

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: P629118

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

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P629118  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-50)  
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-GRSBK  
Description: GALLEON WALL SLIM LUMINAIRE. (1) LIGHTSQUARES WITH 16 LEDS EACH AND  
RECTANGULAR WIDE OPTICS W/ FACTORY INSTALLED GLARE SHIELD, BK  
Light Source: (16) 2200K CCT, 70 CRI LEDS  
Ballast/Driver: -

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 1711 lumens  
Efficiency: N/A  
Efficacy: 68.4 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

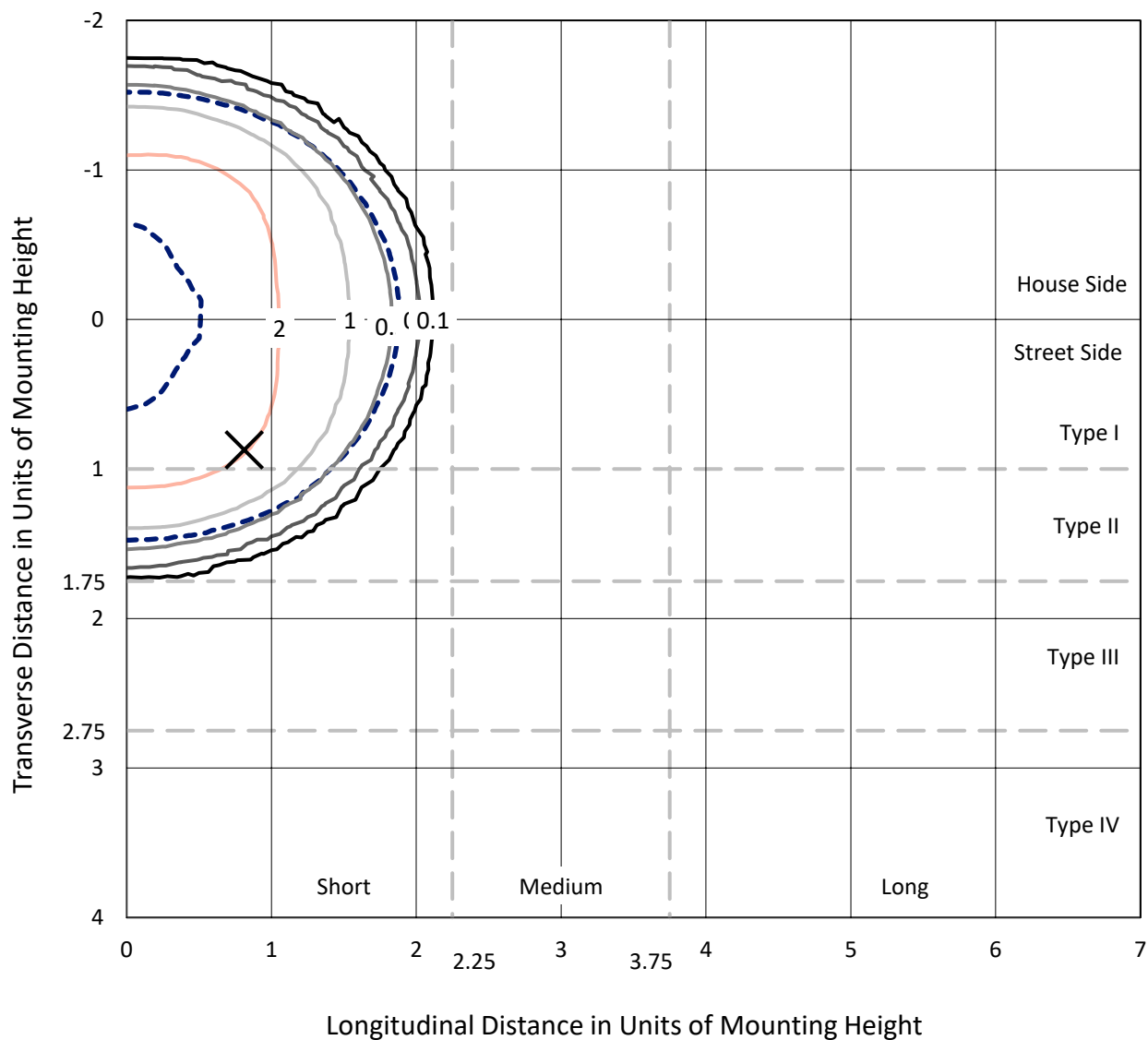


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## Iso-Footcandle Lines of Horizontal Illumination

✕ Max cd  
 - - - 1/2 Max cd

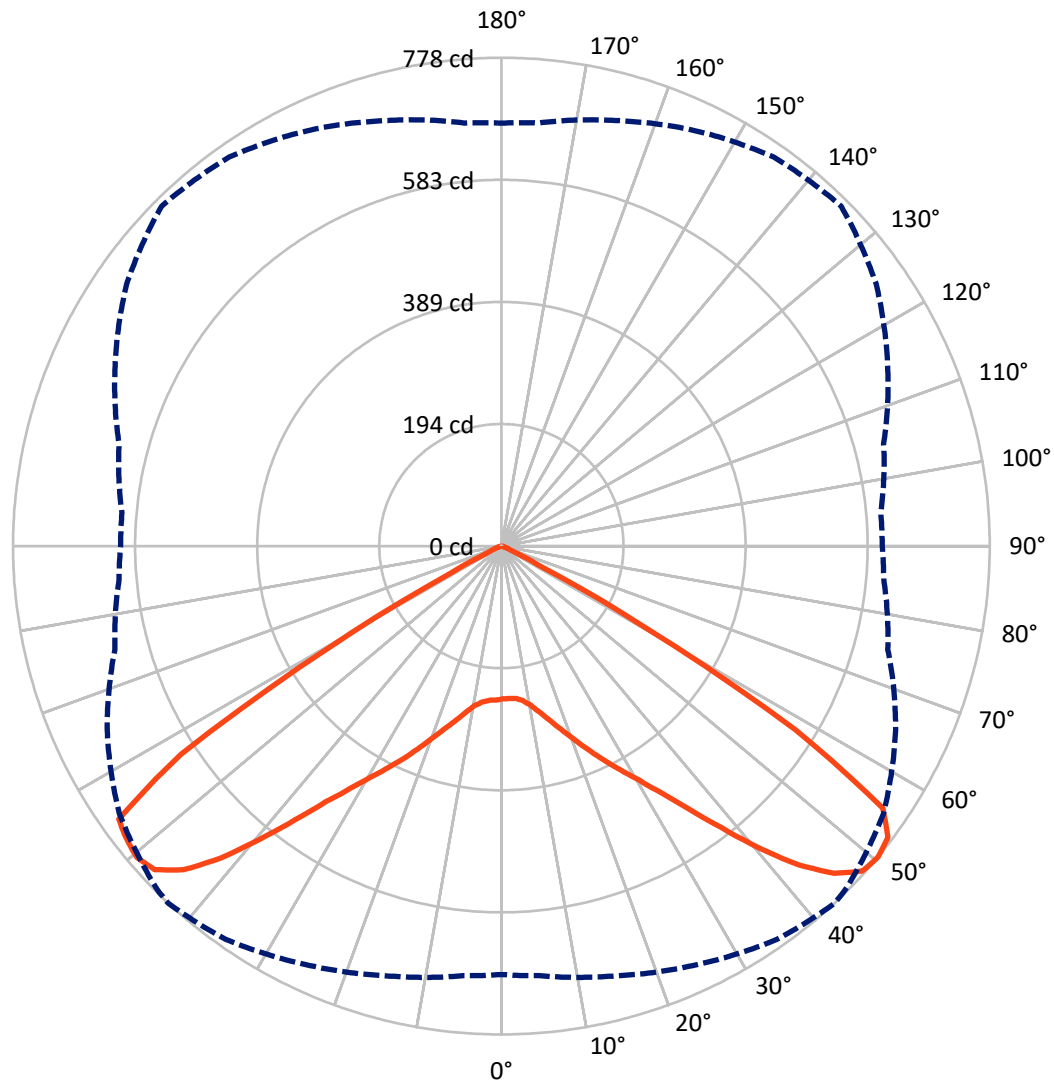


Based on 10 foot mounting height. Maximum calculated value = 2.9 fc  
 Type V - Short - N/A

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## Luminous Intensity Polar Plot



— Vertical Plane Through 43-Deg Lateral    - - - Horizontal Cone Through 50-Deg Vertical

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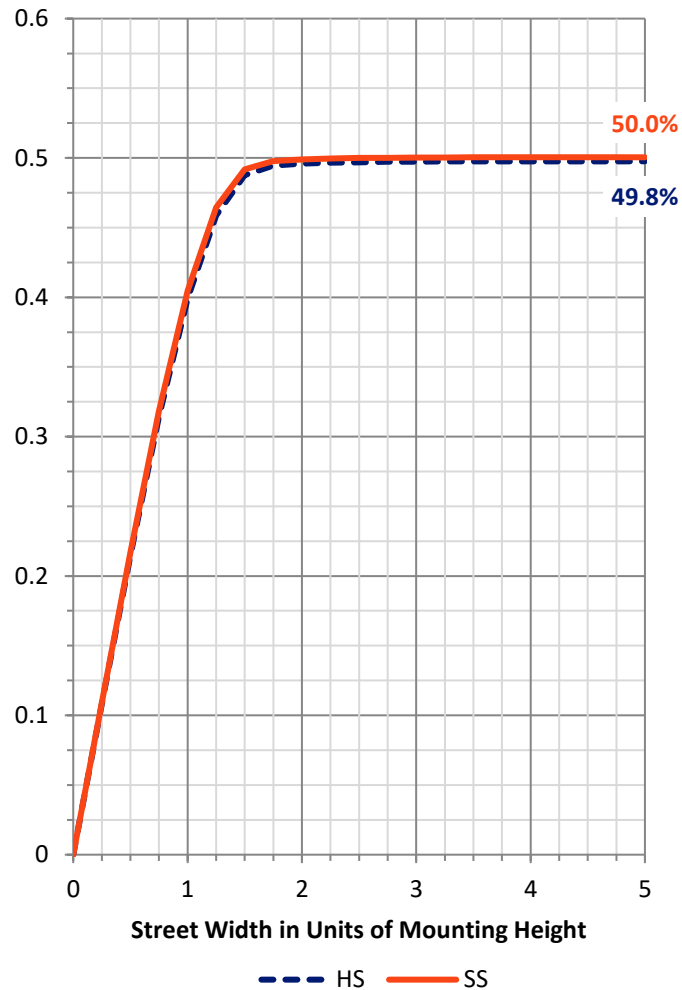
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 855.5    | 0.0    | 855.5  |
|                    | % Fixture | 50.0     | 0.0    | 50.0   |
| <b>Street Side</b> | Lumens    | 855.5    | 0.0    | 855.5  |
|                    | % Fixture | 50.0     | 0.0    | 50.0   |
| <b>Total</b>       | Lumens    | 1711.0   | 0.0    | 1711.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 24.0   | 1.4       |
| 10°-20°   | 82.5   | 4.8       |
| 20°-30°   | 166.9  | 9.8       |
| 30°-40°   | 309.6  | 18.1      |
| 40°-50°   | 513.9  | 30.0      |
| 50°-60°   | 524.4  | 30.7      |
| 60°-70°   | 86.0   | 5.0       |
| 70°-80°   | 3.8    | 0.2       |
| 80°-90°   | 0.1    | 0.0       |
| 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°    | 1711.0 | 100.0     |
| 0°-180°   | 1711.0 | 100.0     |

**Coefficient of Utilization**



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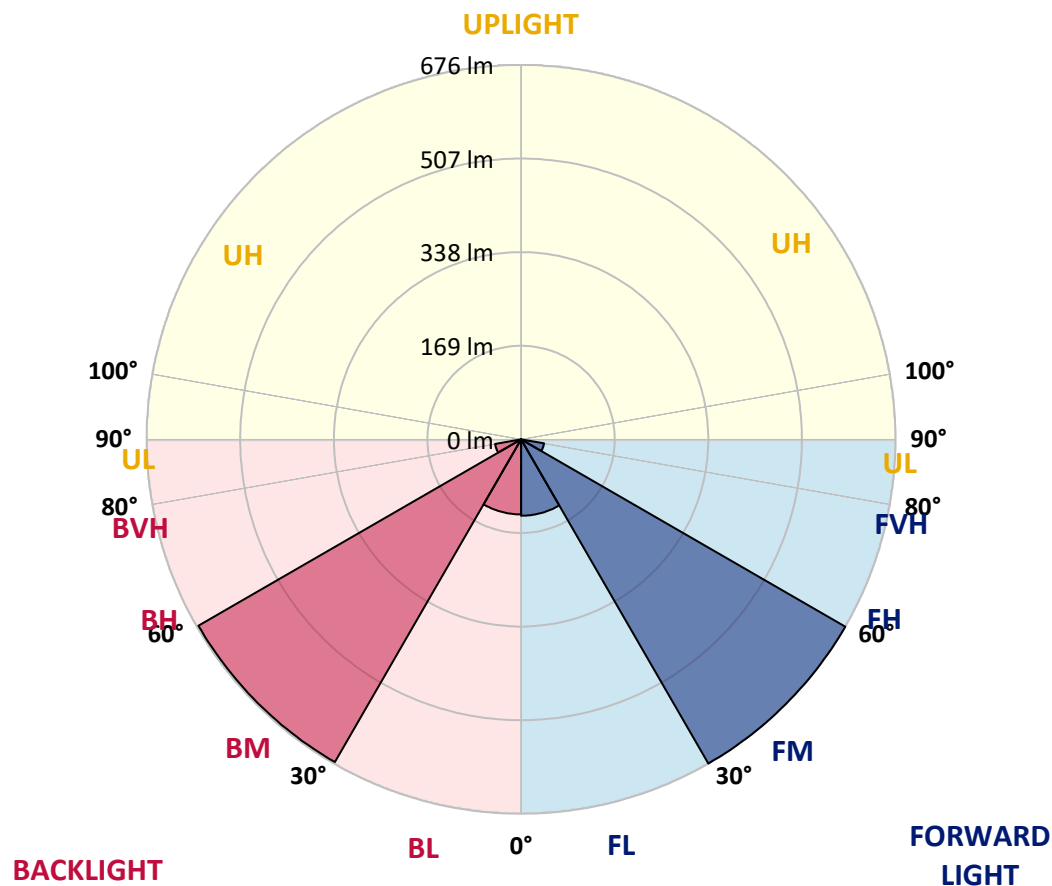
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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |        |
|------|-------------|--------|-----------|-------------------------|------|--------|
|      |             |        |           | B                       | U    | G      |
| FL   | (0°-30°)    | 137.8  | 8.1       |                         |      |        |
| FM   | (30°-60°)   | 675.6  | 39.5      |                         |      |        |
| FH   | (60°-80°)   | 42.1   | 2.5       |                         |      | G0/660 |
| FVH  | (80°-90°)   | 0.0    | 0.0       |                         |      | G0/10  |
| BL   | (0°-30°)    | 135.4  | 7.9       | B1/500                  |      |        |
| BM   | (30°-60°)   | 672.3  | 39.3      | B1/1000                 |      |        |
| BH   | (60°-80°)   | 47.7   | 2.8       | B0/110                  |      | G0/660 |
| BVH  | (80°-90°)   | 0.0    | 0.0       |                         |      | G0/10  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |        |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |        |

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

Type V Short



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°    | 5°    | 15°   | 25°   | 35°   | 43°   | 45°   | 55°   | 65°   | 75°   | 85°   |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 243.4 | 243.4 | 243.4 | 243.4 | 243.4 | 243.4 | 243.4 | 243.4 | 243.4 | 243.4 | 243.4 |
| 2.5°  | 238.8 | 239.4 | 240.1 | 240.9 | 241.8 | 242.8 | 243.4 | 245.1 | 244.7 | 246.2 | 246.2 |
| 5°    | 236.2 | 236.7 | 237.7 | 239.4 | 241.5 | 243.6 | 245.1 | 248.5 | 250.4 | 253.4 | 254.5 |
| 7.5°  | 237.5 | 238.3 | 239.4 | 242.0 | 245.3 | 248.5 | 250.2 | 255.7 | 259.4 | 265.1 | 268.3 |
| 10°   | 241.8 | 242.6 | 244.5 | 249.0 | 253.2 | 257.7 | 259.8 | 266.8 | 272.9 | 280.6 | 285.2 |
| 12.5° | 246.8 | 247.7 | 251.5 | 258.3 | 265.5 | 271.6 | 274.4 | 282.2 | 288.4 | 297.1 | 304.3 |
| 15°   | 251.9 | 253.4 | 259.3 | 269.3 | 279.5 | 287.6 | 290.7 | 299.0 | 305.2 | 314.5 | 322.7 |
| 17.5° | 263.8 | 265.5 | 272.1 | 282.9 | 296.9 | 306.4 | 309.0 | 317.7 | 322.5 | 328.7 | 337.2 |
| 20°   | 278.8 | 282.0 | 290.1 | 303.2 | 318.5 | 327.6 | 329.5 | 338.0 | 337.6 | 340.3 | 347.6 |
| 22.5° | 297.3 | 299.6 | 308.5 | 324.0 | 341.2 | 351.2 | 355.6 | 359.2 | 354.4 | 352.2 | 356.9 |
| 25°   | 316.6 | 319.2 | 328.9 | 345.9 | 365.2 | 376.8 | 380.4 | 383.2 | 375.6 | 367.1 | 367.7 |
| 27.5° | 341.6 | 343.5 | 352.9 | 371.1 | 390.4 | 403.5 | 406.7 | 411.6 | 401.6 | 387.9 | 384.2 |
| 30°   | 371.3 | 373.2 | 383.2 | 402.3 | 421.4 | 432.6 | 437.5 | 443.6 | 432.6 | 415.6 | 411.2 |
| 32.5° | 406.1 | 408.0 | 420.9 | 440.6 | 456.3 | 468.4 | 473.1 | 479.5 | 470.8 | 451.7 | 446.8 |
| 35°   | 447.7 | 448.9 | 464.0 | 485.4 | 502.1 | 513.8 | 517.0 | 524.6 | 514.9 | 495.8 | 493.2 |
| 37.5° | 496.0 | 497.3 | 513.8 | 538.6 | 555.6 | 568.7 | 573.8 | 575.9 | 564.1 | 542.7 | 540.7 |
| 40°   | 549.0 | 553.3 | 569.4 | 596.1 | 615.2 | 631.7 | 636.2 | 629.2 | 612.8 | 583.6 | 579.8 |
| 42.5° | 604.2 | 608.0 | 626.0 | 655.0 | 677.1 | 693.9 | 694.1 | 679.0 | 651.0 | 610.7 | 605.0 |
| 45°   | 650.2 | 651.7 | 675.0 | 704.2 | 731.4 | 743.3 | 744.5 | 717.0 | 674.8 | 626.4 | 614.3 |
| 47.5° | 681.8 | 684.3 | 704.5 | 732.5 | 762.6 | 773.4 | 771.2 | 736.9 | 686.2 | 636.6 | 616.5 |
| 50°   | 682.2 | 686.4 | 708.3 | 735.4 | 764.5 | 777.6 | 774.4 | 742.6 | 692.6 | 637.0 | 611.1 |
| 52.5° | 621.8 | 628.7 | 664.4 | 703.6 | 748.3 | 770.6 | 771.3 | 750.0 | 690.2 | 630.9 | 606.1 |
| 55°   | 469.1 | 476.5 | 521.5 | 588.3 | 674.6 | 736.9 | 747.7 | 741.3 | 687.3 | 633.6 | 614.8 |
| 57.5° | 248.3 | 242.6 | 267.6 | 333.8 | 442.3 | 552.4 | 584.0 | 635.5 | 655.7 | 636.8 | 630.9 |
| 60°   | 54.1  | 57.7  | 76.8  | 103.5 | 172.6 | 259.8 | 290.7 | 378.9 | 483.7 | 530.3 | 563.9 |
| 62.5° | 23.3  | 22.9  | 23.8  | 27.1  | 39.6  | 65.9  | 80.4  | 131.3 | 207.2 | 284.6 | 337.0 |
| 65°   | 19.1  | 19.3  | 20.1  | 20.1  | 18.7  | 18.9  | 19.9  | 30.1  | 48.4  | 67.9  | 91.2  |
| 67.5° | 14.4  | 14.6  | 15.9  | 16.3  | 15.3  | 13.6  | 13.4  | 11.4  | 11.9  | 14.9  | 15.5  |
| 70°   | 9.1   | 9.1   | 9.8   | 10.2  | 10.2  | 9.5   | 9.3   | 8.1   | 7.9   | 9.1   | 10.2  |
| 72.5° | 4.9   | 4.9   | 5.3   | 5.5   | 5.3   | 5.1   | 5.1   | 4.9   | 4.7   | 5.5   | 7.0   |
| 75°   | 2.1   | 2.1   | 2.3   | 2.3   | 2.1   | 2.1   | 2.1   | 2.1   | 2.1   | 2.5   | 3.8   |
| 77.5° | 0.4   | 0.6   | 0.8   | 0.6   | 0.4   | 0.4   | 0.4   | 0.6   | 0.6   | 0.8   | 1.1   |
| 80°   | 0.2   | 0.2   | 0.4   | 0.2   | 0.0   | 0.0   | 0.0   | 0.0   | 0.2   | 0.2   | 0.2   |
| 82.5° | 0.2   | 0.2   | 0.2   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.2   |
| 85°   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 87.5° | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 90°   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |

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**CANDELA DISTRIBUTION (continued):**

|       | 90°   | 95°   | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 243.4 | 243.4 | 243.4 | 243.4 | 243.4 | 243.4 | 243.4 | 243.4 | 243.4 | 243.4 | 243.4 |
| 2.5°  | 247.5 | 245.4 | 246.2 | 246.6 | 246.0 | 245.6 | 243.6 | 243.0 | 242.0 | 240.5 | 240.1 |
| 5°    | 255.9 | 254.1 | 254.0 | 252.8 | 250.2 | 247.0 | 243.0 | 241.3 | 239.4 | 237.5 | 237.1 |
| 7.5°  | 269.9 | 267.8 | 266.4 | 262.7 | 256.6 | 251.5 | 244.9 | 241.3 | 238.8 | 236.4 | 235.8 |
| 10°   | 287.8 | 285.4 | 281.6 | 274.6 | 266.4 | 259.1 | 251.3 | 246.6 | 242.8 | 239.4 | 239.2 |
| 12.5° | 306.9 | 304.3 | 297.5 | 288.6 | 278.8 | 271.9 | 262.1 | 255.5 | 249.8 | 244.7 | 244.1 |
| 15°   | 327.0 | 323.8 | 314.5 | 303.9 | 294.8 | 287.8 | 277.0 | 266.4 | 257.7 | 250.4 | 249.6 |
| 17.5° | 342.3 | 338.4 | 327.4 | 319.4 | 312.1 | 304.9 | 292.8 | 278.8 | 267.2 | 258.3 | 256.2 |
| 20°   | 352.0 | 348.2 | 337.8 | 333.4 | 330.0 | 324.9 | 310.5 | 296.0 | 283.1 | 272.1 | 270.2 |
| 22.5° | 361.3 | 356.7 | 347.6 | 347.6 | 350.3 | 348.2 | 332.7 | 316.0 | 300.9 | 288.2 | 285.4 |
| 25°   | 371.7 | 368.1 | 361.6 | 366.9 | 373.6 | 373.4 | 357.5 | 336.7 | 319.2 | 305.1 | 302.2 |
| 27.5° | 386.8 | 383.2 | 380.9 | 391.0 | 399.3 | 398.7 | 381.3 | 358.8 | 340.4 | 326.4 | 323.8 |
| 30°   | 413.5 | 410.1 | 407.6 | 419.7 | 430.3 | 426.4 | 407.2 | 385.5 | 366.9 | 351.0 | 349.1 |
| 32.5° | 449.1 | 445.5 | 442.3 | 454.4 | 463.8 | 458.7 | 440.6 | 420.1 | 398.7 | 383.2 | 379.4 |
| 35°   | 495.8 | 488.2 | 485.0 | 499.4 | 503.4 | 497.7 | 480.3 | 462.3 | 439.6 | 421.8 | 419.4 |
| 37.5° | 544.1 | 535.2 | 532.9 | 545.4 | 551.8 | 549.7 | 529.3 | 510.6 | 486.0 | 466.3 | 463.4 |
| 40°   | 585.3 | 577.2 | 573.2 | 592.7 | 607.3 | 608.6 | 590.2 | 567.3 | 538.4 | 517.9 | 512.8 |
| 42.5° | 609.5 | 602.5 | 601.6 | 631.9 | 655.7 | 672.7 | 650.8 | 627.1 | 596.7 | 573.6 | 569.4 |
| 45°   | 615.0 | 610.5 | 618.4 | 658.2 | 695.3 | 726.3 | 707.6 | 682.6 | 649.7 | 625.2 | 621.3 |
| 47.5° | 614.5 | 612.9 | 627.1 | 671.8 | 718.7 | 757.0 | 747.7 | 719.5 | 687.7 | 662.2 | 658.4 |
| 50°   | 606.3 | 606.5 | 630.2 | 678.6 | 728.2 | 765.3 | 756.0 | 729.9 | 701.5 | 676.3 | 673.3 |
| 52.5° | 603.1 | 602.0 | 624.5 | 676.5 | 737.8 | 761.5 | 740.7 | 711.4 | 679.8 | 648.7 | 644.2 |
| 55°   | 614.5 | 611.6 | 625.2 | 674.8 | 739.0 | 759.4 | 704.5 | 641.0 | 576.2 | 539.5 | 536.5 |
| 57.5° | 631.5 | 628.5 | 634.9 | 662.3 | 679.8 | 631.5 | 518.5 | 415.9 | 349.3 | 321.1 | 308.8 |
| 60°   | 563.9 | 561.9 | 556.9 | 523.8 | 449.3 | 338.9 | 230.9 | 147.2 | 105.8 | 85.5  | 85.5  |
| 62.5° | 349.9 | 347.1 | 320.4 | 238.1 | 173.0 | 100.1 | 55.1  | 34.4  | 26.1  | 24.4  | 24.2  |
| 65°   | 98.2  | 97.6  | 80.8  | 57.2  | 36.3  | 22.5  | 19.9  | 20.2  | 19.9  | 19.3  | 19.1  |
| 67.5° | 14.8  | 16.3  | 16.3  | 13.2  | 12.7  | 14.2  | 16.7  | 17.8  | 16.8  | 15.9  | 15.5  |
| 70°   | 9.5   | 10.2  | 9.8   | 8.5   | 9.1   | 10.6  | 11.9  | 12.1  | 11.5  | 10.6  | 10.4  |
| 72.5° | 6.6   | 7.4   | 6.1   | 5.5   | 5.7   | 6.2   | 6.8   | 6.8   | 6.6   | 6.2   | 5.9   |
| 75°   | 4.0   | 4.0   | 2.8   | 2.6   | 2.6   | 2.8   | 2.8   | 3.2   | 3.2   | 3.0   | 2.8   |
| 77.5° | 1.3   | 1.5   | 0.9   | 0.8   | 0.8   | 0.8   | 0.9   | 1.1   | 1.1   | 0.9   | 0.8   |
| 80°   | 0.2   | 0.4   | 0.2   | 0.2   | 0.2   | 0.2   | 0.2   | 0.2   | 0.4   | 0.4   | 0.2   |
| 82.5° | 0.2   | 0.2   | 0.2   | 0.0   | 0.0   | 0.0   | 0.0   | 0.2   | 0.2   | 0.2   | 0.2   |
| 85°   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.2   | 0.2   |
| 87.5° | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 90°   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |

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

Report Prepared for

Cooper Lighting Solutions

McGRAW-EDISON

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

Test Date: 10/25/2019

Luminaire Tested: SA1C-722-U-5WQ

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

### Test Information

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

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

### Spectral Parameters

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



### Test Conditions

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

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

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CIE 1931 Chromaticity Diagram



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



Point lies inside the ANSI 2200K 4-step quadrangle

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**Photopic Flux vs. Wavelength**



#####

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

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Scotopic Flux vs. Wavelength



Scotopic Lumens: 4696.9

S/P: 0.85

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

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**Melanopic Flux vs. Wavelength**



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

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

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### Summary

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



### Color Vector Graphics



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

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



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Color Rendition by Hue-Angle Bin



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**Measure Comparisons**



(END OF REPORT)