

Signify Classified - Internal  
Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



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: P638142

Luminaire Tested: GWS-SA4E-730-U-SL2-W

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P638142  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-27)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA4E-730-U-SL2-W  
Description: GALLEON WALL SLIM LUMINAIRE. (4) LIGHTSQUARES WITH 16 LEDS EACH AND TYPE II SPILL LIGHT ELIMINATOR OPTICS  
Light Source: (64) 3000K CCT, 70 CRI LEDS  
Ballast/Driver: -

**Summary**

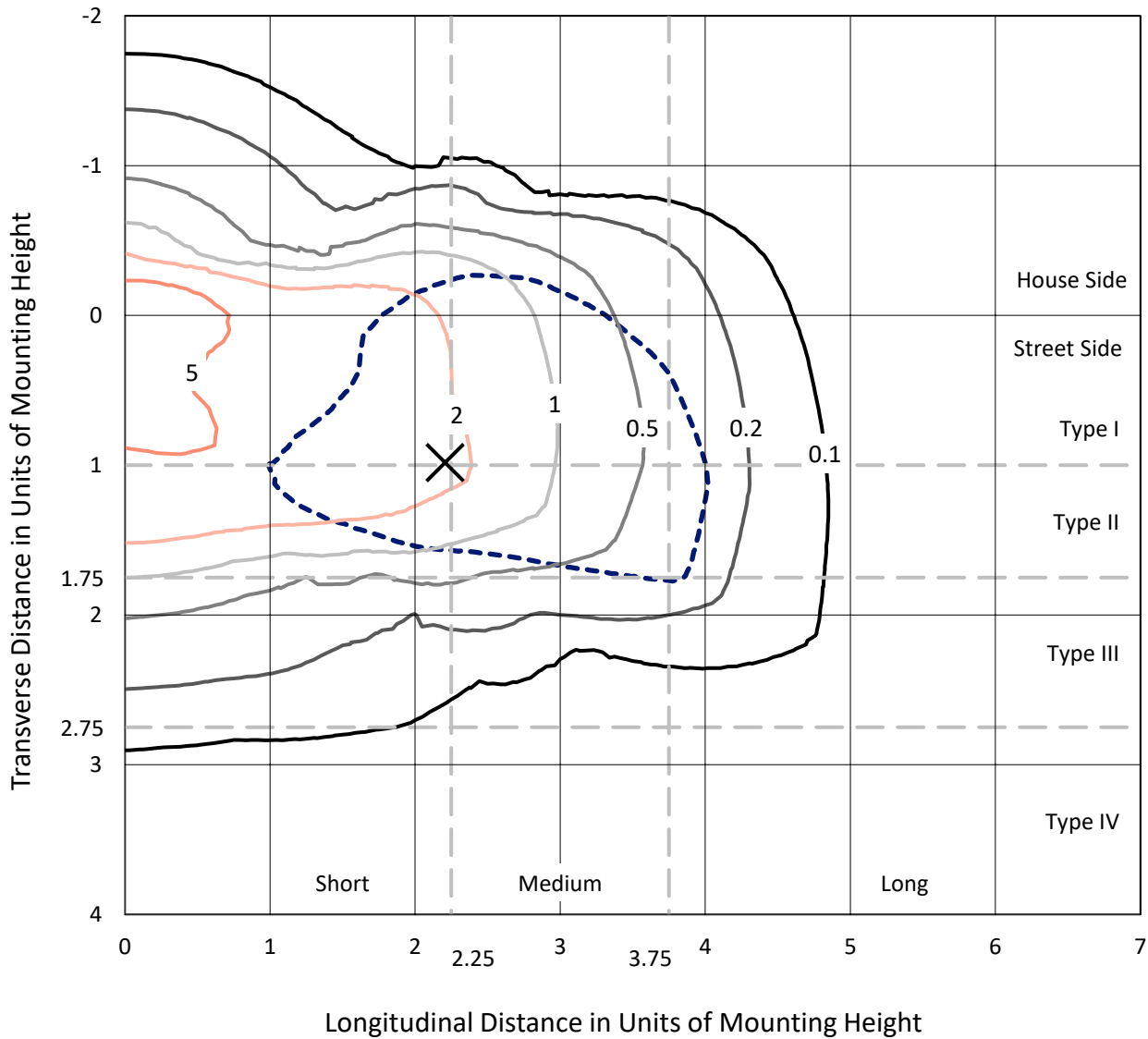
Lumens per Lamp: N/A  
Luminaire Lumens: 27384.8 lumens  
Efficiency: N/A  
Efficacy: 135.2 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 1' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B3 - U0 - G4  
  
Input Watts (W): 202.6  
Input Voltage (V): 120  
Input Current (Ain): NR  
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: P638142  
 CATALOG NUMBER: GWS-SA4E-730-U-SL2-W

### Iso-Footcandle Lines of Horizontal Illumination

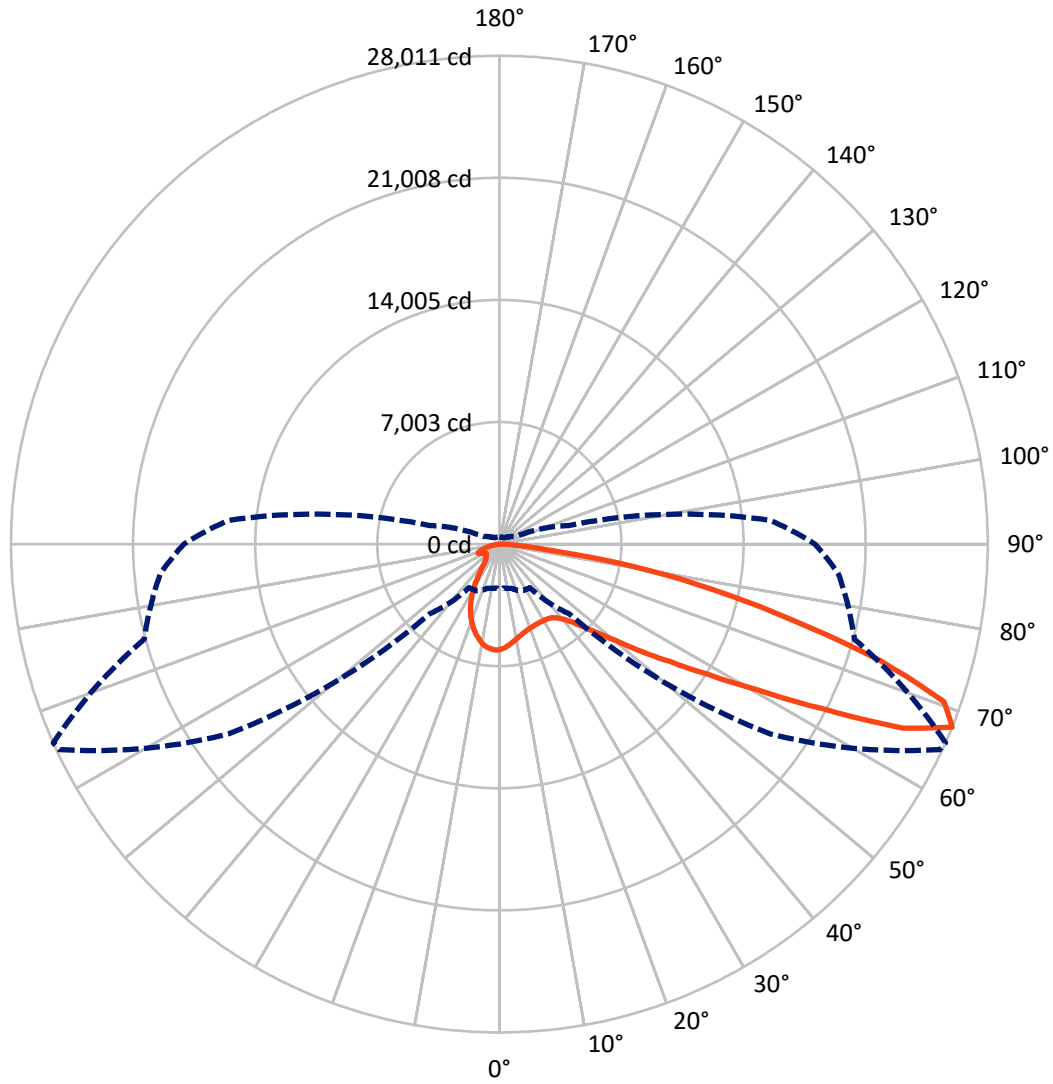
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 9.7 fc  
 Type II - Short - N/A

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### Luminous Intensity Polar Plot



— Vertical Plane Through 66-Deg Lateral    - - - Horizontal Cone Through 67.5-Deg Vertical

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**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 5557.0   | 0.0    | 5557.0  |
|                    | % Fixture | 20.3     | 0.0    | 20.3    |
| <b>Street Side</b> | Lumens    | 21827.8  | 0.0    | 21827.8 |
|                    | % Fixture | 79.7     | 0.0    | 79.7    |
| <b>Total</b>       | Lumens    | 27384.8  | 0.0    | 27384.8 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 531.1   | 1.9       |
| 10°-20°   | 1305.2  | 4.8       |
| 20°-30°   | 1794.0  | 6.6       |
| 30°-40°   | 2452.7  | 9.0       |
| 40°-50°   | 3716.5  | 13.6      |
| 50°-60°   | 5777.4  | 21.1      |
| 60°-70°   | 7033.9  | 25.7      |
| 70°-80°   | 4284.7  | 15.6      |
| 80°-90°   | 489.4   | 1.8       |
| 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°    | 27384.8 | 100.0     |
| 0°-180°   | 27384.8 | 100.0     |

**Coefficient of Utilization**



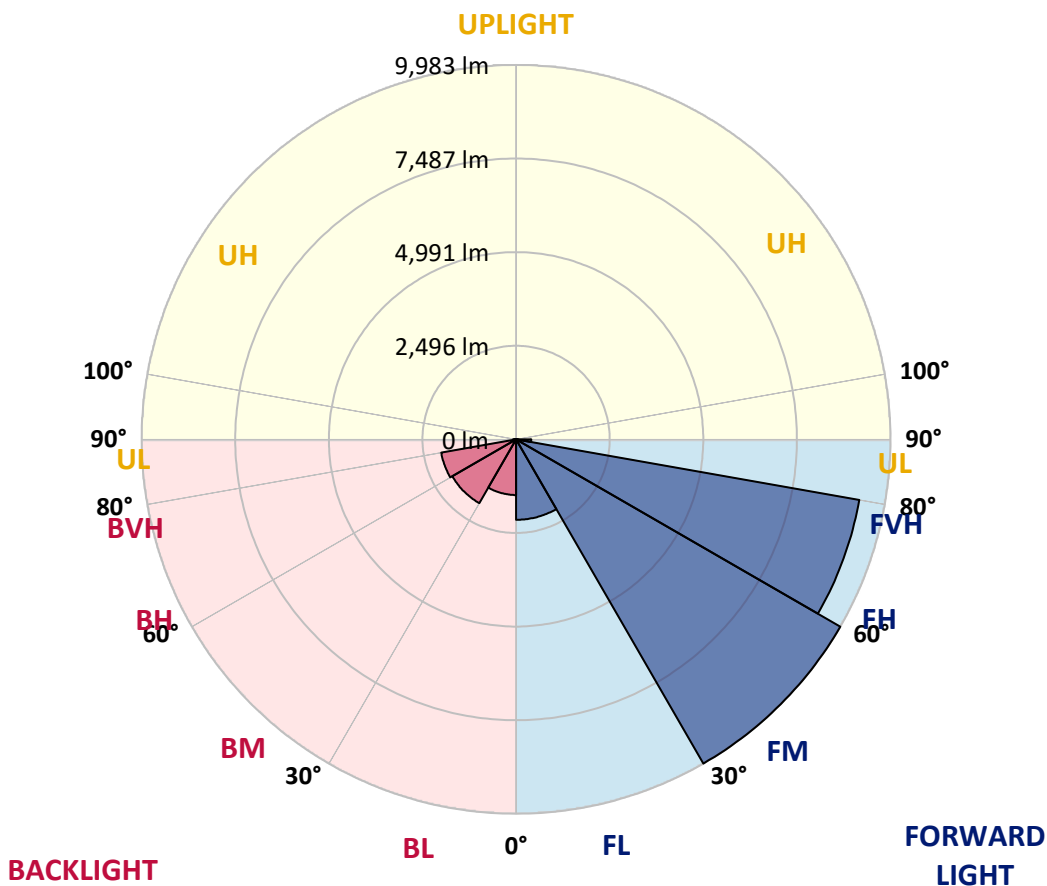
REPORT NUMBER: P638142

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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°)    | 2145.7 | 7.8       |                         |      |          |
| FM (30°-60°)   | 9982.8 | 36.5      |                         |      |          |
| FH (60°-80°)   | 9292.4 | 33.9      |                         |      | G4/12000 |
| FVH (80°-90°)  | 406.9  | 1.5       |                         |      | G3/500   |
| BL (0°-30°)    | 1484.5 | 5.4       | B3/2500                 |      |          |
| BM (30°-60°)   | 1963.8 | 7.2       | B2/2500                 |      |          |
| BH (60°-80°)   | 2026.2 | 7.4       | B3/2500                 |      | G3/2500  |
| BVH (80°-90°)  | 82.5   | 0.3       |                         |      | G1/100   |
| UL (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |          |
| UH (100°-180°) | 0.0    | 0.0       |                         | U0/0 |          |

**BUG Rating: B3-U0-G4**  
 Type II Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°     | 35°     | 45°     | 55°     | 65°     | 66°     | 75°     | 85°     |
|-------|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 6051.3 | 6051.3 | 6051.3 | 6051.3  | 6051.3  | 6051.3  | 6051.3  | 6051.3  | 6051.3  | 6051.3  | 6051.3  |
| 2.5°  | 5667.7 | 5687.7 | 5675.7 | 5751.6  | 5755.6  | 5851.5  | 5905.4  | 5951.4  | 5955.4  | 6015.3  | 6055.3  |
| 5°    | 5280.1 | 5292.1 | 5292.1 | 5364.0  | 5412.0  | 5539.8  | 5663.7  | 5795.5  | 5805.5  | 5949.4  | 6059.3  |
| 7.5°  | 4966.5 | 4978.5 | 4970.5 | 5066.4  | 5128.3  | 5270.1  | 5428.0  | 5629.7  | 5649.7  | 5881.5  | 6073.2  |
| 10°   | 4720.7 | 4716.7 | 4736.7 | 4824.6  | 4904.5  | 5074.4  | 5250.2  | 5479.9  | 5509.9  | 5803.5  | 6089.2  |
| 12.5° | 4552.9 | 4556.9 | 4568.9 | 4660.8  | 4746.7  | 4914.5  | 5096.3  | 5346.0  | 5378.0  | 5713.6  | 6081.2  |
| 15°   | 4473.0 | 4465.0 | 4475.0 | 4558.9  | 4640.8  | 4788.7  | 4976.5  | 5234.2  | 5266.1  | 5633.7  | 6083.2  |
| 17.5° | 4455.0 | 4449.0 | 4447.0 | 4507.0  | 4568.9  | 4706.8  | 4886.6  | 5148.3  | 5182.2  | 5581.8  | 6095.2  |
| 20°   | 4511.0 | 4503.0 | 4481.0 | 4507.0  | 4533.0  | 4648.8  | 4822.6  | 5086.3  | 5124.3  | 5547.8  | 6119.2  |
| 22.5° | 4664.8 | 4650.8 | 4616.9 | 4584.9  | 4550.9  | 4620.9  | 4782.7  | 5040.4  | 5078.3  | 5525.8  | 6143.2  |
| 25°   | 4898.5 | 4886.6 | 4850.6 | 4778.7  | 4654.8  | 4642.8  | 4774.7  | 5020.4  | 5058.4  | 5509.9  | 6153.1  |
| 27.5° | 5220.2 | 5202.2 | 5166.2 | 5062.4  | 4860.6  | 4724.7  | 4804.7  | 5018.4  | 5054.4  | 5491.9  | 6143.2  |
| 30°   | 5601.8 | 5589.8 | 5569.8 | 5443.9  | 5174.2  | 4898.5  | 4872.6  | 5034.4  | 5062.4  | 5481.9  | 6123.2  |
| 32.5° | 5989.3 | 5977.3 | 5993.3 | 5933.4  | 5601.8  | 5186.2  | 5020.4  | 5078.3  | 5098.3  | 5479.9  | 6105.2  |
| 35°   | 6331.0 | 6344.9 | 6460.8 | 6470.8  | 6145.2  | 5575.8  | 5254.2  | 5180.2  | 5184.2  | 5519.9  | 6113.2  |
| 37.5° | 6688.6 | 6742.5 | 6894.3 | 7024.2  | 6752.5  | 6091.2  | 5601.8  | 5372.0  | 5368.0  | 5621.7  | 6163.1  |
| 40°   | 7162.0 | 7186.0 | 7379.8 | 7623.5  | 7453.7  | 6798.4  | 6095.2  | 5685.7  | 5657.7  | 5829.5  | 6297.0  |
| 42.5° | 7623.5 | 7681.4 | 7991.1 | 8270.8  | 8214.9  | 7595.5  | 6716.5  | 6155.1  | 6105.2  | 6197.1  | 6572.7  |
| 45°   | 8210.9 | 8266.8 | 8614.4 | 8974.0  | 9075.9  | 8496.5  | 7511.6  | 6822.4  | 6772.5  | 6750.5  | 7078.1  |
| 47.5° | 8798.2 | 8856.1 | 9167.8 | 9687.2  | 10044.8 | 9623.3  | 8546.5  | 7703.4  | 7621.5  | 7535.6  | 7841.3  |
| 50°   | 9193.8 | 9261.7 | 9559.4 | 10182.7 | 11021.7 | 11029.7 | 9773.1  | 8858.1  | 8754.3  | 8618.4  | 8916.1  |
| 52.5° | 9179.8 | 9223.7 | 9507.4 | 10226.6 | 11724.9 | 12645.9 | 11415.3 | 10328.5 | 10244.6 | 9948.9  | 10208.6 |
| 55°   | 8458.6 | 8524.5 | 8810.2 | 9709.2  | 11800.9 | 14178.2 | 13828.6 | 12062.6 | 11912.7 | 11383.3 | 11669.0 |
| 57.5° | 7010.2 | 7066.1 | 7353.8 | 8462.6  | 11127.6 | 14963.3 | 16893.2 | 14272.1 | 14066.3 | 12945.6 | 13275.2 |
| 60°   | 5292.1 | 5224.2 | 5360.0 | 6331.0  | 9517.4  | 14983.3 | 19598.2 | 17268.8 | 16925.2 | 14615.7 | 14891.4 |
| 62.5° | 3971.6 | 3903.7 | 3933.6 | 4207.3  | 6452.8  | 13772.7 | 21140.5 | 21368.2 | 20800.8 | 16501.6 | 16447.7 |
| 65°   | 3138.5 | 3100.5 | 3186.5 | 3374.2  | 3761.8  | 10488.3 | 21152.5 | 25801.3 | 25443.7 | 18687.2 | 18043.9 |
| 67.5° | 2557.2 | 2533.2 | 2621.1 | 2968.7  | 3050.6  | 5635.7  | 18966.9 | 27871.0 | 28010.8 | 21080.5 | 19524.3 |
| 70°   | 2059.7 | 2023.7 | 2161.6 | 2619.1  | 2836.8  | 3410.2  | 13586.9 | 26816.1 | 27041.9 | 22506.9 | 19106.7 |
| 72.5° | 1422.4 | 1424.4 | 1494.3 | 2121.6  | 2739.0  | 2944.7  | 7685.4  | 22329.1 | 22818.6 | 21214.4 | 16797.3 |
| 75°   | 958.9  | 966.9  | 986.9  | 1400.4  | 2523.2  | 2856.8  | 4095.4  | 16905.2 | 17250.8 | 17534.5 | 13884.5 |
| 77.5° | 579.4  | 583.4  | 629.3  | 847.1   | 1740.1  | 2667.0  | 2774.9  | 12254.4 | 12526.1 | 11559.1 | 8606.4  |
| 80°   | 335.6  | 349.6  | 391.6  | 567.4   | 1174.7  | 2003.8  | 2147.6  | 7513.6  | 7821.3  | 5138.3  | 2735.0  |
| 82.5° | 147.8  | 157.8  | 213.8  | 329.6   | 685.2   | 1704.1  | 1676.1  | 2968.7  | 2924.7  | 1432.4  | 948.9   |
| 85°   | 26.0   | 32.0   | 45.9   | 103.9   | 251.7   | 899.0   | 1300.6  | 1310.5  | 1232.6  | 543.4   | 393.6   |
| 87.5° | 0.0    | 0.0    | 0.0    | 0.0     | 0.0     | 6.0     | 195.8   | 351.6   | 349.6   | 153.8   | 135.8   |
| 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: P638142  
 CATALOG NUMBER: GWS-SA4E-730-U-SL2-W

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°     | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|---------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 6051.3  | 6051.3  | 6051.3 | 6051.3 | 6051.3 | 6051.3 | 6051.3 | 6051.3 | 6051.3 | 6051.3 | 6051.3 |
| 2.5°  | 6081.2  | 6027.3  | 6075.2 | 6081.2 | 6071.2 | 6063.2 | 6003.3 | 5951.4 | 5945.4 | 5889.4 | 5889.4 |
| 5°    | 6103.2  | 6053.3  | 6077.2 | 6031.3 | 5959.4 | 5885.4 | 5757.6 | 5669.7 | 5629.7 | 5557.8 | 5557.8 |
| 7.5°  | 6133.2  | 6081.2  | 6053.3 | 5939.4 | 5771.6 | 5609.8 | 5404.0 | 5232.2 | 5162.3 | 5060.4 | 5056.4 |
| 10°   | 6161.1  | 6095.2  | 5999.3 | 5777.6 | 5509.9 | 5252.2 | 4952.5 | 4708.8 | 4542.9 | 4421.1 | 4421.1 |
| 12.5° | 6159.1  | 6073.2  | 5883.5 | 5555.8 | 5186.2 | 4812.6 | 4413.1 | 4045.5 | 3825.7 | 3636.0 | 3624.0 |
| 15°   | 6155.1  | 6037.3  | 5735.6 | 5298.1 | 4808.6 | 4291.2 | 3747.8 | 3268.4 | 2942.7 | 2756.9 | 2740.9 |
| 17.5° | 6151.2  | 5991.3  | 5569.8 | 5004.4 | 4349.2 | 3643.9 | 2926.7 | 2407.3 | 2135.6 | 2021.7 | 2025.7 |
| 20°   | 6151.2  | 5939.4  | 5392.0 | 4666.8 | 3819.7 | 2868.8 | 2147.6 | 1770.0 | 1702.1 | 1708.1 | 1714.1 |
| 22.5° | 6133.2  | 5875.5  | 5194.2 | 4299.2 | 3230.4 | 2109.7 | 1584.2 | 1456.4 | 1492.3 | 1548.3 | 1556.3 |
| 25°   | 6091.2  | 5769.6  | 4964.5 | 3891.7 | 2529.2 | 1536.3 | 1292.6 | 1268.6 | 1334.5 | 1404.4 | 1424.4 |
| 27.5° | 6025.3  | 5647.7  | 4706.8 | 3414.2 | 1861.9 | 1234.6 | 1136.7 | 1134.7 | 1186.7 | 1238.6 | 1256.6 |
| 30°   | 5955.4  | 5511.9  | 4435.1 | 2882.8 | 1348.5 | 1074.8 | 1036.8 | 1036.8 | 1062.8 | 1094.8 | 1090.8 |
| 32.5° | 5873.5  | 5374.0  | 4143.4 | 2329.4 | 1098.8 | 984.9  | 972.9  | 966.9  | 970.9  | 982.9  | 982.9  |
| 35°   | 5803.5  | 5252.2  | 3843.7 | 1744.1 | 984.9  | 935.0  | 923.0  | 909.0  | 903.0  | 895.0  | 899.0  |
| 37.5° | 5777.6  | 5156.3  | 3534.1 | 1314.5 | 929.0  | 899.0  | 879.0  | 859.0  | 845.1  | 841.1  | 839.1  |
| 40°   | 5819.5  | 5116.3  | 3224.4 | 1082.8 | 889.0  | 861.0  | 839.1  | 813.1  | 801.1  | 801.1  | 801.1  |
| 42.5° | 5983.3  | 5146.3  | 2908.8 | 978.9  | 861.0  | 829.1  | 797.1  | 773.1  | 769.1  | 773.1  | 775.1  |
| 45°   | 6283.0  | 5262.1  | 2581.1 | 927.0  | 837.1  | 797.1  | 759.2  | 741.2  | 741.2  | 745.2  | 745.2  |
| 47.5° | 6818.4  | 5565.8  | 2257.5 | 895.0  | 813.1  | 771.1  | 731.2  | 713.2  | 711.2  | 715.2  | 715.2  |
| 50°   | 7745.4  | 6113.2  | 1965.8 | 873.0  | 795.1  | 751.2  | 711.2  | 687.2  | 681.2  | 679.2  | 679.2  |
| 52.5° | 8914.1  | 7062.1  | 1780.0 | 857.0  | 773.1  | 729.2  | 689.2  | 657.3  | 645.3  | 639.3  | 639.3  |
| 55°   | 10326.5 | 8326.7  | 1780.0 | 845.1  | 745.2  | 703.2  | 657.3  | 625.3  | 607.3  | 599.3  | 599.3  |
| 57.5° | 11926.7 | 9799.1  | 2087.7 | 835.1  | 723.2  | 673.3  | 623.3  | 591.3  | 571.4  | 559.4  | 559.4  |
| 60°   | 13554.9 | 11355.4 | 2848.8 | 821.1  | 703.2  | 635.3  | 585.3  | 555.4  | 529.4  | 515.4  | 513.4  |
| 62.5° | 15243.0 | 13069.5 | 3851.7 | 829.1  | 689.2  | 599.3  | 545.4  | 511.4  | 489.5  | 475.5  | 473.5  |
| 65°   | 16789.3 | 14701.6 | 4728.7 | 891.0  | 691.2  | 567.4  | 499.4  | 469.5  | 451.5  | 433.5  | 431.5  |
| 67.5° | 18101.8 | 15602.6 | 4113.4 | 1016.9 | 733.2  | 529.4  | 453.5  | 423.5  | 407.5  | 395.6  | 393.6  |
| 70°   | 17182.9 | 14228.2 | 2333.4 | 1094.8 | 791.1  | 489.5  | 401.6  | 381.6  | 365.6  | 357.6  | 355.6  |
| 72.5° | 14693.6 | 12046.6 | 1560.3 | 966.9  | 721.2  | 437.5  | 353.6  | 337.6  | 325.6  | 315.6  | 313.7  |
| 75°   | 11902.7 | 9553.4  | 1192.7 | 793.1  | 561.4  | 355.6  | 303.7  | 291.7  | 279.7  | 269.7  | 267.7  |
| 77.5° | 7042.2  | 5519.9  | 879.0  | 627.3  | 395.6  | 277.7  | 251.7  | 241.7  | 229.7  | 221.8  | 219.8  |
| 80°   | 2247.5  | 1917.9  | 557.4  | 431.5  | 261.7  | 213.8  | 193.8  | 185.8  | 173.8  | 163.8  | 161.8  |
| 82.5° | 857.0   | 741.2   | 295.7  | 219.8  | 173.8  | 145.8  | 129.9  | 121.9  | 113.9  | 103.9  | 101.9  |
| 85°   | 379.6   | 355.6   | 163.8  | 117.9  | 93.9   | 71.9   | 63.9   | 59.9   | 49.9   | 42.0   | 40.0   |
| 87.5° | 133.9   | 133.9   | 69.9   | 34.0   | 20.0   | 10.0   | 6.0    | 2.0    | 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    |



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

Report Prepared for

Cooper Lighting Solutions

McGRAW-EDISON

Report Number: SP1-1908-441-2-R4

Test Date: 10/03/2019

Luminaire Tested: SA1C-730-U-5WQ

Data in this report applies to families of products SA1C-730-U-5WQ .

**Test Information**

Test Method: LM-79-2008  
 Report Number: SP1-1908-441-2-R4  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry: 4π  
 Issue Date: 10/28/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: McGRAW-EDISON  
 Catalog Number: **SA1C-730-U-5WQ**  
 Description: McGRAW EDISON ROADWAY AND AREA LUMINAIRE

\*\*\*THIS IS A REVISION OF SP1-1908-441-2-R3. TO UPDATE THE CATALOG INFORMATION.\*\*\*TESTED IN SITU. (1) 70 CRI, 3000K, 1050MA LIGHTSQUARE WITH 16 LEDS AND TYPE V WIDE OPTICS.

**Spectral Parameters**

|                           |        |           |      |      |       |
|---------------------------|--------|-----------|------|------|-------|
| CCT (K):                  | 2993   | CRI (Ra): | 71.8 | R9:  | -38.3 |
| CIE u':                   | 0.2508 | R1:       | 67.5 | R10: | 62.5  |
| CIE v':                   | 0.5215 | R2:       | 82.9 | R11: | 63.7  |
| Duv:                      | 0.0000 | R3:       | 94.7 | R12: | 57.8  |
| CIE x:                    | 0.4374 | R4:       | 67.7 | R13: | 70.4  |
| CIE y:                    | 0.4043 | R5:       | 67.9 | R14: | 97.3  |
| CIE z:                    | 0.1583 | R6:       | 77.6 |      |       |
| Peak Wavelength (nm):     | 593    | R7:       | 76.0 |      |       |
| Dominant Wavelength (nm): | 582    | R8:       | 40.5 |      |       |
| Purity:                   | 53     |           |      |      |       |
| Rf:                       | 75.7   |           |      |      |       |
| Rg:                       | 93.9   |           |      |      |       |



**Test Conditions**

Stabilization Time: 53M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.0./44%  
 Sphere Temperature (°C): 25.7

REPORT NUMBER: SP1-1908-441-2-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 3000K 4-step quadrangle

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**Photopic Flux vs. Wavelength**



#####

| $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|
| 360               | 2397                                 | NR                             | 490               | 24908                                | NR                             | 620               | 118784                               | NR                             | 750               | 5037                                 | NR                             | 880               | 2677                                 | NR                             |
| 365               | 2084                                 | NR                             | 495               | 30998                                | NR                             | 625               | 108951                               | NR                             | 755               | 4413                                 | NR                             | 885               | 2940                                 | NR                             |
| 370               | 2143                                 | NR                             | 500               | 37103                                | NR                             | 630               | 99573                                | NR                             | 760               | 4189                                 | NR                             | 890               | 3116                                 | NR                             |
| 375               | 2413                                 | NR                             | 505               | 42987                                | NR                             | 635               | 90444                                | NR                             | 765               | 3677                                 | NR                             | 895               | 3345                                 | NR                             |
| 380               | 2172                                 | NR                             | 510               | 48702                                | NR                             | 640               | 80749                                | NR                             | 770               | 3366                                 | NR                             | 900               | 2312                                 | NR                             |
| 385               | 1997                                 | NR                             | 515               | 53741                                | NR                             | 645               | 71664                                | NR                             | 775               | 3211                                 | NR                             | 905               | 2829                                 | NR                             |
| 390               | 1830                                 | NR                             | 520               | 57283                                | NR                             | 650               | 63936                                | NR                             | 780               | 2682                                 | NR                             | 910               | 2783                                 | NR                             |
| 395               | 1861                                 | NR                             | 525               | 61876                                | NR                             | 655               | 56611                                | NR                             | 785               | 2804                                 | NR                             | 915               | 2662                                 | NR                             |
| 400               | 1717                                 | NR                             | 530               | 65398                                | NR                             | 660               | 49763                                | NR                             | 790               | 2581                                 | NR                             | 920               | 3047                                 | NR                             |
| 405               | 1761                                 | NR                             | 535               | 69597                                | NR                             | 665               | 42891                                | NR                             | 795               | 2711                                 | NR                             | 925               | 2256                                 | NR                             |
| 410               | 2680                                 | NR                             | 540               | 74214                                | NR                             | 670               | 36939                                | NR                             | 800               | 2609                                 | NR                             | 930               | 2976                                 | NR                             |
| 415               | 4374                                 | NR                             | 545               | 79911                                | NR                             | 675               | 31946                                | NR                             | 805               | 2581                                 | NR                             | 935               | 3503                                 | NR                             |
| 420               | 8071                                 | NR                             | 550               | 86153                                | NR                             | 680               | 27385                                | NR                             | 810               | 2404                                 | NR                             | 940               | 4226                                 | NR                             |
| 425               | 15169                                | NR                             | 555               | 93952                                | NR                             | 685               | 23504                                | NR                             | 815               | 2556                                 | NR                             | 945               | 2930                                 | NR                             |
| 430               | 26038                                | NR                             | 560               | 102904                               | NR                             | 690               | 20210                                | NR                             | 820               | 2742                                 | NR                             | 950               | 2115                                 | NR                             |
| 435               | 41316                                | NR                             | 565               | 112009                               | NR                             | 695               | 17459                                | NR                             | 825               | 2014                                 | NR                             | 955               | 2634                                 | NR                             |
| 440               | 59674                                | NR                             | 570               | 121662                               | NR                             | 700               | 15207                                | NR                             | 830               | 2488                                 | NR                             | 960               | 4200                                 | NR                             |
| 445               | 72751                                | NR                             | 575               | 130476                               | NR                             | 705               | 13322                                | NR                             | 835               | 2625                                 | NR                             | 965               | 1982                                 | NR                             |
| 450               | 65091                                | NR                             | 580               | 137926                               | NR                             | 710               | 11676                                | NR                             | 840               | 2754                                 | NR                             | 970               | 3613                                 | NR                             |
| 455               | 44894                                | NR                             | 585               | 143406                               | NR                             | 715               | 10626                                | NR                             | 845               | 2708                                 | NR                             | 975               | 4034                                 | NR                             |
| 460               | 32712                                | NR                             | 590               | 147039                               | NR                             | 720               | 9416                                 | NR                             | 850               | 2608                                 | NR                             | 980               | 3922                                 | NR                             |
| 465               | 25296                                | NR                             | 595               | 147365                               | NR                             | 725               | 8333                                 | NR                             | 855               | 2605                                 | NR                             | 985               | 1909                                 | NR                             |
| 470               | 19318                                | NR                             | 600               | 145800                               | NR                             | 730               | 7134                                 | NR                             | 860               | 1765                                 | NR                             | 990               | 3617                                 | NR                             |
| 475               | 17265                                | NR                             | 605               | 141363                               | NR                             | 735               | 6437                                 | NR                             | 865               | 2581                                 | NR                             | 995               | 4767                                 | NR                             |
| 480               | 18260                                | NR                             | 610               | 134199                               | NR                             | 740               | 5834                                 | NR                             | 870               | 3016                                 | NR                             | 1000              | 2528                                 | NR                             |
| 485               | 20845                                | NR                             | 615               | 127683                               | NR                             | 745               | 5500                                 | NR                             | 875               | 3952                                 | NR                             |                   |                                      |                                |

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Scotopic Flux vs. Wavelength



Scotopic Lumens: 8494.8

S/P: 1.23

| λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) |
|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|
| 360    | 2397          | NR            | 490    | 24908         | NR            | 620    | 118784        | NR            | 750    | 5037          | NR            | 880    | 2677          | NR            |
| 365    | 2084          | NR            | 495    | 30998         | NR            | 625    | 108951        | NR            | 755    | 4413          | NR            | 885    | 2940          | NR            |
| 370    | 2143          | NR            | 500    | 37103         | NR            | 630    | 99573         | NR            | 760    | 4189          | NR            | 890    | 3116          | NR            |
| 375    | 2413          | NR            | 505    | 42987         | NR            | 635    | 90444         | NR            | 765    | 3677          | NR            | 895    | 3345          | NR            |
| 380    | 2172          | NR            | 510    | 48702         | NR            | 640    | 80749         | NR            | 770    | 3366          | NR            | 900    | 2312          | NR            |
| 385    | 1997          | NR            | 515    | 53741         | NR            | 645    | 71664         | NR            | 775    | 3211          | NR            | 905    | 2829          | NR            |
| 390    | 1830          | NR            | 520    | 57283         | NR            | 650    | 63936         | NR            | 780    | 2682          | NR            | 910    | 2783          | NR            |
| 395    | 1861          | NR            | 525    | 61876         | NR            | 655    | 56611         | NR            | 785    | 2804          | NR            | 915    | 2662          | NR            |
| 400    | 1717          | NR            | 530    | 65398         | NR            | 660    | 49763         | NR            | 790    | 2581          | NR            | 920    | 3047          | NR            |
| 405    | 1761          | NR            | 535    | 69597         | NR            | 665    | 42891         | NR            | 795    | 2711          | NR            | 925    | 2256          | NR            |
| 410    | 2680          | NR            | 540    | 74214         | NR            | 670    | 36939         | NR            | 800    | 2609          | NR            | 930    | 2976          | NR            |
| 415    | 4374          | NR            | 545    | 79911         | NR            | 675    | 31946         | NR            | 805    | 2581          | NR            | 935    | 3503          | NR            |
| 420    | 8071          | NR            | 550    | 86153         | NR            | 680    | 27385         | NR            | 810    | 2404          | NR            | 940    | 4226          | NR            |
| 425    | 15169         | NR            | 555    | 93952         | NR            | 685    | 23504         | NR            | 815    | 2556          | NR            | 945    | 2930          | NR            |
| 430    | 26038         | NR            | 560    | 102904        | NR            | 690    | 20210         | NR            | 820    | 2742          | NR            | 950    | 2115          | NR            |
| 435    | 41316         | NR            | 565    | 112009        | NR            | 695    | 17459         | NR            | 825    | 2014          | NR            | 955    | 2634          | NR            |
| 440    | 59674         | NR            | 570    | 121662        | NR            | 700    | 15207         | NR            | 830    | 2488          | NR            | 960    | 4200          | NR            |
| 445    | 72751         | NR            | 575    | 130476        | NR            | 705    | 13322         | NR            | 835    | 2625          | NR            | 965    | 1982          | NR            |
| 450    | 65091         | NR            | 580    | 137926        | NR            | 710    | 11676         | NR            | 840    | 2754          | NR            | 970    | 3613          | NR            |
| 455    | 44894         | NR            | 585    | 143406        | NR            | 715    | 10626         | NR            | 845    | 2708          | NR            | 975    | 4034          | NR            |
| 460    | 32712         | NR            | 590    | 147039        | NR            | 720    | 9416          | NR            | 850    | 2608          | NR            | 980    | 3922          | NR            |
| 465    | 25296         | NR            | 595    | 147365        | NR            | 725    | 8333          | NR            | 855    | 2605          | NR            | 985    | 1909          | NR            |
| 470    | 19318         | NR            | 600    | 145800        | NR            | 730    | 7134          | NR            | 860    | 1765          | NR            | 990    | 3617          | NR            |
| 475    | 17265         | NR            | 605    | 141363        | NR            | 735    | 6437          | NR            | 865    | 2581          | NR            | 995    | 4767          | NR            |
| 480    | 18260         | NR            | 610    | 134199        | NR            | 740    | 5834          | NR            | 870    | 3016          | NR            | 1000   | 2528          | NR            |
| 485    | 20845         | NR            | 615    | 127683        | NR            | 745    | 5500          | NR            | 875    | 3952          | NR            |        |               |               |

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Melanopic Flux vs. Wavelength



Melanopic Lumens: 3101.5 M/P: 0.45

| λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) |
|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|
| 360    | 2397          | NR            | 490    | 24908         | NR            | 620    | 118784        | NR            | 750    | 5037          | NR            | 880    | 2677          | NR            |
| 365    | 2084          | NR            | 495    | 30998         | NR            | 625    | 108951        | NR            | 755    | 4413          | NR            | 885    | 2940          | NR            |
| 370    | 2143          | NR            | 500    | 37103         | NR            | 630    | 99573         | NR            | 760    | 4189          | NR            | 890    | 3116          | NR            |
| 375    | 2413          | NR            | 505    | 42987         | NR            | 635    | 90444         | NR            | 765    | 3677          | NR            | 895    | 3345          | NR            |
| 380    | 2172          | NR            | 510    | 48702         | NR            | 640    | 80749         | NR            | 770    | 3366          | NR            | 900    | 2312          | NR            |
| 385    | 1997          | NR            | 515    | 53741         | NR            | 645    | 71664         | NR            | 775    | 3211          | NR            | 905    | 2829          | NR            |
| 390    | 1830          | NR            | 520    | 57283         | NR            | 650    | 63936         | NR            | 780    | 2682          | NR            | 910    | 2783          | NR            |
| 395    | 1861          | NR            | 525    | 61876         | NR            | 655    | 56611         | NR            | 785    | 2804          | NR            | 915    | 2662          | NR            |
| 400    | 1717          | NR            | 530    | 65398         | NR            | 660    | 49763         | NR            | 790    | 2581          | NR            | 920    | 3047          | NR            |
| 405    | 1761          | NR            | 535    | 69597         | NR            | 665    | 42891         | NR            | 795    | 2711          | NR            | 925    | 2256          | NR            |
| 410    | 2680          | NR            | 540    | 74214         | NR            | 670    | 36939         | NR            | 800    | 2609          | NR            | 930    | 2976          | NR            |
| 415    | 4374          | NR            | 545    | 79911         | NR            | 675    | 31946         | NR            | 805    | 2581          | NR            | 935    | 3503          | NR            |
| 420    | 8071          | NR            | 550    | 86153         | NR            | 680    | 27385         | NR            | 810    | 2404          | NR            | 940    | 4226          | NR            |
| 425    | 15169         | NR            | 555    | 93952         | NR            | 685    | 23504         | NR            | 815    | 2556          | NR            | 945    | 2930          | NR            |
| 430    | 26038         | NR            | 560    | 102904        | NR            | 690    | 20210         | NR            | 820    | 2742          | NR            | 950    | 2115          | NR            |
| 435    | 41316         | NR            | 565    | 112009        | NR            | 695    | 17459         | NR            | 825    | 2014          | NR            | 955    | 2634          | NR            |
| 440    | 59674         | NR            | 570    | 121662        | NR            | 700    | 15207         | NR            | 830    | 2488          | NR            | 960    | 4200          | NR            |
| 445    | 72751         | NR            | 575    | 130476        | NR            | 705    | 13322         | NR            | 835    | 2625          | NR            | 965    | 1982          | NR            |
| 450    | 65091         | NR            | 580    | 137926        | NR            | 710    | 11676         | NR            | 840    | 2754          | NR            | 970    | 3613          | NR            |
| 455    | 44894         | NR            | 585    | 143406        | NR            | 715    | 10626         | NR            | 845    | 2708          | NR            | 975    | 4034          | NR            |
| 460    | 32712         | NR            | 590    | 147039        | NR            | 720    | 9416          | NR            | 850    | 2608          | NR            | 980    | 3922          | NR            |
| 465    | 25296         | NR            | 595    | 147365        | NR            | 725    | 8333          | NR            | 855    | 2605          | NR            | 985    | 1909          | NR            |
| 470    | 19318         | NR            | 600    | 145800        | NR            | 730    | 7134          | NR            | 860    | 1765          | NR            | 990    | 3617          | NR            |
| 475    | 17265         | NR            | 605    | 141363        | NR            | 735    | 6437          | NR            | 865    | 2581          | NR            | 995    | 4767          | NR            |
| 480    | 18260         | NR            | 610    | 134199        | NR            | 740    | 5834          | NR            | 870    | 3016          | NR            | 1000   | 2528          | NR            |
| 485    | 20845         | NR            | 615    | 127683        | NR            | 745    | 5500          | NR            | 875    | 3952          | NR            |        |               |               |

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**Summary**

$R_f = 75.7$   
 $R_g = 93.9$   
 CIE  $R_a = 71.8$   
 $R_9 = -38.3$



**Color Vector Graphics**





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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 67 | CES51 = 87 | CES76 = 63 |
| CES02 = 63 | CES27 = 88 | CES52 = 86 | CES77 = 80 |
| CES03 = 31 | CES28 = 87 | CES53 = 78 | CES78 = 67 |
| CES04 = 71 | CES29 = 66 | CES54 = 84 | CES79 = 87 |
| CES05 = 49 | CES30 = 73 | CES55 = 84 | CES80 = 86 |
| CES06 = 51 | CES31 = 70 | CES56 = 75 | CES81 = 71 |
| CES07 = 41 | CES32 = 65 | CES57 = 74 | CES82 = 94 |
| CES08 = 40 | CES33 = 73 | CES58 = 76 | CES83 = 90 |
| CES09 = 29 | CES34 = 79 | CES59 = 85 | CES84 = 89 |
| CES10 = 76 | CES35 = 89 | CES60 = 93 | CES85 = 77 |
| CES11 = 59 | CES36 = 97 | CES61 = 84 | CES86 = 61 |
| CES12 = 65 | CES37 = 87 | CES62 = 91 | CES87 = 78 |
| CES13 = 43 | CES38 = 81 | CES63 = 77 | CES88 = 77 |
| CES14 = 74 | CES39 = 95 | CES64 = 72 | CES89 = 67 |
| CES15 = 71 | CES40 = 92 | CES65 = 68 | CES90 = 76 |
| CES16 = 47 | CES41 = 88 | CES66 = 69 | CES91 = 89 |
| CES17 = 50 | CES42 = 89 | CES67 = 67 | CES92 = 58 |
| CES18 = 56 | CES43 = 79 | CES68 = 72 | CES93 = 74 |
| CES19 = 73 | CES44 = 99 | CES69 = 81 | CES94 = 49 |
| CES20 = 66 | CES45 = 85 | CES70 = 66 | CES95 = 68 |
| CES21 = 87 | CES46 = 80 | CES71 = 67 | CES96 = 76 |
| CES22 = 79 | CES47 = 82 | CES72 = 88 | CES97 = 82 |
| CES23 = 92 | CES48 = 69 | CES73 = 59 | CES98 = 75 |
| CES24 = 91 | CES49 = 80 | CES74 = 95 | CES99 = 62 |
| CES25 = 73 | CES50 = 87 | CES75 = 69 |            |



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Color Rendition by Hue-Angle Bin



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Measure Comparisons



(END OF REPORT)