

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



Scaled data based on original data using  
LM-79-08 Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Test Report Prepared for  
Cooper Lighting Solutions  
(formerly Eaton)

Brand: McGRAW-EDISON

Report Number: P821268

Luminaire Tested: **TT-D1-750-24VDC-RW-PM**

Issue Date: 10/15/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P821268  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2010-981-1)  
Test Lab: INNOVATION CENTER  
Issue Date: 10/15/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: MCGRAW-EDISON  
Catalog Number: TT-D1-750-24VDC-RW-PM  
Description: TOPTIER LED SITE LUMINAIRE  
5000K, 70 CRI LEDS AND RECTANGULAR DISTRIBUTION  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

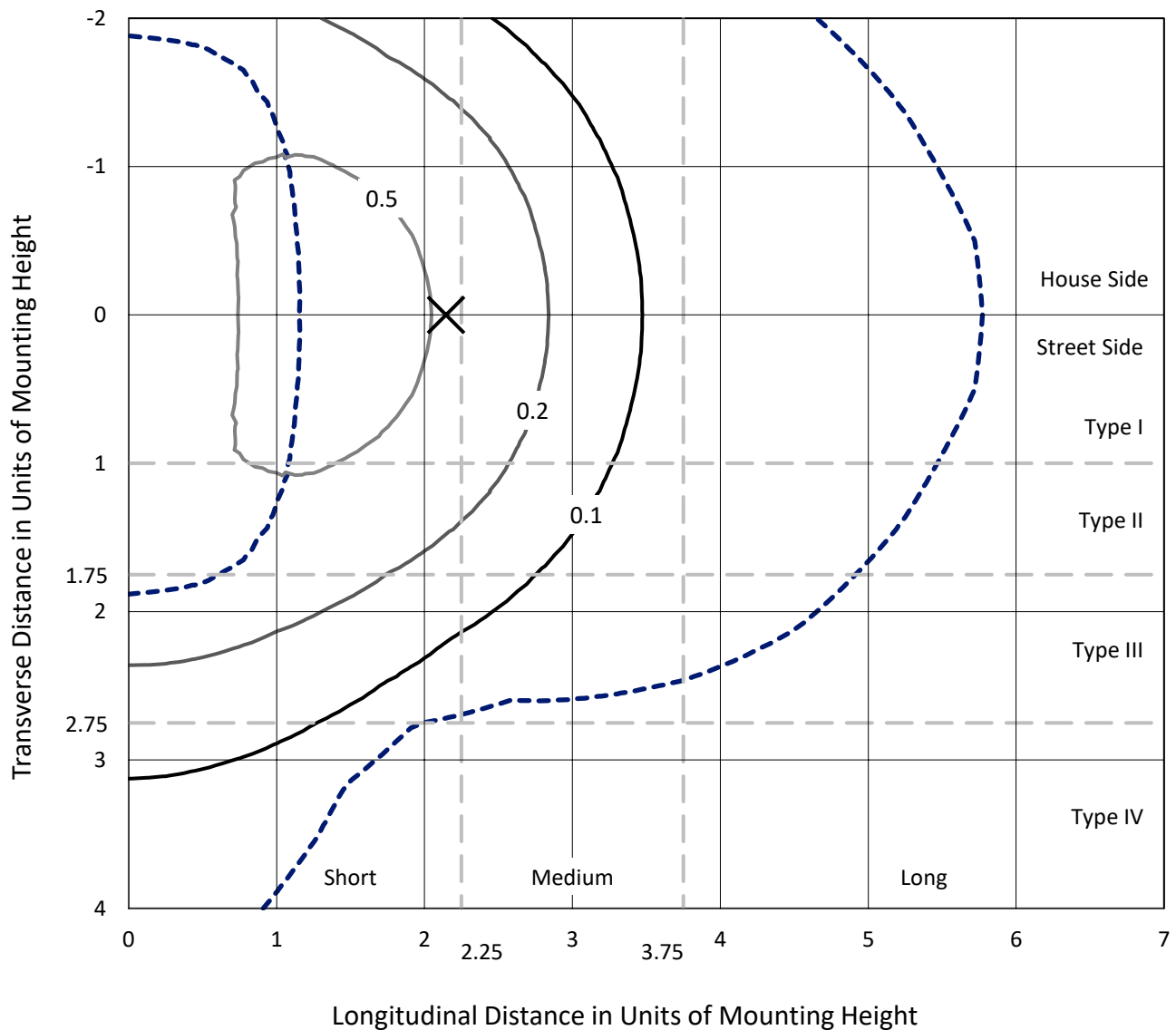
Lumens per Lamp: N/A  
Luminaire Lumens: 3097 lumens  
Efficiency: N/A  
Efficacy: 110.6 lumens/watt  
Luminous Opening: Circular (Dia: 1.12' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B2 - U0 - G2

Input Watts (W): 28  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 25 FT

REPORT NUMBER: P821268  
 CATALOG NUMBER: TT-D1-750-24VDC-RW-PM

## Iso-Footcandle Lines of Horizontal Illumination

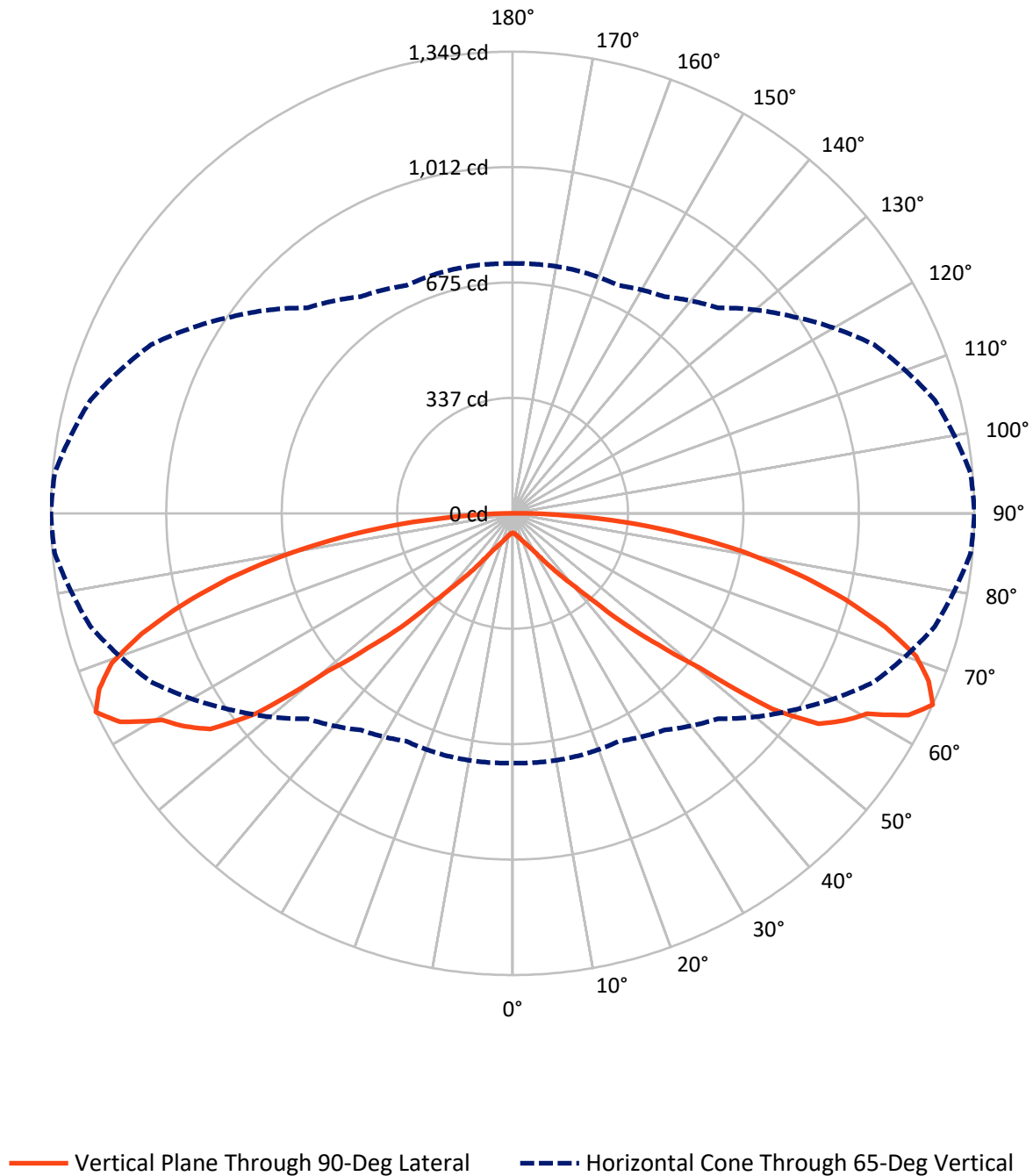
× Max cd  
 - - - 1/2 Max cd



Based on 15 foot mounting height. Maximum calculated value = 0.9 fc  
 Type IV - Short - N/A

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## Luminous Intensity Polar Plot



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CATALOG NUMBER: TT-D1-750-24VDC-RW-PM

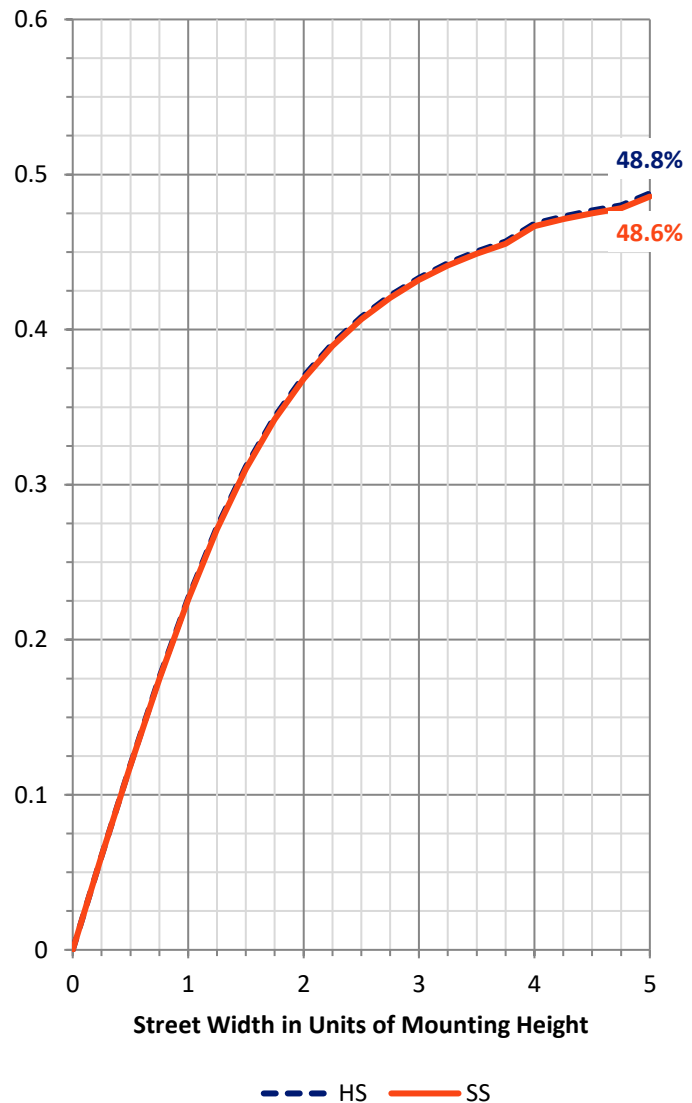
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 1548.5   | 0.0    | 1548.5 |
|                    | % Fixture | 50.0     | 0.0    | 50.0   |
| <b>Street Side</b> | Lumens    | 1548.5   | 0.0    | 1548.5 |
|                    | % Fixture | 50.0     | 0.0    | 50.0   |
| <b>Total</b>       | Lumens    | 3097.0   | 0.0    | 3097.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**Coefficient of Utilization**

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 5.9    | 0.2       |
| 10°-20°   | 22.1   | 0.7       |
| 20°-30°   | 51.0   | 1.6       |
| 30°-40°   | 115.4  | 3.7       |
| 40°-50°   | 281.1  | 9.1       |
| 50°-60°   | 632.1  | 20.4      |
| 60°-70°   | 923.8  | 29.8      |
| 70°-80°   | 804.9  | 26.0      |
| 80°-90°   | 260.7  | 8.4       |
| 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°    | 3097.0 | 100.0     |
| 0°-180°   | 3097.0 | 100.0     |



REPORT NUMBER: P821268

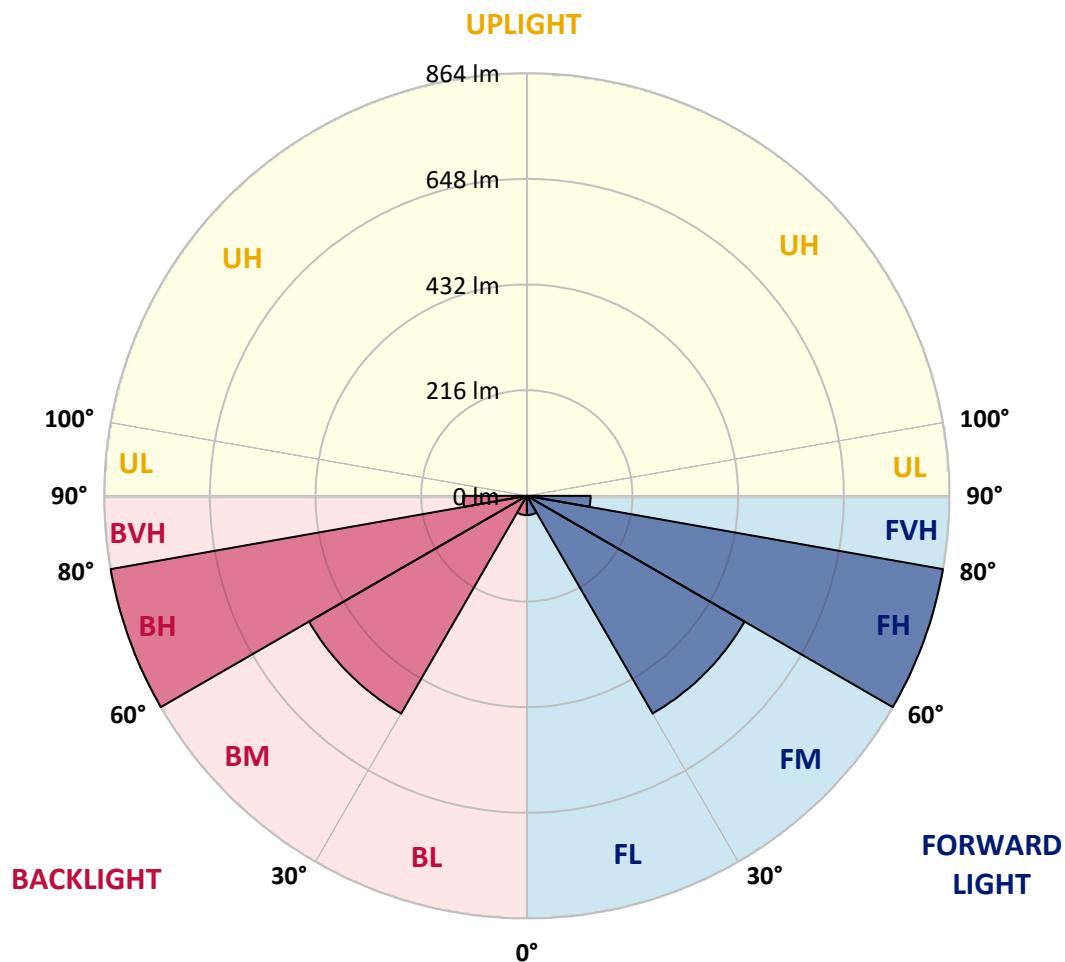
CATALOG NUMBER: TT-D1-750-24VDC-RW-PM

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 39.5   | 1.3       |                         |      |         |
| FM   | (30°-60°)   | 514.3  | 16.6      |                         |      |         |
| FH   | (60°-80°)   | 864.3  | 27.9      |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 130.4  | 4.2       |                         |      | G2/225  |
| BL   | (0°-30°)    | 39.5   | 1.3       | B0/110                  |      |         |
| BM   | (30°-60°)   | 514.3  | 16.6      | B1/1000                 |      |         |
| BH   | (60°-80°)   | 864.3  | 27.9      | B2/1000                 |      | G2/1000 |
| BVH  | (80°-90°)   | 130.4  | 4.2       |                         |      | G2/225  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B2-U0-G2**

Type IV Short



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CATALOG NUMBER: TT-D1-750-24VDC-RW-PM

**CANDELA DISTRIBUTION (FULL):**

|       | 0°    | 5°    | 15°   | 25°   | 35°   | 45°   | 55°    | 65°    | 75°    | 85°    | 90°    |
|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|
| 0°    | 56.6  | 56.6  | 56.6  | 56.6  | 56.6  | 56.6  | 56.6   | 56.6   | 56.6   | 56.6   | 56.6   |
| 2.5°  | 57.3  | 57.3  | 58.1  | 58.1  | 58.1  | 58.1  | 58.1   | 58.1   | 58.1   | 58.1   | 58.1   |
| 5°    | 59.5  | 59.5  | 59.5  | 59.5  | 60.3  | 60.3  | 59.5   | 59.5   | 59.5   | 59.5   | 59.5   |
| 7.5°  | 63.2  | 62.5  | 63.2  | 63.2  | 63.2  | 62.5  | 62.5   | 62.5   | 61.7   | 61.7   | 61.7   |
| 10°   | 66.9  | 66.9  | 67.6  | 66.9  | 66.9  | 66.1  | 66.1   | 66.1   | 65.4   | 65.4   | 65.4   |
| 12.5° | 72.0  | 72.0  | 72.0  | 72.0  | 71.3  | 71.3  | 70.5   | 69.8   | 69.1   | 69.1   | 69.1   |
| 15°   | 78.6  | 77.9  | 77.9  | 77.2  | 76.4  | 75.7  | 75.0   | 75.0   | 74.2   | 74.2   | 74.2   |
| 17.5° | 85.2  | 85.2  | 84.5  | 83.8  | 82.3  | 81.6  | 81.6   | 80.8   | 80.1   | 80.1   | 80.1   |
| 20°   | 93.3  | 93.3  | 92.6  | 91.1  | 89.7  | 88.9  | 88.2   | 88.2   | 87.4   | 87.4   | 87.4   |
| 22.5° | 102.9 | 102.1 | 100.7 | 99.2  | 97.7  | 97.0  | 96.3   | 95.5   | 95.5   | 95.5   | 95.5   |
| 25°   | 113.2 | 112.4 | 111.7 | 109.5 | 107.3 | 106.6 | 105.1  | 105.1  | 104.3  | 105.1  | 105.1  |
| 27.5° | 125.7 | 124.9 | 123.5 | 121.2 | 118.3 | 116.8 | 116.1  | 116.1  | 116.8  | 116.8  | 117.6  |
| 30°   | 141.1 | 139.6 | 138.1 | 135.2 | 132.3 | 130.1 | 130.1  | 130.8  | 133.0  | 134.5  | 134.5  |
| 32.5° | 159.5 | 158.7 | 156.5 | 153.6 | 148.4 | 147.0 | 148.4  | 152.8  | 155.8  | 158.0  | 159.5  |
| 35°   | 180.8 | 180.0 | 177.1 | 172.0 | 168.3 | 167.5 | 172.0  | 179.3  | 188.9  | 191.8  | 193.3  |
| 37.5° | 204.3 | 205.0 | 201.3 | 195.5 | 191.8 | 193.3 | 202.1  | 216.0  | 225.6  | 232.2  | 233.7  |
| 40°   | 233.7 | 235.1 | 230.7 | 224.1 | 220.5 | 226.3 | 240.3  | 256.5  | 273.4  | 281.4  | 283.6  |
| 42.5° | 268.2 | 270.4 | 264.5 | 257.9 | 255.7 | 265.3 | 285.1  | 311.6  | 341.7  | 351.3  | 354.9  |
| 45°   | 310.8 | 312.3 | 305.0 | 299.1 | 297.6 | 314.5 | 348.3  | 392.4  | 440.2  | 462.2  | 465.9  |
| 47.5° | 361.5 | 360.8 | 354.2 | 346.8 | 348.3 | 372.6 | 423.3  | 482.8  | 533.5  | 567.3  | 574.6  |
| 50°   | 419.6 | 415.9 | 410.8 | 402.0 | 411.5 | 446.8 | 510.7  | 582.7  | 668.0  | 698.1  | 711.3  |
| 52.5° | 477.6 | 471.0 | 466.6 | 460.7 | 477.6 | 523.2 | 612.9  | 738.5  | 867.1  | 936.2  | 950.1  |
| 55°   | 529.8 | 524.7 | 522.5 | 523.2 | 549.7 | 615.1 | 732.6  | 893.6  | 1017.8 | 1075.1 | 1085.4 |
| 57.5° | 581.3 | 578.3 | 576.1 | 580.5 | 622.4 | 707.7 | 839.9  | 990.6  | 1092.7 | 1135.3 | 1142.7 |
| 60°   | 629.8 | 632.7 | 631.2 | 644.5 | 695.2 | 781.1 | 895.8  | 1044.2 | 1142.7 | 1181.6 | 1189.7 |
| 62.5° | 683.4 | 685.6 | 685.6 | 700.3 | 741.5 | 817.1 | 934.0  | 1107.4 | 1232.3 | 1289.6 | 1298.5 |
| 65°   | 729.7 | 731.2 | 734.1 | 734.8 | 773.1 | 848.7 | 1001.6 | 1165.5 | 1277.2 | 1343.3 | 1349.2 |
| 67.5° | 764.2 | 765.7 | 762.0 | 758.4 | 787.7 | 856.1 | 996.4  | 1158.1 | 1257.3 | 1307.3 | 1311.7 |
| 70°   | 792.2 | 785.5 | 775.3 | 756.9 | 766.4 | 817.9 | 953.8  | 1099.3 | 1199.3 | 1244.1 | 1250.7 |
| 72.5° | 795.8 | 790.0 | 757.6 | 716.5 | 704.7 | 749.5 | 878.9  | 1009.7 | 1095.6 | 1138.3 | 1139.0 |
| 75°   | 773.8 | 758.4 | 704.7 | 643.0 | 620.9 | 663.6 | 774.5  | 893.6  | 962.6  | 998.6  | 1002.3 |
| 77.5° | 699.6 | 684.9 | 617.3 | 546.7 | 521.7 | 558.5 | 652.5  | 748.8  | 814.9  | 850.2  | 852.4  |
| 80°   | 568.0 | 562.9 | 501.2 | 436.5 | 406.4 | 427.7 | 510.0  | 585.7  | 639.3  | 681.2  | 684.9  |
| 82.5° | 418.9 | 414.4 | 367.4 | 310.8 | 286.6 | 304.2 | 363.0  | 418.9  | 468.8  | 502.6  | 504.8  |
| 85°   | 261.6 | 252.8 | 223.4 | 183.7 | 167.5 | 179.3 | 218.2  | 255.7  | 300.5  | 327.0  | 328.5  |
| 87.5° | 87.4  | 83.8  | 72.0  | 59.5  | 50.0  | 52.2  | 63.9   | 77.9   | 113.9  | 125.7  | 133.0  |
| 90°   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

LM-79-2019: Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Report Prepared for

Cooper Lighting Solutions

Streetworks

Report Number: SP1-2407-176-6

Test Date: 09/26/2024

Luminaire Tested: MEM2-HTN-VA-30-750-U-WQ

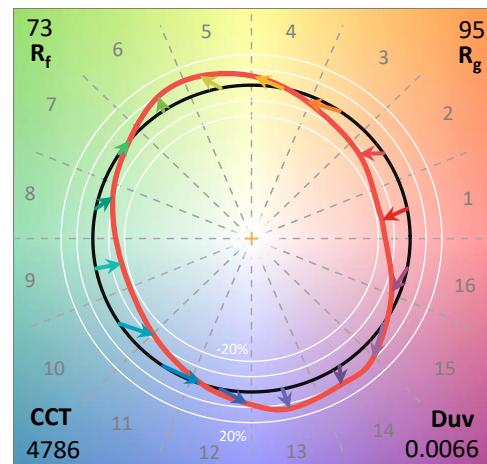
Data in this report applies to families of products including MEM2-HTN-VA-30-750-U-WQ

### Test Information

Test Method: LM-79-2019  
 Report Number: SP1-2407-176-6  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 09/27/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: Streetworks  
 Catalog Number: **MEM2-HTN-VA-30-750-U-WQ**  
 Description: EPIC MODERN VISUAL COMFORT 30W WAVESTREAM WIDE

### Spectral Parameters

|                           |          |           |      |      |       |
|---------------------------|----------|-----------|------|------|-------|
| CCT (K):                  | 4786     | CRI (Ra): | 70.9 |      |       |
| CIE u':                   | 0.2093   | R1:       | 67.8 | R9:  | -29.8 |
| CIE v':                   | 0.4953   | R2:       | 75.1 | R10: | 40.9  |
| Duv:                      | 0.0066   | R3:       | 80.6 | R11: | 67.4  |
| CIE x:                    | 0.3533   | R4:       | 71.6 | R12: | 35.3  |
| CIE y:                    | 0.3716   | R5:       | 67.8 | R13: | 68.5  |
| CIE z:                    | 0.2751   | R6:       | 65.4 | R14: | 89.0  |
| Peak Wavelength (nm):     | 449      | R7:       | 82.0 | R15: | 60.9  |
| Dominant Wavelength (nm): | 570      | R8:       | 57.0 |      |       |
| Purity:                   | 17.53512 |           |      |      |       |
| Rf:                       | 73       |           |      |      |       |
| Rg:                       | 94.6     |           |      |      |       |



### Test Conditions

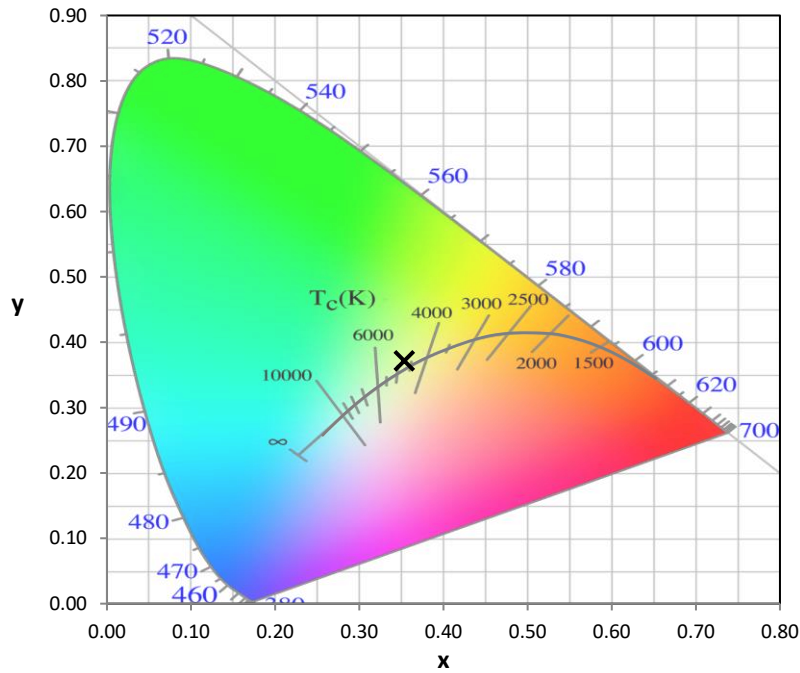
Stabilization Time: 45M  
 Operation Time: 1H 45M  
 Sphere Temperature (°C): 25.2

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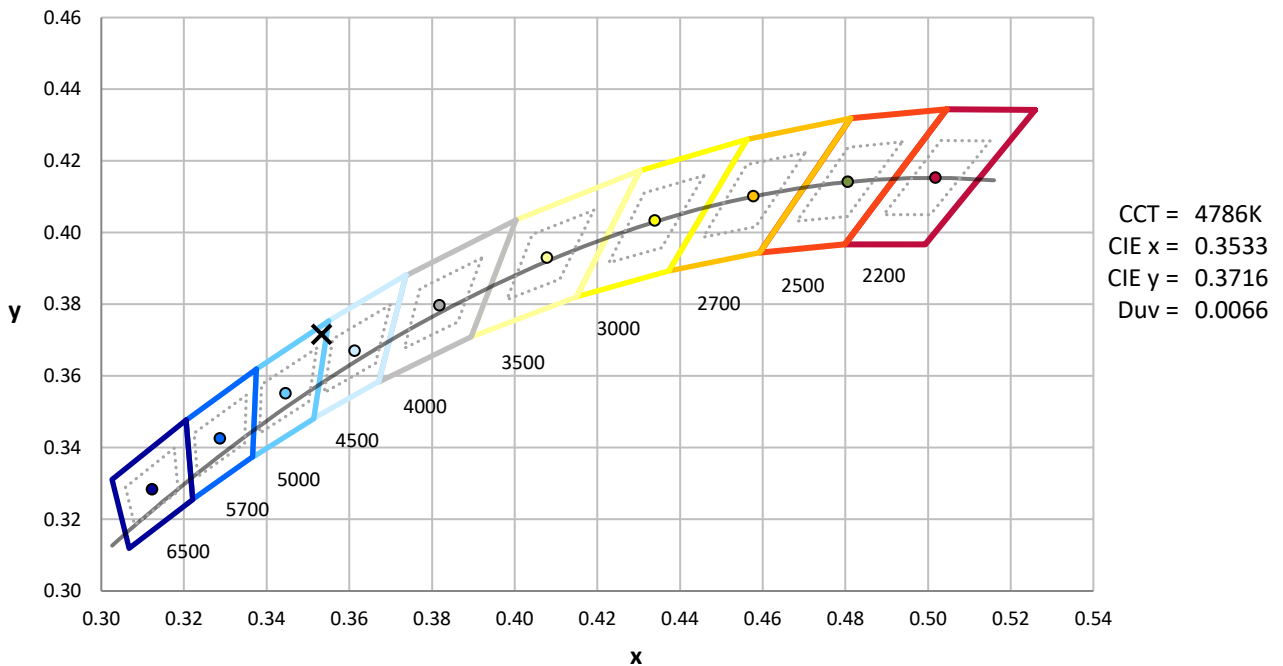
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 6/18/2024        | 12/18/2024           |
| Power Meter                    | INXT2011004           | 2/8/2024         | 2/8/2025             |
| AC Power Source                | IN0063                | 10/24/2023       | 10/24/2024           |
| DC Power Source                | IN0208                | 10/24/2023       | 10/24/2024           |
| Sphere Thermometer             | IN0085                | 10/24/2023       | 10/24/2024           |
| Room Thermometer               | IN0046                | 10/24/2023       | 10/24/2024           |

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**CIE 1931 Chromaticity Diagram**

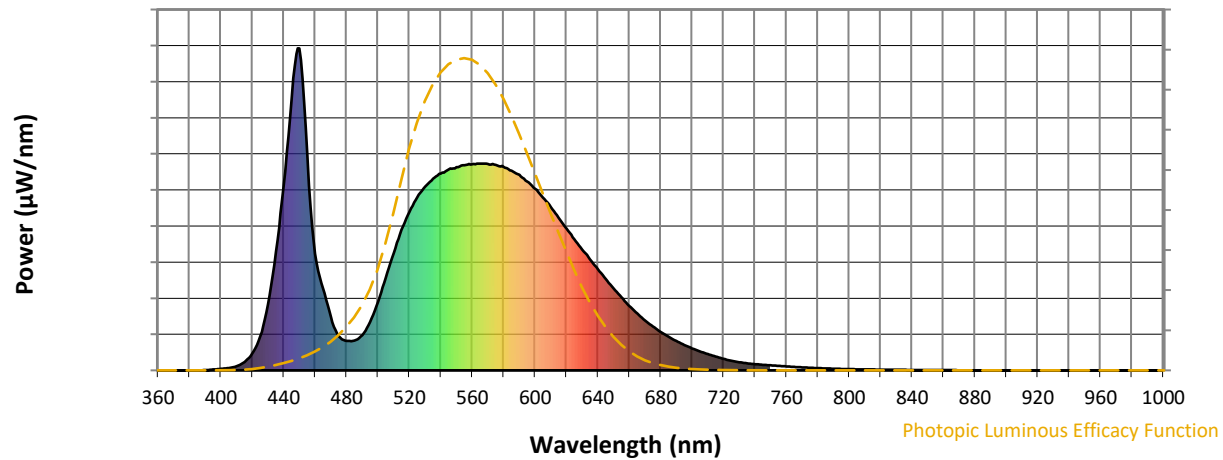


**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



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### Photopic Flux vs. Wavelength

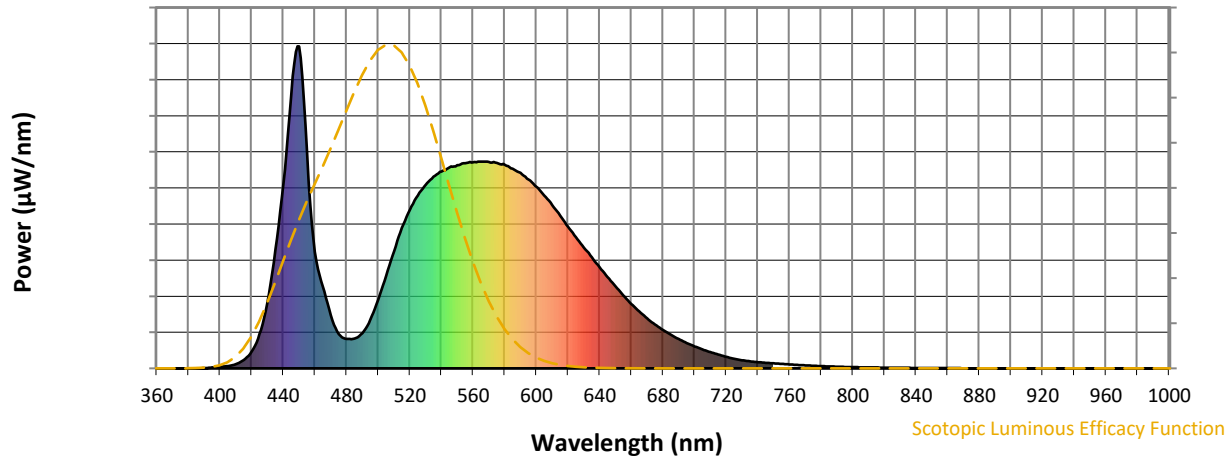


### Photopic Lumens: NR

| $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|
| 360               | 0                                    | NR                             | 490               | 110                                  | NR                             | 620               | 440                                  | NR                             | 750               | 16                                   | NR                             | 880               | 0                                    | NR                             |
| 365               | 0                                    | NR                             | 495               | 150                                  | NR                             | 625               | 407                                  | NR                             | 755               | 14                                   | NR                             | 885               | 0                                    | NR                             |
| 370               | 0                                    | NR                             | 500               | 213                                  | NR                             | 630               | 375                                  | NR                             | 760               | 12                                   | NR                             | 890               | 0                                    | NR                             |
| 375               | 0                                    | NR                             | 505               | 288                                  | NR                             | 635               | 345                                  | NR                             | 765               | 11                                   | NR                             | 895               | 0                                    | NR                             |
| 380               | 0                                    | NR                             | 510               | 364                                  | NR                             | 640               | 314                                  | NR                             | 770               | 9                                    | NR                             | 900               | 0                                    | NR                             |
| 385               | 0                                    | NR                             | 515               | 436                                  | NR                             | 645               | 283                                  | NR                             | 775               | 8                                    | NR                             | 905               | 0                                    | NR                             |
| 390               | 1                                    | NR                             | 520               | 492                                  | NR                             | 650               | 254                                  | NR                             | 780               | 7                                    | NR                             | 910               | 0                                    | NR                             |
| 395               | 3                                    | NR                             | 525               | 537                                  | NR                             | 655               | 227                                  | NR                             | 785               | 6                                    | NR                             | 915               | 0                                    | NR                             |
| 400               | 5                                    | NR                             | 530               | 570                                  | NR                             | 660               | 200                                  | NR                             | 790               | 5                                    | NR                             | 920               | 0                                    | NR                             |
| 405               | 7                                    | NR                             | 535               | 595                                  | NR                             | 665               | 177                                  | NR                             | 795               | 4                                    | NR                             | 925               | 0                                    | NR                             |
| 410               | 13                                   | NR                             | 540               | 611                                  | NR                             | 670               | 155                                  | NR                             | 800               | 4                                    | NR                             | 930               | 0                                    | NR                             |
| 415               | 25                                   | NR                             | 545               | 624                                  | NR                             | 675               | 136                                  | NR                             | 805               | 3                                    | NR                             | 935               | 0                                    | NR                             |
| 420               | 52                                   | NR                             | 550               | 631                                  | NR                             | 680               | 119                                  | NR                             | 810               | 3                                    | NR                             | 940               | 0                                    | NR                             |
| 425               | 106                                  | NR                             | 555               | 637                                  | NR                             | 685               | 104                                  | NR                             | 815               | 3                                    | NR                             | 945               | 0                                    | NR                             |
| 430               | 204                                  | NR                             | 560               | 640                                  | NR                             | 690               | 91                                   | NR                             | 820               | 2                                    | NR                             | 950               | 0                                    | NR                             |
| 435               | 369                                  | NR                             | 565               | 642                                  | NR                             | 695               | 79                                   | NR                             | 825               | 2                                    | NR                             | 955               | 0                                    | NR                             |
| 440               | 573                                  | NR                             | 570               | 641                                  | NR                             | 700               | 68                                   | NR                             | 830               | 2                                    | NR                             | 960               | 0                                    | NR                             |
| 445               | 844                                  | NR                             | 575               | 638                                  | NR                             | 705               | 59                                   | NR                             | 835               | 2                                    | NR                             | 965               | 0                                    | NR                             |
| 450               | 999                                  | NR                             | 580               | 632                                  | NR                             | 710               | 50                                   | NR                             | 840               | 1                                    | NR                             | 970               | 0                                    | NR                             |
| 455               | 668                                  | NR                             | 585               | 620                                  | NR                             | 715               | 43                                   | NR                             | 845               | 1                                    | NR                             | 975               | 0                                    | NR                             |
| 460               | 361                                  | NR                             | 590               | 607                                  | NR                             | 720               | 36                                   | NR                             | 850               | 1                                    | NR                             | 980               | 0                                    | NR                             |
| 465               | 255                                  | NR                             | 595               | 586                                  | NR                             | 725               | 30                                   | NR                             | 855               | 1                                    | NR                             | 985               | 0                                    | NR                             |
| 470               | 165                                  | NR                             | 600               | 564                                  | NR                             | 730               | 25                                   | NR                             | 860               | 1                                    | NR                             | 990               | 0                                    | NR                             |
| 475               | 106                                  | NR                             | 605               | 537                                  | NR                             | 735               | 22                                   | NR                             | 865               | 1                                    | NR                             | 995               | 0                                    | NR                             |
| 480               | 91                                   | NR                             | 610               | 507                                  | NR                             | 740               | 19                                   | NR                             | 870               | 0                                    | NR                             | 1000              | 0                                    | NR                             |
| 485               | 93                                   | NR                             | 615               | 474                                  | NR                             | 745               | 17                                   | NR                             | 875               | 0                                    | NR                             |                   |                                      |                                |

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### Scotopic Flux vs. Wavelength



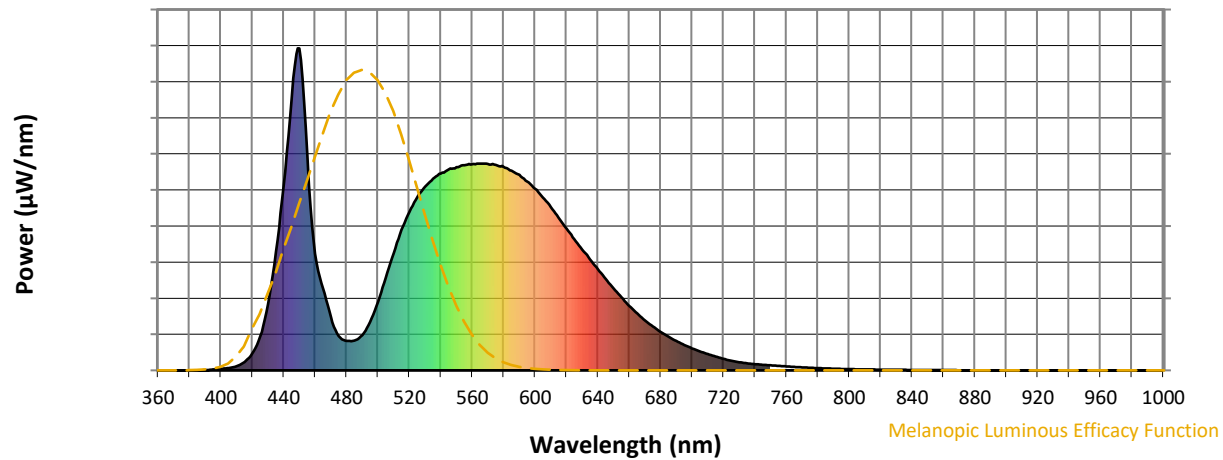
Scotopic Lumens: NR

S/P: 1.69

| λ (nm) | Power W <sup>^</sup> /nm | Lumens (Φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (Φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (Φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (Φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (Φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360    | 0                        | NR            | 490    | 110                      | NR            | 620    | 440                      | NR            | 750    | 16                       | NR            | 880    | 0                        | NR            |
| 365    | 0                        | NR            | 495    | 150                      | NR            | 625    | 407                      | NR            | 755    | 14                       | NR            | 885    | 0                        | NR            |
| 370    | 0                        | NR            | 500    | 213                      | NR            | 630    | 375                      | NR            | 760    | 12                       | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 288                      | NR            | 635    | 345                      | NR            | 765    | 11                       | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 364                      | NR            | 640    | 314                      | NR            | 770    | 9                        | NR            | 900    | 0                        | NR            |
| 385    | 0                        | NR            | 515    | 436                      | NR            | 645    | 283                      | NR            | 775    | 8                        | NR            | 905    | 0                        | NR            |
| 390    | 1                        | NR            | 520    | 492                      | NR            | 650    | 254                      | NR            | 780    | 7                        | NR            | 910    | 0                        | NR            |
| 395    | 3                        | NR            | 525    | 537                      | NR            | 655    | 227                      | NR            | 785    | 6                        | NR            | 915    | 0                        | NR            |
| 400    | 5                        | NR            | 530    | 570                      | NR            | 660    | 200                      | NR            | 790    | 5                        | NR            | 920    | 0                        | NR            |
| 405    | 7                        | NR            | 535    | 595                      | NR            | 665    | 177                      | NR            | 795    | 4                        | NR            | 925    | 0                        | NR            |
| 410    | 13                       | NR            | 540    | 611                      | NR            | 670    | 155                      | NR            | 800    | 4                        | NR            | 930    | 0                        | NR            |
| 415    | 25                       | NR            | 545    | 624                      | NR            | 675    | 136                      | NR            | 805    | 3                        | NR            | 935    | 0                        | NR            |
| 420    | 52                       | NR            | 550    | 631                      | NR            | 680    | 119                      | NR            | 810    | 3                        | NR            | 940    | 0                        | NR            |
| 425    | 106                      | NR            | 555    | 637                      | NR            | 685    | 104                      | NR            | 815    | 3                        | NR            | 945    | 0                        | NR            |
| 430    | 204                      | NR            | 560    | 640                      | NR            | 690    | 91                       | NR            | 820    | 2                        | NR            | 950    | 0                        | NR            |
| 435    | 369                      | NR            | 565    | 642                      | NR            | 695    | 79                       | NR            | 825    | 2                        | NR            | 955    | 0                        | NR            |
| 440    | 573                      | NR            | 570    | 641                      | NR            | 700    | 68                       | NR            | 830    | 2                        | NR            | 960    | 0                        | NR            |
| 445    | 844                      | NR            | 575    | 638                      | NR            | 705    | 59                       | NR            | 835    | 2                        | NR            | 965    | 0                        | NR            |
| 450    | 999                      | NR            | 580    | 632                      | NR            | 710    | 50                       | NR            | 840    | 1                        | NR            | 970    | 0                        | NR            |
| 455    | 668                      | NR            | 585    | 620                      | NR            | 715    | 43                       | NR            | 845    | 1                        | NR            | 975    | 0                        | NR            |
| 460    | 361                      | NR            | 590    | 607                      | NR            | 720    | 36                       | NR            | 850    | 1                        | NR            | 980    | 0                        | NR            |
| 465    | 255                      | NR            | 595    | 586                      | NR            | 725    | 30                       | NR            | 855    | 1                        | NR            | 985    | 0                        | NR            |
| 470    | 165                      | NR            | 600    | 564                      | NR            | 730    | 25                       | NR            | 860    | 1                        | NR            | 990    | 0                        | NR            |
| 475    | 106                      | NR            | 605    | 537                      | NR            | 735    | 22                       | NR            | 865    | 1                        | NR            | 995    | 0                        | NR            |
| 480    | 91                       | NR            | 610    | 507                      | NR            | 740    | 19                       | NR            | 870    | 0                        | NR            | 1000   | 0                        | NR            |
| 485    | 93                       | NR            | 615    | 474                      | NR            | 745    | 17                       | NR            | 875    | 0                        | NR            |        |                          |               |

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### Melanopic Flux vs. Wavelength



Melanopic Lumens: NR

M/P: 3.36

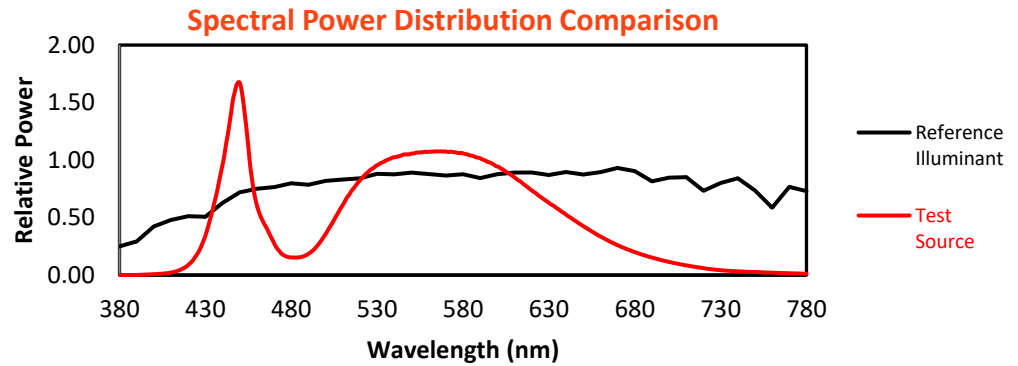
| $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|----------------------------------------|--------------------------------|-------------------|----------------------------------------|--------------------------------|-------------------|----------------------------------------|--------------------------------|-------------------|----------------------------------------|--------------------------------|-------------------|----------------------------------------|--------------------------------|
| 360               | 0                                      | NR                             | 490               | 110                                    | NR                             | 620               | 440                                    | NR                             | 750               | 16                                     | NR                             | 880               | 0                                      | NR                             |
| 365               | 0                                      | NR                             | 495               | 150                                    | NR                             | 625               | 407                                    | NR                             | 755               | 14                                     | NR                             | 885               | 0                                      | NR                             |
| 370               | 0                                      | NR                             | 500               | 213                                    | NR                             | 630               | 375                                    | NR                             | 760               | 12                                     | NR                             | 890               | 0                                      | NR                             |
| 375               | 0                                      | NR                             | 505               | 288                                    | NR                             | 635               | 345                                    | NR                             | 765               | 11                                     | NR                             | 895               | 0                                      | NR                             |
| 380               | 0                                      | NR                             | 510               | 364                                    | NR                             | 640               | 314                                    | NR                             | 770               | 9                                      | NR                             | 900               | 0                                      | NR                             |
| 385               | 0                                      | NR                             | 515               | 436                                    | NR                             | 645               | 283                                    | NR                             | 775               | 8                                      | NR                             | 905               | 0                                      | NR                             |
| 390               | 1                                      | NR                             | 520               | 492                                    | NR                             | 650               | 254                                    | NR                             | 780               | 7                                      | NR                             | 910               | 0                                      | NR                             |
| 395               | 3                                      | NR                             | 525               | 537                                    | NR                             | 655               | 227                                    | NR                             | 785               | 6                                      | NR                             | 915               | 0                                      | NR                             |
| 400               | 5                                      | NR                             | 530               | 570                                    | NR                             | 660               | 200                                    | NR                             | 790               | 5                                      | NR                             | 920               | 0                                      | NR                             |
| 405               | 7                                      | NR                             | 535               | 595                                    | NR                             | 665               | 177                                    | NR                             | 795               | 4                                      | NR                             | 925               | 0                                      | NR                             |
| 410               | 13                                     | NR                             | 540               | 611                                    | NR                             | 670               | 155                                    | NR                             | 800               | 4                                      | NR                             | 930               | 0                                      | NR                             |
| 415               | 25                                     | NR                             | 545               | 624                                    | NR                             | 675               | 136                                    | NR                             | 805               | 3                                      | NR                             | 935               | 0                                      | NR                             |
| 420               | 52                                     | NR                             | 550               | 631                                    | NR                             | 680               | 119                                    | NR                             | 810               | 3                                      | NR                             | 940               | 0                                      | NR                             |
| 425               | 106                                    | NR                             | 555               | 637                                    | NR                             | 685               | 104                                    | NR                             | 815               | 3                                      | NR                             | 945               | 0                                      | NR                             |
| 430               | 204                                    | NR                             | 560               | 640                                    | NR                             | 690               | 91                                     | NR                             | 820               | 2                                      | NR                             | 950               | 0                                      | NR                             |
| 435               | 369                                    | NR                             | 565               | 642                                    | NR                             | 695               | 79                                     | NR                             | 825               | 2                                      | NR                             | 955               | 0                                      | NR                             |
| 440               | 573                                    | NR                             | 570               | 641                                    | NR                             | 700               | 68                                     | NR                             | 830               | 2                                      | NR                             | 960               | 0                                      | NR                             |
| 445               | 844                                    | NR                             | 575               | 638                                    | NR                             | 705               | 59                                     | NR                             | 835               | 2                                      | NR                             | 965               | 0                                      | NR                             |
| 450               | 999                                    | NR                             | 580               | 632                                    | NR                             | 710               | 50                                     | NR                             | 840               | 1                                      | NR                             | 970               | 0                                      | NR                             |
| 455               | 668                                    | NR                             | 585               | 620                                    | NR                             | 715               | 43                                     | NR                             | 845               | 1                                      | NR                             | 975               | 0                                      | NR                             |
| 460               | 361                                    | NR                             | 590               | 607                                    | NR                             | 720               | 36                                     | NR                             | 850               | 1                                      | NR                             | 980               | 0                                      | NR                             |
| 465               | 255                                    | NR                             | 595               | 586                                    | NR                             | 725               | 30                                     | NR                             | 855               | 1                                      | NR                             | 985               | 0                                      | NR                             |
| 470               | 165                                    | NR                             | 600               | 564                                    | NR                             | 730               | 25                                     | NR                             | 860               | 1                                      | NR                             | 990               | 0                                      | NR                             |
| 475               | 106                                    | NR                             | 605               | 537                                    | NR                             | 735               | 22                                     | NR                             | 865               | 1                                      | NR                             | 995               | 0                                      | NR                             |
| 480               | 91                                     | NR                             | 610               | 507                                    | NR                             | 740               | 19                                     | NR                             | 870               | 0                                      | NR                             | 1000              | 0                                      | NR                             |
| 485               | 93                                     | NR                             | 615               | 474                                    | NR                             | 745               | 17                                     | NR                             | 875               | 0                                      | NR                             |                   |                                        |                                |

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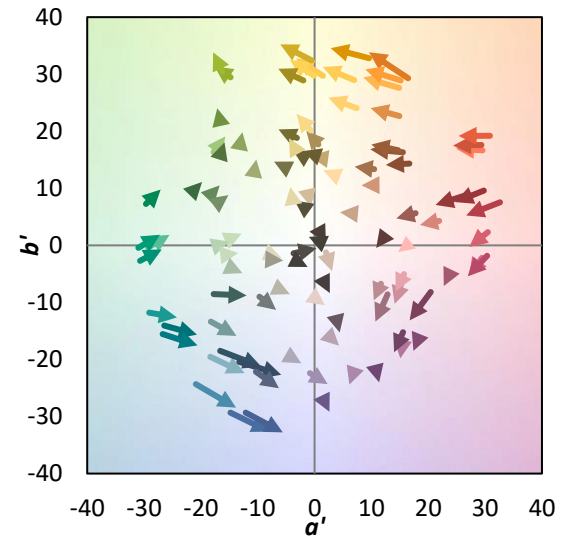
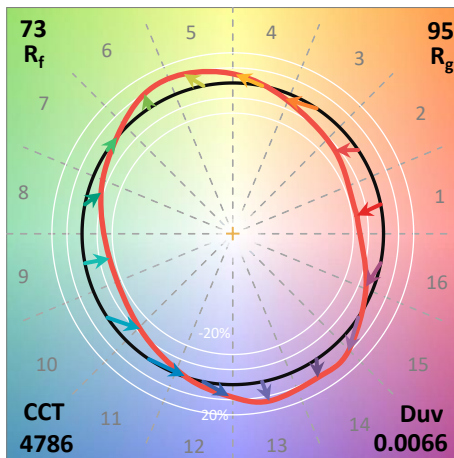
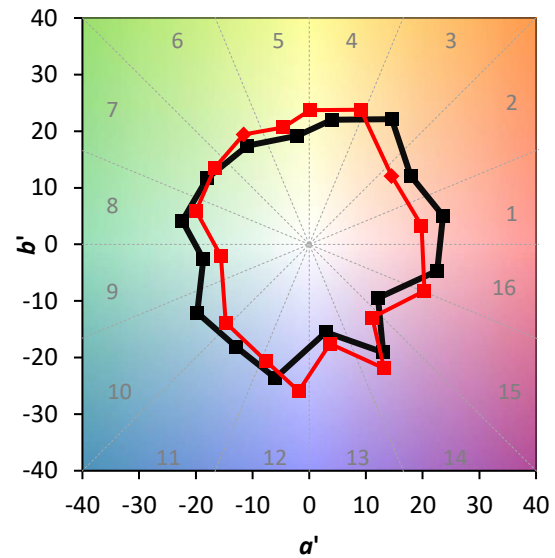
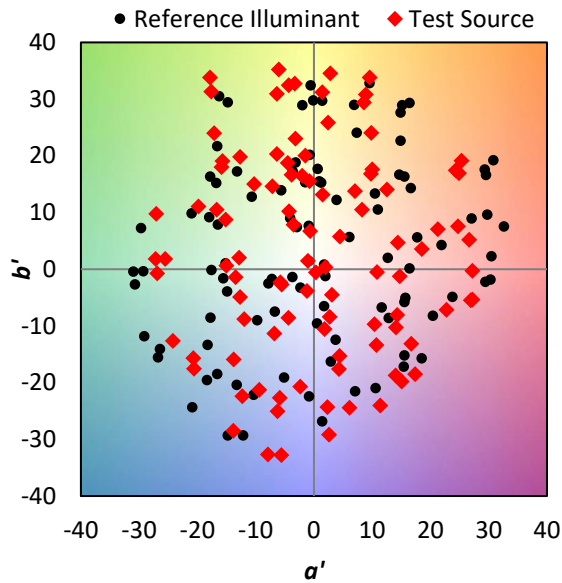
TM-30-18

### Summary

$R_f = 73$   
 $R_g = 94.6$   
 $CIE R_a = 70.9$   
 $R_g = -29.8$

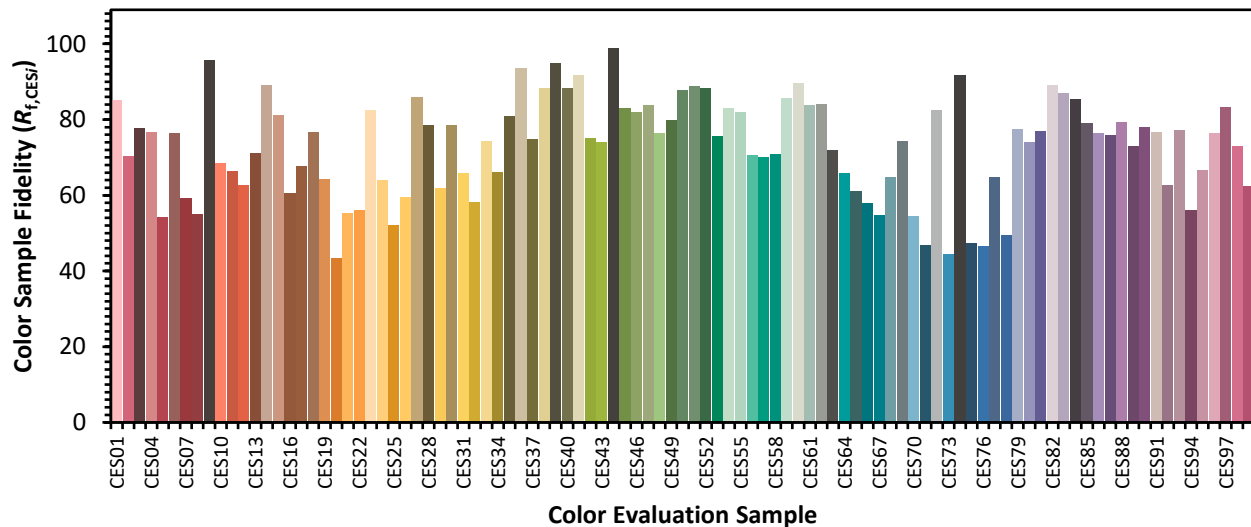


### Color Vector Graphics

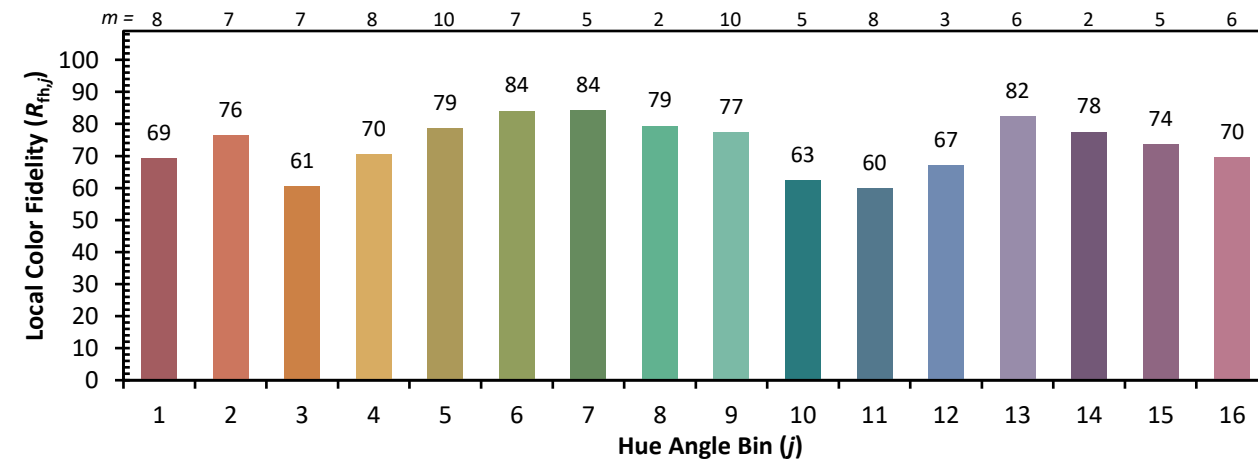
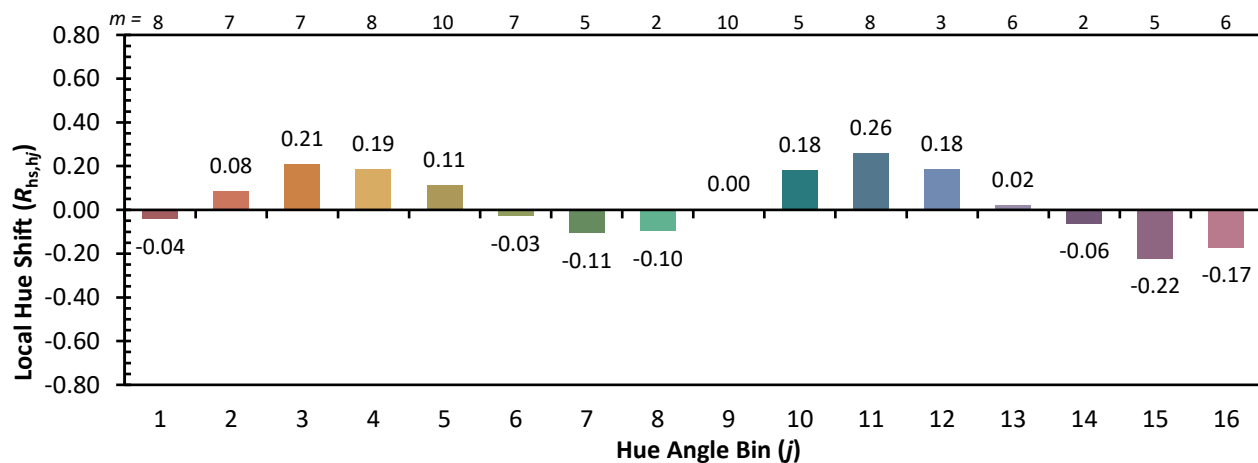
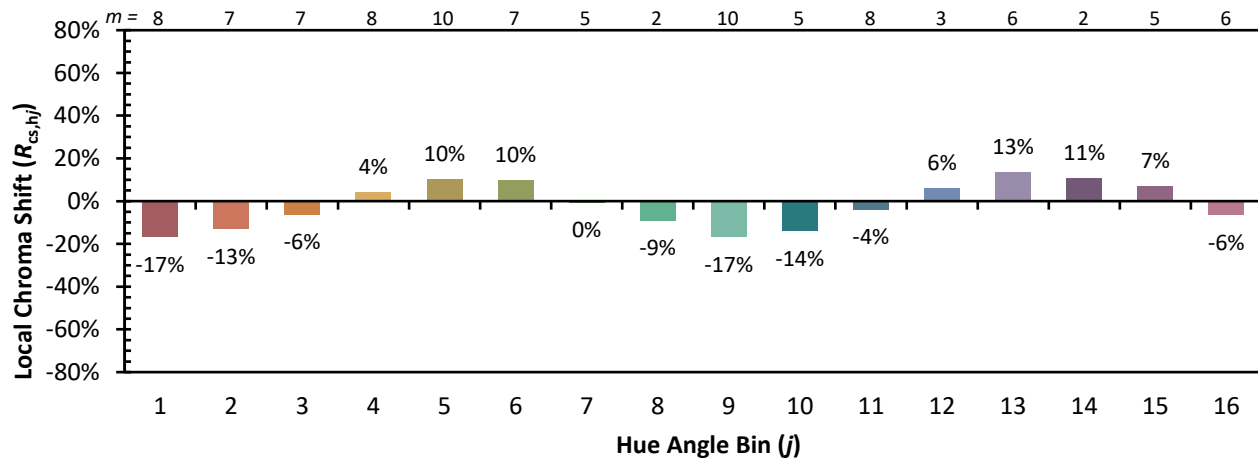


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

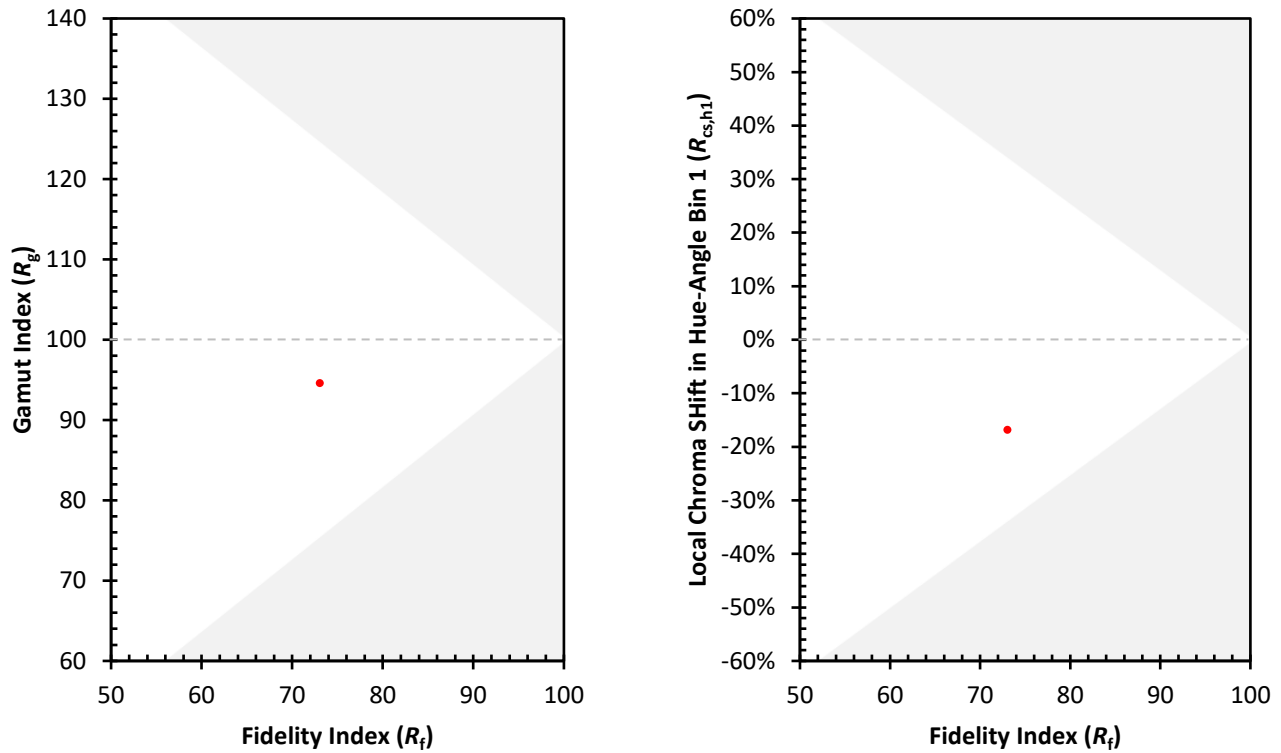
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 60 | CES51 = 89 | CES76 = 46 |
| CES02 = 59 | CES27 = 86 | CES52 = 88 | CES77 = 65 |
| CES03 = 30 | CES28 = 78 | CES53 = 76 | CES78 = 49 |
| CES04 = 69 | CES29 = 62 | CES54 = 83 | CES79 = 78 |
| CES05 = 46 | CES30 = 79 | CES55 = 82 | CES80 = 74 |
| CES06 = 50 | CES31 = 66 | CES56 = 71 | CES81 = 77 |
| CES07 = 39 | CES32 = 58 | CES57 = 70 | CES82 = 89 |
| CES08 = 38 | CES33 = 74 | CES58 = 71 | CES83 = 87 |
| CES09 = 29 | CES34 = 66 | CES59 = 86 | CES84 = 86 |
| CES10 = 72 | CES35 = 81 | CES60 = 90 | CES85 = 79 |
| CES11 = 56 | CES36 = 94 | CES61 = 84 | CES86 = 76 |
| CES12 = 61 | CES37 = 75 | CES62 = 84 | CES87 = 76 |
| CES13 = 41 | CES38 = 88 | CES63 = 72 | CES88 = 79 |
| CES14 = 74 | CES39 = 95 | CES64 = 66 | CES89 = 73 |
| CES15 = 70 | CES40 = 88 | CES65 = 61 | CES90 = 78 |
| CES16 = 46 | CES41 = 92 | CES66 = 58 | CES91 = 77 |
| CES17 = 49 | CES42 = 75 | CES67 = 55 | CES92 = 63 |
| CES18 = 55 | CES43 = 74 | CES68 = 65 | CES93 = 77 |
| CES19 = 71 | CES44 = 99 | CES69 = 74 | CES94 = 56 |
| CES20 = 64 | CES45 = 83 | CES70 = 55 | CES95 = 67 |
| CES21 = 85 | CES46 = 82 | CES71 = 47 | CES96 = 76 |
| CES22 = 77 | CES47 = 84 | CES72 = 82 | CES97 = 83 |
| CES23 = 91 | CES48 = 76 | CES73 = 44 | CES98 = 73 |
| CES24 = 90 | CES49 = 80 | CES74 = 92 | CES99 = 62 |
| CES25 = 71 | CES50 = 88 | CES75 = 47 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)