

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: P629119

Luminaire Tested: GWS-SA1B-722-U-RW-W-GRSWH

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P629119  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-51)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA1B-722-U-RW-W-GRSWH  
Description: GALLEON WALL SLIM LUMINAIRE. (1) LIGHTSQUARES WITH 16 LEDS EACH AND  
RECTANGULAR WIDE OPTICS W/ FACTORY INSTALLED GLARE SHIELD, WH  
Light Source: (16) 2200K CCT, 70 CRI LEDS  
Ballast/Driver: -

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 2327.2 lumens  
Efficiency: N/A  
Efficacy: 93.1 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.5' x H: 0')  
IES Classification: Type V - Short  
BUG Rating: B1 - U0 - G0

Input Watts (W): 25  
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

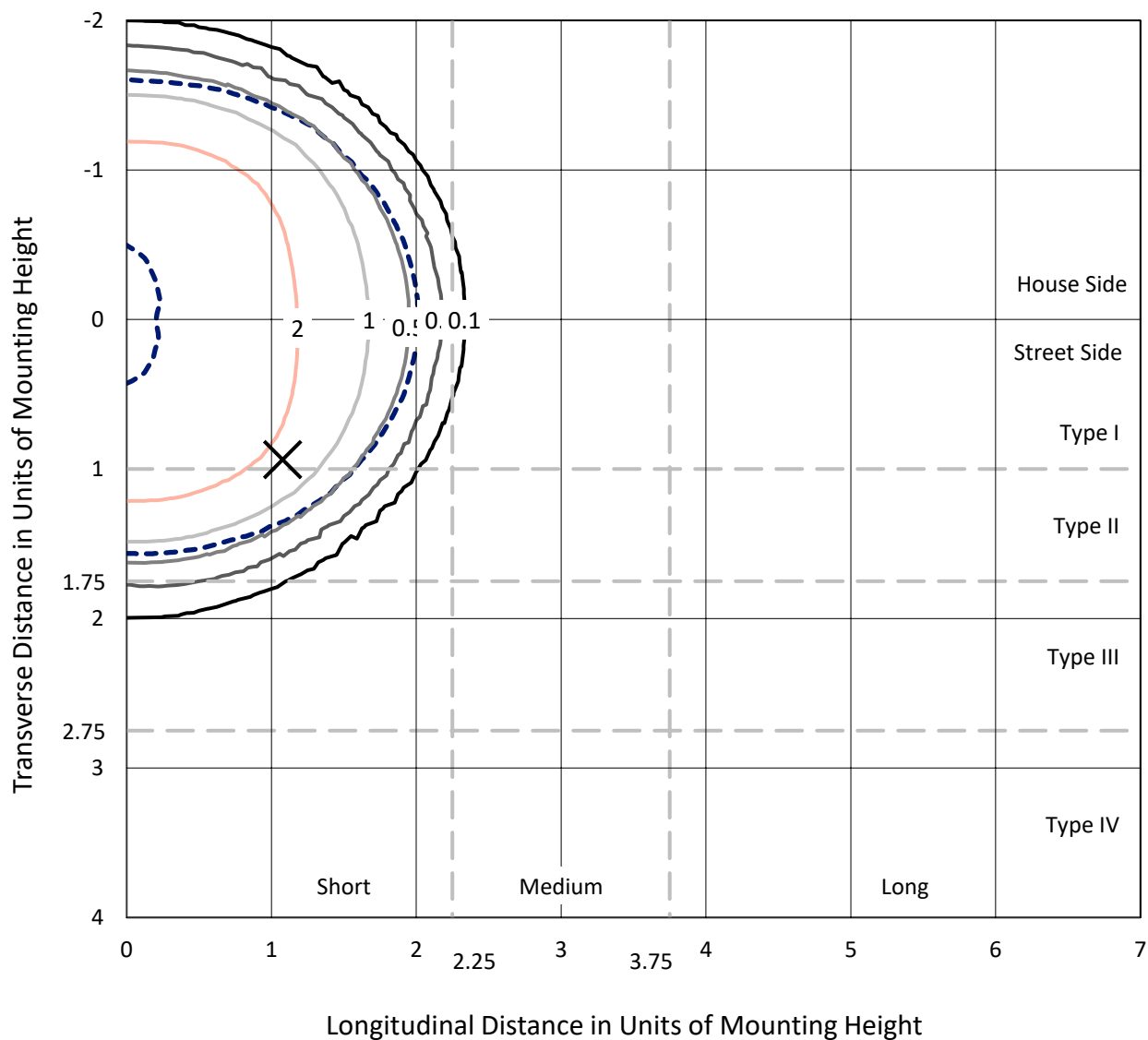


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## Iso-Footcandle Lines of Horizontal Illumination

✕ Max cd  
 - - - 1/2 Max cd

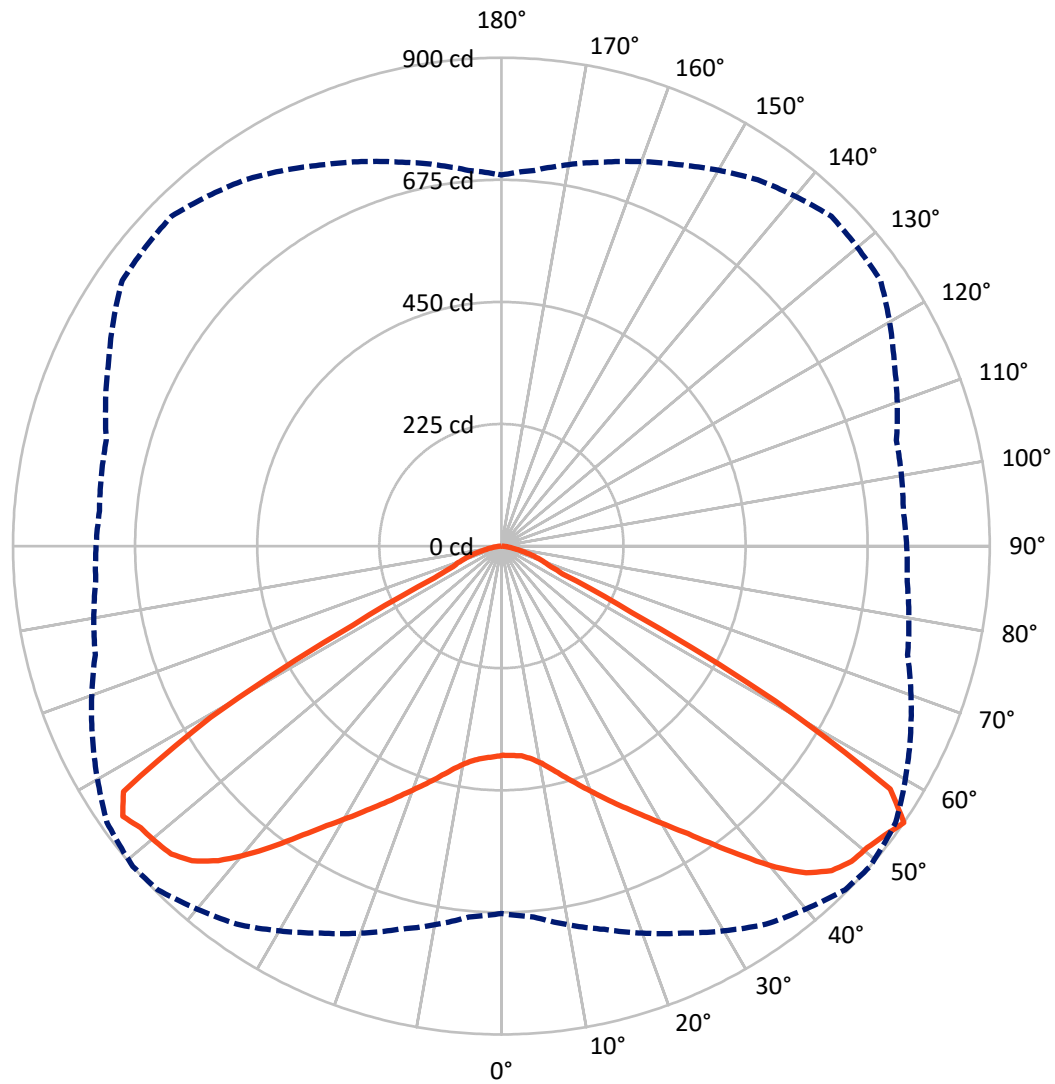


Based on 10 foot mounting height. Maximum calculated value = 4.3 fc  
 Type V - Short - N/A

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## Luminous Intensity Polar Plot



— Vertical Plane Through 49-Deg Lateral    - - - Horizontal Cone Through 55-Deg Vertical

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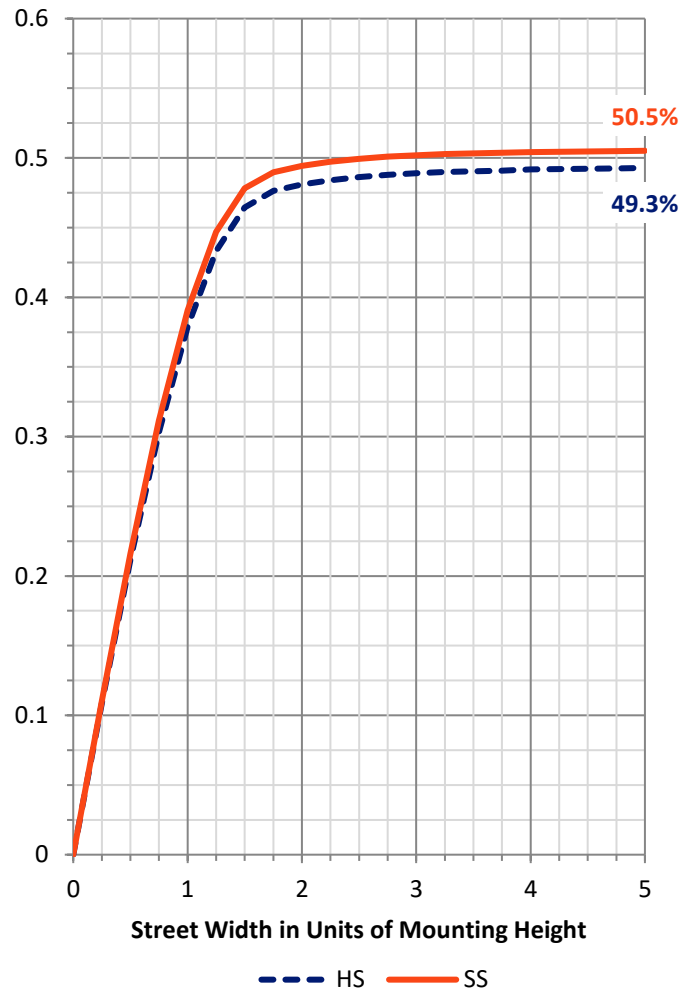
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 1152.2   | 0.0    | 1152.2 |
|                    | % Fixture | 49.5     | 0.0    | 49.5   |
| <b>Street Side</b> | Lumens    | 1175.0   | 0.0    | 1175.0 |
|                    | % Fixture | 50.5     | 0.0    | 50.5   |
| <b>Total</b>       | Lumens    | 2327.2   | 0.0    | 2327.2 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 37.6   | 1.6       |
| 10°-20°   | 124.0  | 5.3       |
| 20°-30°   | 236.3  | 10.2      |
| 30°-40°   | 400.5  | 17.2      |
| 40°-50°   | 602.8  | 25.9      |
| 50°-60°   | 659.8  | 28.4      |
| 60°-70°   | 208.6  | 9.0       |
| 70°-80°   | 50.1   | 2.2       |
| 80°-90°   | 7.5    | 0.3       |
| 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°    | 2327.2 | 100.0     |
| 0°-180°   | 2327.2 | 100.0     |

**Coefficient of Utilization**



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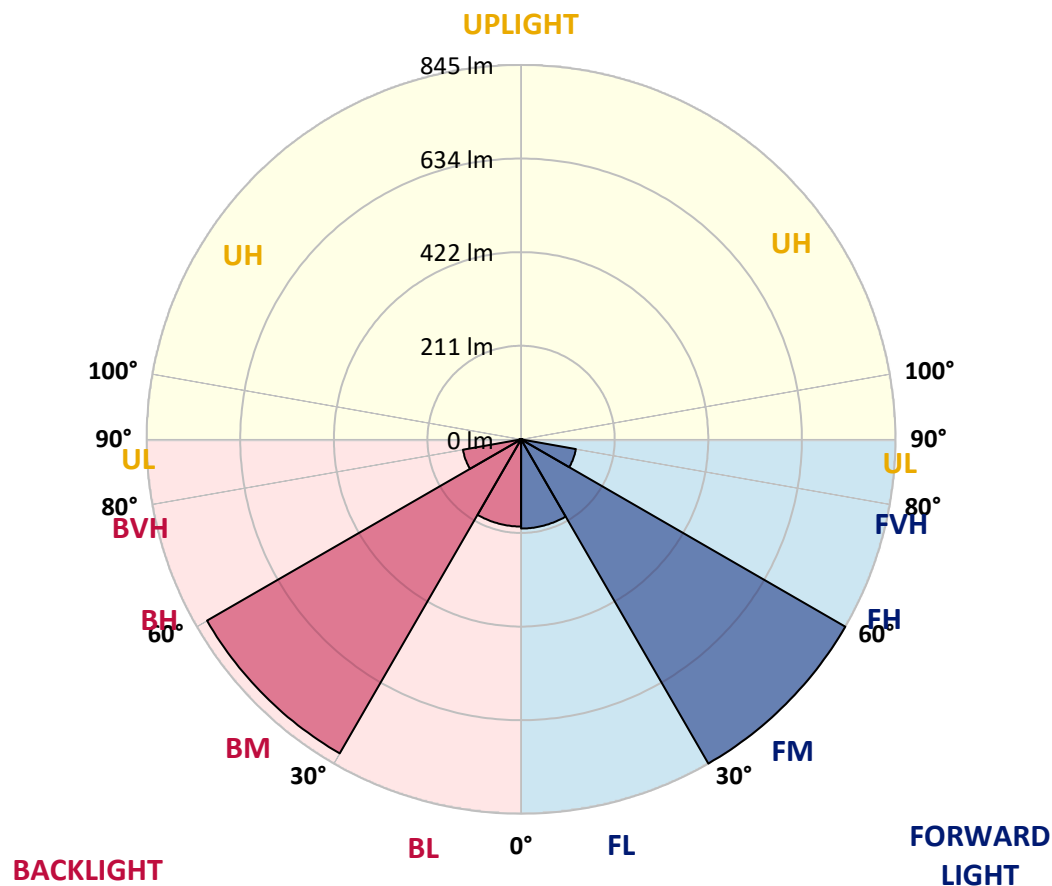
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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |        |
|------|-------------|--------|-----------|-------------------------|------|--------|
|      |             |        |           | B                       | U    | G      |
| FL   | (0°-30°)    | 201.2  | 8.6       |                         |      |        |
| FM   | (30°-60°)   | 844.8  | 36.3      |                         |      |        |
| FH   | (60°-80°)   | 125.5  | 5.4       |                         |      | G0/660 |
| FVH  | (80°-90°)   | 3.5    | 0.1       |                         |      | G0/10  |
| BL   | (0°-30°)    | 196.7  | 8.5       | B1/500                  |      |        |
| BM   | (30°-60°)   | 818.2  | 35.2      | B1/1000                 |      |        |
| BH   | (60°-80°)   | 133.2  | 5.7       | B1/500                  |      | G0/660 |
| BVH  | (80°-90°)   | 4.0    | 0.2       |                         |      | G0/10  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |        |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |        |

**BUG Rating: B1-U0-G0**

Type V Short



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°    | 5°    | 15°   | 25°   | 35°   | 45°   | 49°   | 55°   | 65°   | 75°   | 85°   |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 385.5 | 385.5 | 385.5 | 385.5 | 385.5 | 385.5 | 385.5 | 385.5 | 385.5 | 385.5 | 385.5 |
| 2.5°  | 379.8 | 380.2 | 381.0 | 382.3 | 383.6 | 385.5 | 386.3 | 387.2 | 387.0 | 388.2 | 388.2 |
| 5°    | 377.9 | 378.5 | 379.6 | 381.5 | 383.8 | 387.4 | 388.4 | 390.6 | 392.9 | 395.7 | 396.7 |
| 7.5°  | 380.2 | 381.0 | 382.3 | 385.3 | 388.7 | 393.5 | 395.4 | 399.1 | 403.5 | 408.6 | 410.7 |
| 10°   | 384.6 | 385.5 | 387.8 | 392.7 | 398.2 | 405.4 | 407.1 | 411.8 | 418.8 | 425.8 | 430.0 |
| 12.5° | 389.5 | 391.0 | 395.2 | 402.9 | 411.1 | 420.5 | 423.2 | 429.0 | 436.6 | 445.7 | 451.4 |
| 15°   | 395.2 | 396.5 | 402.9 | 413.9 | 426.6 | 439.1 | 442.1 | 447.8 | 456.3 | 465.2 | 473.1 |
| 17.5° | 407.1 | 409.4 | 416.9 | 429.6 | 444.4 | 459.1 | 462.5 | 469.0 | 475.8 | 482.8 | 490.4 |
| 20°   | 423.4 | 425.3 | 434.9 | 450.6 | 468.0 | 481.5 | 484.9 | 490.6 | 493.8 | 497.4 | 503.8 |
| 22.5° | 439.6 | 442.3 | 453.3 | 471.8 | 492.3 | 506.8 | 509.5 | 514.8 | 512.5 | 511.4 | 515.5 |
| 25°   | 459.9 | 463.5 | 474.3 | 494.5 | 515.3 | 533.3 | 535.4 | 539.9 | 536.2 | 530.3 | 530.1 |
| 27.5° | 485.1 | 488.3 | 499.4 | 520.3 | 540.9 | 559.6 | 563.6 | 569.7 | 561.3 | 554.1 | 549.0 |
| 30°   | 515.0 | 517.0 | 529.3 | 551.5 | 572.7 | 590.5 | 595.6 | 601.6 | 595.4 | 583.5 | 578.4 |
| 32.5° | 549.8 | 552.6 | 566.8 | 590.1 | 609.0 | 626.8 | 631.9 | 639.5 | 632.7 | 619.2 | 612.8 |
| 35°   | 591.6 | 594.5 | 609.4 | 634.8 | 654.1 | 672.4 | 676.0 | 682.3 | 673.8 | 658.2 | 653.1 |
| 37.5° | 637.0 | 640.6 | 659.6 | 683.6 | 703.8 | 725.2 | 725.4 | 727.3 | 715.2 | 695.9 | 690.2 |
| 40°   | 688.1 | 692.9 | 711.8 | 736.8 | 761.2 | 778.6 | 778.4 | 773.1 | 752.7 | 722.8 | 714.1 |
| 42.5° | 738.7 | 742.5 | 761.6 | 787.3 | 811.7 | 828.2 | 823.3 | 810.4 | 780.9 | 740.2 | 728.6 |
| 45°   | 775.2 | 778.0 | 798.1 | 827.0 | 851.8 | 862.1 | 853.2 | 837.6 | 797.7 | 751.2 | 734.1 |
| 47.5° | 792.4 | 796.2 | 816.5 | 845.2 | 873.2 | 879.1 | 868.5 | 853.9 | 807.6 | 761.4 | 738.5 |
| 50°   | 783.1 | 788.1 | 811.0 | 837.6 | 869.3 | 881.4 | 873.8 | 859.2 | 818.0 | 771.4 | 746.2 |
| 52.5° | 759.1 | 763.8 | 792.8 | 825.2 | 860.9 | 885.0 | 884.8 | 872.8 | 829.9 | 774.2 | 746.6 |
| 55°   | 677.0 | 686.2 | 731.3 | 787.1 | 850.7 | 895.6 | 900.1 | 887.4 | 831.8 | 775.0 | 750.6 |
| 57.5° | 440.6 | 456.9 | 499.6 | 572.3 | 699.9 | 814.6 | 845.2 | 848.2 | 818.2 | 771.8 | 751.3 |
| 60°   | 184.0 | 197.0 | 230.9 | 279.2 | 384.6 | 521.0 | 580.4 | 640.1 | 712.0 | 738.1 | 744.3 |
| 62.5° | 114.3 | 115.4 | 118.9 | 129.8 | 165.0 | 231.6 | 269.9 | 325.7 | 432.6 | 523.7 | 565.7 |
| 65°   | 103.1 | 103.7 | 104.5 | 103.7 | 105.4 | 113.6 | 123.8 | 143.3 | 186.8 | 232.0 | 285.8 |
| 67.5° | 90.8  | 91.6  | 92.2  | 91.6  | 92.2  | 92.5  | 93.7  | 95.4  | 103.3 | 109.8 | 114.7 |
| 70°   | 73.4  | 74.6  | 75.5  | 75.1  | 77.4  | 77.4  | 78.5  | 79.9  | 83.8  | 88.6  | 92.0  |
| 72.5° | 56.0  | 55.1  | 56.2  | 56.6  | 58.7  | 59.8  | 61.5  | 63.0  | 67.6  | 70.4  | 74.8  |
| 75°   | 36.3  | 35.4  | 37.1  | 38.0  | 40.9  | 42.4  | 43.9  | 45.4  | 48.6  | 50.5  | 54.7  |
| 77.5° | 19.7  | 19.5  | 21.2  | 22.5  | 25.5  | 27.4  | 28.6  | 29.7  | 32.4  | 32.9  | 35.6  |
| 80°   | 11.4  | 11.4  | 12.5  | 13.4  | 15.3  | 17.4  | 18.5  | 19.5  | 21.4  | 22.0  | 23.1  |
| 82.5° | 6.2   | 6.2   | 6.8   | 7.4   | 8.9   | 10.0  | 11.0  | 11.7  | 13.4  | 14.0  | 14.6  |
| 85°   | 3.0   | 2.8   | 3.2   | 3.6   | 4.2   | 4.7   | 5.3   | 5.7   | 7.0   | 7.4   | 8.1   |
| 87.5° | 0.4   | 0.4   | 0.4   | 0.6   | 0.8   | 1.1   | 1.3   | 1.3   | 2.1   | 2.5   | 2.8   |
| 90°   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |

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**CANDELA DISTRIBUTION (continued):**

|       | 90°   | 95°   | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 385.5 | 385.5 | 385.5 | 385.5 | 385.5 | 385.5 | 385.5 | 385.5 | 385.5 | 385.5 | 385.5 |
| 2.5°  | 389.3 | 386.8 | 388.4 | 388.9 | 388.9 | 388.4 | 385.9 | 385.1 | 384.0 | 382.3 | 382.3 |
| 5°    | 398.0 | 396.1 | 396.5 | 395.5 | 393.3 | 390.4 | 385.9 | 383.6 | 381.7 | 379.6 | 379.5 |
| 7.5°  | 413.0 | 410.5 | 410.1 | 406.5 | 400.5 | 394.4 | 387.6 | 383.4 | 380.6 | 377.9 | 377.8 |
| 10°   | 432.5 | 430.2 | 427.3 | 420.1 | 411.3 | 402.4 | 393.1 | 387.4 | 383.2 | 379.5 | 379.3 |
| 12.5° | 454.2 | 451.6 | 446.3 | 435.7 | 424.5 | 415.8 | 405.2 | 396.5 | 390.2 | 385.1 | 384.2 |
| 15°   | 477.9 | 474.1 | 465.0 | 452.5 | 441.5 | 432.3 | 420.9 | 408.4 | 399.0 | 390.8 | 389.9 |
| 17.5° | 496.0 | 491.1 | 481.3 | 469.5 | 460.5 | 451.2 | 436.4 | 420.7 | 407.1 | 396.9 | 395.4 |
| 20°   | 508.5 | 504.6 | 493.4 | 484.7 | 479.4 | 471.2 | 454.0 | 436.2 | 420.9 | 408.0 | 407.3 |
| 22.5° | 520.1 | 515.3 | 504.4 | 499.3 | 499.3 | 493.8 | 477.3 | 456.3 | 438.3 | 423.4 | 421.5 |
| 25°   | 533.1 | 528.0 | 519.7 | 519.1 | 521.8 | 519.3 | 499.4 | 476.9 | 455.9 | 439.1 | 436.0 |
| 27.5° | 551.3 | 545.6 | 540.7 | 544.1 | 547.9 | 545.2 | 523.1 | 497.0 | 474.8 | 457.8 | 455.2 |
| 30°   | 580.3 | 573.3 | 568.7 | 572.9 | 580.3 | 572.5 | 548.5 | 520.8 | 498.5 | 479.8 | 478.4 |
| 32.5° | 613.9 | 606.0 | 601.3 | 607.9 | 614.5 | 602.4 | 578.6 | 552.1 | 528.6 | 508.9 | 506.6 |
| 35°   | 654.4 | 644.4 | 637.4 | 646.3 | 653.1 | 641.2 | 617.5 | 592.4 | 566.3 | 545.8 | 542.8 |
| 37.5° | 690.4 | 678.3 | 673.6 | 686.1 | 695.1 | 687.4 | 661.6 | 638.0 | 609.4 | 587.1 | 585.7 |
| 40°   | 716.5 | 704.6 | 701.2 | 721.8 | 737.7 | 735.8 | 712.7 | 685.7 | 658.8 | 633.1 | 630.6 |
| 42.5° | 727.9 | 719.6 | 720.3 | 748.1 | 772.7 | 784.8 | 764.2 | 735.3 | 709.3 | 682.6 | 680.9 |
| 45°   | 730.3 | 725.2 | 731.3 | 766.1 | 798.5 | 823.3 | 805.7 | 781.4 | 752.1 | 726.4 | 725.6 |
| 47.5° | 733.0 | 730.2 | 739.4 | 776.3 | 814.7 | 843.5 | 833.7 | 808.7 | 779.0 | 753.8 | 751.9 |
| 50°   | 739.2 | 738.1 | 748.5 | 783.5 | 822.5 | 849.0 | 837.8 | 813.0 | 782.6 | 757.8 | 753.2 |
| 52.5° | 741.1 | 739.2 | 754.2 | 794.7 | 835.4 | 848.8 | 824.8 | 792.4 | 761.8 | 734.1 | 729.4 |
| 55°   | 747.0 | 743.6 | 753.8 | 798.9 | 853.2 | 859.8 | 824.0 | 775.6 | 732.8 | 695.1 | 684.0 |
| 57.5° | 748.5 | 744.7 | 751.3 | 792.0 | 833.9 | 828.0 | 724.3 | 625.9 | 545.2 | 503.4 | 508.2 |
| 60°   | 740.4 | 741.5 | 730.2 | 725.6 | 668.8 | 590.5 | 443.4 | 354.5 | 278.4 | 246.2 | 253.2 |
| 62.5° | 563.6 | 568.3 | 529.5 | 460.5 | 354.1 | 280.7 | 185.7 | 144.2 | 122.1 | 116.4 | 117.3 |
| 65°   | 284.5 | 290.9 | 250.6 | 207.2 | 154.1 | 124.5 | 107.7 | 104.3 | 103.1 | 101.8 | 101.8 |
| 67.5° | 112.6 | 114.5 | 113.0 | 105.8 | 98.4  | 95.8  | 95.0  | 94.6  | 93.3  | 92.5  | 92.7  |
| 70°   | 90.5  | 92.0  | 89.7  | 85.2  | 82.1  | 81.9  | 81.6  | 80.8  | 79.9  | 79.9  | 80.4  |
| 72.5° | 73.8  | 75.3  | 72.1  | 69.3  | 67.0  | 65.3  | 64.3  | 63.8  | 62.5  | 62.5  | 63.0  |
| 75°   | 54.3  | 55.3  | 52.6  | 52.2  | 49.8  | 48.1  | 46.6  | 45.8  | 44.1  | 43.3  | 43.9  |
| 77.5° | 36.1  | 36.0  | 34.6  | 34.6  | 33.7  | 31.6  | 29.9  | 28.2  | 25.9  | 24.4  | 24.8  |
| 80°   | 23.5  | 23.5  | 22.9  | 22.9  | 22.0  | 20.3  | 18.2  | 16.5  | 15.1  | 14.0  | 14.0  |
| 82.5° | 15.0  | 14.8  | 14.6  | 14.4  | 14.0  | 12.3  | 10.8  | 9.7   | 8.7   | 7.9   | 8.1   |
| 85°   | 8.3   | 8.3   | 7.9   | 7.9   | 7.2   | 6.2   | 5.5   | 4.7   | 4.2   | 4.0   | 4.0   |
| 87.5° | 2.8   | 2.8   | 2.6   | 2.6   | 2.3   | 1.7   | 1.3   | 1.1   | 0.9   | 0.8   | 0.9   |
| 90°   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |

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

Report Prepared for

Cooper Lighting Solutions

McGRAW-EDISON

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

Test Date: 10/25/2019

Luminaire Tested: SA1C-722-U-5WQ

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

### Test Information

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

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

### Spectral Parameters

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



### Test Conditions

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

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

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CIE 1931 Chromaticity Diagram



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



Point lies inside the ANSI 2200K 4-step quadrangle

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**Photopic Flux vs. Wavelength**



#####

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

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**Scotopic Flux vs. Wavelength**



**Scotopic Lumens: 4696.9**

**S/P: 0.85**

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

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**Melanopic Flux vs. Wavelength**



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

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

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### Summary

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



### Color Vector Graphics



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

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



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**Color Rendition by Hue-Angle Bin**



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**Measure Comparisons**



(END OF REPORT)