

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

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

Test Report Prepared for  
Cooper Lighting Solutions

Brand: McGRAW-EDISON

Report Number: P1445148

Luminaire Tested: TPTN-VA3-735-U-MQ-GM

Issue Date: 05/21/2026

**Test Information**

Test Method: LM-79-2024  
Report Number: P1445148  
Test Lab: INNOVATION CENTER(G1)  
Issue Date: 5/21/2026  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: MCGRAW-EDISON  
Catalog Number: TPTN-VA3-735-U-MQ-GM  
Description: TOPTIER NANO SPIDER MOUNT VISUAL COMFORT LED LUMINAIRE 60W 70CRI 3500K w/  
TYPE V MEDIUM DISTRIBUTION OPTIC  
Light Source: 3500K CCT, 70 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 5595.3 lumens  
Efficiency: N/A  
Efficacy: 93.3 lumens/watt  
Luminous Opening: Circular (Dia: 0.71' x H: 0')  
IES Classification: Type V - Short  
BUG Rating: B3 - U0 - G2

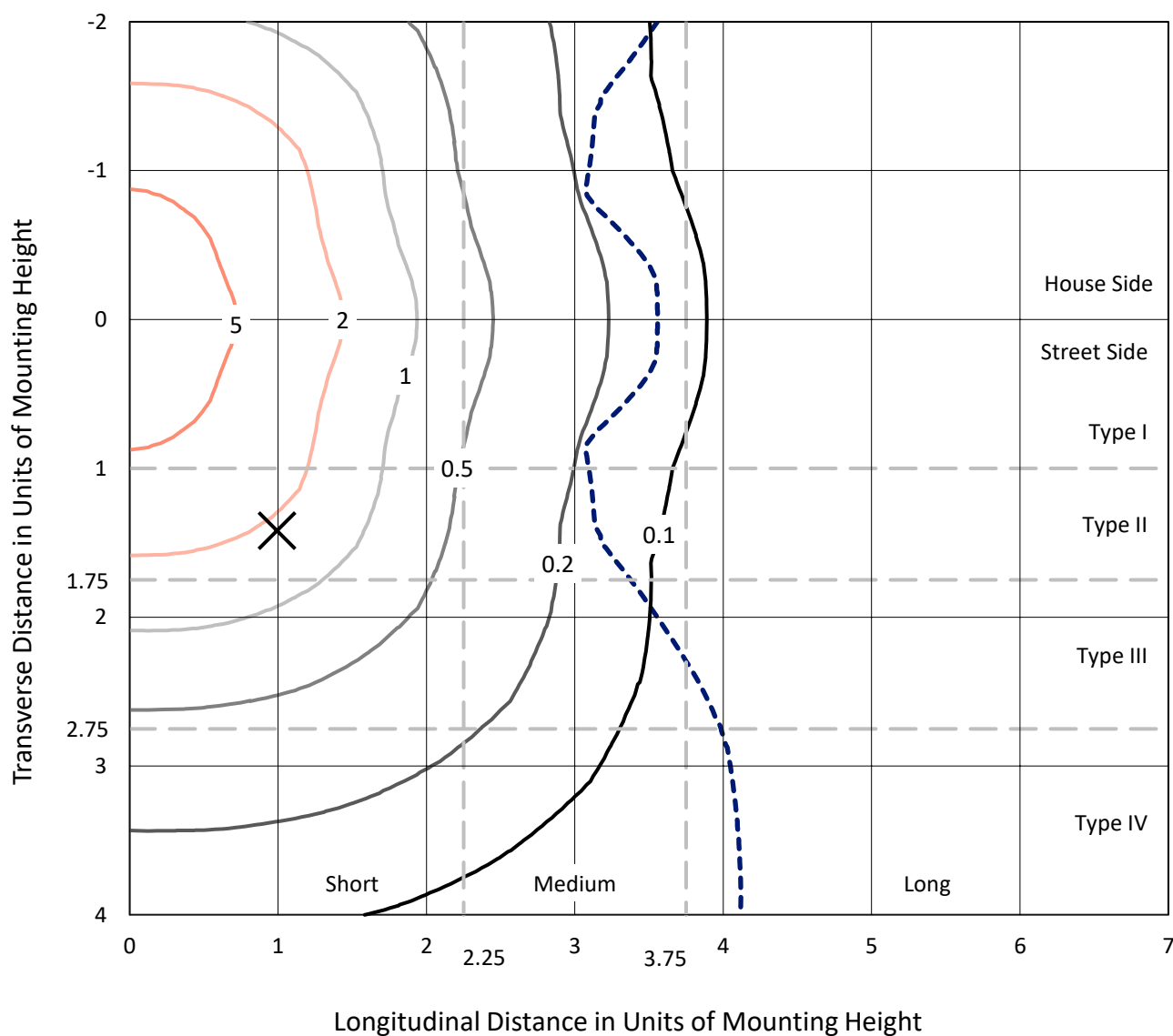
Input Watts (W): 60  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.98  
Total Harmonic Distortion (THDi): 5.3%  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT

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CATALOG NUMBER: TPTN-VA3-735-U-MQ-GM

## Iso-Footcandle Lines of Horizontal Illumination

× Max cd  
- - - 1/2 Max cd

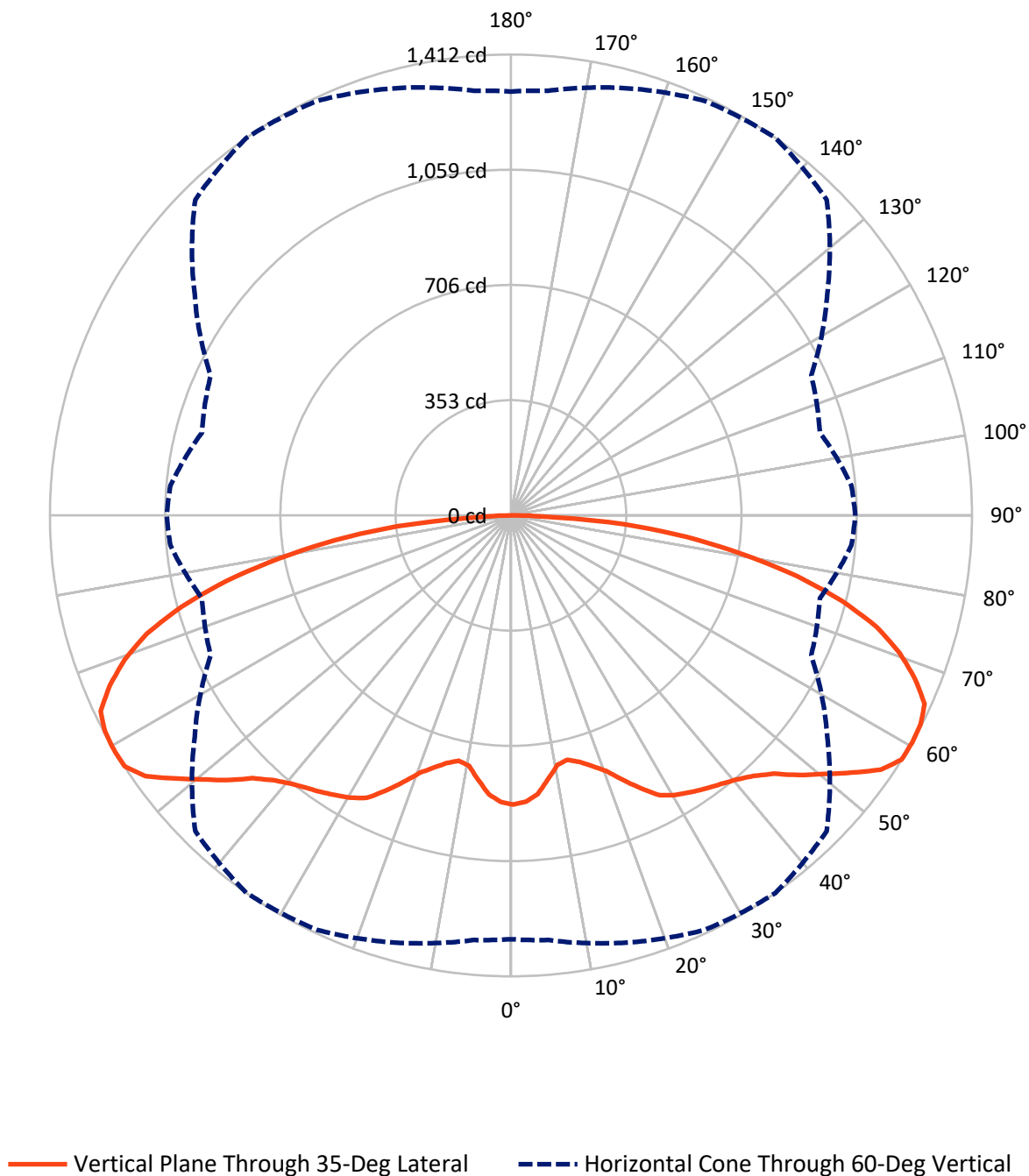


Based on 10 foot mounting height. Maximum calculated value = 8.9 fc  
Type V - Short - N/A

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## Luminous Intensity Polar Plot



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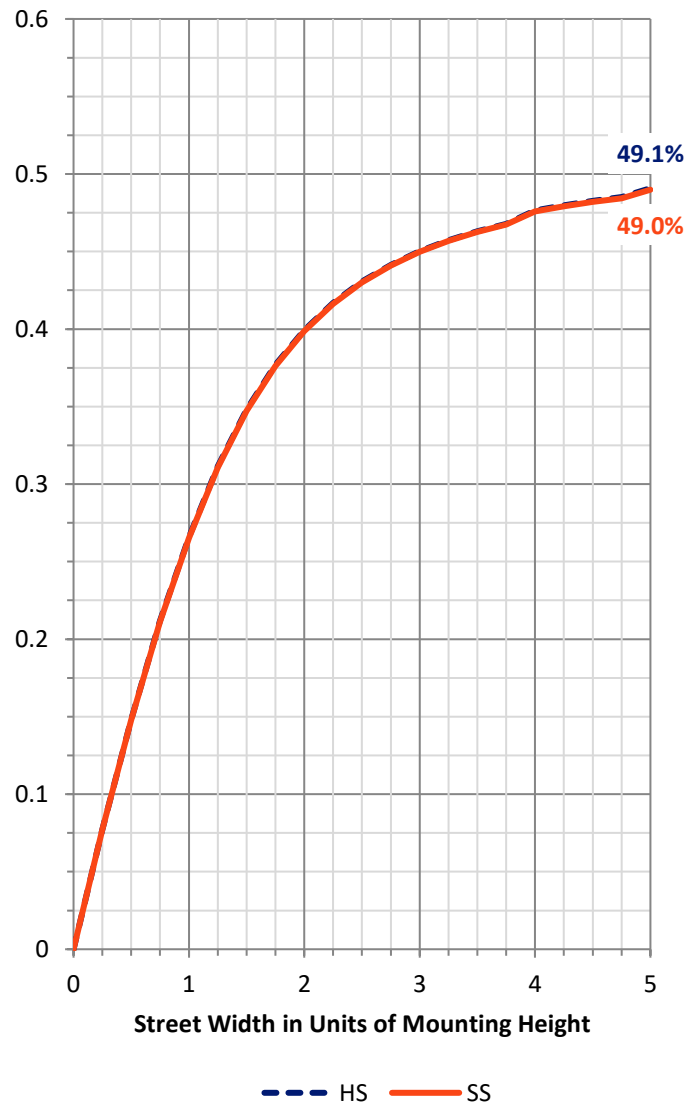
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 2797.7   | 0.0    | 2797.7 |
|                    | % Fixture | 50.0     | 0.0    | 50.0   |
| <b>Street Side</b> | Lumens    | 2797.7   | 0.0    | 2797.7 |
|                    | % Fixture | 50.0     | 0.0    | 50.0   |
| <b>Total</b>       | Lumens    | 5595.3   | 0.0    | 5595.3 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 79.6   | 1.4       |
| 10°-20°   | 226.7  | 4.1       |
| 20°-30°   | 421.7  | 7.5       |
| 30°-40°   | 626.9  | 11.2      |
| 40°-50°   | 831.5  | 14.9      |
| 50°-60°   | 1084.4 | 19.4      |
| 60°-70°   | 1157.2 | 20.7      |
| 70°-80°   | 887.9  | 15.9      |
| 80°-90°   | 279.5  | 5.0       |
| 90°-100°  | 0.0    | 0.0       |
| 100°-110° | 0.0    | 0.0       |
| 110°-120° | 0.0    | 0.0       |
| 120°-130° | 0.0    | 0.0       |
| 130°-140° | 0.0    | 0.0       |
| 140°-150° | 0.0    | 0.0       |
| 150°-160° | 0.0    | 0.0       |
| 160°-170° | 0.0    | 0.0       |
| 170°-180° | 0.0    | 0.0       |
| 0°-90°    | 5595.3 | 100.0     |
| 0°-180°   | 5595.3 | 100.0     |

**Coefficient of Utilization**



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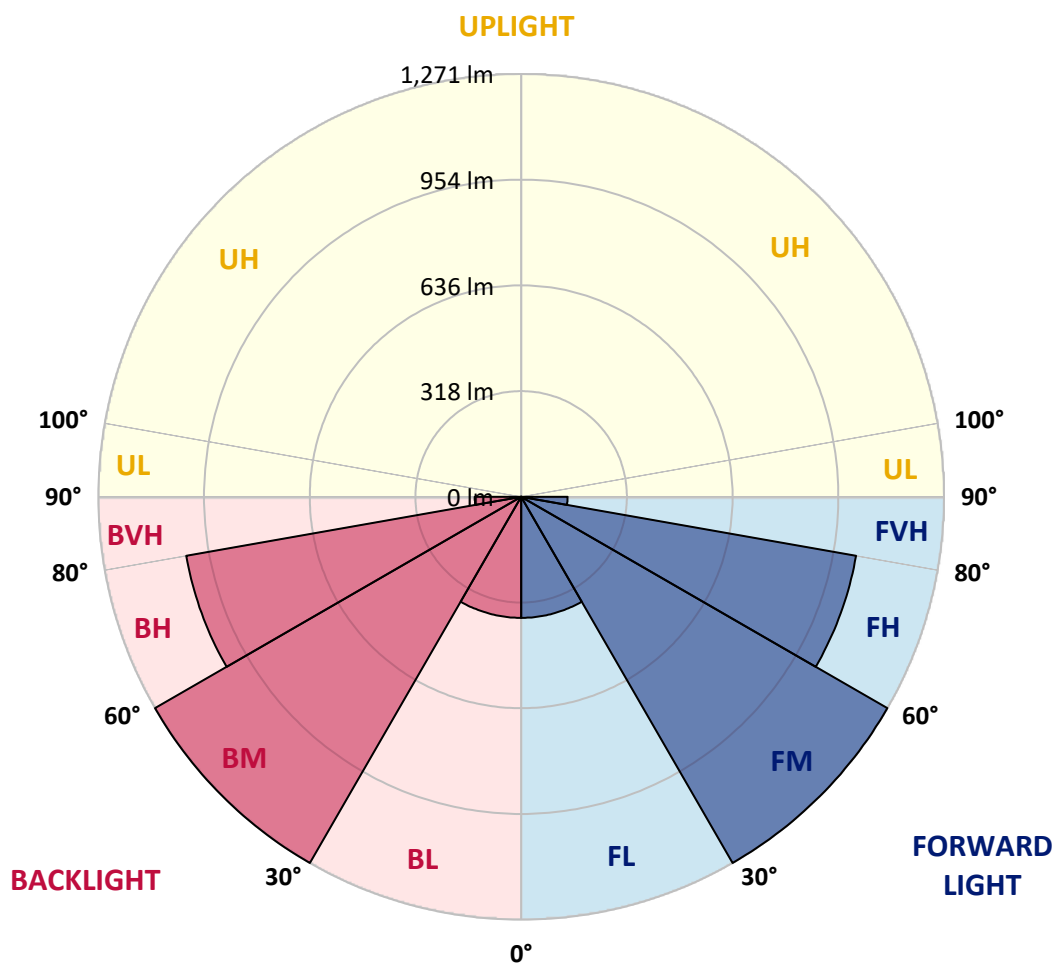
CATALOG NUMBER: TPTN-VA3-735-U-MQ-GM

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 364.0  | 6.5       |                         |      |         |
| FM   | (30°-60°)   | 1271.4 | 22.7      |                         |      |         |
| FH   | (60°-80°)   | 1022.6 | 18.3      |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 139.7  | 2.5       |                         |      | G2/225  |
| BL   | (0°-30°)    | 364.0  | 6.5       | B1/500                  |      |         |
| BM   | (30°-60°)   | 1271.4 | 22.7      | B2/2500                 |      |         |
| BH   | (60°-80°)   | 1022.6 | 18.3      | B3/2500                 |      | G1/1800 |
| BVH  | (80°-90°)   | 139.7  | 2.5       |                         |      | G2/225  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B3-U0-G2**

Type V Short



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 75°    | 85°    | 90°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 885.4  | 885.4  | 885.4  | 885.4  | 885.4  | 885.4  | 885.4  | 885.4  | 885.4  | 885.4  | 885.4  |
| 2.5°  | 877.8  | 877.8  | 878.8  | 878.8  | 877.8  | 877.8  | 876.9  | 876.9  | 877.8  | 878.8  | 878.8  |
| 5°    | 854.1  | 854.1  | 854.1  | 855.1  | 857.0  | 857.9  | 861.7  | 864.5  | 867.4  | 867.4  | 867.4  |
| 7.5°  | 812.4  | 811.5  | 813.4  | 815.2  | 816.2  | 820.9  | 826.6  | 830.4  | 836.1  | 839.9  | 840.8  |
| 10°   | 776.4  | 774.5  | 775.4  | 775.4  | 777.3  | 782.1  | 791.6  | 802.0  | 809.6  | 813.4  | 815.2  |
| 12.5° | 761.2  | 761.2  | 762.2  | 764.1  | 767.9  | 774.5  | 784.9  | 796.3  | 803.9  | 806.7  | 807.7  |
| 15°   | 766.0  | 766.9  | 769.7  | 777.3  | 783.0  | 786.8  | 793.4  | 803.9  | 811.5  | 817.1  | 816.2  |
| 17.5° | 781.1  | 784.0  | 795.3  | 802.9  | 806.7  | 805.8  | 806.7  | 813.4  | 823.8  | 830.4  | 831.4  |
| 20°   | 820.9  | 823.8  | 834.2  | 839.9  | 836.1  | 829.5  | 823.8  | 826.6  | 839.9  | 848.4  | 851.3  |
| 22.5° | 883.5  | 884.5  | 886.3  | 890.1  | 880.7  | 860.8  | 844.6  | 844.6  | 859.8  | 872.1  | 875.0  |
| 25°   | 958.4  | 957.4  | 953.7  | 946.1  | 926.2  | 895.8  | 871.2  | 863.6  | 875.9  | 893.0  | 895.8  |
| 27.5° | 1026.6 | 1028.5 | 1012.4 | 992.5  | 970.7  | 932.8  | 899.6  | 883.5  | 893.0  | 911.9  | 915.7  |
| 30°   | 1078.8 | 1075.0 | 1047.5 | 1014.3 | 993.5  | 951.8  | 913.8  | 894.9  | 902.5  | 924.3  | 927.1  |
| 32.5° | 1115.8 | 1109.1 | 1071.2 | 1033.3 | 1010.5 | 967.9  | 924.3  | 902.5  | 909.1  | 931.8  | 934.7  |
| 35°   | 1141.3 | 1132.8 | 1091.1 | 1051.3 | 1027.6 | 982.1  | 931.8  | 905.3  | 911.9  | 936.6  | 940.4  |
| 37.5° | 1158.4 | 1150.8 | 1111.0 | 1072.1 | 1043.7 | 1000.1 | 938.5  | 910.0  | 916.7  | 942.3  | 945.1  |
| 40°   | 1169.8 | 1165.0 | 1130.9 | 1094.9 | 1063.6 | 1020.0 | 948.9  | 913.8  | 920.5  | 948.0  | 951.8  |
| 42.5° | 1179.3 | 1179.3 | 1153.7 | 1120.5 | 1090.2 | 1041.8 | 962.2  | 920.5  | 925.2  | 955.5  | 960.3  |
| 45°   | 1196.3 | 1196.3 | 1183.1 | 1159.4 | 1128.1 | 1077.8 | 984.0  | 935.6  | 936.6  | 970.7  | 973.6  |
| 47.5° | 1226.7 | 1228.6 | 1227.6 | 1210.6 | 1187.8 | 1140.4 | 1025.7 | 960.3  | 956.5  | 997.3  | 1000.1 |
| 50°   | 1255.1 | 1258.9 | 1272.2 | 1258.9 | 1244.7 | 1192.5 | 1065.5 | 979.2  | 974.5  | 1019.1 | 1021.0 |
| 52.5° | 1284.5 | 1290.2 | 1315.8 | 1322.4 | 1308.2 | 1251.3 | 1109.1 | 1007.7 | 989.7  | 1042.8 | 1046.6 |
| 55°   | 1318.6 | 1321.5 | 1357.5 | 1380.2 | 1374.5 | 1329.0 | 1159.4 | 1032.3 | 1007.7 | 1066.5 | 1074.0 |
| 57.5° | 1316.7 | 1320.5 | 1367.9 | 1401.1 | 1410.6 | 1368.9 | 1185.0 | 1028.5 | 1002.0 | 1061.7 | 1071.2 |
| 60°   | 1297.8 | 1305.3 | 1354.6 | 1401.1 | 1411.5 | 1367.0 | 1182.1 | 1014.3 | 979.2  | 1046.6 | 1054.1 |
| 62.5° | 1276.9 | 1288.3 | 1335.7 | 1386.9 | 1407.7 | 1365.1 | 1177.4 | 987.8  | 953.7  | 1032.3 | 1036.1 |
| 65°   | 1227.6 | 1239.9 | 1307.2 | 1354.6 | 1391.6 | 1348.0 | 1165.0 | 951.8  | 922.4  | 990.6  | 993.5  |
| 67.5° | 1156.5 | 1165.0 | 1226.7 | 1307.2 | 1333.8 | 1297.8 | 1114.8 | 905.3  | 851.3  | 924.3  | 930.0  |
| 70°   | 1081.6 | 1088.3 | 1141.3 | 1232.4 | 1262.7 | 1242.8 | 1057.9 | 838.9  | 779.2  | 860.8  | 869.3  |
| 72.5° | 978.3  | 986.8  | 1045.6 | 1128.1 | 1171.7 | 1159.4 | 984.9  | 757.4  | 704.3  | 780.2  | 784.0  |
| 75°   | 847.5  | 863.6  | 924.3  | 998.2  | 1046.6 | 1041.8 | 889.2  | 661.7  | 610.5  | 675.0  | 673.1  |
| 77.5° | 711.9  | 720.5  | 780.2  | 852.2  | 895.8  | 891.1  | 762.2  | 555.5  | 501.5  | 558.4  | 560.2  |
| 80°   | 555.5  | 562.1  | 619.0  | 681.6  | 719.5  | 721.4  | 612.4  | 437.0  | 387.7  | 431.3  | 434.2  |
| 82.5° | 390.6  | 398.1  | 448.4  | 504.3  | 542.2  | 547.9  | 466.4  | 315.7  | 267.3  | 296.7  | 294.8  |
| 85°   | 210.4  | 214.2  | 254.1  | 307.1  | 349.8  | 360.2  | 299.6  | 191.5  | 149.8  | 155.5  | 151.7  |
| 87.5° | 47.4   | 49.3   | 61.6   | 73.0   | 92.9   | 102.4  | 86.3   | 63.5   | 42.7   | 30.3   | 19.0   |
| 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

MCGRAW EDISON

Report Number: SP1-2411-284-1

Test Date: 11/15/2024

Luminaire Tested: TTN-D0-735-U-WQ

Data in this report applies to families of products including TTN-D0-735-U-WQ

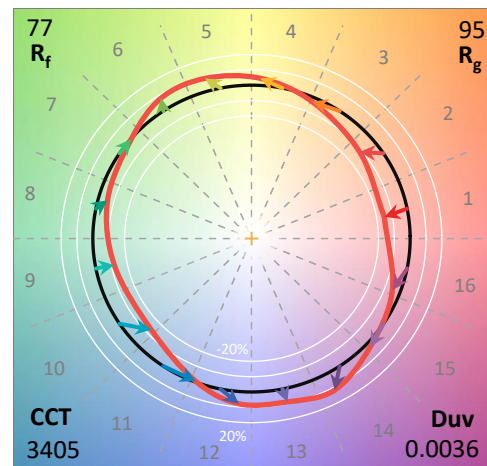


### Test Information

Test Method: LM-79-2019  
 Report Number: SP1-2411-284-1  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 11/15/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: MCGRAW EDISON  
 Catalog Number: **TTN-D0-735-U-WQ**  
 Description: TOPTIER NANO LED PARKING GARAGE LUMINAIRE. 3500K, 70 CRI LEDS AND WIDE DISTRIBUTION

### Spectral Parameters

|                           |          |           |      |      |       |
|---------------------------|----------|-----------|------|------|-------|
| CCT (K):                  | 3405     | CRI (Ra): | 73.9 |      |       |
| CIE u':                   | 0.2365   | R1:       | 71.3 | R9:  | -18.0 |
| CIE v':                   | 0.5180   | R2:       | 80.3 | R10: | 53.1  |
| Duv:                      | 0.0036   | R3:       | 87.8 | R11: | 68.6  |
| CIE x:                    | 0.4148   | R4:       | 73.2 | R12: | 42.6  |
| CIE y:                    | 0.4038   | R5:       | 69.8 | R13: | 72.5  |
| CIE z:                    | 0.1814   | R6:       | 71.8 | R14: | 92.7  |
| Peak Wavelength (nm):     | 596      | R7:       | 82.8 | R15: | 64.3  |
| Dominant Wavelength (nm): | 579      | R8:       | 54.1 |      |       |
| Purity:                   | 45.70672 |           |      |      |       |
| Rf:                       | 76.6     |           |      |      |       |
| Rg:                       | 95.4     |           |      |      |       |



### Test Conditions

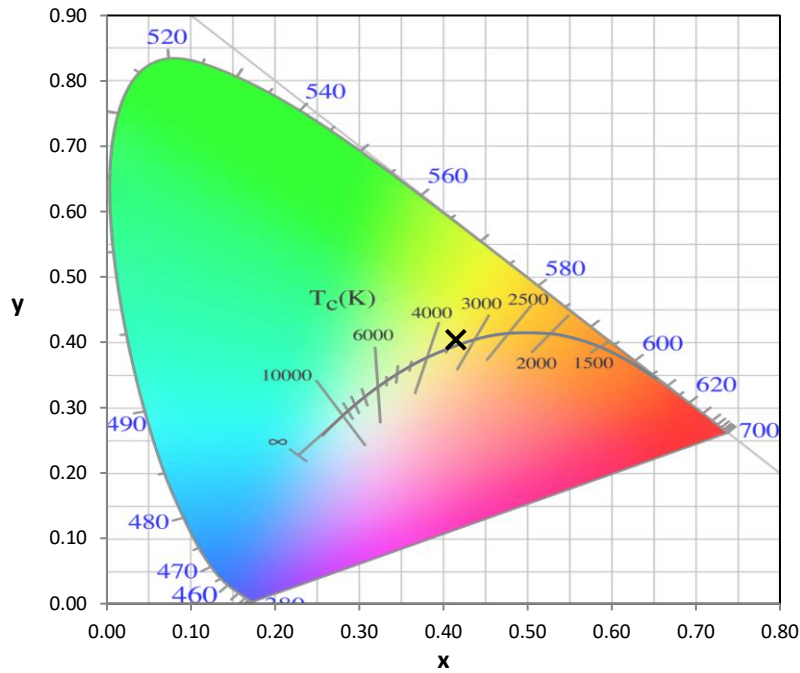
Stabilization Time: 38M  
 Operation Time: 1H 38M  
 Sphere Temperature (°C): 24.9

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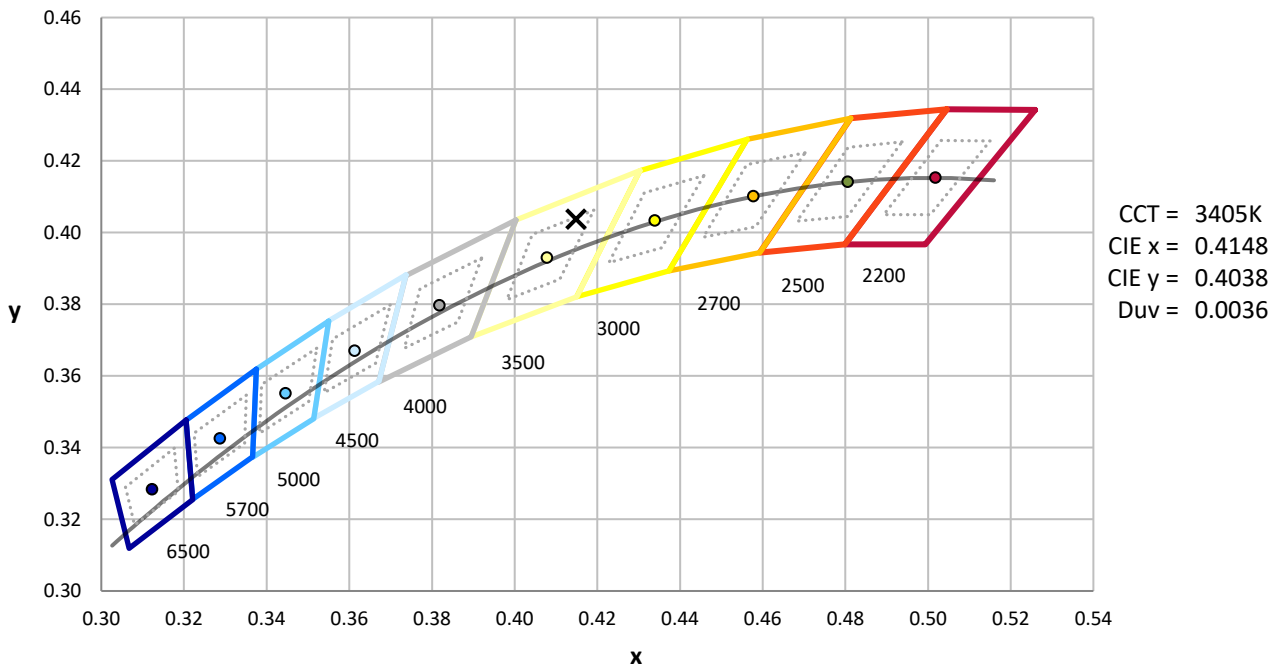
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 6/18/2024        | 12/18/2024           |
| Power Meter                    | INXT2011004           | 2/8/2024         | 2/8/2025             |
| AC Power Source                | IN0063                | 10/22/2024       | 10/22/2025           |
| DC Power Source                | IN0208                | 10/22/2024       | 10/22/2025           |
| Sphere Thermometer             | IN0085                | 10/22/2024       | 10/22/2025           |
| Room Thermometer               | IN0046                | 10/22/2024       | 10/22/2025           |

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**CIE 1931 Chromaticity Diagram**



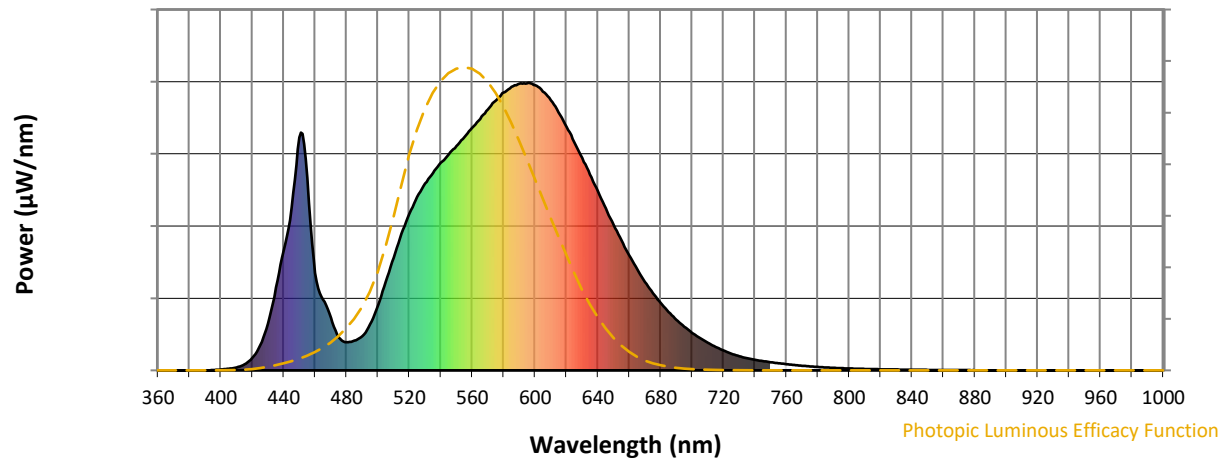
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 3500K 4-step quadrangle

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### Photopic Flux vs. Wavelength

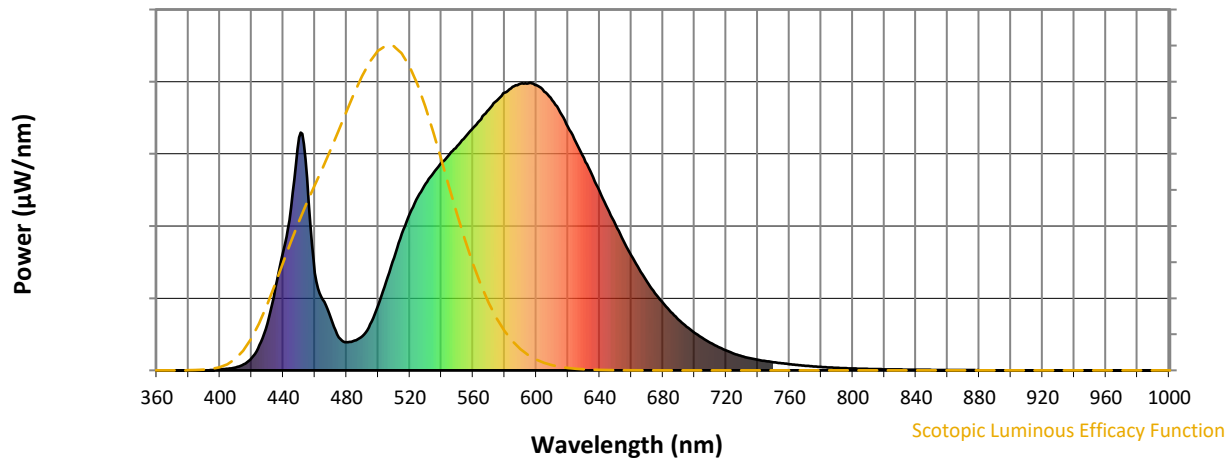


### Photopic Lumens: NR

| $\lambda$<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               | 119                                  | NR                             | 620               | 846                                  | NR                             | 750               | 28                                   | NR                             | 880               | 1                                    | NR                             |
| 365               | 0                                    | NR                             | 495               | 160                                  | NR                             | 625               | 793                                  | NR                             | 755               | 25                                   | NR                             | 885               | 0                                    | NR                             |
| 370               | 0                                    | NR                             | 500               | 225                                  | NR                             | 630               | 739                                  | NR                             | 760               | 22                                   | NR                             | 890               | 0                                    | NR                             |
| 375               | 0                                    | NR                             | 505               | 308                                  | NR                             | 635               | 681                                  | NR                             | 765               | 19                                   | NR                             | 895               | 0                                    | NR                             |
| 380               | 0                                    | NR                             | 510               | 392                                  | NR                             | 640               | 623                                  | NR                             | 770               | 16                                   | NR                             | 900               | 0                                    | NR                             |
| 385               | 0                                    | NR                             | 515               | 474                                  | NR                             | 645               | 563                                  | NR                             | 775               | 14                                   | NR                             | 905               | 0                                    | NR                             |
| 390               | 0                                    | NR                             | 520               | 545                                  | NR                             | 650               | 506                                  | NR                             | 780               | 12                                   | NR                             | 910               | 0                                    | NR                             |
| 395               | 1                                    | NR                             | 525               | 603                                  | NR                             | 655               | 451                                  | NR                             | 785               | 10                                   | NR                             | 915               | 0                                    | NR                             |
| 400               | 3                                    | NR                             | 530               | 649                                  | NR                             | 660               | 399                                  | NR                             | 790               | 9                                    | NR                             | 920               | 0                                    | NR                             |
| 405               | 5                                    | NR                             | 535               | 687                                  | NR                             | 665               | 352                                  | NR                             | 795               | 8                                    | NR                             | 925               | 0                                    | NR                             |
| 410               | 11                                   | NR                             | 540               | 721                                  | NR                             | 670               | 307                                  | NR                             | 800               | 6                                    | NR                             | 930               | 0                                    | NR                             |
| 415               | 21                                   | NR                             | 545               | 751                                  | NR                             | 675               | 268                                  | NR                             | 805               | 6                                    | NR                             | 935               | 0                                    | NR                             |
| 420               | 43                                   | NR                             | 550               | 779                                  | NR                             | 680               | 234                                  | NR                             | 810               | 5                                    | NR                             | 940               | 0                                    | NR                             |
| 425               | 88                                   | NR                             | 555               | 811                                  | NR                             | 685               | 203                                  | NR                             | 815               | 4                                    | NR                             | 945               | 0                                    | NR                             |
| 430               | 163                                  | NR                             | 560               | 843                                  | NR                             | 690               | 176                                  | NR                             | 820               | 4                                    | NR                             | 950               | 0                                    | NR                             |
| 435               | 288                                  | NR                             | 565               | 873                                  | NR                             | 695               | 152                                  | NR                             | 825               | 3                                    | NR                             | 955               | 0                                    | NR                             |
| 440               | 416                                  | NR                             | 570               | 907                                  | NR                             | 700               | 131                                  | NR                             | 830               | 3                                    | NR                             | 960               | 0                                    | NR                             |
| 445               | 566                                  | NR                             | 575               | 938                                  | NR                             | 705               | 112                                  | NR                             | 835               | 3                                    | NR                             | 965               | 0                                    | NR                             |
| 450               | 810                                  | NR                             | 580               | 965                                  | NR                             | 710               | 96                                   | NR                             | 840               | 2                                    | NR                             | 970               | 0                                    | NR                             |
| 455               | 669                                  | NR                             | 585               | 986                                  | NR                             | 715               | 81                                   | NR                             | 845               | 2                                    | NR                             | 975               | 0                                    | NR                             |
| 460               | 338                                  | NR                             | 590               | 997                                  | NR                             | 720               | 69                                   | NR                             | 850               | 2                                    | NR                             | 980               | 0                                    | NR                             |
| 465               | 246                                  | NR                             | 595               | 997                                  | NR                             | 725               | 58                                   | NR                             | 855               | 1                                    | NR                             | 985               | 0                                    | NR                             |
| 470               | 182                                  | NR                             | 600               | 991                                  | NR                             | 730               | 49                                   | NR                             | 860               | 1                                    | NR                             | 990               | 0                                    | NR                             |
| 475               | 115                                  | NR                             | 605               | 968                                  | NR                             | 735               | 42                                   | NR                             | 865               | 1                                    | NR                             | 995               | 0                                    | NR                             |
| 480               | 97                                   | NR                             | 610               | 939                                  | NR                             | 740               | 37                                   | NR                             | 870               | 1                                    | NR                             | 1000              | 0                                    | NR                             |
| 485               | 103                                  | NR                             | 615               | 896                                  | NR                             | 745               | 32                                   | NR                             | 875               | 1                                    | NR                             |                   |                                      |                                |

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### Scotopic Flux vs. Wavelength



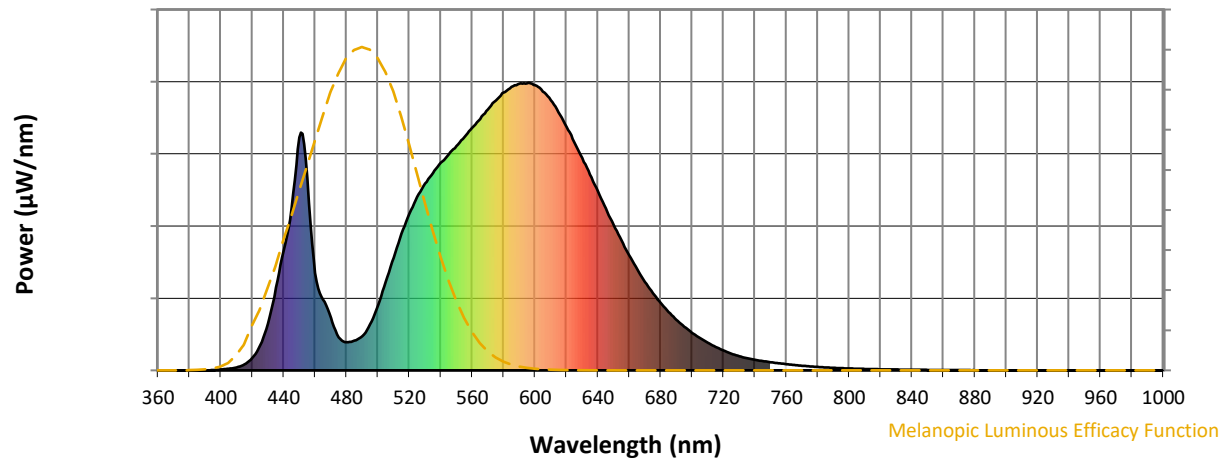
Scotopic Lumens: NR

S/P: 1.33

| λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(Φ/nm) |
|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|
| 360       | 0                           | NR               | 490       | 119                         | NR               | 620       | 846                         | NR               | 750       | 28                          | NR               | 880       | 1                           | NR               |
| 365       | 0                           | NR               | 495       | 160                         | NR               | 625       | 793                         | NR               | 755       | 25                          | NR               | 885       | 0                           | NR               |
| 370       | 0                           | NR               | 500       | 225                         | NR               | 630       | 739                         | NR               | 760       | 22                          | NR               | 890       | 0                           | NR               |
| 375       | 0                           | NR               | 505       | 308                         | NR               | 635       | 681                         | NR               | 765       | 19                          | NR               | 895       | 0                           | NR               |
| 380       | 0                           | NR               | 510       | 392                         | NR               | 640       | 623                         | NR               | 770       | 16                          | NR               | 900       | 0                           | NR               |
| 385       | 0                           | NR               | 515       | 474                         | NR               | 645       | 563                         | NR               | 775       | 14                          | NR               | 905       | 0                           | NR               |
| 390       | 0                           | NR               | 520       | 545                         | NR               | 650       | 506                         | NR               | 780       | 12                          | NR               | 910       | 0                           | NR               |
| 395       | 1                           | NR               | 525       | 603                         | NR               | 655       | 451                         | NR               | 785       | 10                          | NR               | 915       | 0                           | NR               |
| 400       | 3                           | NR               | 530       | 649                         | NR               | 660       | 399                         | NR               | 790       | 9                           | NR               | 920       | 0                           | NR               |
| 405       | 5                           | NR               | 535       | 687                         | NR               | 665       | 352                         | NR               | 795       | 8                           | NR               | 925       | 0                           | NR               |
| 410       | 11                          | NR               | 540       | 721                         | NR               | 670       | 307                         | NR               | 800       | 6                           | NR               | 930       | 0                           | NR               |
| 415       | 21                          | NR               | 545       | 751                         | NR               | 675       | 268                         | NR               | 805       | 6                           | NR               | 935       | 0                           | NR               |
| 420       | 43                          | NR               | 550       | 779                         | NR               | 680       | 234                         | NR               | 810       | 5                           | NR               | 940       | 0                           | NR               |
| 425       | 88                          | NR               | 555       | 811                         | NR               | 685       | 203                         | NR               | 815       | 4                           | NR               | 945       | 0                           | NR               |
| 430       | 163                         | NR               | 560       | 843                         | NR               | 690       | 176                         | NR               | 820       | 4                           | NR               | 950       | 0                           | NR               |
| 435       | 288                         | NR               | 565       | 873                         | NR               | 695       | 152                         | NR               | 825       | 3                           | NR               | 955       | 0                           | NR               |
| 440       | 416                         | NR               | 570       | 907                         | NR               | 700       | 131                         | NR               | 830       | 3                           | NR               | 960       | 0                           | NR               |
| 445       | 566                         | NR               | 575       | 938                         | NR               | 705       | 112                         | NR               | 835       | 3                           | NR               | 965       | 0                           | NR               |
| 450       | 810                         | NR               | 580       | 965                         | NR               | 710       | 96                          | NR               | 840       | 2                           | NR               | 970       | 0                           | NR               |
| 455       | 669                         | NR               | 585       | 986                         | NR               | 715       | 81                          | NR               | 845       | 2                           | NR               | 975       | 0                           | NR               |
| 460       | 338                         | NR               | 590       | 997                         | NR               | 720       | 69                          | NR               | 850       | 2                           | NR               | 980       | 0                           | NR               |
| 465       | 246                         | NR               | 595       | 997                         | NR               | 725       | 58                          | NR               | 855       | 1                           | NR               | 985       | 0                           | NR               |
| 470       | 182                         | NR               | 600       | 991                         | NR               | 730       | 49                          | NR               | 860       | 1                           | NR               | 990       | 0                           | NR               |
| 475       | 115                         | NR               | 605       | 968                         | NR               | 735       | 42                          | NR               | 865       | 1                           | NR               | 995       | 0                           | NR               |
| 480       | 97                          | NR               | 610       | 939                         | NR               | 740       | 37                          | NR               | 870       | 1                           | NR               | 1000      | 0                           | NR               |
| 485       | 103                         | NR               | 615       | 896                         | NR               | 745       | 32                          | NR               | 875       | 1                           | NR               |           |                             |                  |

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### Melanopic Flux vs. Wavelength



Melanopic Lumens: NR

M/P: 2.47

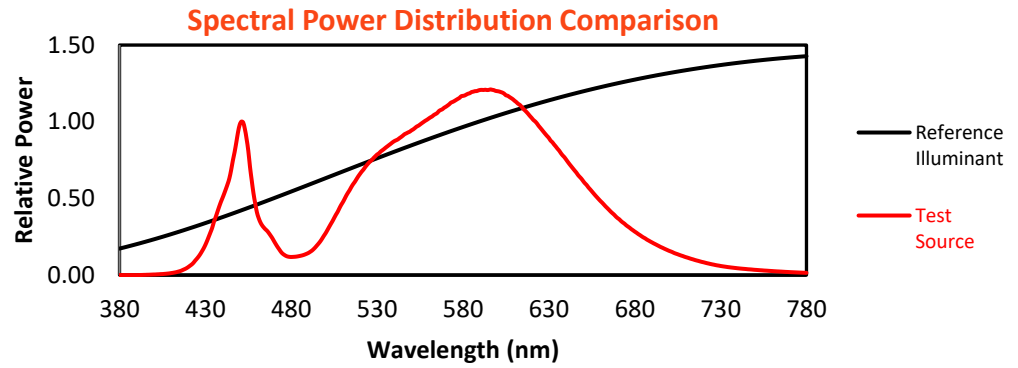
| λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(φ/nm) |
|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|
| 360       | 0                           | NR               | 490       | 119                         | NR               | 620       | 846                         | NR               | 750       | 28                          | NR               | 880       | 1                           | NR               |
| 365       | 0                           | NR               | 495       | 160                         | NR               | 625       | 793                         | NR               | 755       | 25                          | NR               | 885       | 0                           | NR               |
| 370       | 0                           | NR               | 500       | 225                         | NR               | 630       | 739                         | NR               | 760       | 22                          | NR               | 890       | 0                           | NR               |
| 375       | 0                           | NR               | 505       | 308                         | NR               | 635       | 681                         | NR               | 765       | 19                          | NR               | 895       | 0                           | NR               |
| 380       | 0                           | NR               | 510       | 392                         | NR               | 640       | 623                         | NR               | 770       | 16                          | NR               | 900       | 0                           | NR               |
| 385       | 0                           | NR               | 515       | 474                         | NR               | 645       | 563                         | NR               | 775       | 14                          | NR               | 905       | 0                           | NR               |
| 390       | 0                           | NR               | 520       | 545                         | NR               | 650       | 506                         | NR               | 780       | 12                          | NR               | 910       | 0                           | NR               |
| 395       | 1                           | NR               | 525       | 603                         | NR               | 655       | 451                         | NR               | 785       | 10                          | NR               | 915       | 0                           | NR               |
| 400       | 3                           | NR               | 530       | 649                         | NR               | 660       | 399                         | NR               | 790       | 9                           | NR               | 920       | 0                           | NR               |
| 405       | 5                           | NR               | 535       | 687                         | NR               | 665       | 352                         | NR               | 795       | 8                           | NR               | 925       | 0                           | NR               |
| 410       | 11                          | NR               | 540       | 721                         | NR               | 670       | 307                         | NR               | 800       | 6                           | NR               | 930       | 0                           | NR               |
| 415       | 21                          | NR               | 545       | 751                         | NR               | 675       | 268                         | NR               | 805       | 6                           | NR               | 935       | 0                           | NR               |
| 420       | 43                          | NR               | 550       | 779                         | NR               | 680       | 234                         | NR               | 810       | 5                           | NR               | 940       | 0                           | NR               |
| 425       | 88                          | NR               | 555       | 811                         | NR               | 685       | 203                         | NR               | 815       | 4                           | NR               | 945       | 0                           | NR               |
| 430       | 163                         | NR               | 560       | 843                         | NR               | 690       | 176                         | NR               | 820       | 4                           | NR               | 950       | 0                           | NR               |
| 435       | 288                         | NR               | 565       | 873                         | NR               | 695       | 152                         | NR               | 825       | 3                           | NR               | 955       | 0                           | NR               |
| 440       | 416                         | NR               | 570       | 907                         | NR               | 700       | 131                         | NR               | 830       | 3                           | NR               | 960       | 0                           | NR               |
| 445       | 566                         | NR               | 575       | 938                         | NR               | 705       | 112                         | NR               | 835       | 3                           | NR               | 965       | 0                           | NR               |
| 450       | 810                         | NR               | 580       | 965                         | NR               | 710       | 96                          | NR               | 840       | 2                           | NR               | 970       | 0                           | NR               |
| 455       | 669                         | NR               | 585       | 986                         | NR               | 715       | 81                          | NR               | 845       | 2                           | NR               | 975       | 0                           | NR               |
| 460       | 338                         | NR               | 590       | 997                         | NR               | 720       | 69                          | NR               | 850       | 2                           | NR               | 980       | 0                           | NR               |
| 465       | 246                         | NR               | 595       | 997                         | NR               | 725       | 58                          | NR               | 855       | 1                           | NR               | 985       | 0                           | NR               |
| 470       | 182                         | NR               | 600       | 991                         | NR               | 730       | 49                          | NR               | 860       | 1                           | NR               | 990       | 0                           | NR               |
| 475       | 115                         | NR               | 605       | 968                         | NR               | 735       | 42                          | NR               | 865       | 1                           | NR               | 995       | 0                           | NR               |
| 480       | 97                          | NR               | 610       | 939                         | NR               | 740       | 37                          | NR               | 870       | 1                           | NR               | 1000      | 0                           | NR               |
| 485       | 103                         | NR               | 615       | 896                         | NR               | 745       | 32                          | NR               | 875       | 1                           | NR               |           |                             |                  |

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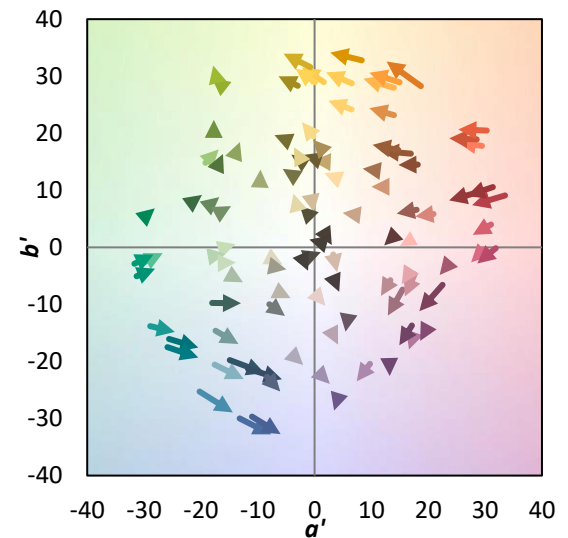
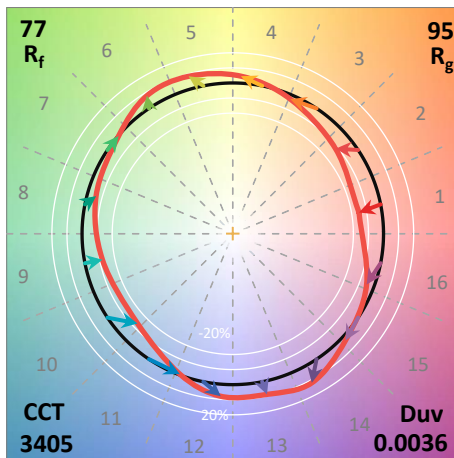
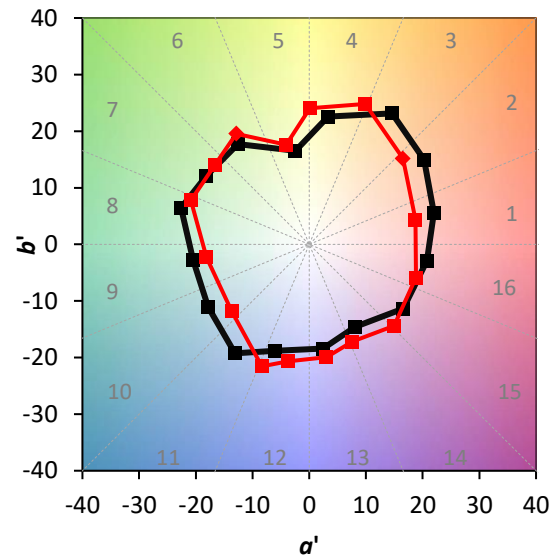
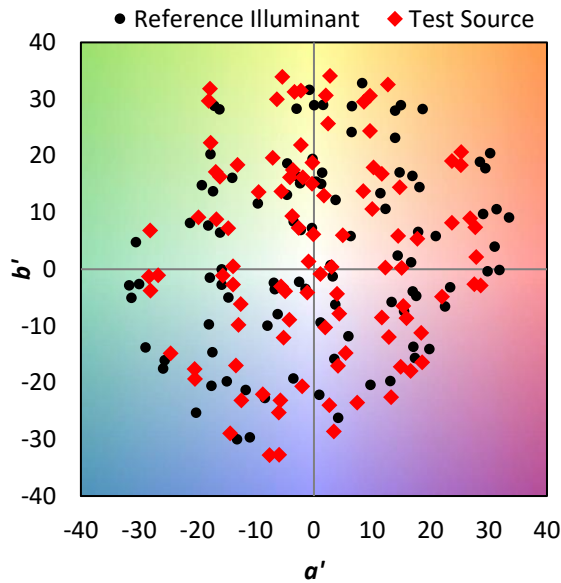
TM-30-18

### Summary

$R_f = 76.6$   
 $R_g = 95.4$   
 $CIE R_a = 73.9$   
 $R_g = -18.0$

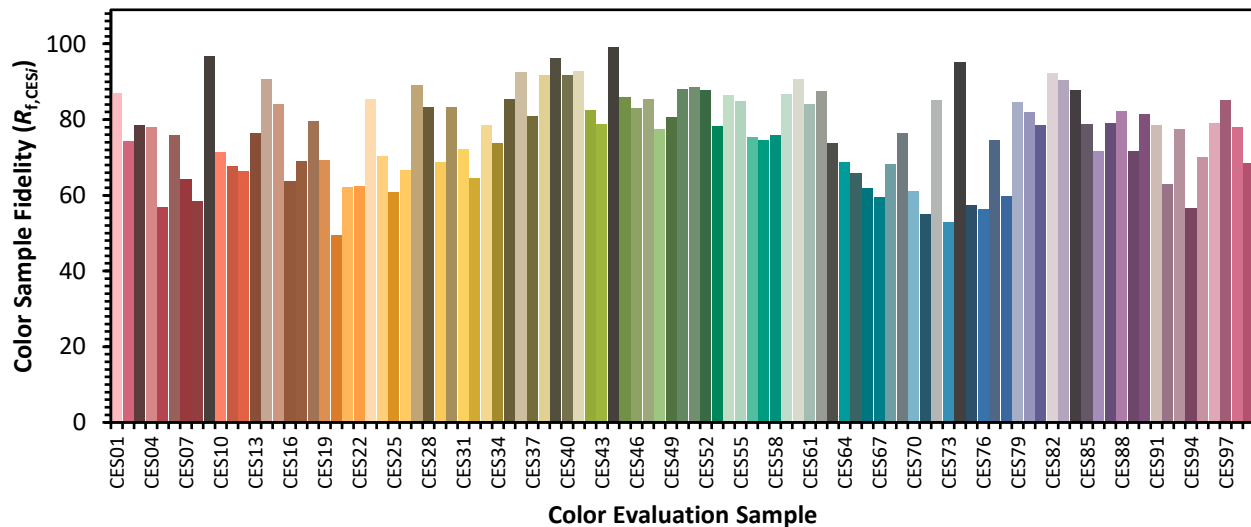


### Color Vector Graphics



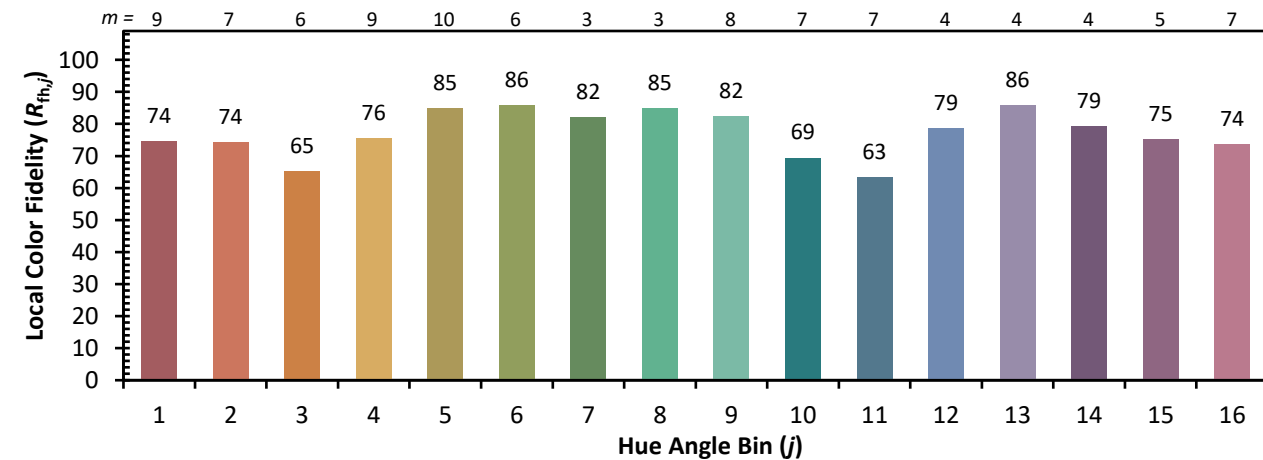
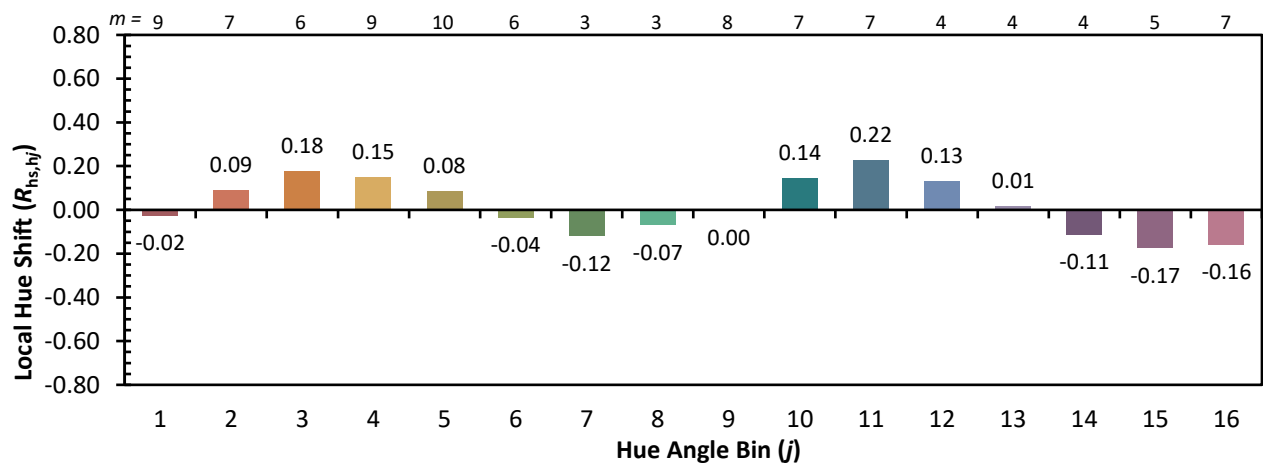
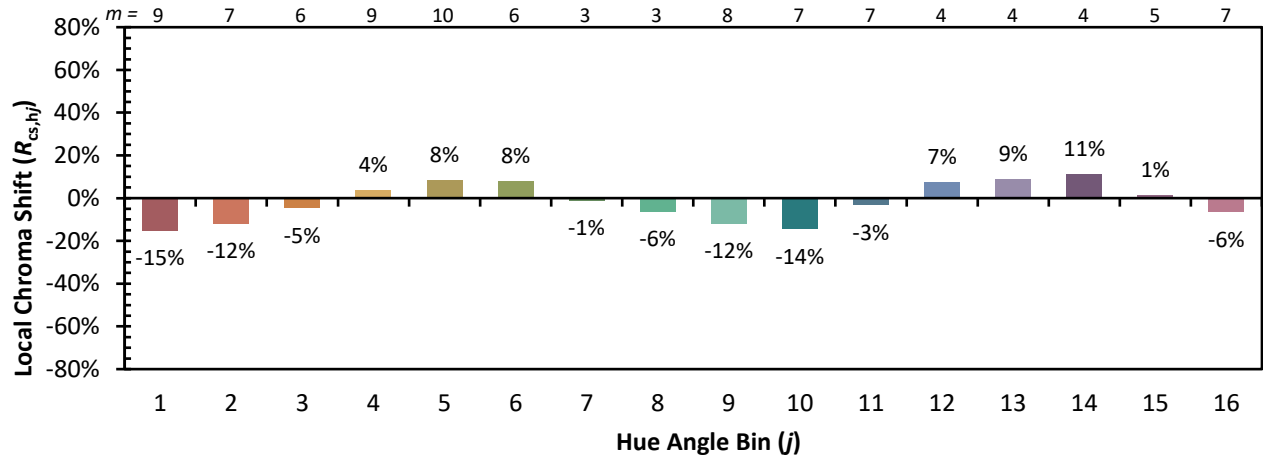
**Individual Sample Fidelity Index ( $R_{f,i}$ )**

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 67 | CES51 = 88 | CES76 = 56 |
| CES02 = 62 | CES27 = 89 | CES52 = 88 | CES77 = 75 |
| CES03 = 31 | CES28 = 83 | CES53 = 78 | CES78 = 60 |
| CES04 = 70 | CES29 = 69 | CES54 = 86 | CES79 = 85 |
| CES05 = 48 | CES30 = 83 | CES55 = 85 | CES80 = 82 |
| CES06 = 51 | CES31 = 72 | CES56 = 75 | CES81 = 78 |
| CES07 = 41 | CES32 = 65 | CES57 = 75 | CES82 = 92 |
| CES08 = 40 | CES33 = 78 | CES58 = 76 | CES83 = 90 |
| CES09 = 29 | CES34 = 74 | CES59 = 87 | CES84 = 88 |
| CES10 = 75 | CES35 = 86 | CES60 = 91 | CES85 = 79 |
| CES11 = 58 | CES36 = 93 | CES61 = 84 | CES86 = 72 |
| CES12 = 64 | CES37 = 81 | CES62 = 88 | CES87 = 79 |
| CES13 = 43 | CES38 = 92 | CES63 = 74 | CES88 = 82 |
| CES14 = 74 | CES39 = 96 | CES64 = 69 | CES89 = 72 |
| CES15 = 71 | CES40 = 92 | CES65 = 66 | CES90 = 82 |
| CES16 = 47 | CES41 = 93 | CES66 = 62 | CES91 = 79 |
| CES17 = 50 | CES42 = 83 | CES67 = 60 | CES92 = 63 |
| CES18 = 56 | CES43 = 79 | CES68 = 68 | CES93 = 77 |
| CES19 = 72 | CES44 = 99 | CES69 = 76 | CES94 = 56 |
| CES20 = 65 | CES45 = 86 | CES70 = 61 | CES95 = 70 |
| CES21 = 86 | CES46 = 83 | CES71 = 55 | CES96 = 79 |
| CES22 = 79 | CES47 = 85 | CES72 = 85 | CES97 = 85 |
| CES23 = 92 | CES48 = 78 | CES73 = 53 | CES98 = 78 |
| CES24 = 91 | CES49 = 81 | CES74 = 95 | CES99 = 68 |
| CES25 = 72 | CES50 = 88 | CES75 = 57 |            |

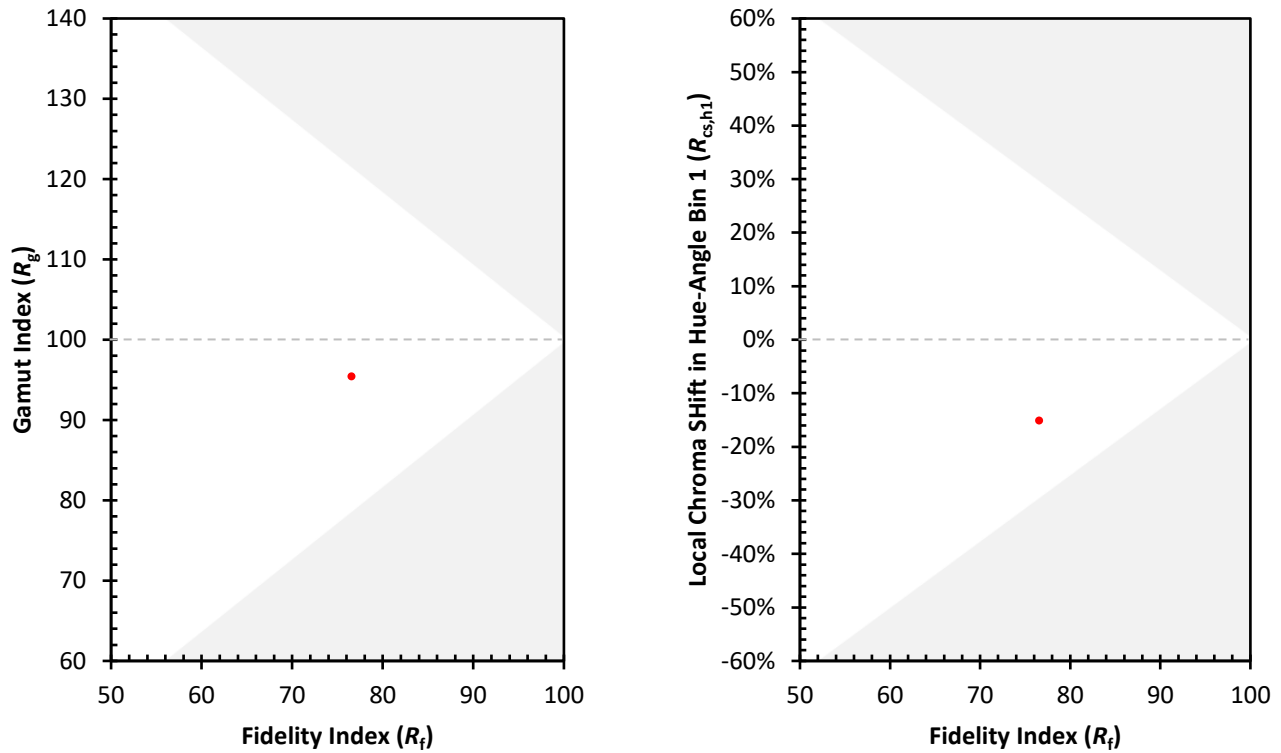




Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)