

Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269

Scaled data based on original data using  
LM-79-2024 Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Test Report Prepared for  
Cooper Lighting Solutions

Brand: INVUE

Report Number: P870958

Luminaire Tested: EMM2-HTN-SA1B-840-U-5MQ

Issue Date: 09/05/2024

**Test Information**

Test Method: LM-79-2024  
Report Number: P870958  
Test Lab: INNOVATION CENTER(G3)  
Issue Date: 5/19/2026  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: INVUE  
Catalog Number: EMM2-HTN-SA1B-840-U-5MQ  
Description: EPIC MODERN TALL HOUSING DISCRETE LED ARRAYS 60W 80CRI 4000K FIXTURE w/ TYPE V SQUARE MEDIUM DISTRIBUTION OPTIC  
Light Source: (10) 4000K CCT, 80 CRI LEDS  
Ballast/Driver: -

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 6164.8 lumens  
Efficiency: N/A  
Efficacy: 140.1 lumens/watt  
Luminous Opening: Rectangular (W 0.33' x L: 0.33' x H: 0')  
IES Classification: Type V - Short  
BUG Rating: B3 - U0 - G1

Input Watts (W): 44  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.99  
Total Harmonic Distortion (THDi): 6.91%  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT

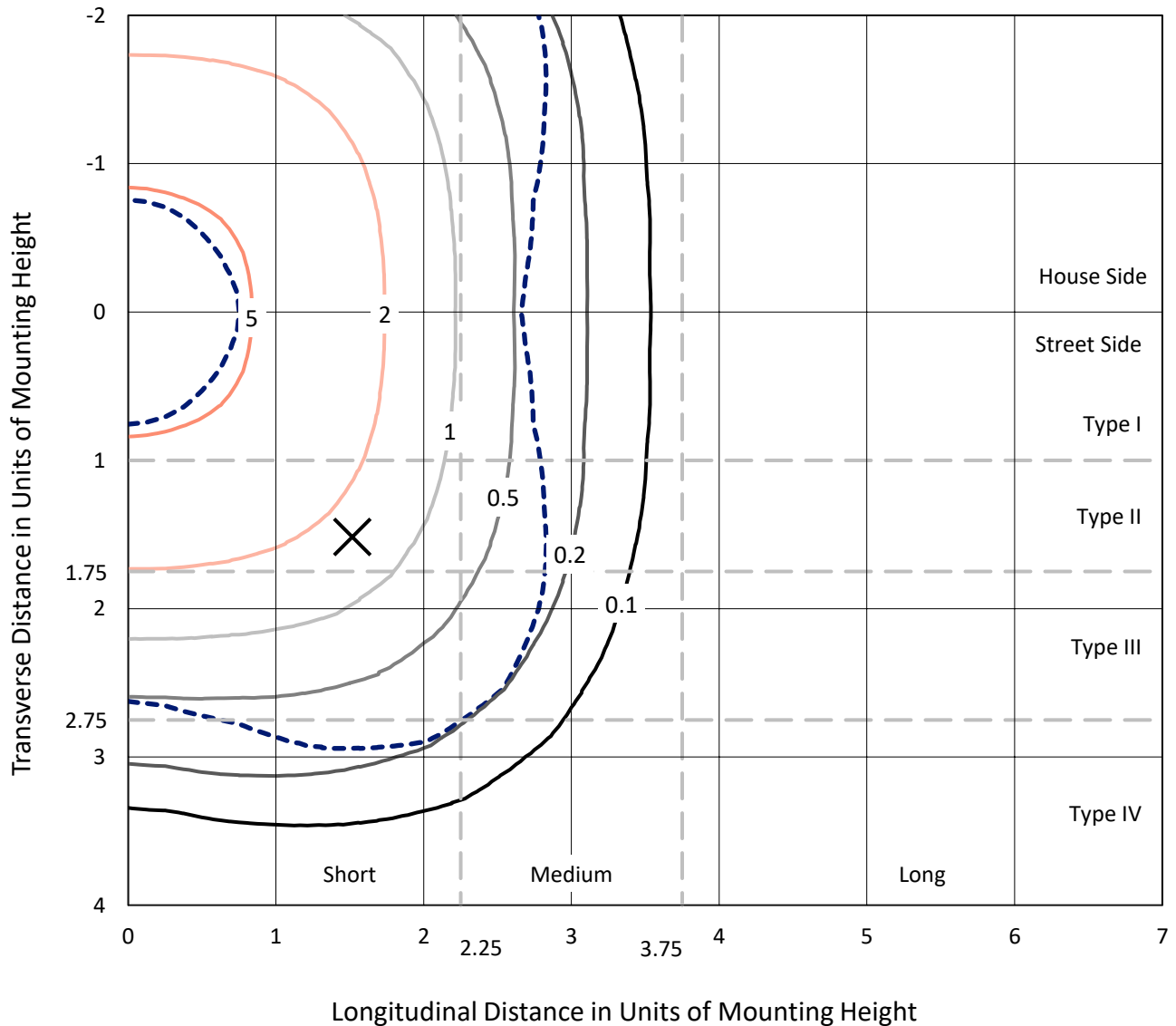


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### Iso-Footcandle Lines of Horizontal Illumination

✕ Max cd  
 - - - 1/2 Max cd

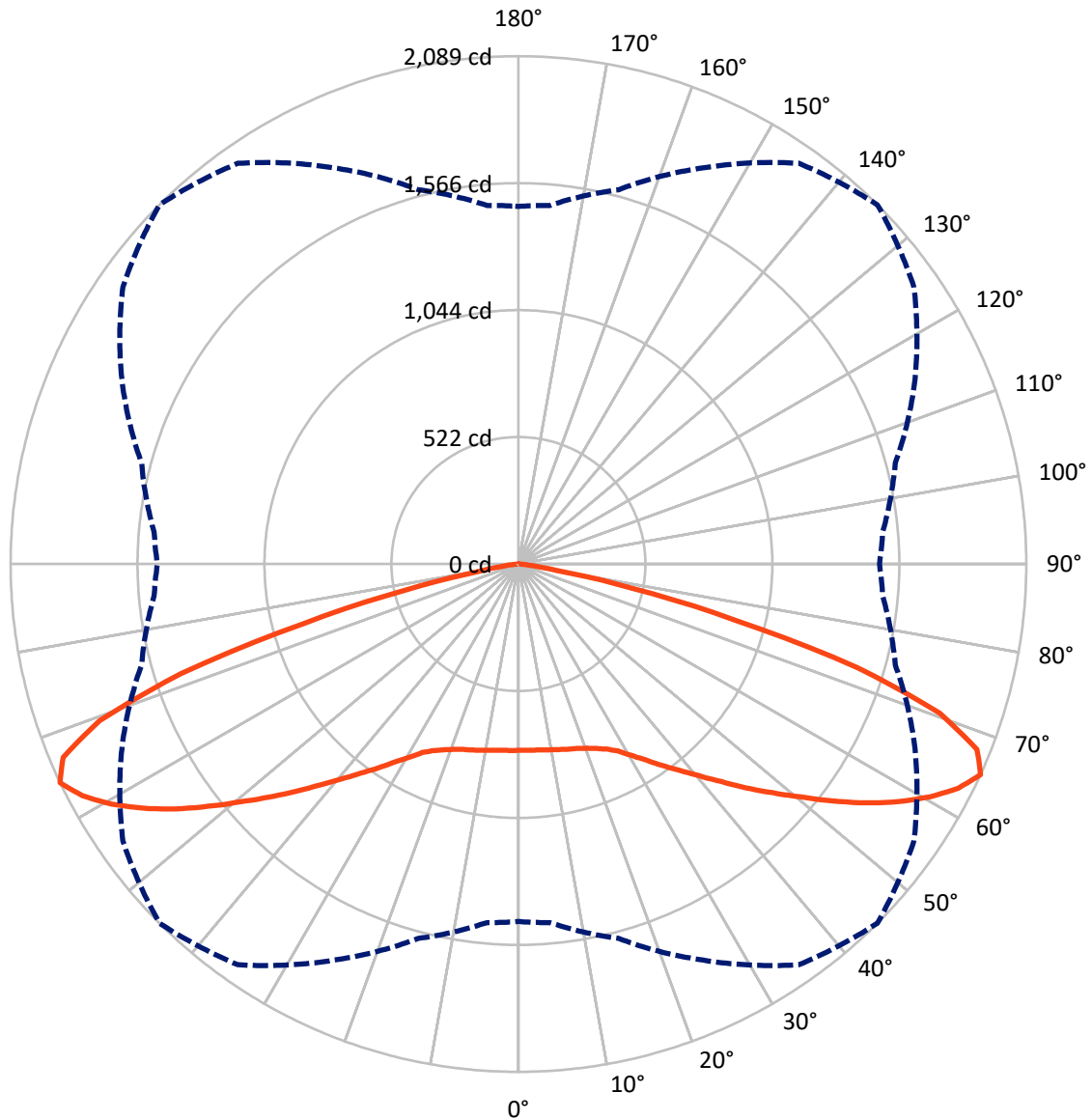


Based on 10 foot mounting height. Maximum calculated value = 7.7 fc  
 Type V - Short - N/A

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### Luminous Intensity Polar Plot



— Vertical Plane Through 45-Deg Lateral      - - - Horizontal Cone Through 65-Deg Vertical

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**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 3082.4   | 0.0    | 3082.4 |
|                    | % Fixture | 50.0     | 0.0    | 50.0   |
| <b>Street Side</b> | Lumens    | 3082.4   | 0.0    | 3082.4 |
|                    | % Fixture | 50.0     | 0.0    | 50.0   |
| <b>Total</b>       | Lumens    | 6164.8   | 0.0    | 6164.8 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**Coefficient of Utilization**

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 73.6   | 1.2       |
| 10°-20°   | 224.2  | 3.6       |
| 20°-30°   | 394.4  | 6.4       |
| 30°-40°   | 637.8  | 10.3      |
| 40°-50°   | 993.5  | 16.1      |
| 50°-60°   | 1452.7 | 23.6      |
| 60°-70°   | 1672.8 | 27.1      |
| 70°-80°   | 683.2  | 11.1      |
| 80°-90°   | 32.7   | 0.5       |
| 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°    | 6164.8 | 100.0     |
| 0°-180°   | 6164.8 | 100.0     |



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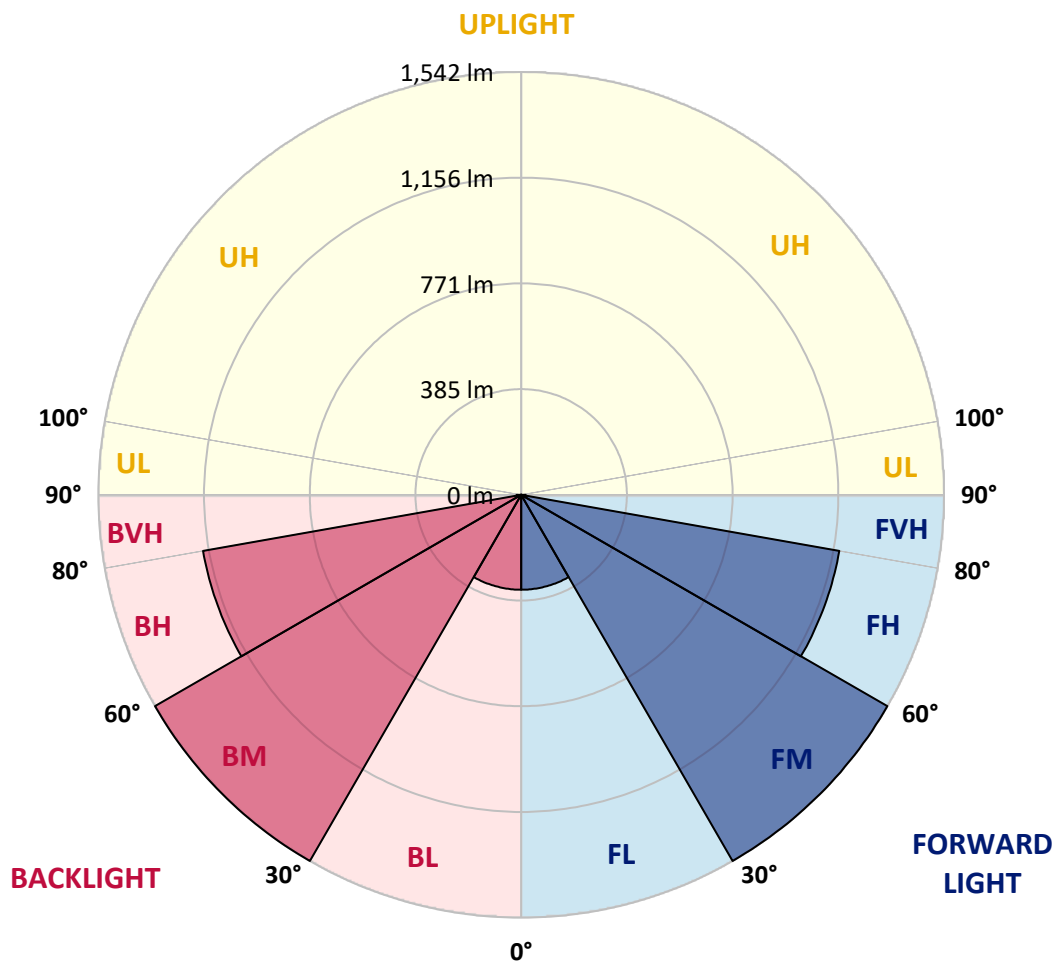
CATALOG NUMBER: EMM2-HTN-SA1B-840-U-5MQ

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 346.1  | 5.6       |                         |      |         |
| FM   | (30°-60°)   | 1541.9 | 25.0      |                         |      |         |
| FH   | (60°-80°)   | 1178.0 | 19.1      |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 16.3   | 0.3       |                         |      | G1/100  |
| BL   | (0°-30°)    | 346.1  | 5.6       | B1/500                  |      |         |
| BM   | (30°-60°)   | 1541.9 | 25.0      | B2/2500                 |      |         |
| BH   | (60°-80°)   | 1178.0 | 19.1      | B3/2500                 |      | G1/1800 |
| BVH  | (80°-90°)   | 16.3   | 0.3       |                         |      | G1/100  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B3-U0-G1**

Type V Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 75°    | 85°    | 90°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 766.0  | 766.0  | 766.0  | 766.0  | 766.0  | 766.0  | 766.0  | 766.0  | 766.0  | 766.0  | 766.0  |
| 2.5°  | 768.4  | 768.4  | 767.2  | 767.2  | 764.8  | 767.2  | 766.0  | 767.2  | 766.0  | 766.0  | 767.2  |
| 5°    | 770.7  | 770.7  | 768.4  | 769.6  | 767.2  | 768.4  | 767.2  | 769.6  | 768.4  | 767.2  | 769.6  |
| 7.5°  | 774.3  | 774.3  | 771.9  | 773.1  | 770.7  | 771.9  | 770.7  | 773.1  | 771.9  | 771.9  | 773.1  |
| 10°   | 777.8  | 779.0  | 776.7  | 775.5  | 775.5  | 776.7  | 777.8  | 779.0  | 777.8  | 777.8  | 780.2  |
| 12.5° | 783.8  | 784.9  | 782.6  | 781.4  | 781.4  | 782.6  | 783.8  | 786.1  | 782.6  | 782.6  | 782.6  |
| 15°   | 789.7  | 789.7  | 788.5  | 787.3  | 788.5  | 789.7  | 789.7  | 792.1  | 789.7  | 787.3  | 787.3  |
| 17.5° | 792.1  | 793.2  | 792.1  | 794.4  | 795.6  | 796.8  | 798.0  | 798.0  | 794.4  | 793.2  | 793.2  |
| 20°   | 800.3  | 801.5  | 799.2  | 800.3  | 803.9  | 808.6  | 808.6  | 808.6  | 808.6  | 805.1  | 805.1  |
| 22.5° | 814.5  | 815.7  | 814.5  | 814.5  | 819.3  | 824.0  | 824.0  | 827.6  | 822.8  | 820.5  | 820.5  |
| 25°   | 838.2  | 838.2  | 837.0  | 838.2  | 840.6  | 843.0  | 847.7  | 850.1  | 850.1  | 848.9  | 850.1  |
| 27.5° | 866.6  | 867.8  | 866.6  | 866.6  | 865.5  | 870.2  | 877.3  | 880.8  | 882.0  | 883.2  | 883.2  |
| 30°   | 904.5  | 906.9  | 905.7  | 906.9  | 909.3  | 912.8  | 915.2  | 916.4  | 916.4  | 914.0  | 914.0  |
| 32.5° | 946.0  | 948.3  | 946.0  | 951.9  | 960.2  | 960.2  | 957.8  | 962.5  | 959.0  | 956.6  | 954.3  |
| 35°   | 994.5  | 994.5  | 996.9  | 999.2  | 1011.1 | 1017.0 | 1017.0 | 1014.6 | 1007.5 | 1004.0 | 1006.3 |
| 37.5° | 1050.1 | 1051.3 | 1053.7 | 1054.9 | 1065.5 | 1076.2 | 1075.0 | 1069.1 | 1060.8 | 1051.3 | 1051.3 |
| 40°   | 1116.4 | 1114.1 | 1115.3 | 1123.6 | 1131.8 | 1144.9 | 1146.0 | 1137.8 | 1123.6 | 1114.1 | 1114.1 |
| 42.5° | 1176.8 | 1178.0 | 1182.7 | 1193.4 | 1212.3 | 1223.0 | 1217.1 | 1202.9 | 1187.5 | 1175.6 | 1174.5 |
| 45°   | 1240.8 | 1239.6 | 1252.6 | 1275.1 | 1300.0 | 1313.0 | 1303.5 | 1283.4 | 1259.7 | 1244.3 | 1244.3 |
| 47.5° | 1305.9 | 1304.7 | 1326.0 | 1362.7 | 1394.7 | 1405.3 | 1395.9 | 1369.8 | 1337.8 | 1315.4 | 1311.8 |
| 50°   | 1373.4 | 1378.1 | 1400.6 | 1452.7 | 1494.1 | 1506.0 | 1494.1 | 1459.8 | 1417.2 | 1387.6 | 1382.8 |
| 52.5° | 1450.3 | 1453.9 | 1483.5 | 1540.3 | 1591.2 | 1618.4 | 1600.7 | 1549.8 | 1495.3 | 1459.8 | 1455.1 |
| 55°   | 1521.4 | 1523.7 | 1566.3 | 1635.0 | 1697.8 | 1734.5 | 1706.0 | 1640.9 | 1572.3 | 1527.3 | 1522.5 |
| 57.5° | 1571.1 | 1577.0 | 1631.5 | 1720.3 | 1800.8 | 1843.4 | 1800.8 | 1730.9 | 1639.7 | 1584.1 | 1580.6 |
| 60°   | 1603.0 | 1612.5 | 1675.3 | 1786.6 | 1897.8 | 1944.0 | 1900.2 | 1803.1 | 1690.7 | 1618.4 | 1614.9 |
| 62.5° | 1586.5 | 1599.5 | 1680.0 | 1825.6 | 1980.7 | 2030.4 | 1973.6 | 1837.5 | 1684.7 | 1593.6 | 1584.1 |
| 65°   | 1470.4 | 1479.9 | 1593.6 | 1797.2 | 2011.5 | 2088.5 | 1985.5 | 1799.6 | 1604.2 | 1503.6 | 1484.7 |
| 67.5° | 1230.1 | 1246.7 | 1397.0 | 1659.9 | 1945.2 | 2034.0 | 1903.8 | 1663.4 | 1427.8 | 1304.7 | 1283.4 |
| 70°   | 944.8  | 974.4  | 1138.9 | 1424.3 | 1738.0 | 1838.6 | 1695.4 | 1404.1 | 1127.1 | 1001.6 | 962.5  |
| 72.5° | 545.8  | 592.0  | 833.5  | 1111.7 | 1382.8 | 1458.6 | 1257.3 | 981.5  | 748.2  | 659.5  | 648.8  |
| 75°   | 181.1  | 197.7  | 396.6  | 640.5  | 882.0  | 919.9  | 786.1  | 619.2  | 492.5  | 421.5  | 425.0  |
| 77.5° | 88.8   | 88.8   | 119.6  | 234.4  | 401.4  | 473.6  | 429.8  | 299.5  | 215.5  | 163.4  | 158.6  |
| 80°   | 71.0   | 71.0   | 82.9   | 114.8  | 135.0  | 158.6  | 135.0  | 98.3   | 80.5   | 73.4   | 77.0   |
| 82.5° | 34.3   | 33.2   | 39.1   | 55.6   | 56.8   | 54.5   | 50.9   | 50.9   | 48.5   | 45.0   | 43.8   |
| 85°   | 2.4    | 2.4    | 4.7    | 10.7   | 17.8   | 23.7   | 27.2   | 26.0   | 24.9   | 21.3   | 23.7   |
| 87.5° | 1.2    | 1.2    | 1.2    | 1.2    | 1.2    | 1.2    | 1.2    | 2.4    | 2.4    | 2.4    | 2.4    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

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



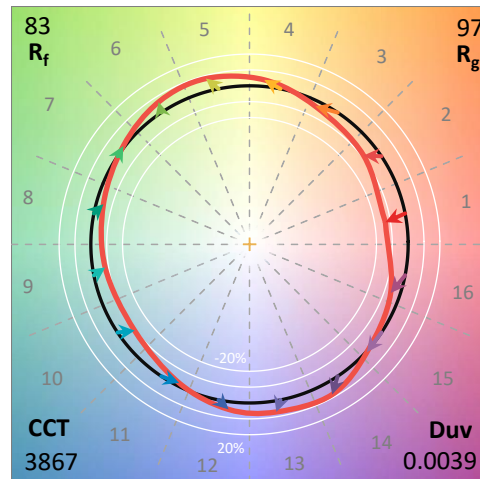
**Test Information**

Test Method: LM-79-2019  
 Report Number: SP1-2309-178-2  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry: 4π  
 Issue Date: 09/22/2023  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: McGRAW-EDISON  
 Catalog Number: **GALN-SA2A-840-U-T4W**  
 Description: GALLEON 2 AREA AND ROADWAY LUMINAIRE. (2) 80 CRI, 4000K, 615MA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE IV WIDE OPTICS

LIGHTSQUARES WITH 16 LEDS EACH AND TYPE IV WIDE OPTICS

**Spectral Parameters**

|                           |        |           |      |      |      |
|---------------------------|--------|-----------|------|------|------|
| CCT (K):                  | 3867   | CRI (Ra): | 79.8 | R9:  | -8.6 |
| CIE u':                   | 0.2254 | R1:       | 76.6 | R10: | 66.3 |
| CIE v':                   | 0.5090 | R2:       | 84.7 | R11: | 80.5 |
| Duv:                      | 0.0039 | R3:       | 93.7 | R12: | 67.3 |
| CIE x:                    | 0.3895 | R4:       | 80.6 | R13: | 77.9 |
| CIE y:                    | 0.3908 | R5:       | 77.9 | R14: | 96.6 |
| CIE z:                    | 0.2197 | R6:       | 81.2 |      |      |
| Peak Wavelength (nm):     | 593    | R7:       | 84.2 |      |      |
| Dominant Wavelength (nm): | 577    | R8:       | 59.0 |      |      |
| Purity:                   | 34.3   |           |      |      |      |
| Rf:                       | 82.7   |           |      |      |      |
| Rg:                       | 96.5   |           |      |      |      |



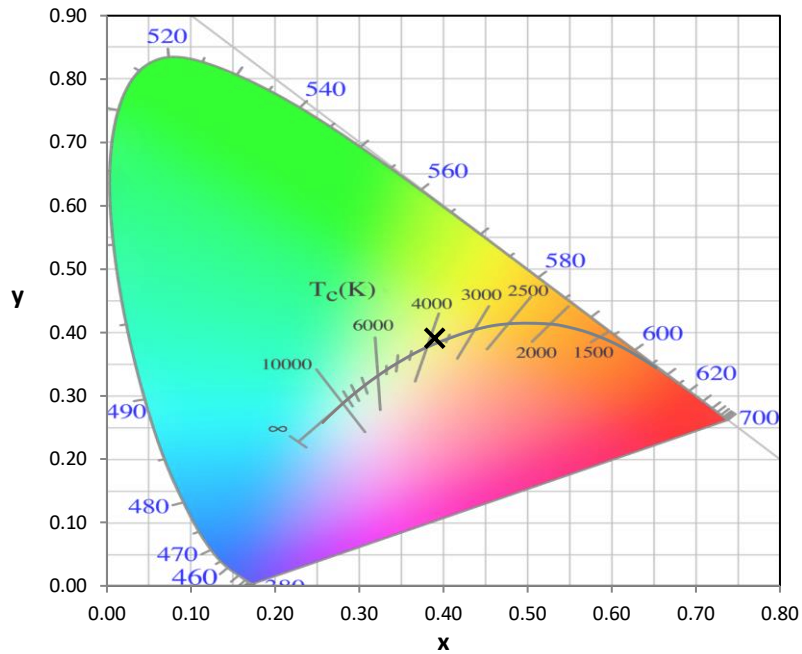
**Test Conditions**  
 Stabilization Time: 25M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.8/46%  
 Sphere Temperature (°C): 24.7

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| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | 76INCH SPHERE IN0058  | 8/9/2023         | 2/9/2024             |
| Power Meter                    | XITRON 2801 IN0071    | 11/29/2022       | 11/29/2023           |
| AC Power Source                | CHROMA 61603 IN0063   | 11/28/2022       | 11/28/2023           |
| DC Power Source                | AGILENT E3634A IN0208 | 11/28/2022       | 11/28/2023           |
| Sphere Thermometer             | ONSET IN0085          | 11/28/2022       | 11/28/2023           |
| Room Thermometer               | ONSET IN0046          | 11/28/2022       | 11/28/2023           |

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CIE 1931 Chromaticity Diagram



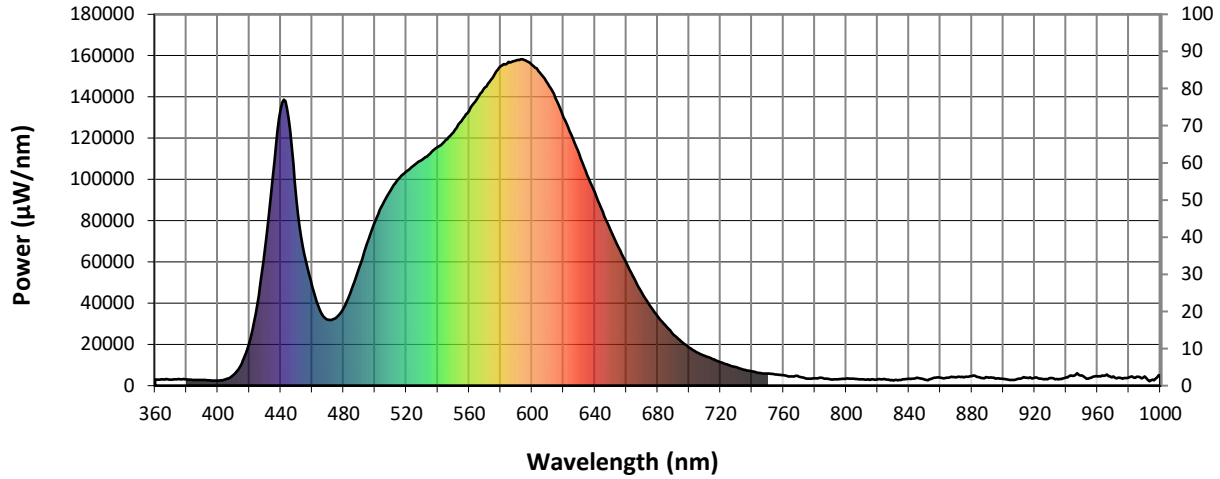
CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles



Point lies inside the ANSI 4000K 4-step quadrangle

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**Photopic Flux vs. Wavelength**



#####

| $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|
| 360               | 3123                                 | NR                             | 490               | 57459                                | NR                             | 620               | 129941                               | NR                             | 750               | 5858                                 | NR                             | 880               | 4622                                 | NR                             |
| 365               | 3041                                 | NR                             | 495               | 69038                                | NR                             | 625               | 121678                               | NR                             | 755               | 5395                                 | NR                             | 885               | 3949                                 | NR                             |
| 370               | 2965                                 | NR                             | 500               | 79493                                | NR                             | 630               | 112252                               | NR                             | 760               | 5011                                 | NR                             | 890               | 4035                                 | NR                             |
| 375               | 3195                                 | NR                             | 505               | 87950                                | NR                             | 635               | 102369                               | NR                             | 765               | 4514                                 | NR                             | 895               | 3391                                 | NR                             |
| 380               | 3028                                 | NR                             | 510               | 94704                                | NR                             | 640               | 93616                                | NR                             | 770               | 4375                                 | NR                             | 900               | 3268                                 | NR                             |
| 385               | 2738                                 | NR                             | 515               | 100214                               | NR                             | 645               | 84211                                | NR                             | 775               | 3450                                 | NR                             | 905               | 2767                                 | NR                             |
| 390               | 2690                                 | NR                             | 520               | 103961                               | NR                             | 650               | 75380                                | NR                             | 780               | 3547                                 | NR                             | 910               | 3391                                 | NR                             |
| 395               | 2604                                 | NR                             | 525               | 106854                               | NR                             | 655               | 66946                                | NR                             | 785               | 3648                                 | NR                             | 915               | 3784                                 | NR                             |
| 400               | 2384                                 | NR                             | 530               | 109533                               | NR                             | 660               | 59483                                | NR                             | 790               | 3081                                 | NR                             | 920               | 3790                                 | NR                             |
| 405               | 3031                                 | NR                             | 535               | 112417                               | NR                             | 665               | 51858                                | NR                             | 795               | 3104                                 | NR                             | 925               | 3175                                 | NR                             |
| 410               | 5239                                 | NR                             | 540               | 115725                               | NR                             | 670               | 44882                                | NR                             | 800               | 3444                                 | NR                             | 930               | 3642                                 | NR                             |
| 415               | 10499                                | NR                             | 545               | 119091                               | NR                             | 675               | 38742                                | NR                             | 805               | 3315                                 | NR                             | 935               | 3040                                 | NR                             |
| 420               | 20790                                | NR                             | 550               | 122884                               | NR                             | 680               | 33597                                | NR                             | 810               | 3022                                 | NR                             | 940               | 4039                                 | NR                             |
| 425               | 39276                                | NR                             | 555               | 128300                               | NR                             | 685               | 29101                                | NR                             | 815               | 2832                                 | NR                             | 945               | 4797                                 | NR                             |
| 430               | 66418                                | NR                             | 560               | 133274                               | NR                             | 690               | 24855                                | NR                             | 820               | 3142                                 | NR                             | 950               | 4945                                 | NR                             |
| 435               | 101961                               | NR                             | 565               | 139112                               | NR                             | 695               | 21367                                | NR                             | 825               | 3115                                 | NR                             | 955               | 3757                                 | NR                             |
| 440               | 134023                               | NR                             | 570               | 144467                               | NR                             | 700               | 18479                                | NR                             | 830               | 2520                                 | NR                             | 960               | 4539                                 | NR                             |
| 445               | 129385                               | NR                             | 575               | 149331                               | NR                             | 705               | 16131                                | NR                             | 835               | 2783                                 | NR                             | 965               | 4857                                 | NR                             |
| 450               | 90434                                | NR                             | 580               | 154784                               | NR                             | 710               | 14388                                | NR                             | 840               | 3364                                 | NR                             | 970               | 4463                                 | NR                             |
| 455               | 63521                                | NR                             | 585               | 156899                               | NR                             | 715               | 12865                                | NR                             | 845               | 3807                                 | NR                             | 975               | 3718                                 | NR                             |
| 460               | 48429                                | NR                             | 590               | 157796                               | NR                             | 720               | 11277                                | NR                             | 850               | 2907                                 | NR                             | 980               | 3955                                 | NR                             |
| 465               | 36445                                | NR                             | 595               | 157849                               | NR                             | 725               | 10063                                | NR                             | 855               | 3470                                 | NR                             | 985               | 4314                                 | NR                             |
| 470               | 31953                                | NR                             | 600               | 155418                               | NR                             | 730               | 8942                                 | NR                             | 860               | 3820                                 | NR                             | 990               | 4478                                 | NR                             |
| 475               | 32768                                | NR                             | 605               | 151601                               | NR                             | 735               | 7722                                 | NR                             | 865               | 3922                                 | NR                             | 995               | 2959                                 | NR                             |
| 480               | 37631                                | NR                             | 610               | 146416                               | NR                             | 740               | 6964                                 | NR                             | 870               | 4061                                 | NR                             | 1000              | 4570                                 | NR                             |
| 485               | 46354                                | NR                             | 615               | 139241                               | NR                             | 745               | 6117                                 | NR                             | 875               | 3975                                 | NR                             |                   |                                      |                                |

REPORT NUMBER: SP1-2309-178-2

Scotopic Flux vs. Wavelength



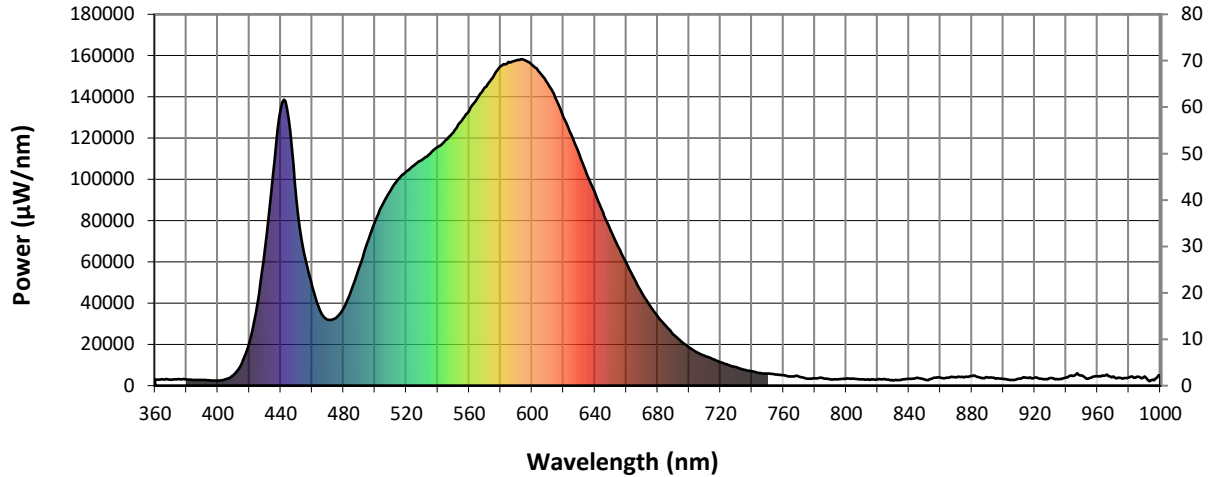
Scotopic Lumens: 14236

S/P: 1.59

| λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) |
|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|
| 360    | 3123          | NR            | 490    | 57459         | NR            | 620    | 129941        | NR            | 750    | 5858          | NR            | 880    | 4622          | NR            |
| 365    | 3041          | NR            | 495    | 69038         | NR            | 625    | 121678        | NR            | 755    | 5395          | NR            | 885    | 3949          | NR            |
| 370    | 2965          | NR            | 500    | 79493         | NR            | 630    | 112252        | NR            | 760    | 5011          | NR            | 890    | 4035          | NR            |
| 375    | 3195          | NR            | 505    | 87950         | NR            | 635    | 102369        | NR            | 765    | 4514          | NR            | 895    | 3391          | NR            |
| 380    | 3028          | NR            | 510    | 94704         | NR            | 640    | 93616         | NR            | 770    | 4375          | NR            | 900    | 3268          | NR            |
| 385    | 2738          | NR            | 515    | 100214        | NR            | 645    | 84211         | NR            | 775    | 3450          | NR            | 905    | 2767          | NR            |
| 390    | 2690          | NR            | 520    | 103961        | NR            | 650    | 75380         | NR            | 780    | 3547          | NR            | 910    | 3391          | NR            |
| 395    | 2604          | NR            | 525    | 106854        | NR            | 655    | 66946         | NR            | 785    | 3648          | NR            | 915    | 3784          | NR            |
| 400    | 2384          | NR            | 530    | 109533        | NR            | 660    | 59483         | NR            | 790    | 3081          | NR            | 920    | 3790          | NR            |
| 405    | 3031          | NR            | 535    | 112417        | NR            | 665    | 51858         | NR            | 795    | 3104          | NR            | 925    | 3175          | NR            |
| 410    | 5239          | NR            | 540    | 115725        | NR            | 670    | 44882         | NR            | 800    | 3444          | NR            | 930    | 3642          | NR            |
| 415    | 10499         | NR            | 545    | 119091        | NR            | 675    | 38742         | NR            | 805    | 3315          | NR            | 935    | 3040          | NR            |
| 420    | 20790         | NR            | 550    | 122884        | NR            | 680    | 33597         | NR            | 810    | 3022          | NR            | 940    | 4039          | NR            |
| 425    | 39276         | NR            | 555    | 128300        | NR            | 685    | 29101         | NR            | 815    | 2832          | NR            | 945    | 4797          | NR            |
| 430    | 66418         | NR            | 560    | 133274        | NR            | 690    | 24855         | NR            | 820    | 3142          | NR            | 950    | 4945          | NR            |
| 435    | 101961        | NR            | 565    | 139112        | NR            | 695    | 21367         | NR            | 825    | 3115          | NR            | 955    | 3757          | NR            |
| 440    | 134023        | NR            | 570    | 144467        | NR            | 700    | 18479         | NR            | 830    | 2520          | NR            | 960    | 4539          | NR            |
| 445    | 129385        | NR            | 575    | 149331        | NR            | 705    | 16131         | NR            | 835    | 2783          | NR            | 965    | 4857          | NR            |
| 450    | 90434         | NR            | 580    | 154784        | NR            | 710    | 14388         | NR            | 840    | 3364          | NR            | 970    | 4463          | NR            |
| 455    | 63521         | NR            | 585    | 156899        | NR            | 715    | 12865         | NR            | 845    | 3807          | NR            | 975    | 3718          | NR            |
| 460    | 48429         | NR            | 590    | 157796        | NR            | 720    | 11277         | NR            | 850    | 2907          | NR            | 980    | 3955          | NR            |
| 465    | 36445         | NR            | 595    | 157849        | NR            | 725    | 10063         | NR            | 855    | 3470          | NR            | 985    | 4314          | NR            |
| 470    | 31953         | NR            | 600    | 155418        | NR            | 730    | 8942          | NR            | 860    | 3820          | NR            | 990    | 4478          | NR            |
| 475    | 32768         | NR            | 605    | 151601        | NR            | 735    | 7722          | NR            | 865    | 3922          | NR            | 995    | 2959          | NR            |
| 480    | 37631         | NR            | 610    | 146416        | NR            | 740    | 6964          | NR            | 870    | 4061          | NR            | 1000   | 4570          | NR            |
| 485    | 46354         | NR            | 615    | 139241        | NR            | 745    | 6117          | NR            | 875    | 3975          | NR            |        |               |               |

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**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 5542.6 M/P: 0.62**

| λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) |
|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|
| 360    | 3123          | NR            | 490    | 57459         | NR            | 620    | 129941        | NR            | 750    | 5858          | NR            | 880    | 4622          | NR            |
| 365    | 3041          | NR            | 495    | 69038         | NR            | 625    | 121678        | NR            | 755    | 5395          | NR            | 885    | 3949          | NR            |
| 370    | 2965          | NR            | 500    | 79493         | NR            | 630    | 112252        | NR            | 760    | 5011          | NR            | 890    | 4035          | NR            |
| 375    | 3195          | NR            | 505    | 87950         | NR            | 635    | 102369        | NR            | 765    | 4514          | NR            | 895    | 3391          | NR            |
| 380    | 3028          | NR            | 510    | 94704         | NR            | 640    | 93616         | NR            | 770    | 4375          | NR            | 900    | 3268          | NR            |
| 385    | 2738          | NR            | 515    | 100214        | NR            | 645    | 84211         | NR            | 775    | 3450          | NR            | 905    | 2767          | NR            |
| 390    | 2690          | NR            | 520    | 103961        | NR            | 650    | 75380         | NR            | 780    | 3547          | NR            | 910    | 3391          | NR            |
| 395    | 2604          | NR            | 525    | 106854        | NR            | 655    | 66946         | NR            | 785    | 3648          | NR            | 915    | 3784          | NR            |
| 400    | 2384          | NR            | 530    | 109533        | NR            | 660    | 59483         | NR            | 790    | 3081          | NR            | 920    | 3790          | NR            |
| 405    | 3031          | NR            | 535    | 112417        | NR            | 665    | 51858         | NR            | 795    | 3104          | NR            | 925    | 3175          | NR            |
| 410    | 5239          | NR            | 540    | 115725        | NR            | 670    | 44882         | NR            | 800    | 3444          | NR            | 930    | 3642          | NR            |
| 415    | 10499         | NR            | 545    | 119091        | NR            | 675    | 38742         | NR            | 805    | 3315          | NR            | 935    | 3040          | NR            |
| 420    | 20790         | NR            | 550    | 122884        | NR            | 680    | 33597         | NR            | 810    | 3022          | NR            | 940    | 4039          | NR            |
| 425    | 39276         | NR            | 555    | 128300        | NR            | 685    | 29101         | NR            | 815    | 2832          | NR            | 945    | 4797          | NR            |
| 430    | 66418         | NR            | 560    | 133274        | NR            | 690    | 24855         | NR            | 820    | 3142          | NR            | 950    | 4945          | NR            |
| 435    | 101961        | NR            | 565    | 139112        | NR            | 695    | 21367         | NR            | 825    | 3115          | NR            | 955    | 3757          | NR            |
| 440    | 134023        | NR            | 570    | 144467        | NR            | 700    | 18479         | NR            | 830    | 2520          | NR            | 960    | 4539          | NR            |
| 445    | 129385        | NR            | 575    | 149331        | NR            | 705    | 16131         | NR            | 835    | 2783          | NR            | 965    | 4857          | NR            |
| 450    | 90434         | NR            | 580    | 154784        | NR            | 710    | 14388         | NR            | 840    | 3364          | NR            | 970    | 4463          | NR            |
| 455    | 63521         | NR            | 585    | 156899        | NR            | 715    | 12865         | NR            | 845    | 3807          | NR            | 975    | 3718          | NR            |
| 460    | 48429         | NR            | 590    | 157796        | NR            | 720    | 11277         | NR            | 850    | 2907          | NR            | 980    | 3955          | NR            |
| 465    | 36445         | NR            | 595    | 157849        | NR            | 725    | 10063         | NR            | 855    | 3470          | NR            | 985    | 4314          | NR            |
| 470    | 31953         | NR            | 600    | 155418        | NR            | 730    | 8942          | NR            | 860    | 3820          | NR            | 990    | 4478          | NR            |
| 475    | 32768         | NR            | 605    | 151601        | NR            | 735    | 7722          | NR            | 865    | 3922          | NR            | 995    | 2959          | NR            |
| 480    | 37631         | NR            | 610    | 146416        | NR            | 740    | 6964          | NR            | 870    | 4061          | NR            | 1000   | 4570          | NR            |
| 485    | 46354         | NR            | 615    | 139241        | NR            | 745    | 6117          | NR            | 875    | 3975          | NR            |        |               |               |

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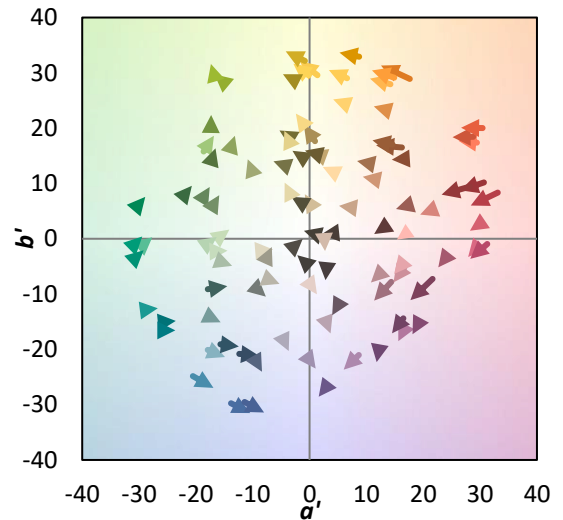
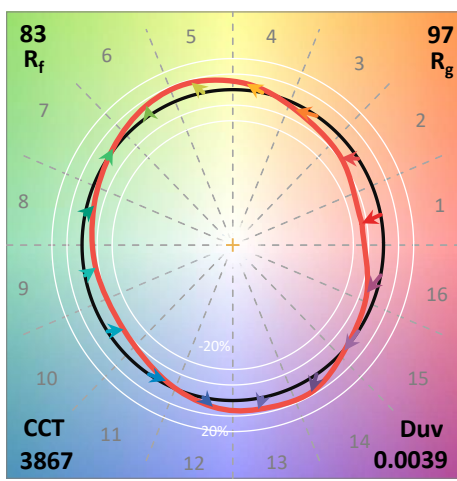
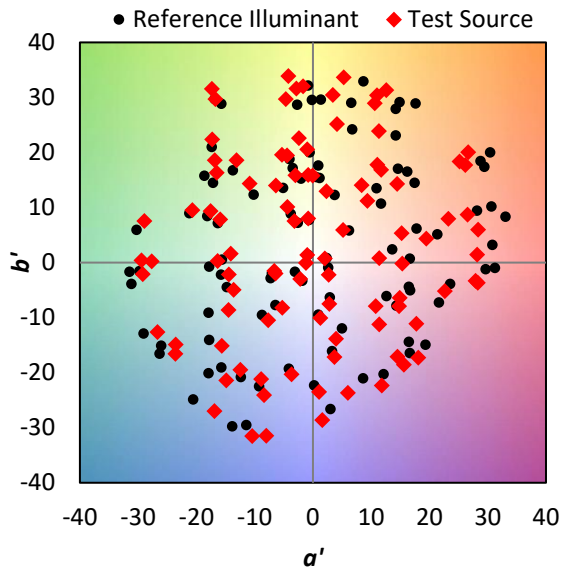
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**Summary**

$R_f = 82.7$   
 $R_g = 96.5$   
 CIE  $R_a = 79.8$   
 $R_g = -8.6$



**Color Vector Graphics**



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

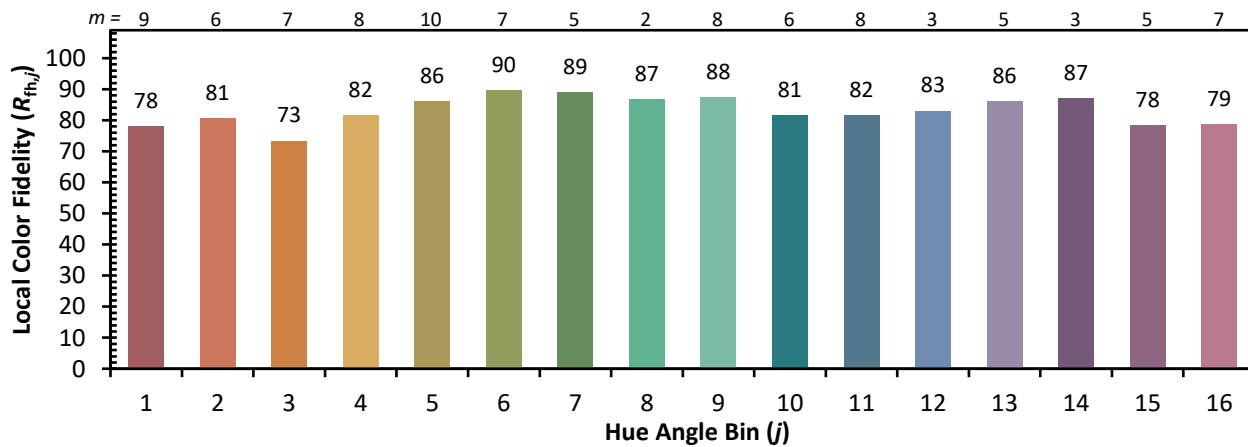
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 76 | CES51 = 94 | CES76 = 73 |
| CES02 = 61 | CES27 = 91 | CES52 = 94 | CES77 = 85 |
| CES03 = 31 | CES28 = 90 | CES53 = 86 | CES78 = 73 |
| CES04 = 69 | CES29 = 73 | CES54 = 88 | CES79 = 91 |
| CES05 = 48 | CES30 = 76 | CES55 = 88 | CES80 = 89 |
| CES06 = 50 | CES31 = 77 | CES56 = 81 | CES81 = 80 |
| CES07 = 40 | CES32 = 74 | CES57 = 80 | CES82 = 95 |
| CES08 = 39 | CES33 = 78 | CES58 = 82 | CES83 = 92 |
| CES09 = 29 | CES34 = 84 | CES59 = 91 | CES84 = 92 |
| CES10 = 74 | CES35 = 92 | CES60 = 96 | CES85 = 85 |
| CES11 = 57 | CES36 = 97 | CES61 = 92 | CES86 = 73 |
| CES12 = 63 | CES37 = 89 | CES62 = 90 | CES87 = 85 |
| CES13 = 42 | CES38 = 83 | CES63 = 83 | CES88 = 83 |
| CES14 = 74 | CES39 = 95 | CES64 = 83 | CES89 = 77 |
| CES15 = 71 | CES40 = 91 | CES65 = 77 | CES90 = 82 |
| CES16 = 47 | CES41 = 90 | CES66 = 82 | CES91 = 91 |
| CES17 = 49 | CES42 = 90 | CES67 = 80 | CES92 = 68 |
| CES18 = 56 | CES43 = 86 | CES68 = 83 | CES93 = 82 |
| CES19 = 71 | CES44 = 99 | CES69 = 90 | CES94 = 61 |
| CES20 = 65 | CES45 = 91 | CES70 = 77 | CES95 = 76 |
| CES21 = 86 | CES46 = 87 | CES71 = 77 | CES96 = 82 |
| CES22 = 78 | CES47 = 85 | CES72 = 92 | CES97 = 89 |
| CES23 = 91 | CES48 = 77 | CES73 = 71 | CES98 = 81 |
| CES24 = 90 | CES49 = 87 | CES74 = 97 | CES99 = 70 |
| CES25 = 71 | CES50 = 93 | CES75 = 76 |            |



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Color Rendition by Hue-Angle Bin



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Measure Comparisons



(END OF REPORT)