

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: P643000

Luminaire Tested: GWS-SA6E-722-U-T2-W-HSS

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P643000  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-22)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA6E-722-U-T2-W-HSS  
Description: GALLEON WALL SLIM LUMINAIRE. (6) LIGHTSQUARES WITH 16 LEDS EACH AND  
TYPE II OPTICS WITH HOUSE SIDE SHIELD  
Light Source: (96) 2200K CCT, 70 CRI LEDS  
Ballast/Driver: -

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 24699 lumens  
Efficiency: N/A  
Efficacy: 76.3 lumens/watt  
Luminous Opening: Rectangular (W 2' x L: 1' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B2 - U0 - G4

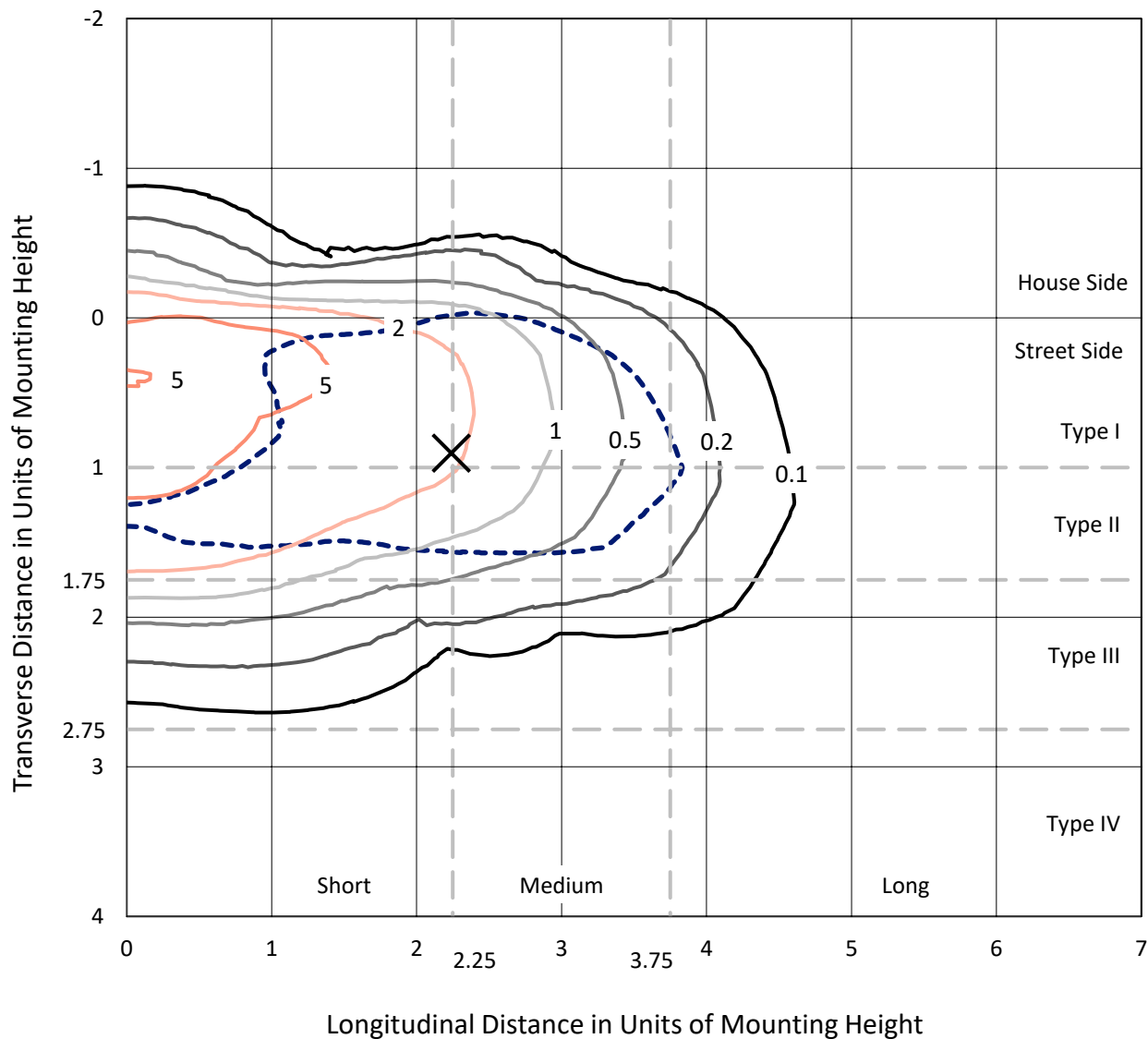
Input Watts (W): 323.8  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 0  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT



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## Iso-Footcandle Lines of Horizontal Illumination

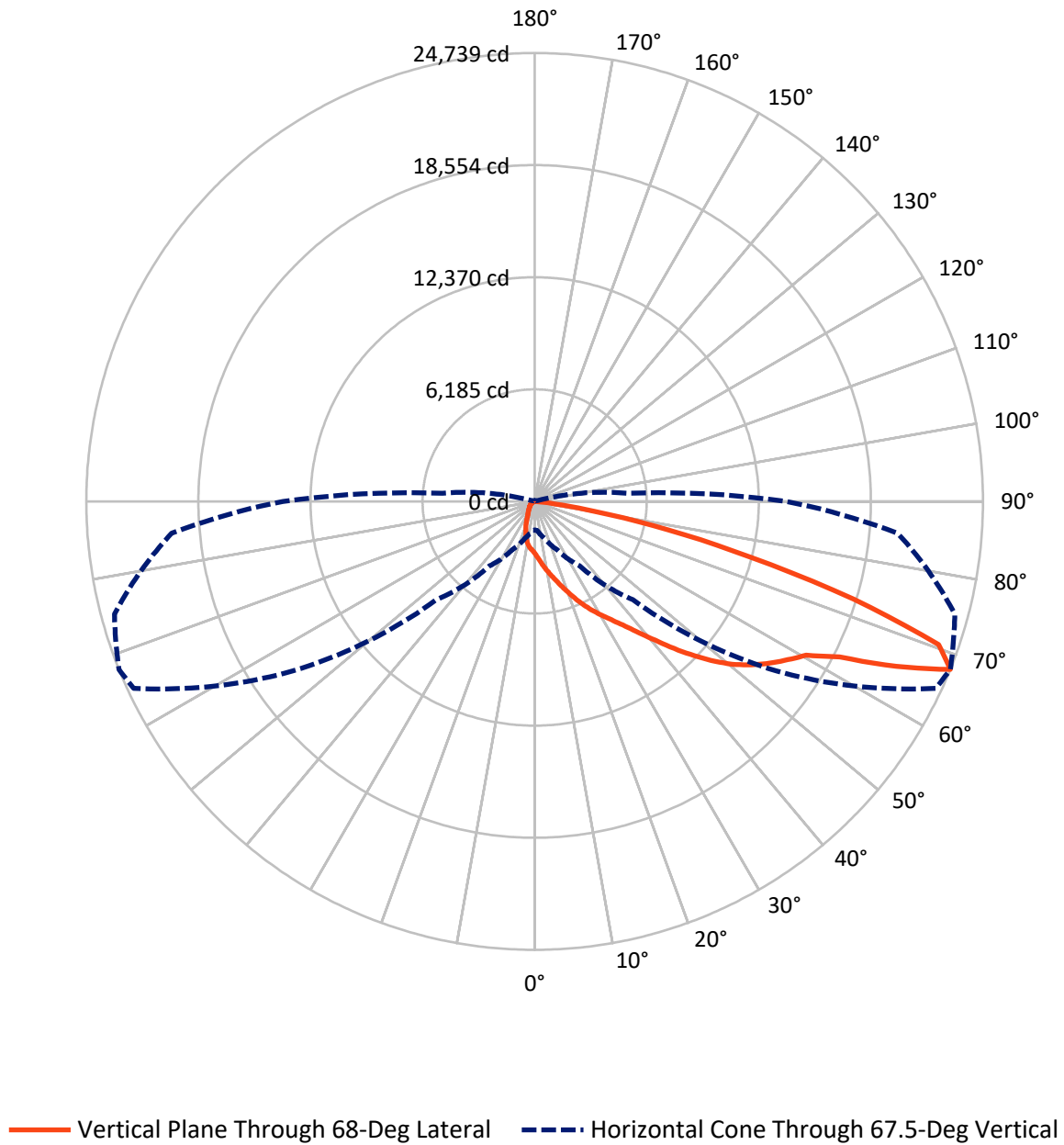
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 7.4 fc  
 Type II - Short - N/A

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## Luminous Intensity Polar Plot



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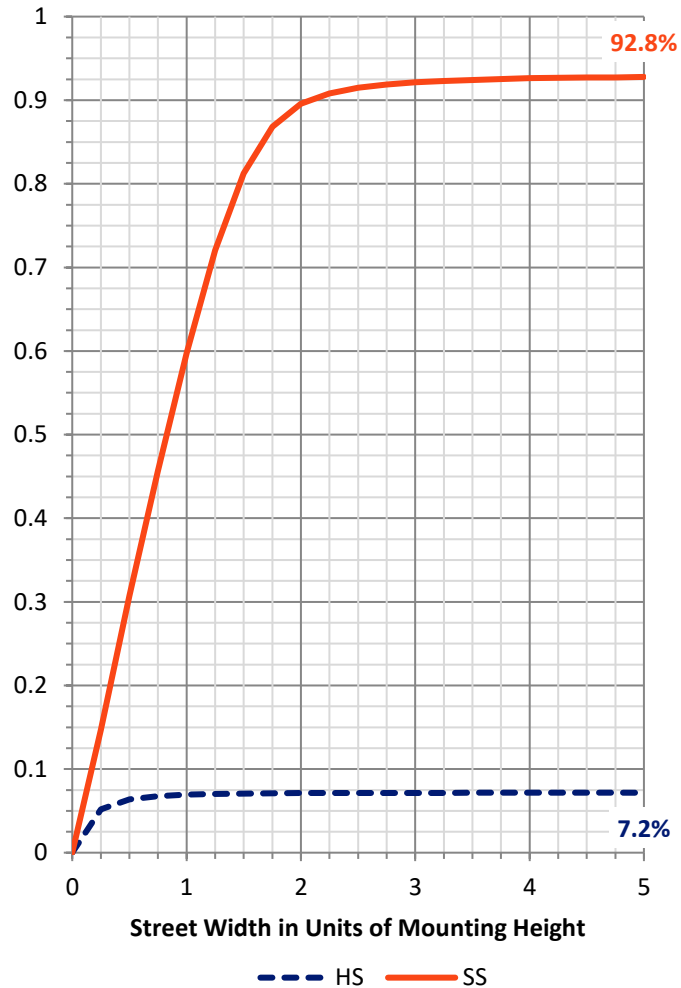
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 1783.6   | 0.0    | 1783.6  |
|                    | % Fixture | 7.2      | 0.0    | 7.2     |
| <b>Street Side</b> | Lumens    | 22915.4  | 0.0    | 22915.4 |
|                    | % Fixture | 92.8     | 0.0    | 92.8    |
| <b>Total</b>       | Lumens    | 24699.0  | 0.0    | 24699.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 280.3   | 1.1       |
| 10°-20°   | 805.0   | 3.3       |
| 20°-30°   | 1383.4  | 5.6       |
| 30°-40°   | 2405.3  | 9.7       |
| 40°-50°   | 4197.0  | 17.0      |
| 50°-60°   | 6330.2  | 25.6      |
| 60°-70°   | 6347.5  | 25.7      |
| 70°-80°   | 2800.5  | 11.3      |
| 80°-90°   | 149.6   | 0.6       |
| 90°-100°  | 0.0     | 0.0       |
| 100°-110° | 0.0     | 0.0       |
| 110°-120° | 0.0     | 0.0       |
| 120°-130° | 0.0     | 0.0       |
| 130°-140° | 0.0     | 0.0       |
| 140°-150° | 0.0     | 0.0       |
| 150°-160° | 0.0     | 0.0       |
| 160°-170° | 0.0     | 0.0       |
| 170°-180° | 0.0     | 0.0       |
| 0°-90°    | 24699.0 | 100.0     |
| 0°-180°   | 24699.0 | 100.0     |

**Coefficient of Utilization**



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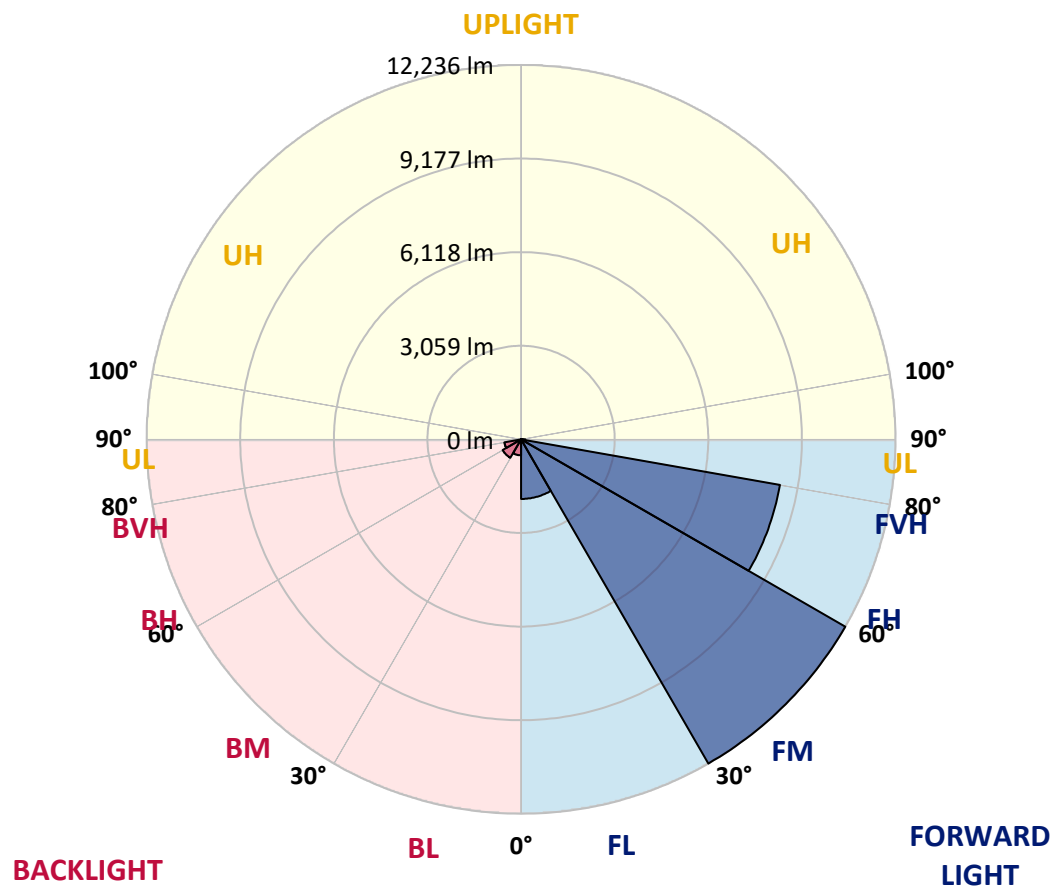
CATALOG NUMBER: GWS-SA6E-722-U-T2-W-HSS

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |          |
|------|-------------|---------|-----------|-------------------------|------|----------|
|      |             |         |           | B                       | U    | G        |
| FL   | (0°-30°)    | 1947.0  | 7.9       |                         |      |          |
| FM   | (30°-60°)   | 12235.8 | 49.5      |                         |      |          |
| FH   | (60°-80°)   | 8591.4  | 34.8      |                         |      | G4/12000 |
| FVH  | (80°-90°)   | 141.1   | 0.6       |                         |      | G2/225   |
| BL   | (0°-30°)    | 521.8   | 2.1       | B2/1000                 |      |          |
| BM   | (30°-60°)   | 696.7   | 2.8       | B1/1000                 |      |          |
| BH   | (60°-80°)   | 556.6   | 2.3       | B2/1000                 |      | G2/1000  |
| BVH  | (80°-90°)   | 8.5     | 0.0       |                         |      | G0/10    |
| UL   | (90°-100°)  | 0.0     | 0.0       |                         | U0/0 |          |
| UH   | (100°-180°) | 0.0     | 0.0       |                         | U0/0 |          |

**BUG Rating: B2-U0-G4**

Type II Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 35°     | 45°     | 55°     | 65°     | 68°     | 75°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 2874.3  | 2874.3  | 2874.3  | 2874.3  | 2874.3  | 2874.3  | 2874.3  | 2874.3  | 2874.3  | 2874.3  | 2874.3  |
| 2.5°  | 3347.1  | 3368.4  | 3347.1  | 3351.8  | 3290.4  | 3262.0  | 3200.5  | 3115.4  | 3094.2  | 3039.8  | 2957.1  |
| 5°    | 3756.0  | 3774.9  | 3753.7  | 3748.9  | 3678.0  | 3626.0  | 3524.4  | 3377.8  | 3335.3  | 3228.9  | 3065.8  |
| 7.5°  | 3978.2  | 3990.0  | 3997.1  | 4008.9  | 3982.9  | 3940.4  | 3848.2  | 3666.2  | 3621.3  | 3448.7  | 3219.4  |
| 10°   | 4001.9  | 4011.3  | 4046.8  | 4117.7  | 4169.7  | 4195.7  | 4143.7  | 3975.8  | 3904.9  | 3737.1  | 3408.5  |
| 12.5° | 3935.7  | 3949.8  | 4006.6  | 4124.8  | 4269.0  | 4401.3  | 4434.4  | 4287.9  | 4224.0  | 4008.9  | 3630.7  |
| 15°   | 3848.2  | 3860.0  | 3938.0  | 4098.8  | 4316.2  | 4559.7  | 4696.8  | 4633.0  | 4562.1  | 4337.5  | 3876.6  |
| 17.5° | 3713.5  | 3730.0  | 3838.8  | 4056.2  | 4337.5  | 4685.0  | 4980.4  | 5001.7  | 4952.1  | 4708.6  | 4148.4  |
| 20°   | 3637.8  | 3649.6  | 3746.6  | 3971.1  | 4323.3  | 4777.2  | 5245.2  | 5446.1  | 5391.7  | 5136.5  | 4460.4  |
| 22.5° | 3701.7  | 3711.1  | 3774.9  | 3949.8  | 4276.0  | 4829.2  | 5491.0  | 5890.5  | 5859.8  | 5595.0  | 4789.0  |
| 25°   | 4037.3  | 4068.0  | 4030.2  | 4060.9  | 4297.3  | 4857.5  | 5689.6  | 6334.9  | 6342.0  | 6074.9  | 5129.4  |
| 27.5° | 4718.1  | 4677.9  | 4588.1  | 4434.4  | 4462.8  | 4933.2  | 5859.8  | 6753.3  | 6814.7  | 6542.9  | 5431.9  |
| 30°   | 5410.7  | 5387.0  | 5332.6  | 5093.9  | 4895.4  | 5101.0  | 6004.0  | 7181.1  | 7278.0  | 7003.8  | 5701.4  |
| 32.5° | 6188.3  | 6212.0  | 6115.1  | 5829.0  | 5491.0  | 5441.4  | 6152.9  | 7587.7  | 7769.7  | 7526.2  | 6018.1  |
| 35°   | 7117.3  | 7124.4  | 6932.9  | 6616.2  | 6233.2  | 6004.0  | 6420.0  | 8036.8  | 8372.4  | 8192.8  | 6441.3  |
| 37.5° | 8022.6  | 8065.2  | 7961.2  | 7462.4  | 7122.0  | 6703.6  | 6862.0  | 8613.6  | 9086.3  | 9015.4  | 6973.1  |
| 40°   | 8823.9  | 8890.1  | 8857.0  | 8374.8  | 7928.1  | 7575.9  | 7547.5  | 9289.6  | 9949.1  | 10029.4 | 7675.1  |
| 42.5° | 9462.1  | 9504.7  | 9530.7  | 9187.9  | 8793.2  | 8594.6  | 8393.7  | 10074.4 | 10967.9 | 11296.4 | 8535.5  |
| 45°   | 10135.8 | 10150.0 | 10204.4 | 9972.7  | 9627.6  | 9644.2  | 9393.6  | 11027.0 | 12041.0 | 12700.5 | 9523.6  |
| 47.5° | 10993.9 | 11041.1 | 11015.1 | 10771.7 | 10459.7 | 10646.4 | 10426.6 | 12007.9 | 13100.0 | 14199.1 | 10535.3 |
| 50°   | 12038.6 | 12088.3 | 12064.6 | 11781.0 | 11433.5 | 11511.5 | 11374.4 | 12960.5 | 14121.1 | 15612.7 | 11376.8 |
| 52.5° | 12577.6 | 12617.8 | 12910.9 | 13038.5 | 12856.5 | 12360.1 | 12182.8 | 14007.7 | 14983.9 | 16775.6 | 12149.7 |
| 55°   | 12317.6 | 12345.9 | 12984.1 | 13523.1 | 14189.7 | 13693.3 | 12996.0 | 14816.1 | 15745.0 | 17683.3 | 12724.1 |
| 57.5° | 11239.7 | 11393.3 | 12260.8 | 13173.3 | 14575.0 | 15009.9 | 14314.9 | 15695.4 | 16477.8 | 18314.4 | 13289.1 |
| 60°   | 9029.6  | 9022.5  | 10265.8 | 11903.9 | 13823.3 | 15371.5 | 16177.6 | 16884.4 | 17212.9 | 18799.0 | 14045.5 |
| 62.5° | 4989.9  | 5034.8  | 6689.4  | 8847.6  | 11733.7 | 14435.5 | 17574.6 | 18938.5 | 18888.8 | 19645.2 | 15229.7 |
| 65°   | 2484.3  | 2574.1  | 3472.4  | 5067.9  | 7807.5  | 11929.9 | 17815.7 | 22072.8 | 21931.0 | 21637.9 | 17676.2 |
| 67.5° | 1576.6  | 1612.1  | 2108.5  | 2945.2  | 4339.9  | 7668.0  | 16314.7 | 24410.6 | 24739.1 | 24001.6 | 20103.8 |
| 70°   | 1021.1  | 1080.2  | 1465.5  | 2013.9  | 2619.0  | 3952.2  | 11951.2 | 22895.4 | 23649.4 | 23741.6 | 18591.0 |
| 72.5° | 555.5   | 598.0   | 936.1   | 1437.2  | 1891.0  | 1976.1  | 6713.1  | 17182.2 | 18394.8 | 20139.3 | 14544.2 |
| 75°   | 316.7   | 347.5   | 512.9   | 976.2   | 1387.5  | 1203.2  | 2976.0  | 11502.1 | 12275.0 | 14393.0 | 10421.8 |
| 77.5° | 191.5   | 217.5   | 288.4   | 475.1   | 869.9   | 803.7   | 1125.2  | 7001.5  | 7493.1  | 8587.6  | 5469.7  |
| 80°   | 87.5    | 104.0   | 182.0   | 262.4   | 475.1   | 380.6   | 430.2   | 3264.4  | 3370.7  | 3524.4  | 1810.6  |
| 82.5° | 40.2    | 47.3    | 82.7    | 156.0   | 269.5   | 219.8   | 165.5   | 754.0   | 1061.3  | 1004.6  | 460.9   |
| 85°   | 4.7     | 4.7     | 30.7    | 63.8    | 75.6    | 56.7    | 68.5    | 170.2   | 215.1   | 302.6   | 132.4   |
| 87.5° | 0.0     | 0.0     | 2.4     | 2.4     | 4.7     | 7.1     | 14.2    | 21.3    | 30.7    | 49.6    | 33.1    |
| 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: P643000

CATALOG NUMBER: GWS-SA6E-722-U-T2-W-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 2874.3  | 2874.3 | 2874.3 | 2874.3 | 2874.3 | 2874.3 | 2874.3 | 2874.3 | 2874.3 | 2874.3 | 2874.3 |
| 2.5°  | 2919.2  | 2853.1 | 2794.0 | 2706.5 | 2647.4 | 2581.2 | 2536.3 | 2482.0 | 2460.7 | 2444.1 | 2420.5 |
| 5°    | 2985.4  | 2879.1 | 2734.9 | 2574.1 | 2441.8 | 2316.5 | 2200.7 | 2125.0 | 2058.8 | 2049.4 | 2016.3 |
| 7.5°  | 3094.2  | 2935.8 | 2692.3 | 2429.9 | 2205.4 | 1997.4 | 1834.3 | 1701.9 | 1635.7 | 1614.4 | 1576.6 |
| 10°   | 3238.4  | 3020.9 | 2628.5 | 2226.7 | 1902.8 | 1654.6 | 1470.3 | 1321.3 | 1217.3 | 1179.5 | 1151.2 |
| 12.5° | 3399.1  | 3098.9 | 2526.9 | 1976.1 | 1607.4 | 1323.7 | 1089.7 | 931.3  | 865.1  | 841.5  | 820.2  |
| 15°   | 3583.5  | 3172.2 | 2366.1 | 1725.5 | 1319.0 | 973.9  | 808.4  | 739.9  | 711.5  | 704.4  | 697.3  |
| 17.5° | 3760.7  | 3219.4 | 2174.7 | 1465.5 | 1014.1 | 756.4  | 678.4  | 652.4  | 645.3  | 638.2  | 633.5  |
| 20°   | 3961.7  | 3252.5 | 1950.1 | 1219.7 | 787.1  | 640.6  | 602.8  | 583.8  | 569.7  | 555.5  | 553.1  |
| 22.5° | 4167.3  | 3252.5 | 1706.6 | 978.6  | 659.5  | 574.4  | 531.8  | 496.4  | 470.4  | 456.2  | 451.5  |
| 25°   | 4363.5  | 3207.6 | 1465.5 | 782.4  | 581.5  | 510.6  | 456.2  | 416.0  | 380.6  | 364.0  | 359.3  |
| 27.5° | 4503.0  | 3091.8 | 1255.2 | 661.9  | 527.1  | 453.8  | 387.7  | 342.7  | 314.4  | 297.8  | 295.5  |
| 30°   | 4590.4  | 2919.2 | 1061.3 | 590.9  | 479.8  | 394.7  | 328.6  | 290.7  | 269.5  | 257.7  | 252.9  |
| 32.5° | 4656.6  | 2706.5 | 888.8  | 541.3  | 434.9  | 342.7  | 286.0  | 255.3  | 236.4  | 226.9  | 224.6  |
| 35°   | 4789.0  | 2505.6 | 761.1  | 496.4  | 387.7  | 300.2  | 250.6  | 226.9  | 212.7  | 200.9  | 198.6  |
| 37.5° | 4973.4  | 2337.8 | 659.5  | 456.2  | 342.7  | 267.1  | 226.9  | 205.6  | 193.8  | 182.0  | 179.6  |
| 40°   | 5245.2  | 2231.4 | 583.8  | 416.0  | 302.6  | 241.1  | 208.0  | 189.1  | 172.6  | 160.7  | 158.4  |
| 42.5° | 5663.6  | 2181.8 | 534.2  | 375.8  | 267.1  | 217.5  | 191.5  | 167.8  | 151.3  | 139.5  | 137.1  |
| 45°   | 6162.3  | 2207.8 | 491.7  | 335.7  | 243.5  | 200.9  | 170.2  | 146.6  | 130.0  | 118.2  | 115.8  |
| 47.5° | 6696.5  | 2299.9 | 456.2  | 297.8  | 219.8  | 184.4  | 151.3  | 125.3  | 111.1  | 99.3   | 96.9   |
| 50°   | 7254.4  | 2451.2 | 425.5  | 262.4  | 200.9  | 165.5  | 130.0  | 108.7  | 94.6   | 85.1   | 82.7   |
| 52.5° | 7739.0  | 2656.9 | 394.7  | 236.4  | 184.4  | 146.6  | 113.5  | 94.6   | 80.4   | 70.9   | 68.5   |
| 55°   | 8202.3  | 2850.7 | 371.1  | 212.7  | 165.5  | 127.6  | 99.3   | 80.4   | 68.5   | 59.1   | 56.7   |
| 57.5° | 8705.7  | 3056.3 | 342.7  | 191.5  | 148.9  | 113.5  | 87.5   | 68.5   | 59.1   | 49.6   | 47.3   |
| 60°   | 9438.5  | 3361.3 | 300.2  | 174.9  | 130.0  | 99.3   | 75.6   | 61.5   | 52.0   | 40.2   | 37.8   |
| 62.5° | 10495.1 | 3916.8 | 252.9  | 151.3  | 111.1  | 85.1   | 63.8   | 52.0   | 42.5   | 33.1   | 28.4   |
| 65°   | 12471.2 | 4862.3 | 208.0  | 125.3  | 89.8   | 70.9   | 54.4   | 42.5   | 33.1   | 23.6   | 21.3   |
| 67.5° | 13894.2 | 5108.1 | 167.8  | 101.6  | 73.3   | 54.4   | 44.9   | 33.1   | 23.6   | 16.5   | 14.2   |
| 70°   | 12147.4 | 3668.6 | 130.0  | 82.7   | 61.5   | 42.5   | 35.5   | 26.0   | 16.5   | 11.8   | 9.5    |
| 72.5° | 9152.5  | 2396.9 | 96.9   | 63.8   | 47.3   | 35.5   | 26.0   | 21.3   | 14.2   | 9.5    | 7.1    |
| 75°   | 6450.7  | 1385.2 | 70.9   | 47.3   | 33.1   | 26.0   | 21.3   | 16.5   | 11.8   | 7.1    | 7.1    |
| 77.5° | 3306.9  | 572.0  | 49.6   | 33.1   | 23.6   | 16.5   | 14.2   | 9.5    | 9.5    | 7.1    | 4.7    |
| 80°   | 1004.6  | 189.1  | 28.4   | 21.3   | 16.5   | 11.8   | 7.1    | 7.1    | 7.1    | 4.7    | 2.4    |
| 82.5° | 229.3   | 61.5   | 16.5   | 16.5   | 11.8   | 9.5    | 7.1    | 2.4    | 2.4    | 0.0    | 0.0    |
| 85°   | 59.1    | 18.9   | 14.2   | 11.8   | 11.8   | 9.5    | 4.7    | 2.4    | 0.0    | 0.0    | 0.0    |
| 87.5° | 21.3    | 11.8   | 11.8   | 11.8   | 9.5    | 7.1    | 4.7    | 0.0    | 0.0    | 0.0    | 0.0    |
| 90°   | 0.0     | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

LM-79-2008: Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Report Prepared for

Cooper Lighting Solutions

McGRAW-EDISON

Report Number: SP1-1908-441-10-R4

Test Date: 10/25/2019

Luminaire Tested: SA1C-722-U-5WQ

Data in this report applies to families of products SA1C-722-U-5WQ.

### Test Information

Test Method: LM-79-2008 Report  
 Number: SP1-1908-441-10-R4  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 10/28/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: MCGRAW-EDISON  
 Catalog Number: **SA1C-722-U-5WQ**  
 Description: MCGRAW EDISON ROADWAY AND AREA LUMINAIRE

\*\*\*THIS IS A REVISION OF SP1-1908-441-4-R3. TO UPDATE THE CATALOG INFORMATION.\*\*\*TESTED IN SITU. ROADWAY AND AREA LUMINAIRE. (1) 70 CRI, 5000K, 1050MA LIGHTSQUARE WITH 16 LEDS AND TYPE V WIDE OPTICS.

### Spectral Parameters

|                           |         |           |      |      |       |
|---------------------------|---------|-----------|------|------|-------|
| CCT (K):                  | 2237    | CRI (Ra): | 72.0 |      |       |
| CIE u':                   | 0.2876  | R1:       | 68.9 | R9:  | -17.4 |
| CIE v':                   | 0.5346  | R2:       | 83.0 | R10: | 61.3  |
| Duv:                      | -0.0006 | R3:       | 95.2 | R11: | 59.8  |
| CIE x:                    | 0.5005  | R4:       | 66.2 | R12: | 50.5  |
| CIE y:                    | 0.4134  | R5:       | 65.9 | R13: | 71.1  |
| CIE z:                    | 0.0860  | R6:       | 76.3 | R14: | 96.9  |
| Peak Wavelength (nm):     | 603     | R7:       | 76.7 |      |       |
| Dominant Wavelength (nm): | 587     | R8:       | 43.8 |      |       |
| Purity:                   | 74.5    |           |      |      |       |
| Rf:                       | 69.8    |           |      |      |       |
| Rg:                       | 99.2    |           |      |      |       |



### Test Conditions

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

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

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

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CIE 1931 Chromaticity Diagram



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



Point lies inside the ANSI 2200K 4-step quadrangle

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**Photopic Flux vs. Wavelength**



#####

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

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Scotopic Flux vs. Wavelength



Scotopic Lumens: 4696.9

S/P: 0.85

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

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**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 1470.8 M/P: 0.27**

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

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### Summary

$R_f = 69.8$   
 $R_g = 99.2$   
 CIE  $R_a = 72.0$   
 $R_9 = -17.4$



### 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)