

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: P629140

Luminaire Tested: GWS-SA1B-722-U-T2-W-GRSBK

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P629140  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-20)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA1B-722-U-T2-W-GRSBK  
Description: GALLEON WALL SLIM LUMINAIRE. (1) LIGHTSQUARES WITH 16 LEDS EACH AND  
TYPE II 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: 1568.1 lumens  
Efficiency: N/A  
Efficacy: 62.7 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.5' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B0 - 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

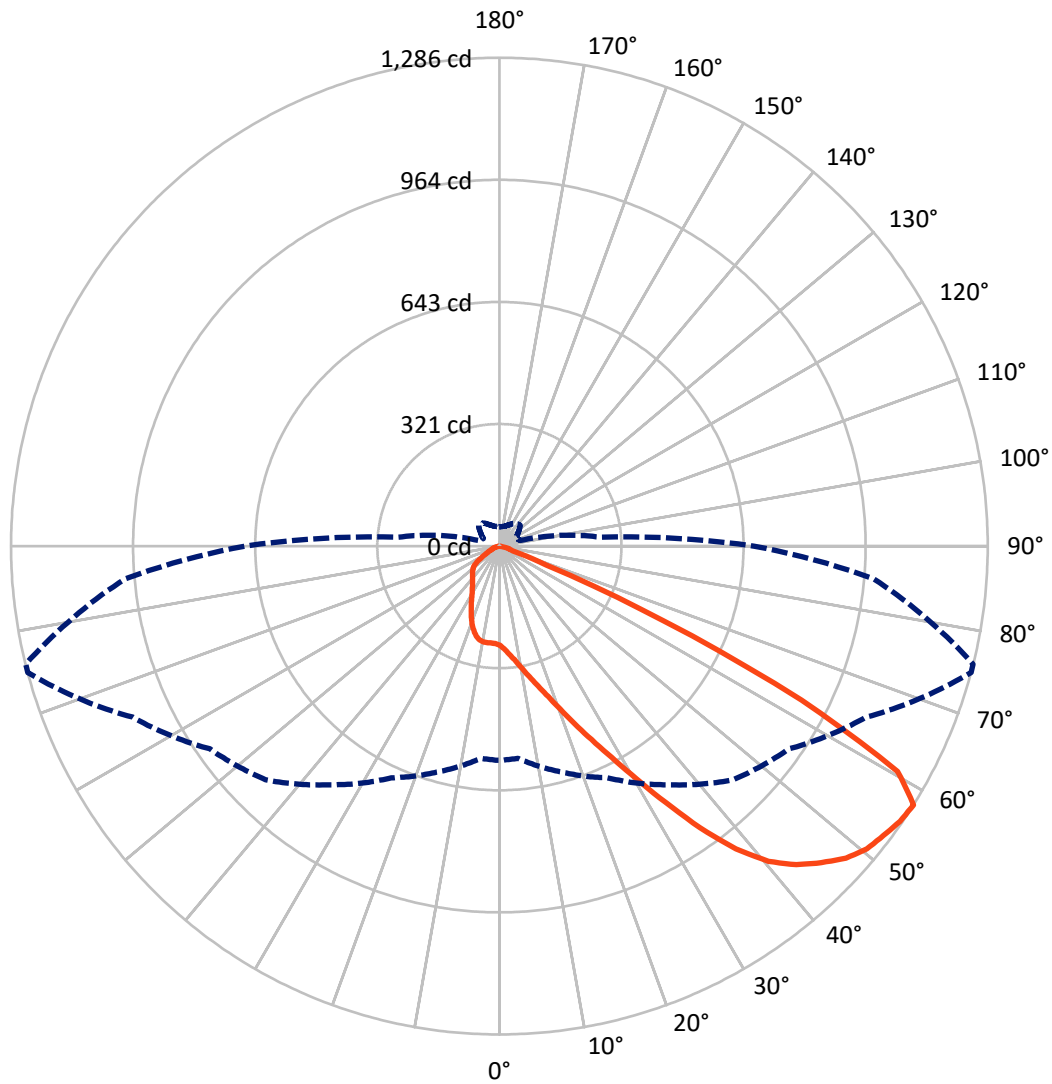




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CATALOG NUMBER: GWS-SA1B-722-U-T2-W-GRSBK

## Luminous Intensity Polar Plot



— Vertical Plane Through 75-Deg Lateral    - - - Horizontal Cone Through 57.5-Deg Vertical

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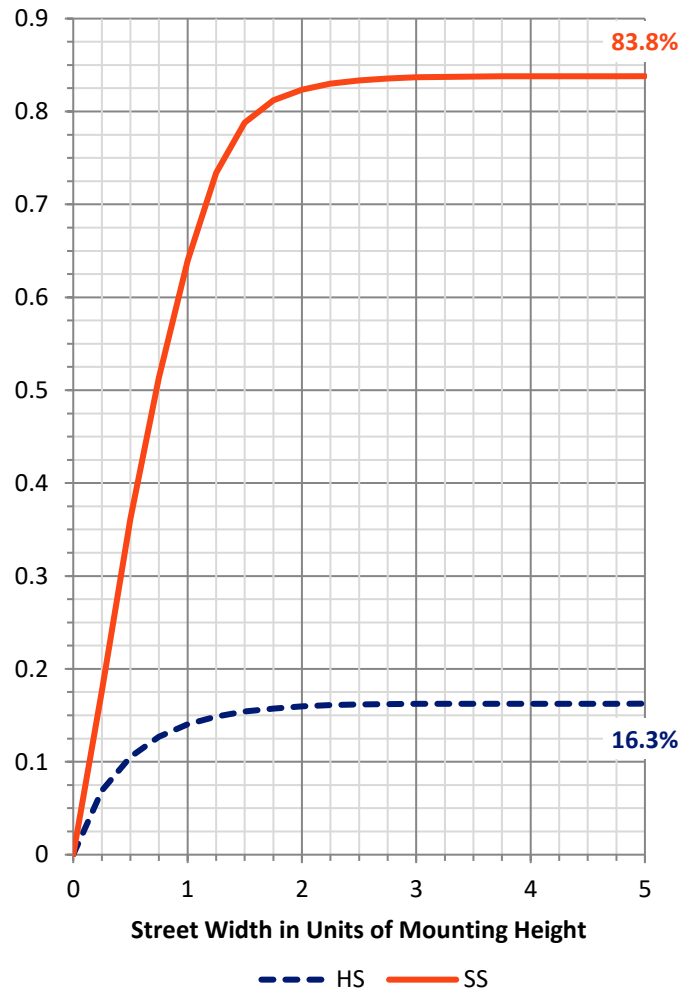
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 256.1    | 0.0    | 256.1  |
|                    | % Fixture | 16.3     | 0.0    | 16.3   |
| <b>Street Side</b> | Lumens    | 1312.0   | 0.0    | 1312.0 |
|                    | % Fixture | 83.7     | 0.0    | 83.7   |
| <b>Total</b>       | Lumens    | 1568.1   | 0.0    | 1568.1 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 26.6   | 1.7       |
| 10°-20°   | 86.5   | 5.5       |
| 20°-30°   | 158.3  | 10.1      |
| 30°-40°   | 262.7  | 16.8      |
| 40°-50°   | 401.1  | 25.6      |
| 50°-60°   | 450.8  | 28.7      |
| 60°-70°   | 166.3  | 10.6      |
| 70°-80°   | 15.9   | 1.0       |
| 80°-90°   | 0.0    | 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°    | 1568.1 | 100.0     |
| 0°-180°   | 1568.1 | 100.0     |

**Coefficient of Utilization**



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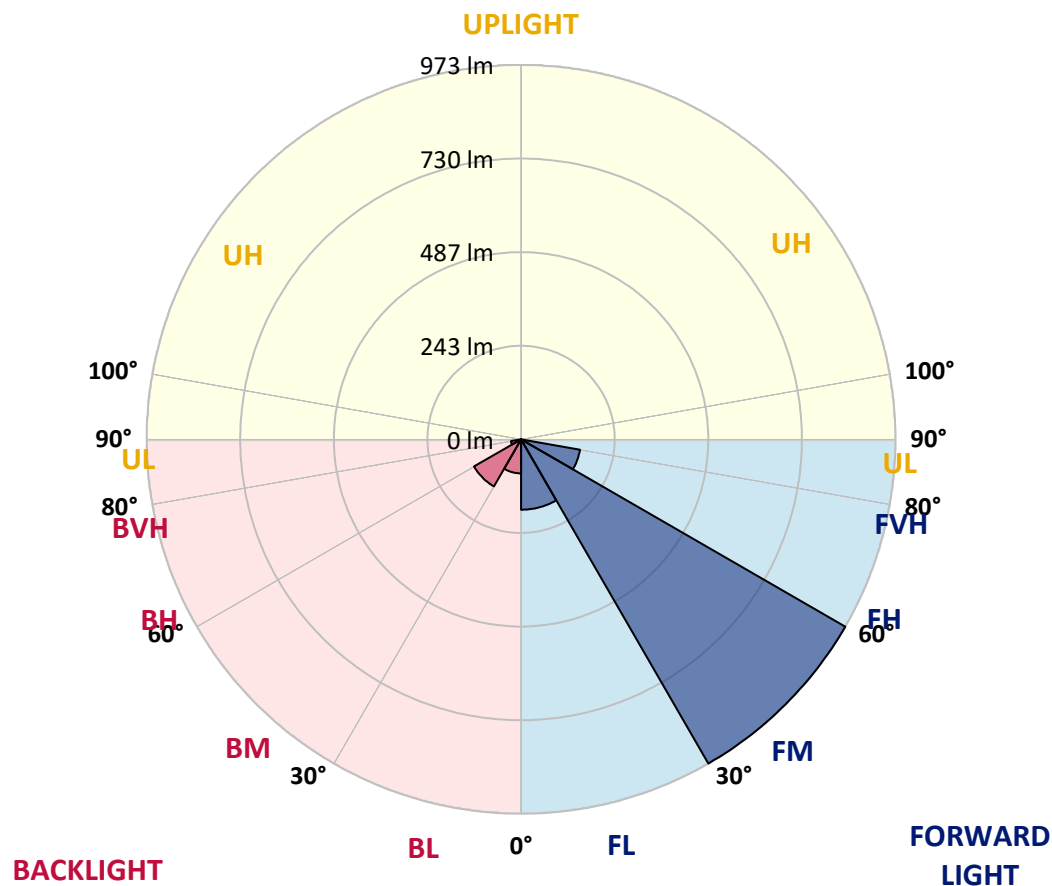
CATALOG NUMBER: GWS-SA1B-722-U-T2-W-GRSBK

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |        |
|------|-------------|--------|-----------|-------------------------|------|--------|
|      |             |        |           | B                       | U    | G      |
| FL   | (0°-30°)    | 183.0  | 11.7      |                         |      |        |
| FM   | (30°-60°)   | 973.4  | 62.1      |                         |      |        |
| FH   | (60°-80°)   | 155.5  | 9.9       |                         |      | G0/660 |
| FVH  | (80°-90°)   | 0.0    | 0.0       |                         |      | G0/10  |
| BL   | (0°-30°)    | 88.4   | 5.6       | B0/110                  |      |        |
| BM   | (30°-60°)   | 141.2  | 9.0       | B0/220                  |      |        |
| BH   | (60°-80°)   | 26.6   | 1.7       | B0/110                  |      | G0/110 |
| 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: B0-U0-G0**

Type II Short



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°    | 5°    | 15°   | 25°   | 35°   | 45°   | 55°   | 65°    | 75°    | 76°    | 85°   |
|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|-------|
| 0°    | 261.5 | 261.5 | 261.5 | 261.5 | 261.5 | 261.5 | 261.5 | 261.5  | 261.5  | 261.5  | 261.5 |
| 2.5°  | 292.2 | 295.2 | 294.3 | 292.4 | 291.2 | 287.3 | 284.8 | 277.6  | 272.5  | 271.9  | 267.2 |
| 5°    | 329.1 | 328.5 | 327.8 | 325.5 | 323.6 | 317.4 | 310.0 | 297.9  | 287.1  | 285.8  | 275.7 |
| 7.5°  | 349.3 | 349.7 | 350.1 | 349.7 | 348.4 | 343.7 | 335.5 | 321.3  | 304.9  | 303.7  | 287.8 |
| 10°   | 357.7 | 358.4 | 360.3 | 363.9 | 367.1 | 366.8 | 362.0 | 347.5  | 327.2  | 325.3  | 303.9 |
| 12.5° | 361.6 | 362.6 | 365.6 | 372.4 | 381.1 | 388.0 | 388.7 | 375.7  | 353.3  | 350.3  | 323.0 |
| 15°   | 367.1 | 368.1 | 371.9 | 380.8 | 393.4 | 406.9 | 415.6 | 407.3  | 382.3  | 379.1  | 344.0 |
| 17.5° | 369.6 | 370.9 | 376.4 | 388.1 | 404.6 | 425.2 | 444.9 | 444.2  | 416.5  | 414.1  | 368.5 |
| 20°   | 374.3 | 375.3 | 380.2 | 392.9 | 412.7 | 442.5 | 475.6 | 487.5  | 458.4  | 454.8  | 398.0 |
| 22.5° | 389.3 | 389.7 | 391.9 | 399.9 | 418.4 | 454.9 | 506.8 | 538.0  | 507.7  | 503.0  | 431.1 |
| 25°   | 413.7 | 413.5 | 414.4 | 415.8 | 429.4 | 467.6 | 536.9 | 595.0  | 564.3  | 559.2  | 468.6 |
| 27.5° | 444.7 | 444.7 | 447.0 | 443.2 | 448.7 | 483.3 | 566.6 | 660.5  | 630.2  | 623.0  | 509.6 |
| 30°   | 481.3 | 481.1 | 486.4 | 480.3 | 482.0 | 508.1 | 598.6 | 731.8  | 709.7  | 700.8  | 556.9 |
| 32.5° | 530.8 | 529.7 | 535.8 | 527.4 | 521.7 | 545.6 | 637.6 | 806.4  | 804.9  | 791.2  | 616.4 |
| 35°   | 593.5 | 591.6 | 593.5 | 585.3 | 575.1 | 598.0 | 688.7 | 880.7  | 910.5  | 896.1  | 687.2 |
| 37.5° | 655.7 | 661.8 | 663.9 | 649.9 | 641.5 | 664.4 | 750.2 | 947.4  | 1011.3 | 996.4  | 760.8 |
| 40°   | 729.2 | 727.3 | 734.5 | 718.8 | 713.5 | 738.8 | 810.3 | 996.9  | 1091.2 | 1077.0 | 826.2 |
| 42.5° | 783.3 | 786.7 | 795.6 | 786.9 | 782.7 | 806.6 | 860.9 | 1025.9 | 1146.6 | 1132.6 | 873.0 |
| 45°   | 848.2 | 850.7 | 854.1 | 846.9 | 842.5 | 866.0 | 897.4 | 1038.6 | 1188.8 | 1173.7 | 904.4 |
| 47.5° | 918.4 | 920.3 | 920.3 | 905.5 | 891.5 | 901.2 | 921.8 | 1045.8 | 1227.6 | 1213.1 | 927.7 |
| 50°   | 968.7 | 969.7 | 978.0 | 967.6 | 937.1 | 922.2 | 933.0 | 1052.8 | 1253.4 | 1239.7 | 935.3 |
| 52.5° | 924.1 | 923.0 | 950.4 | 972.0 | 980.1 | 950.4 | 952.3 | 1063.0 | 1265.9 | 1254.1 | 941.3 |
| 55°   | 778.2 | 776.3 | 814.9 | 867.3 | 939.0 | 977.1 | 975.6 | 1069.0 | 1279.7 | 1272.5 | 963.3 |
| 57.5° | 564.1 | 560.9 | 614.7 | 673.0 | 767.0 | 870.2 | 930.7 | 1065.6 | 1285.7 | 1285.2 | 988.8 |
| 60°   | 339.1 | 336.5 | 387.2 | 448.5 | 521.2 | 624.9 | 725.4 | 954.6  | 1204.7 | 1205.9 | 922.4 |
| 62.5° | 208.7 | 211.2 | 257.0 | 288.2 | 315.3 | 346.5 | 404.6 | 642.1  | 892.5  | 899.9  | 648.2 |
| 65°   | 140.4 | 142.3 | 184.7 | 224.1 | 224.1 | 183.2 | 157.3 | 307.0  | 476.1  | 463.7  | 306.6 |
| 67.5° | 94.2  | 96.3  | 129.8 | 175.8 | 182.4 | 127.7 | 63.8  | 91.6   | 132.7  | 128.7  | 75.9  |
| 70°   | 55.4  | 57.7  | 86.5  | 120.5 | 132.9 | 88.9  | 42.6  | 38.8   | 37.7   | 36.5   | 29.5  |
| 72.5° | 24.8  | 25.7  | 44.1  | 61.3  | 56.0  | 37.5  | 30.1  | 31.0   | 29.3   | 28.8   | 24.0  |
| 75°   | 7.6   | 7.9   | 11.4  | 13.2  | 13.4  | 13.4  | 18.2  | 24.4   | 23.1   | 23.3   | 18.5  |
| 77.5° | 1.9   | 1.9   | 3.0   | 2.8   | 1.5   | 1.3   | 3.4   | 5.5    | 5.7    | 5.1    | 3.8   |
| 80°   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.2   | 0.2   | 0.2    | 0.2    | 0.2    | 0.2   |
| 82.5° | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    | 0.0    | 0.0    | 0.0   |
| 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°    | 261.5 | 261.5 | 261.5 | 261.5 | 261.5 | 261.5 | 261.5 | 261.5 | 261.5 | 261.5 | 261.5 |
| 2.5°  | 265.1 | 260.2 | 257.0 | 252.5 | 249.2 | 245.8 | 242.8 | 240.3 | 239.0 | 238.6 | 238.8 |
| 5°    | 271.2 | 263.4 | 255.9 | 247.2 | 241.1 | 235.4 | 230.9 | 227.3 | 225.6 | 225.0 | 225.0 |
| 7.5°  | 280.5 | 269.7 | 256.2 | 242.6 | 232.4 | 223.5 | 218.2 | 214.2 | 212.7 | 212.3 | 211.2 |
| 10°   | 292.6 | 277.8 | 255.7 | 234.5 | 220.1 | 210.8 | 207.0 | 205.9 | 206.5 | 206.7 | 206.5 |
| 12.5° | 307.1 | 286.3 | 252.1 | 222.6 | 207.0 | 201.4 | 201.7 | 204.8 | 208.2 | 209.9 | 210.3 |
| 15°   | 322.7 | 294.1 | 243.9 | 208.4 | 195.9 | 195.7 | 201.2 | 208.2 | 214.8 | 217.6 | 218.4 |
| 17.5° | 340.1 | 300.3 | 231.4 | 193.2 | 186.2 | 191.7 | 201.5 | 212.3 | 221.2 | 226.0 | 226.9 |
| 20°   | 359.2 | 305.4 | 215.6 | 179.0 | 177.7 | 187.5 | 201.2 | 214.4 | 225.4 | 230.7 | 231.6 |
| 22.5° | 379.1 | 309.0 | 197.2 | 166.0 | 169.9 | 182.8 | 197.6 | 210.4 | 220.8 | 226.9 | 227.7 |
| 25°   | 401.8 | 309.4 | 178.5 | 155.0 | 162.8 | 176.4 | 188.9 | 199.5 | 208.2 | 213.5 | 214.0 |
| 27.5° | 421.6 | 304.9 | 161.8 | 146.1 | 156.1 | 168.4 | 176.8 | 182.6 | 188.7 | 191.7 | 191.9 |
| 30°   | 444.5 | 296.9 | 146.1 | 138.9 | 149.3 | 158.6 | 162.8 | 164.1 | 164.6 | 165.2 | 164.5 |
| 32.5° | 471.8 | 287.3 | 134.4 | 131.9 | 141.6 | 147.8 | 148.9 | 146.3 | 143.1 | 138.5 | 137.4 |
| 35°   | 505.3 | 278.6 | 124.7 | 125.1 | 133.0 | 136.8 | 135.9 | 130.2 | 124.0 | 118.5 | 117.5 |
| 37.5° | 541.6 | 271.2 | 117.3 | 118.5 | 123.8 | 126.4 | 123.6 | 117.3 | 114.5 | 109.8 | 110.0 |
| 40°   | 573.8 | 265.1 | 110.7 | 111.8 | 114.3 | 116.8 | 112.2 | 108.1 | 113.4 | 113.0 | 113.4 |
| 42.5° | 596.7 | 260.0 | 105.0 | 104.5 | 106.2 | 107.9 | 104.5 | 102.4 | 111.3 | 108.8 | 110.1 |
| 45°   | 610.1 | 255.3 | 100.3 | 96.9  | 99.5  | 102.6 | 100.3 | 97.7  | 100.7 | 89.3  | 88.4  |
| 47.5° | 619.2 | 252.6 | 96.1  | 89.5  | 94.2  | 99.5  | 94.8  | 88.4  | 84.0  | 74.2  | 73.4  |
| 50°   | 620.2 | 251.3 | 91.2  | 81.9  | 88.0  | 93.7  | 88.2  | 79.3  | 73.0  | 68.7  | 68.1  |
| 52.5° | 625.1 | 254.0 | 84.4  | 72.3  | 78.9  | 88.0  | 84.2  | 75.3  | 66.8  | 63.0  | 62.3  |
| 55°   | 647.0 | 265.1 | 73.0  | 59.0  | 68.7  | 83.6  | 81.0  | 67.2  | 59.0  | 56.8  | 56.2  |
| 57.5° | 669.7 | 267.4 | 57.5  | 46.7  | 59.8  | 77.4  | 74.0  | 61.9  | 53.9  | 51.3  | 50.7  |
| 60°   | 612.4 | 220.3 | 43.1  | 38.6  | 52.8  | 71.5  | 68.5  | 58.7  | 49.4  | 46.2  | 45.6  |
| 62.5° | 402.3 | 119.0 | 34.3  | 32.7  | 44.5  | 60.6  | 62.5  | 53.0  | 44.1  | 40.7  | 40.5  |
| 65°   | 185.5 | 55.3  | 26.3  | 25.9  | 34.8  | 48.3  | 53.7  | 46.4  | 37.3  | 34.3  | 34.3  |
| 67.5° | 50.5  | 27.4  | 20.6  | 19.1  | 23.7  | 32.4  | 39.2  | 34.6  | 26.5  | 22.9  | 22.7  |
| 70°   | 25.2  | 22.1  | 18.5  | 16.5  | 17.0  | 20.1  | 23.1  | 19.3  | 13.4  | 11.0  | 10.8  |
| 72.5° | 20.6  | 18.2  | 15.7  | 14.0  | 12.9  | 12.3  | 11.9  | 9.7   | 6.2   | 4.7   | 4.5   |
| 75°   | 15.3  | 13.1  | 11.2  | 9.1   | 7.8   | 7.2   | 6.4   | 4.7   | 2.6   | 1.5   | 1.3   |
| 77.5° | 3.4   | 3.2   | 3.0   | 2.3   | 2.1   | 1.7   | 1.3   | 0.9   | 0.4   | 0.0   | 0.0   |
| 80°   | 0.2   | 0.2   | 0.2   | 0.2   | 0.2   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 82.5° | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 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   |

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)