

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: P821356

Luminaire Tested: **TT-D2-735-12VDC-RW-PM**

Issue Date: 10/15/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P821356  
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-D2-735-12VDC-RW-PM  
Description: TOPTIER LED SITE LUMINAIRE  
3500K, 70 CRI LEDS AND RECTANGULAR DISTRIBUTION  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

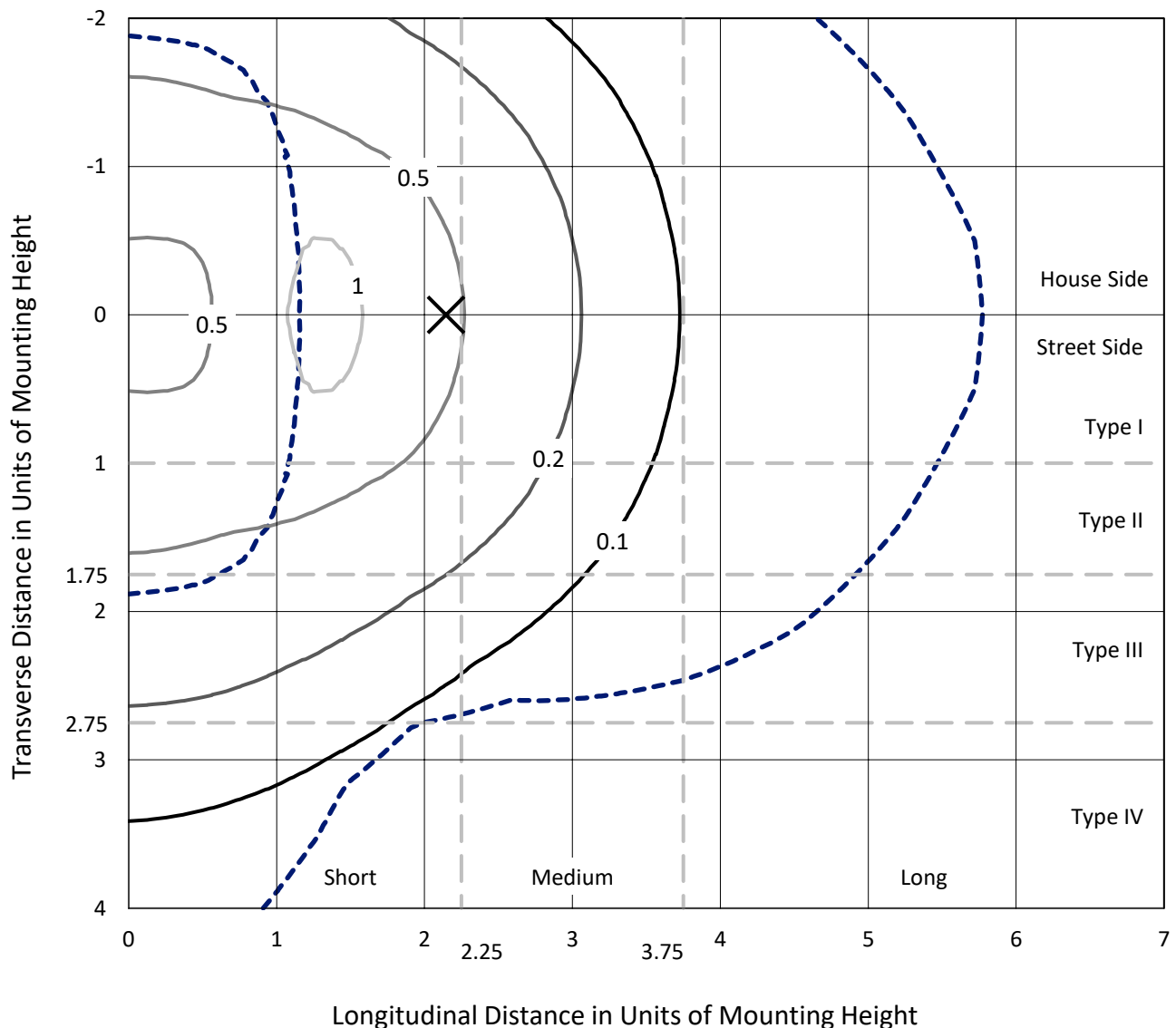
Lumens per Lamp: N/A  
Luminaire Lumens: 3984 lumens  
Efficiency: N/A  
Efficacy: 104.8 lumens/watt  
Luminous Opening: Circular (Dia: 1.12' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B3 - U0 - G3

Input Watts (W): 38  
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: P821356  
 CATALOG NUMBER: TT-D2-735-12VDC-RW-PM

## Iso-Footcandle Lines of Horizontal Illumination

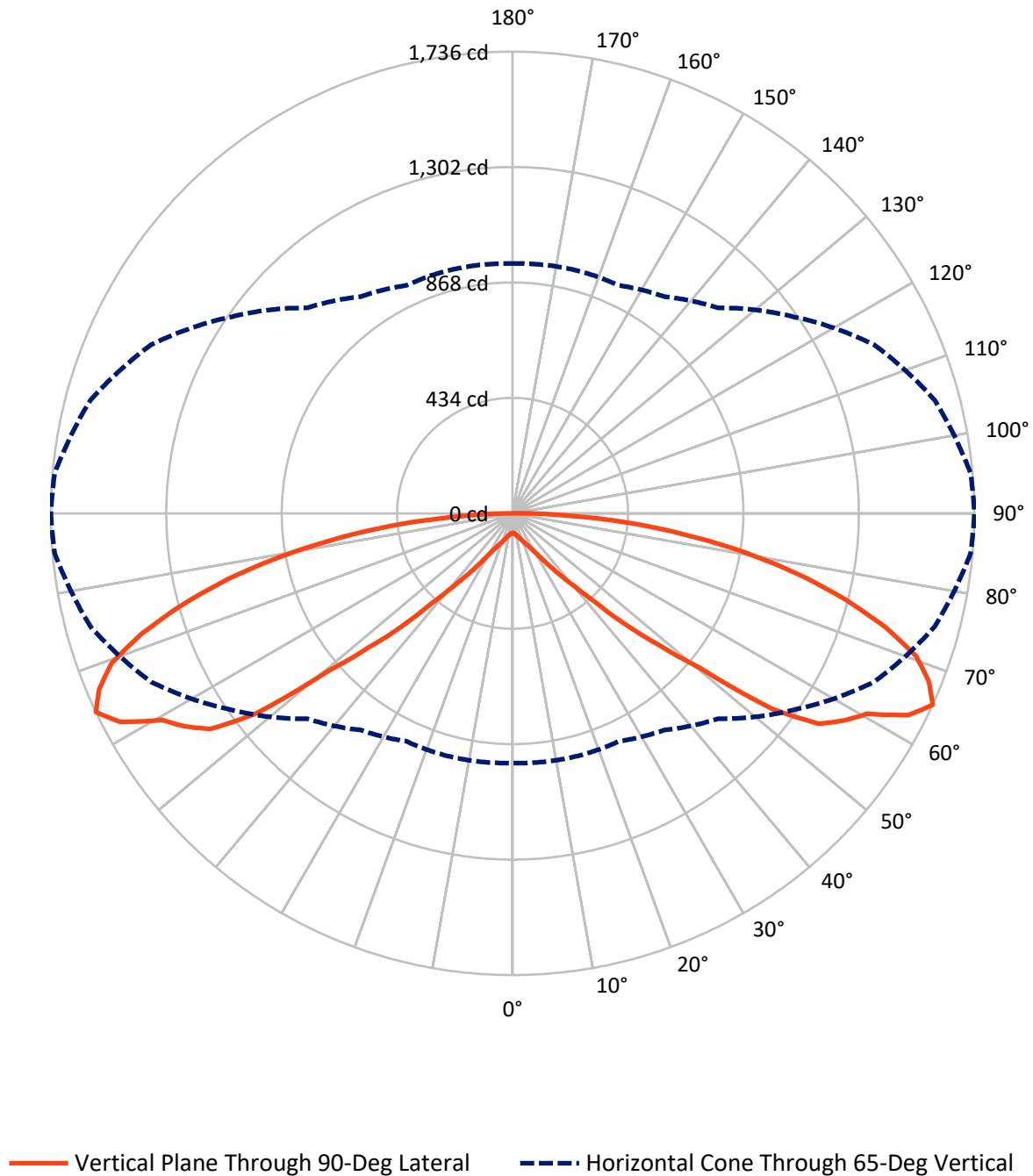
× Max cd  
 - - - 1/2 Max cd



Based on 15 foot mounting height. Maximum calculated value = 1.2 fc  
 Type IV - Short - N/A

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## Luminous Intensity Polar Plot



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CATALOG NUMBER: TT-D2-735-12VDC-RW-PM

**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 1992.0   | 0.0    | 1992.0 |
|                    | % Fixture | 50.0     | 0.0    | 50.0   |
| <b>Street Side</b> | Lumens    | 1992.0   | 0.0    | 1992.0 |
|                    | % Fixture | 50.0     | 0.0    | 50.0   |
| <b>Total</b>       | Lumens    | 3984.0   | 0.0    | 3984.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**Coefficient of Utilization**

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 7.6    | 0.2       |
| 10°-20°   | 28.4   | 0.7       |
| 20°-30°   | 65.7   | 1.6       |
| 30°-40°   | 148.4  | 3.7       |
| 40°-50°   | 361.6  | 9.1       |
| 50°-60°   | 813.1  | 20.4      |
| 60°-70°   | 1188.3 | 29.8      |
| 70°-80°   | 1035.5 | 26.0      |
| 80°-90°   | 335.4  | 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°    | 3984.0 | 100.0     |
| 0°-180°   | 3984.0 | 100.0     |



REPORT NUMBER: P821356

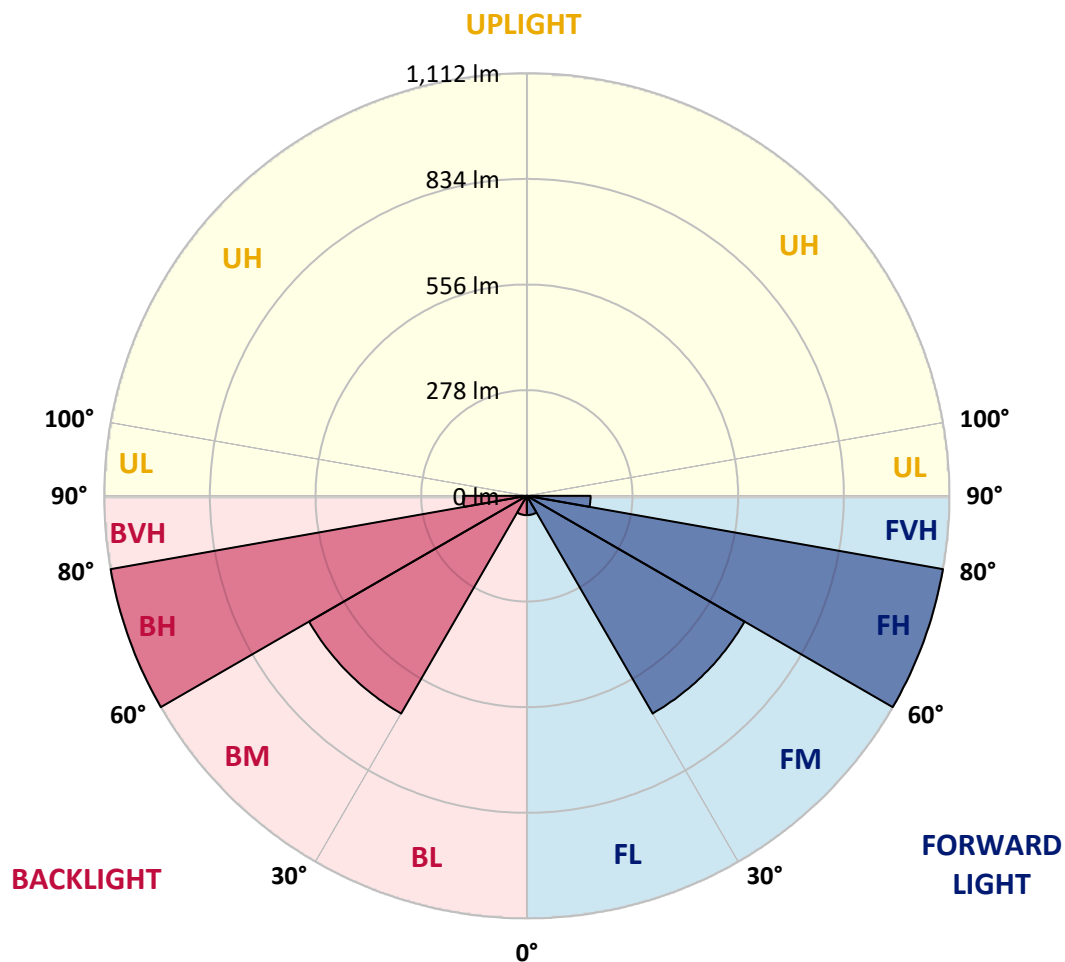
CATALOG NUMBER: TT-D2-735-12VDC-RW-PM

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 50.8   | 1.3       |                         |      |         |
| FM   | (30°-60°)   | 661.6  | 16.6      |                         |      |         |
| FH   | (60°-80°)   | 1111.9 | 27.9      |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 167.7  | 4.2       |                         |      | G2/225  |
| BL   | (0°-30°)    | 50.8   | 1.3       | B0/110                  |      |         |
| BM   | (30°-60°)   | 661.6  | 16.6      | B1/1000                 |      |         |
| BH   | (60°-80°)   | 1111.9 | 27.9      | B3/2500                 |      | G3/2500 |
| BVH  | (80°-90°)   | 167.7  | 4.2       |                         |      | G2/225  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B3-U0-G3**

Type IV Short





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CATALOG NUMBER: TT-D2-735-12VDC-RW-PM

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°   | 25°   | 35°    | 45°    | 55°    | 65°    | 75°    | 85°    | 90°    |
|-------|--------|--------|-------|-------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 72.8   | 72.8   | 72.8  | 72.8  | 72.8   | 72.8   | 72.8   | 72.8   | 72.8   | 72.8   | 72.8   |
| 2.5°  | 73.7   | 73.7   | 74.7  | 74.7  | 74.7   | 74.7   | 74.7   | 74.7   | 74.7   | 74.7   | 74.7   |
| 5°    | 76.6   | 76.6   | 76.6  | 76.6  | 77.5   | 77.5   | 76.6   | 76.6   | 76.6   | 76.6   | 76.6   |
| 7.5°  | 81.3   | 80.4   | 81.3  | 81.3  | 81.3   | 80.4   | 80.4   | 80.4   | 79.4   | 79.4   | 79.4   |
| 10°   | 86.0   | 86.0   | 87.0  | 86.0  | 86.0   | 85.1   | 85.1   | 85.1   | 84.1   | 84.1   | 84.1   |
| 12.5° | 92.6   | 92.6   | 92.6  | 92.6  | 91.7   | 91.7   | 90.7   | 89.8   | 88.9   | 88.9   | 88.9   |
| 15°   | 101.1  | 100.2  | 100.2 | 99.3  | 98.3   | 97.4   | 96.4   | 96.4   | 95.5   | 95.5   | 95.5   |
| 17.5° | 109.7  | 109.7  | 108.7 | 107.8 | 105.9  | 104.9  | 104.9  | 104.0  | 103.0  | 103.0  | 103.0  |
| 20°   | 120.1  | 120.1  | 119.1 | 117.2 | 115.3  | 114.4  | 113.4  | 113.4  | 112.5  | 112.5  | 112.5  |
| 22.5° | 132.3  | 131.4  | 129.5 | 127.6 | 125.7  | 124.8  | 123.8  | 122.9  | 122.9  | 122.9  | 122.9  |
| 25°   | 145.6  | 144.6  | 143.7 | 140.9 | 138.0  | 137.1  | 135.2  | 135.2  | 134.2  | 135.2  | 135.2  |
| 27.5° | 161.6  | 160.7  | 158.8 | 156.0 | 152.2  | 150.3  | 149.4  | 149.4  | 150.3  | 150.3  | 151.2  |
| 30°   | 181.5  | 179.6  | 177.7 | 173.9 | 170.2  | 167.3  | 167.3  | 168.3  | 171.1  | 173.0  | 173.0  |
| 32.5° | 205.1  | 204.2  | 201.3 | 197.6 | 191.0  | 189.1  | 191.0  | 196.6  | 200.4  | 203.2  | 205.1  |
| 35°   | 232.5  | 231.6  | 227.8 | 221.2 | 216.5  | 215.5  | 221.2  | 230.7  | 242.9  | 246.7  | 248.6  |
| 37.5° | 262.8  | 263.7  | 259.0 | 251.5 | 246.7  | 248.6  | 260.0  | 277.9  | 290.2  | 298.7  | 300.6  |
| 40°   | 300.6  | 302.5  | 296.8 | 288.3 | 283.6  | 291.2  | 309.1  | 329.9  | 351.7  | 362.1  | 364.9  |
| 42.5° | 345.0  | 347.9  | 340.3 | 331.8 | 329.0  | 341.3  | 366.8  | 400.8  | 439.6  | 451.9  | 456.6  |
| 45°   | 399.9  | 401.8  | 392.3 | 384.7 | 382.8  | 404.6  | 448.1  | 504.8  | 566.2  | 594.6  | 599.3  |
| 47.5° | 465.1  | 464.1  | 455.6 | 446.2 | 448.1  | 479.3  | 544.5  | 621.1  | 686.3  | 729.8  | 739.2  |
| 50°   | 539.8  | 535.0  | 528.4 | 517.1 | 529.4  | 574.7  | 657.0  | 749.6  | 859.3  | 898.0  | 915.1  |
| 52.5° | 614.4  | 605.9  | 600.3 | 592.7 | 614.4  | 673.1  | 788.4  | 950.0  | 1115.5 | 1204.3 | 1222.3 |
| 55°   | 681.6  | 674.9  | 672.1 | 673.1 | 707.1  | 791.2  | 942.5  | 1149.5 | 1309.2 | 1383.0 | 1396.2 |
| 57.5° | 747.7  | 744.0  | 741.1 | 746.8 | 800.7  | 910.3  | 1080.5 | 1274.3 | 1405.7 | 1460.5 | 1469.9 |
| 60°   | 810.1  | 813.9  | 812.0 | 829.0 | 894.3  | 1004.9 | 1152.3 | 1343.3 | 1469.9 | 1520.0 | 1530.4 |
| 62.5° | 879.1  | 882.0  | 882.0 | 900.9 | 953.8  | 1051.2 | 1201.5 | 1424.6 | 1585.3 | 1659.0 | 1670.3 |
| 65°   | 938.7  | 940.6  | 944.4 | 945.3 | 994.5  | 1091.8 | 1288.4 | 1499.2 | 1642.9 | 1728.0 | 1735.6 |
| 67.5° | 983.1  | 985.0  | 980.3 | 975.6 | 1013.4 | 1101.3 | 1281.8 | 1489.8 | 1617.4 | 1681.7 | 1687.4 |
| 70°   | 1019.0 | 1010.5 | 997.3 | 973.7 | 986.0  | 1052.1 | 1227.0 | 1414.2 | 1542.7 | 1600.4 | 1608.9 |
| 72.5° | 1023.8 | 1016.2 | 974.6 | 921.7 | 906.5  | 964.2  | 1130.6 | 1298.8 | 1409.4 | 1464.3 | 1465.2 |
| 75°   | 995.4  | 975.6  | 906.5 | 827.1 | 798.8  | 853.6  | 996.3  | 1149.5 | 1238.3 | 1284.7 | 1289.4 |
| 77.5° | 899.9  | 881.0  | 794.1 | 703.3 | 671.2  | 718.4  | 839.4  | 963.3  | 1048.3 | 1093.7 | 1096.6 |
| 80°   | 730.7  | 724.1  | 644.7 | 561.5 | 522.8  | 550.2  | 656.0  | 753.4  | 822.4  | 876.3  | 881.0  |
| 82.5° | 538.8  | 533.2  | 472.7 | 399.9 | 368.7  | 391.4  | 467.0  | 538.8  | 603.1  | 646.6  | 649.4  |
| 85°   | 336.5  | 325.2  | 287.4 | 236.3 | 215.5  | 230.7  | 280.8  | 329.0  | 386.6  | 420.7  | 422.6  |
| 87.5° | 112.5  | 107.8  | 92.6  | 76.6  | 64.3   | 67.1   | 82.2   | 100.2  | 146.5  | 161.6  | 171.1  |
| 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: SP1-2407-176-4

Test Date: 09/24/2024

Luminaire Tested: MEM2-HTN-VA-30-735-U-WQ

Data in this report applies to families of products including MEM2-HTN-VA-30-735-U-WQ

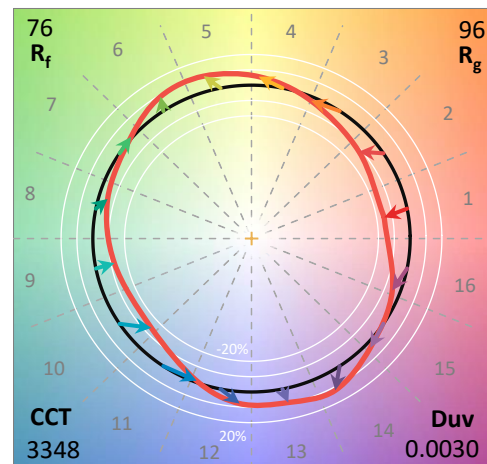
### Test Information

Test Method: LM-79-2019  
 Report Number: SP1-2407-176-4  
 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-30-735-U-WQ**  
 Description: EPIC MODERN VISUAL COMFORT 30W WAVESTREAM WIDE

### Spectral Parameters

CCT (K): 3348  
 CIE  $u'$ : 0.2384  
 CIE  $v'$ : 0.5184  
 Duv: 0.0030  
 CIE x: 0.4177  
 CIE y: 0.4036  
 CIE z: 0.1787  
 Peak Wavelength (nm): 593  
 Dominant Wavelength (nm): 580  
 Purity: 46.5223  
 R<sub>f</sub>: 75.8  
 R<sub>g</sub>: 95.8

CRI (Ra): 73.4  
 R1: 70.8  
 R2: 79.9  
 R3: 87.6  
 R4: 72.6  
 R5: 69.3  
 R6: 71.3  
 R7: 82.1  
 R8: 53.3  
 R9: -19.2  
 R10: 52.5  
 R11: 68.0  
 R12: 42.6  
 R13: 72.0  
 R14: 92.6  
 R15: 63.8



### Test Conditions

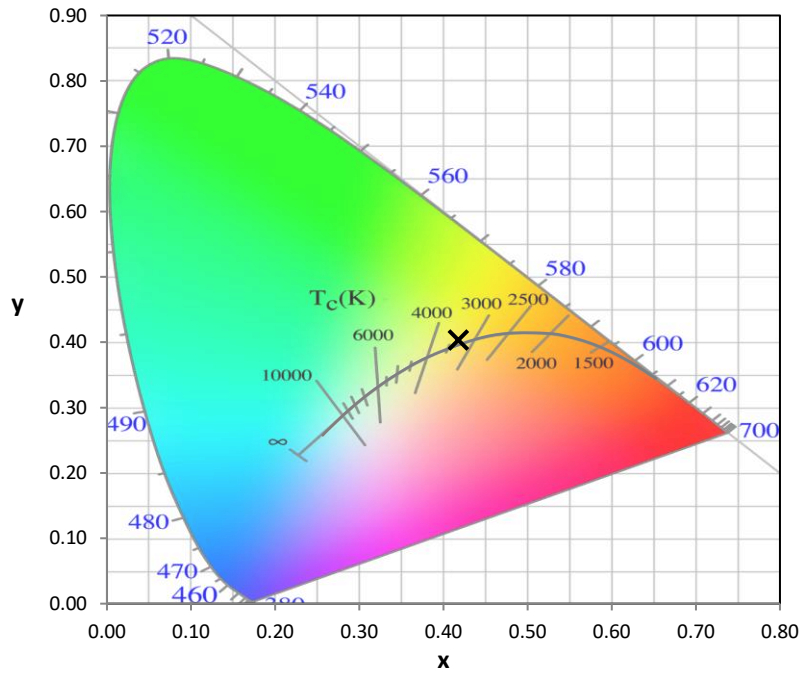
Stabilization Time: 30M  
 Operation Time: 1H 30M  
 Sphere Temperature (°C): 25.2

REPORT NUMBER: SP1-2407-176-4

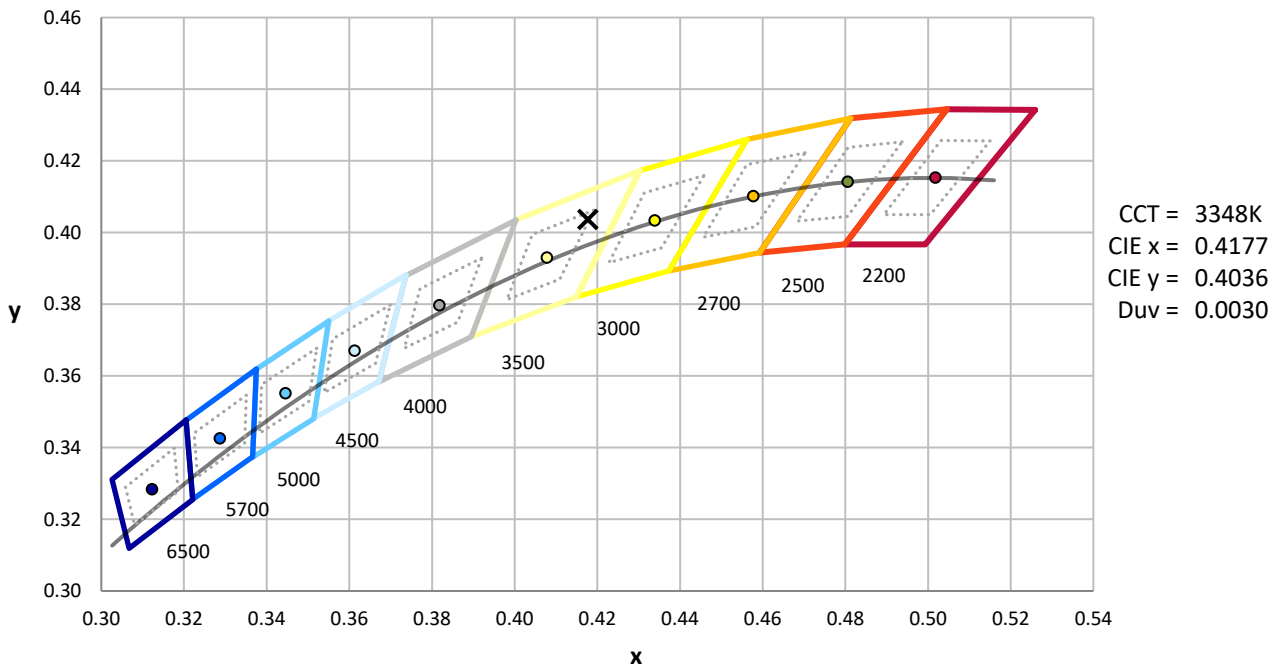
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| 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           |

REPORT NUMBER: SP1-2407-176-4

**CIE 1931 Chromaticity Diagram**



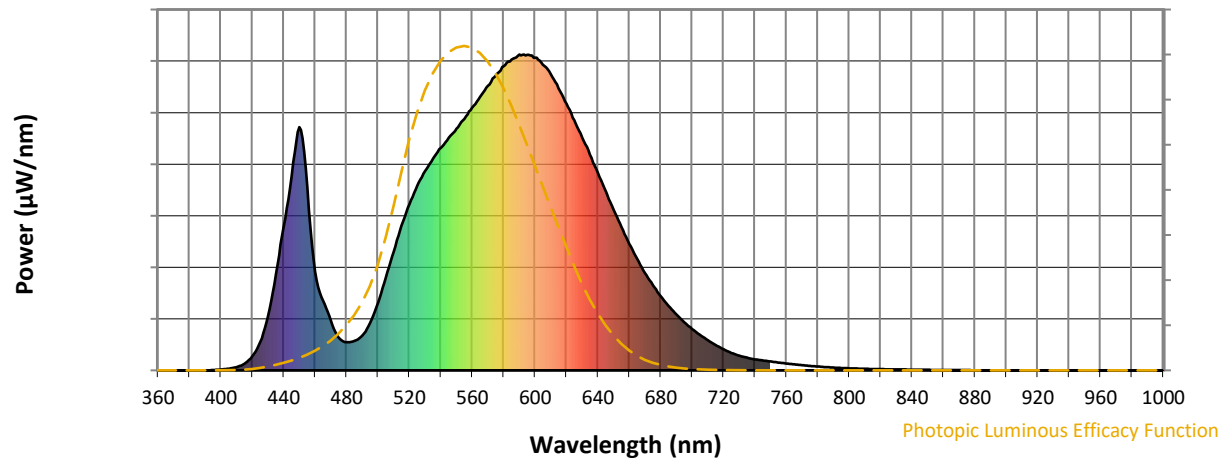
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 3500K 4-step quadrangle

REPORT NUMBER: SP1-2407-176-4

### Photopic Flux vs. Wavelength

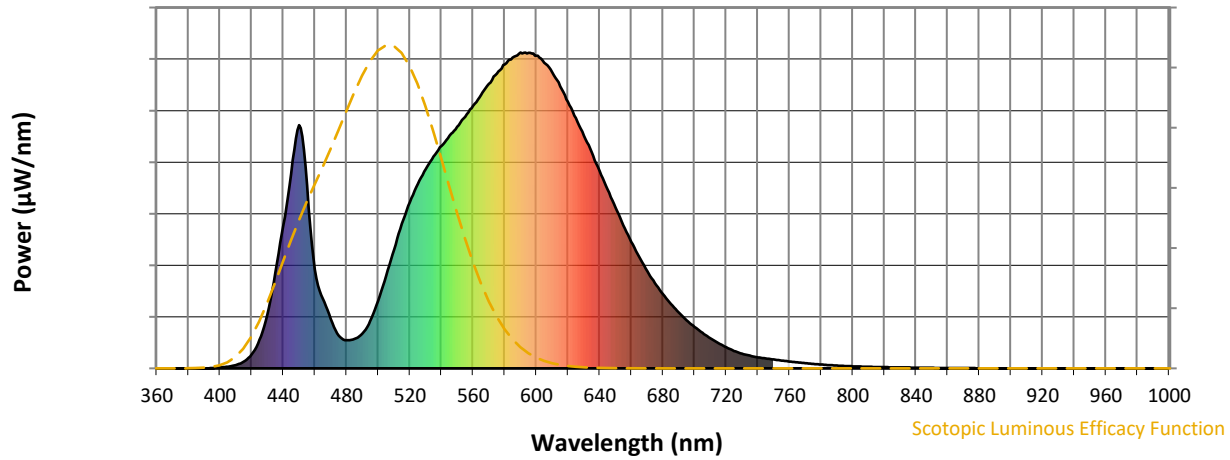


### Photopic Lumens: NR

| λ (nm) | Power W <sup>λ</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>λ</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>λ</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>λ</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>λ</sup> /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360    | 0                        | NR            | 490    | 110                      | NR            | 620    | 844                      | NR            | 750    | 28                       | NR            | 880    | 0                        | NR            |
| 365    | 0                        | NR            | 495    | 150                      | NR            | 625    | 792                      | NR            | 755    | 25                       | NR            | 885    | 0                        | NR            |
| 370    | 0                        | NR            | 500    | 214                      | NR            | 630    | 737                      | NR            | 760    | 22                       | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 293                      | NR            | 635    | 683                      | NR            | 765    | 19                       | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 376                      | NR            | 640    | 625                      | NR            | 770    | 16                       | NR            | 900    | 0                        | NR            |
| 385    | 0                        | NR            | 515    | 458                      | NR            | 645    | 566                      | NR            | 775    | 14                       | NR            | 905    | 0                        | NR            |
| 390    | 0                        | NR            | 520    | 526                      | NR            | 650    | 509                      | NR            | 780    | 12                       | NR            | 910    | 0                        | NR            |
| 395    | 1                        | NR            | 525    | 584                      | NR            | 655    | 453                      | NR            | 785    | 10                       | NR            | 915    | 0                        | NR            |
| 400    | 3                        | NR            | 530    | 631                      | NR            | 660    | 401                      | NR            | 790    | 9                        | NR            | 920    | 0                        | NR            |
| 405    | 5                        | NR            | 535    | 671                      | NR            | 665    | 353                      | NR            | 795    | 8                        | NR            | 925    | 0                        | NR            |
| 410    | 10                       | NR            | 540    | 704                      | NR            | 670    | 308                      | NR            | 800    | 7                        | NR            | 930    | 0                        | NR            |
| 415    | 21                       | NR            | 545    | 737                      | NR            | 675    | 269                      | NR            | 805    | 6                        | NR            | 935    | 0                        | NR            |
| 420    | 44                       | NR            | 550    | 766                      | NR            | 680    | 235                      | NR            | 810    | 5                        | NR            | 940    | 0                        | NR            |
| 425    | 90                       | NR            | 555    | 797                      | NR            | 685    | 204                      | NR            | 815    | 4                        | NR            | 945    | 0                        | NR            |
| 430    | 171                      | NR            | 560    | 832                      | NR            | 690    | 177                      | NR            | 820    | 4                        | NR            | 950    | 0                        | NR            |
| 435    | 305                      | NR            | 565    | 866                      | NR            | 695    | 152                      | NR            | 825    | 3                        | NR            | 955    | 0                        | NR            |
| 440    | 455                      | NR            | 570    | 901                      | NR            | 700    | 131                      | NR            | 830    | 3                        | NR            | 960    | 0                        | NR            |
| 445    | 615                      | NR            | 575    | 933                      | NR            | 705    | 112                      | NR            | 835    | 3                        | NR            | 965    | 0                        | NR            |
| 450    | 771                      | NR            | 580    | 963                      | NR            | 710    | 96                       | NR            | 840    | 2                        | NR            | 970    | 0                        | NR            |
| 455    | 579                      | NR            | 585    | 984                      | NR            | 715    | 80                       | NR            | 845    | 2                        | NR            | 975    | 0                        | NR            |
| 460    | 313                      | NR            | 590    | 1000                     | NR            | 720    | 67                       | NR            | 850    | 2                        | NR            | 980    | 0                        | NR            |
| 465    | 221                      | NR            | 595    | 999                      | NR            | 725    | 55                       | NR            | 855    | 1                        | NR            | 985    | 0                        | NR            |
| 470    | 156                      | NR            | 600    | 990                      | NR            | 730    | 46                       | NR            | 860    | 1                        | NR            | 990    | 0                        | NR            |
| 475    | 103                      | NR            | 605    | 968                      | NR            | 735    | 40                       | NR            | 865    | 1                        | NR            | 995    | 0                        | NR            |
| 480    | 89                       | NR            | 610    | 937                      | NR            | 740    | 35                       | NR            | 870    | 1                        | NR            | 1000   | 0                        | NR            |
| 485    | 93                       | NR            | 615    | 893                      | NR            | 745    | 31                       | NR            | 875    | 1                        | NR            |        |                          |               |

REPORT NUMBER: SP1-2407-176-4

### Scotopic Flux vs. Wavelength



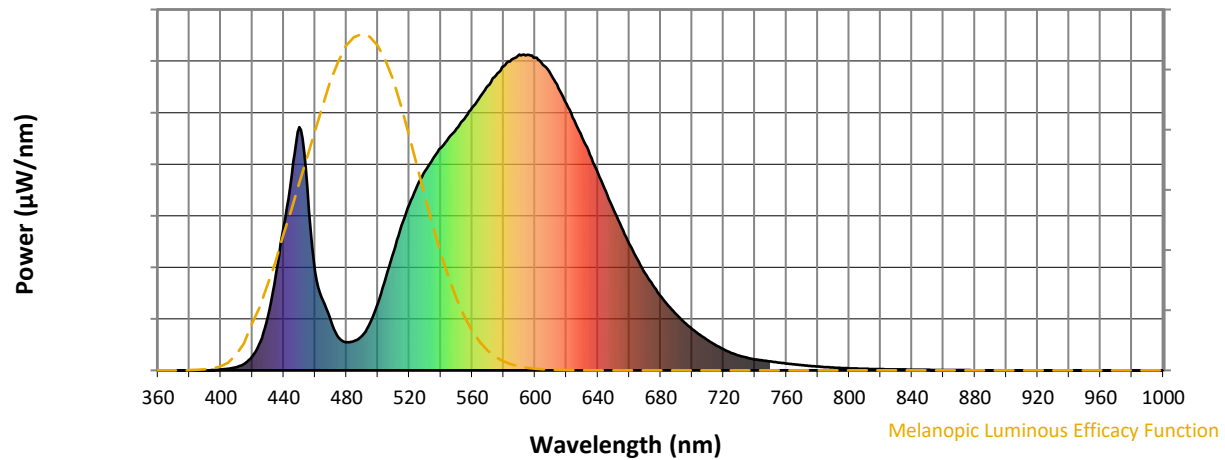
Scotopic Lumens: NR

S/P: 1.31

| $\lambda$<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               | 844                                  | NR                             | 750               | 28                                   | NR                             | 880               | 0                                    | NR                             |
| 365               | 0                                    | NR                             | 495               | 150                                  | NR                             | 625               | 792                                  | NR                             | 755               | 25                                   | NR                             | 885               | 0                                    | NR                             |
| 370               | 0                                    | NR                             | 500               | 214                                  | NR                             | 630               | 737                                  | NR                             | 760               | 22                                   | NR                             | 890               | 0                                    | NR                             |
| 375               | 0                                    | NR                             | 505               | 293                                  | NR                             | 635               | 683                                  | NR                             | 765               | 19                                   | NR                             | 895               | 0                                    | NR                             |
| 380               | 0                                    | NR                             | 510               | 376                                  | NR                             | 640               | 625                                  | NR                             | 770               | 16                                   | NR                             | 900               | 0                                    | NR                             |
| 385               | 0                                    | NR                             | 515               | 458                                  | NR                             | 645               | 566                                  | NR                             | 775               | 14                                   | NR                             | 905               | 0                                    | NR                             |
| 390               | 0                                    | NR                             | 520               | 526                                  | NR                             | 650               | 509                                  | NR                             | 780               | 12                                   | NR                             | 910               | 0                                    | NR                             |
| 395               | 1                                    | NR                             | 525               | 584                                  | NR                             | 655               | 453                                  | NR                             | 785               | 10                                   | NR                             | 915               | 0                                    | NR                             |
| 400               | 3                                    | NR                             | 530               | 631                                  | NR                             | 660               | 401                                  | NR                             | 790               | 9                                    | NR                             | 920               | 0                                    | NR                             |
| 405               | 5                                    | NR                             | 535               | 671                                  | NR                             | 665               | 353                                  | NR                             | 795               | 8                                    | NR                             | 925               | 0                                    | NR                             |
| 410               | 10                                   | NR                             | 540               | 704                                  | NR                             | 670               | 308                                  | NR                             | 800               | 7                                    | NR                             | 930               | 0                                    | NR                             |
| 415               | 21                                   | NR                             | 545               | 737                                  | NR                             | 675               | 269                                  | NR                             | 805               | 6                                    | NR                             | 935               | 0                                    | NR                             |
| 420               | 44                                   | NR                             | 550               | 766                                  | NR                             | 680               | 235                                  | NR                             | 810               | 5                                    | NR                             | 940               | 0                                    | NR                             |
| 425               | 90                                   | NR                             | 555               | 797                                  | NR                             | 685               | 204                                  | NR                             | 815               | 4                                    | NR                             | 945               | 0                                    | NR                             |
| 430               | 171                                  | NR                             | 560               | 832                                  | NR                             | 690               | 177                                  | NR                             | 820               | 4                                    | NR                             | 950               | 0                                    | NR                             |
| 435               | 305                                  | NR                             | 565               | 866                                  | NR                             | 695               | 152                                  | NR                             | 825               | 3                                    | NR                             | 955               | 0                                    | NR                             |
| 440               | 455                                  | NR                             | 570               | 901                                  | NR                             | 700               | 131                                  | NR                             | 830               | 3                                    | NR                             | 960               | 0                                    | NR                             |
| 445               | 615                                  | NR                             | 575               | 933                                  | NR                             | 705               | 112                                  | NR                             | 835               | 3                                    | NR                             | 965               | 0                                    | NR                             |
| 450               | 771                                  | NR                             | 580               | 963                                  | NR                             | 710               | 96                                   | NR                             | 840               | 2                                    | NR                             | 970               | 0                                    | NR                             |
| 455               | 579                                  | NR                             | 585               | 984                                  | NR                             | 715               | 80                                   | NR                             | 845               | 2                                    | NR                             | 975               | 0                                    | NR                             |
| 460               | 313                                  | NR                             | 590               | 1000                                 | NR                             | 720               | 67                                   | NR                             | 850               | 2                                    | NR                             | 980               | 0                                    | NR                             |
| 465               | 221                                  | NR                             | 595               | 999                                  | NR                             | 725               | 55                                   | NR                             | 855               | 1                                    | NR                             | 985               | 0                                    | NR                             |
| 470               | 156                                  | NR                             | 600               | 990                                  | NR                             | 730               | 46                                   | NR                             | 860               | 1                                    | NR                             | 990               | 0                                    | NR                             |
| 475               | 103                                  | NR                             | 605               | 968                                  | NR                             | 735               | 40                                   | NR                             | 865               | 1                                    | NR                             | 995               | 0                                    | NR                             |
| 480               | 89                                   | NR                             | 610               | 937                                  | NR                             | 740               | 35                                   | NR                             | 870               | 1                                    | NR                             | 1000              | 0                                    | NR                             |
| 485               | 93                                   | NR                             | 615               | 893                                  | NR                             | 745               | 31                                   | NR                             | 875               | 1                                    | NR                             |                   |                                      |                                |

REPORT NUMBER: SP1-2407-176-4

### Melanopic Flux vs. Wavelength


**Melanopic Lumens: NR**
**M/P: 2.4**

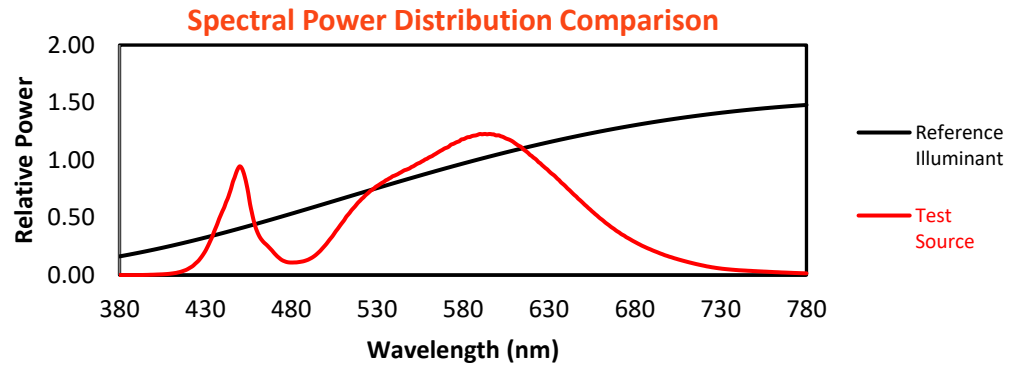
| $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | 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               | 844                                    | NR                             | 750               | 28                                     | NR                             | 880               | 0                                      | NR                             |
| 365               | 0                                      | NR                             | 495               | 150                                    | NR                             | 625               | 792                                    | NR                             | 755               | 25                                     | NR                             | 885               | 0                                      | NR                             |
| 370               | 0                                      | NR                             | 500               | 214                                    | NR                             | 630               | 737                                    | NR                             | 760               | 22                                     | NR                             | 890               | 0                                      | NR                             |
| 375               | 0                                      | NR                             | 505               | 293                                    | NR                             | 635               | 683                                    | NR                             | 765               | 19                                     | NR                             | 895               | 0                                      | NR                             |
| 380               | 0                                      | NR                             | 510               | 376                                    | NR                             | 640               | 625                                    | NR                             | 770               | 16                                     | NR                             | 900               | 0                                      | NR                             |
| 385               | 0                                      | NR                             | 515               | 458                                    | NR                             | 645               | 566                                    | NR                             | 775               | 14                                     | NR                             | 905               | 0                                      | NR                             |
| 390               | 0                                      | NR                             | 520               | 526                                    | NR                             | 650               | 509                                    | NR                             | 780               | 12                                     | NR                             | 910               | 0                                      | NR                             |
| 395               | 1                                      | NR                             | 525               | 584                                    | NR                             | 655               | 453                                    | NR                             | 785               | 10                                     | NR                             | 915               | 0                                      | NR                             |
| 400               | 3                                      | NR                             | 530               | 631                                    | NR                             | 660               | 401                                    | NR                             | 790               | 9                                      | NR                             | 920               | 0                                      | NR                             |
| 405               | 5                                      | NR                             | 535               | 671                                    | NR                             | 665               | 353                                    | NR                             | 795               | 8                                      | NR                             | 925               | 0                                      | NR                             |
| 410               | 10                                     | NR                             | 540               | 704                                    | NR                             | 670               | 308                                    | NR                             | 800               | 7                                      | NR                             | 930               | 0                                      | NR                             |
| 415               | 21                                     | NR                             | 545               | 737                                    | NR                             | 675               | 269                                    | NR                             | 805               | 6                                      | NR                             | 935               | 0                                      | NR                             |
| 420               | 44                                     | NR                             | 550               | 766                                    | NR                             | 680               | 235                                    | NR                             | 810               | 5                                      | NR                             | 940               | 0                                      | NR                             |
| 425               | 90                                     | NR                             | 555               | 797                                    | NR                             | 685               | 204                                    | NR                             | 815               | 4                                      | NR                             | 945               | 0                                      | NR                             |
| 430               | 171                                    | NR                             | 560               | 832                                    | NR                             | 690               | 177                                    | NR                             | 820               | 4                                      | NR                             | 950               | 0                                      | NR                             |
| 435               | 305                                    | NR                             | 565               | 866                                    | NR                             | 695               | 152                                    | NR                             | 825               | 3                                      | NR                             | 955               | 0                                      | NR                             |
| 440               | 455                                    | NR                             | 570               | 901                                    | NR                             | 700               | 131                                    | NR                             | 830               | 3                                      | NR                             | 960               | 0                                      | NR                             |
| 445               | 615                                    | NR                             | 575               | 933                                    | NR                             | 705               | 112                                    | NR                             | 835               | 3                                      | NR                             | 965               | 0                                      | NR                             |
| 450               | 771                                    | NR                             | 580               | 963                                    | NR                             | 710               | 96                                     | NR                             | 840               | 2                                      | NR                             | 970               | 0                                      | NR                             |
| 455               | 579                                    | NR                             | 585               | 984                                    | NR                             | 715               | 80                                     | NR                             | 845               | 2                                      | NR                             | 975               | 0                                      | NR                             |
| 460               | 313                                    | NR                             | 590               | 1000                                   | NR                             | 720               | 67                                     | NR                             | 850               | 2                                      | NR                             | 980               | 0                                      | NR                             |
| 465               | 221                                    | NR                             | 595               | 999                                    | NR                             | 725               | 55                                     | NR                             | 855               | 1                                      | NR                             | 985               | 0                                      | NR                             |
| 470               | 156                                    | NR                             | 600               | 990                                    | NR                             | 730               | 46                                     | NR                             | 860               | 1                                      | NR                             | 990               | 0                                      | NR                             |
| 475               | 103                                    | NR                             | 605               | 968                                    | NR                             | 735               | 40                                     | NR                             | 865               | 1                                      | NR                             | 995               | 0                                      | NR                             |
| 480               | 89                                     | NR                             | 610               | 937                                    | NR                             | 740               | 35                                     | NR                             | 870               | 1                                      | NR                             | 1000              | 0                                      | NR                             |
| 485               | 93                                     | NR                             | 615               | 893                                    | NR                             | 745               | 31                                     | NR                             | 875               | 1                                      | NR                             |                   |                                        |                                |

REPORT NUMBER: SP1-2407-176-4

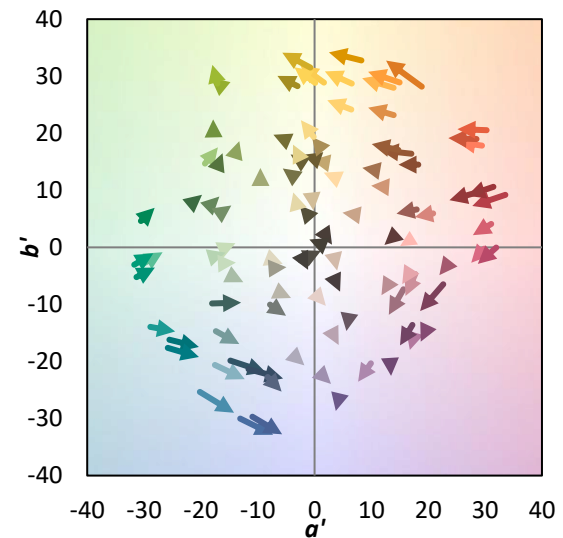
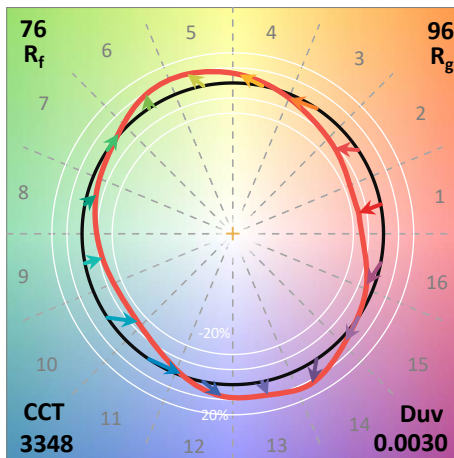
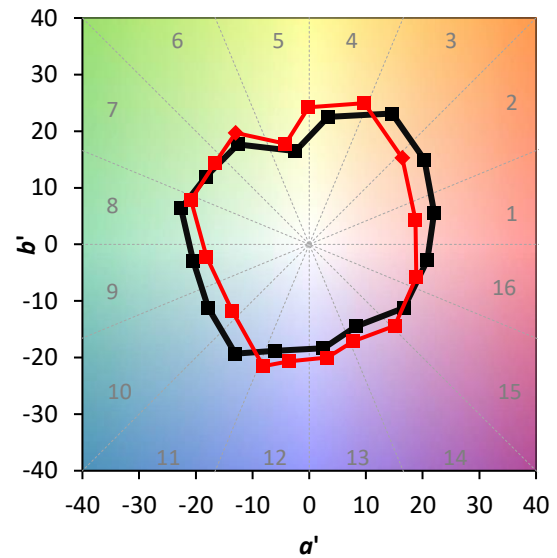
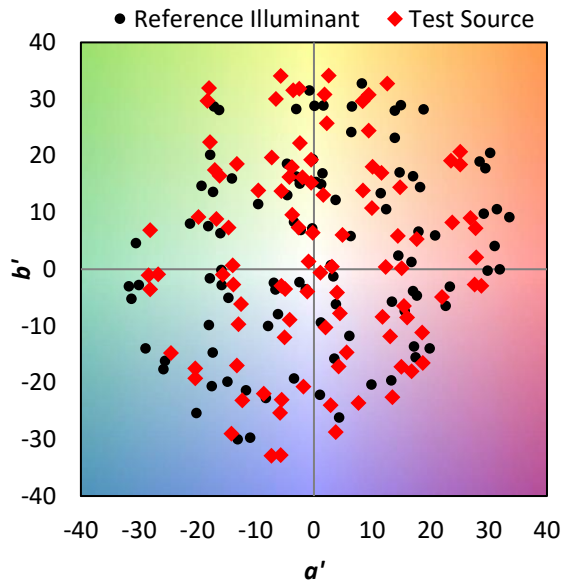
TM-30-18

### Summary

$R_f = 75.8$   
 $R_g = 95.8$   
 $CIE R_a = 73.4$   
 $R_g = -19.2$

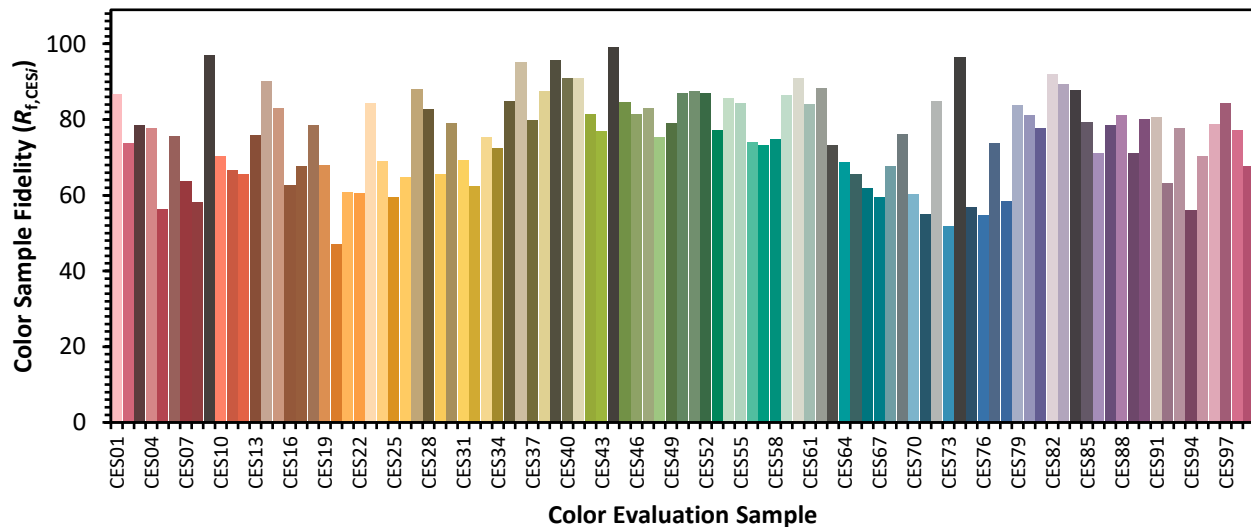


### Color Vector Graphics

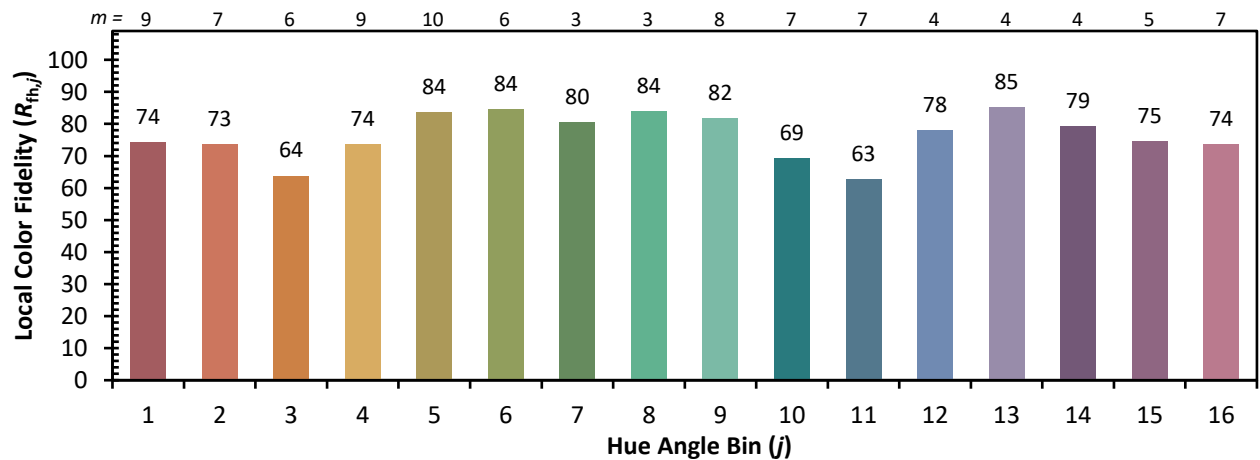
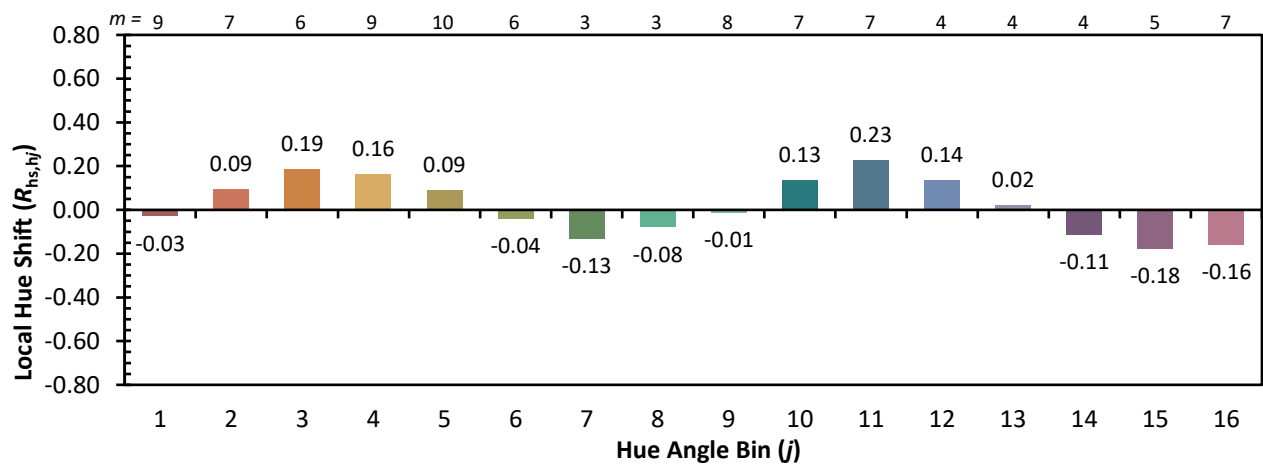
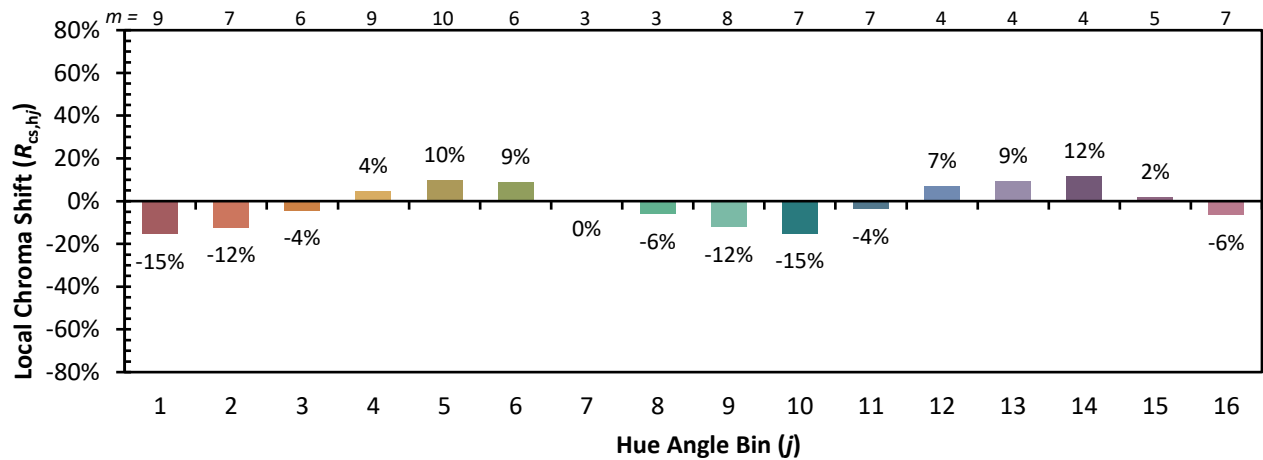


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

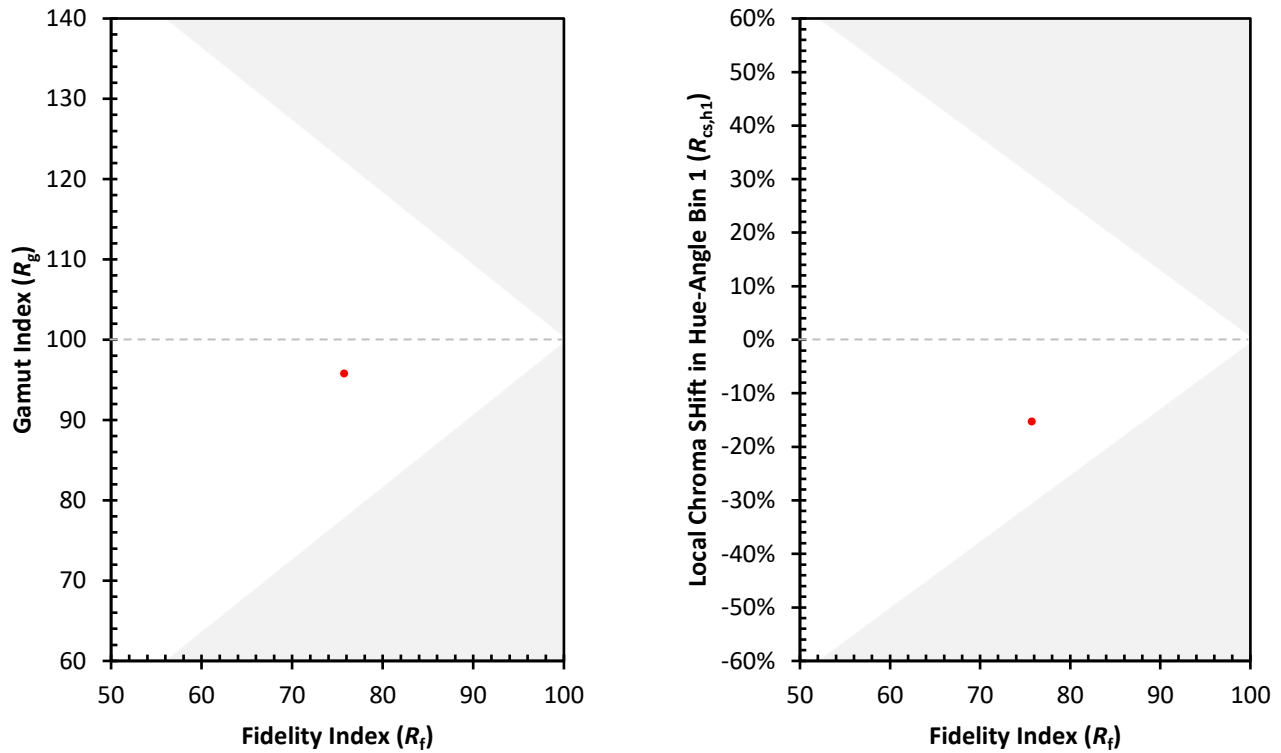
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 65 | CES51 = 88 | CES76 = 55 |
| CES02 = 62 | CES27 = 88 | CES52 = 87 | CES77 = 74 |
| CES03 = 31 | CES28 = 83 | CES53 = 77 | CES78 = 58 |
| CES04 = 70 | CES29 = 66 | CES54 = 86 | CES79 = 84 |
| CES05 = 48 | CES30 = 79 | CES55 = 84 | CES80 = 81 |
| CES06 = 51 | CES31 = 69 | CES56 = 74 | CES81 = 78 |
| CES07 = 41 | CES32 = 62 | CES57 = 73 | CES82 = 92 |
| CES08 = 40 | CES33 = 75 | CES58 = 75 | CES83 = 89 |
| CES09 = 29 | CES34 = 73 | CES59 = 87 | CES84 = 88 |
| CES10 = 75 | CES35 = 85 | CES60 = 91 | CES85 = 79 |
| CES11 = 58 | CES36 = 95 | CES61 = 84 | CES86 = 71 |
| CES12 = 64 | CES37 = 80 | CES62 = 88 | CES87 = 79 |
| CES13 = 43 | CES38 = 88 | CES63 = 73 | CES88 = 81 |
| CES14 = 74 | CES39 = 96 | CES64 = 69 | CES89 = 71 |
| CES15 = 71 | CES40 = 91 | CES65 = 66 | CES90 = 80 |
| CES16 = 47 | CES41 = 91 | CES66 = 62 | CES91 = 81 |
| CES17 = 50 | CES42 = 81 | CES67 = 60 | CES92 = 63 |
| CES18 = 56 | CES43 = 77 | CES68 = 68 | CES93 = 78 |
| CES19 = 72 | CES44 = 99 | CES69 = 76 | CES94 = 56 |
| CES20 = 65 | CES45 = 85 | CES70 = 60 | CES95 = 70 |
| CES21 = 87 | CES46 = 82 | CES71 = 55 | CES96 = 79 |
| CES22 = 79 | CES47 = 83 | CES72 = 85 | CES97 = 84 |
| CES23 = 92 | CES48 = 75 | CES73 = 52 | CES98 = 77 |
| CES24 = 91 | CES49 = 79 | CES74 = 96 | CES99 = 68 |
| CES25 = 72 | CES50 = 87 | CES75 = 57 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)