |
| 87.5° | 43.9   | 9.0    | 10.3   | 9.0    | 9.0    | 6.5    | 5.2    | 3.9    | 3.9    | 2.6    | 1.3    |
| 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)