

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

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Peachtree City, GA 30269

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

Test Report Prepared for

Cooper Lighting Solutions

Brand: McGRAW-EDISON

Report Number: P1445250

Luminaire Tested: TPTN-VA1-750-U-DL-CG-GM

Issue Date: 05/21/2026

**Test Information**

Test Method: LM-79-2024  
Report Number: P1445250  
Test Lab: INNOVATION CENTER(G1)  
Issue Date: 5/21/2026  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: MCGRAW-EDISON  
Catalog Number: TPTN-VA1-750-U-DL-CG-GM  
Description: TOPTIER NANO SPIDER MOUNT VISUAL COMFORT LED LUMINAIRE 27W 70CRI 5000K w/  
DRIVE LANE TYPE IV DISTRIBUTION OPTIC AND GLASS  
Light Source: 5000K CCT, 70 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 2295.7 lumens  
Efficiency: N/A  
Efficacy: 86.0 lumens/watt  
Luminous Opening: Circular (Dia: 0.71' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B1 - U0 - G1

Input Watts (W): 26.7  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.98  
Total Harmonic Distortion (THDi): 11.9%  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT

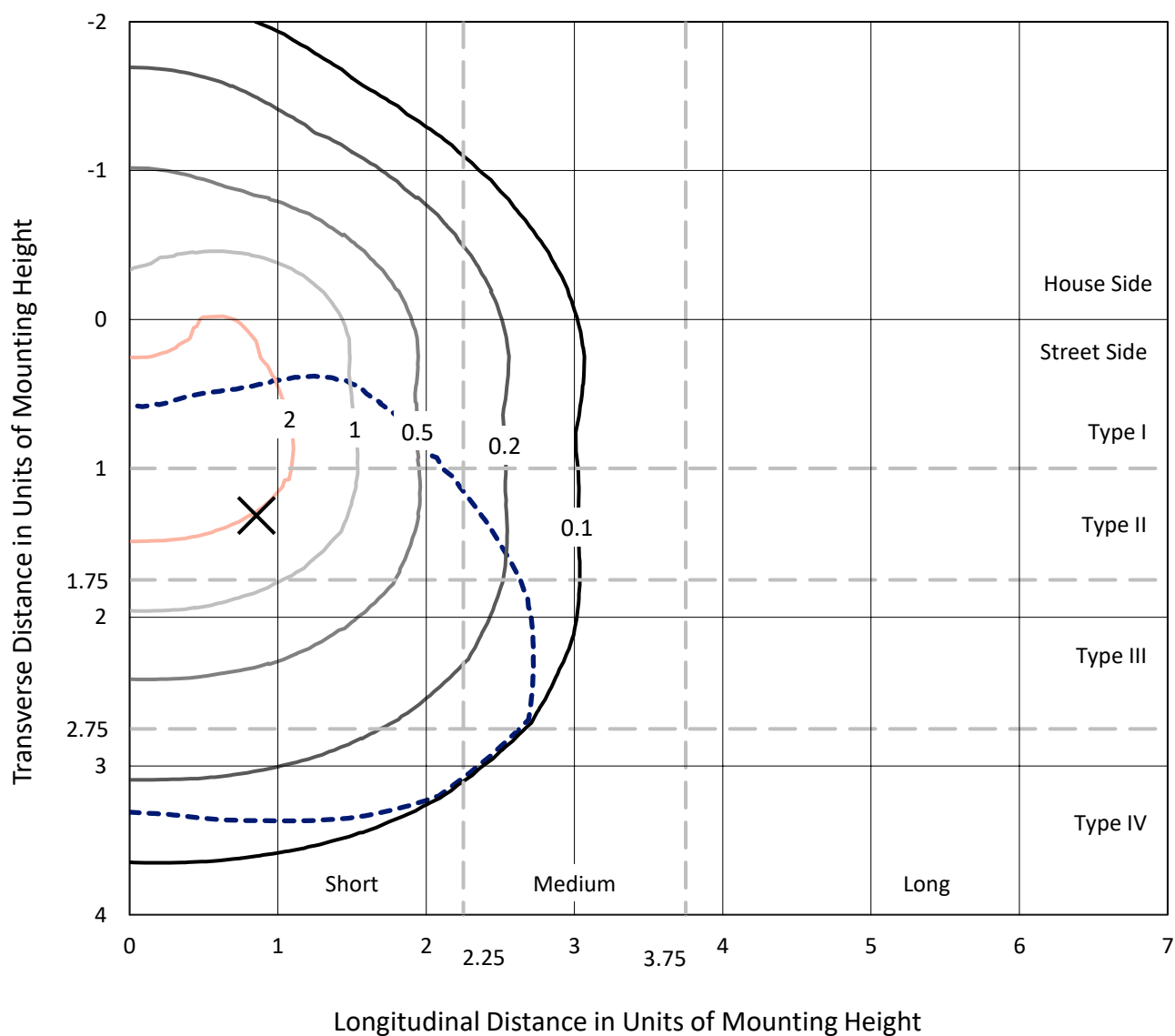
REPORT NUMBER: P1445250

CATALOG NUMBER: TPTN-VA1-750-U-DL-CG-GM

## Iso-Footcandle Lines of Horizontal Illumination

× Max cd

--- 1/2 Max cd



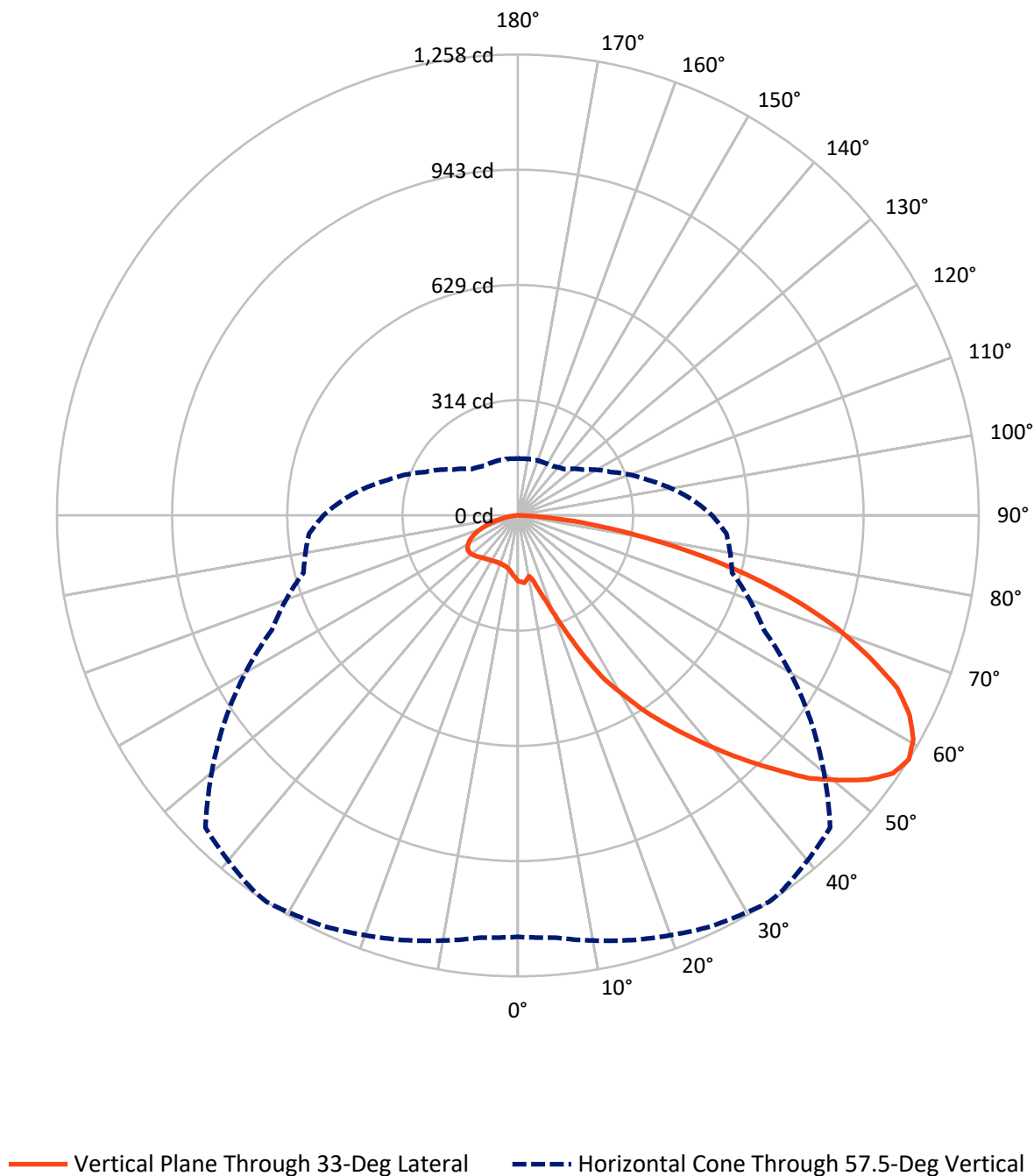
Based on 10 foot mounting height. Maximum calculated value = 4.1 fc

Type IV - Short - N/A

REPORT NUMBER: P1445250

CATALOG NUMBER: TPTN-VA1-750-U-DL-CG-GM

## Luminous Intensity Polar Plot



REPORT NUMBER: P1445250

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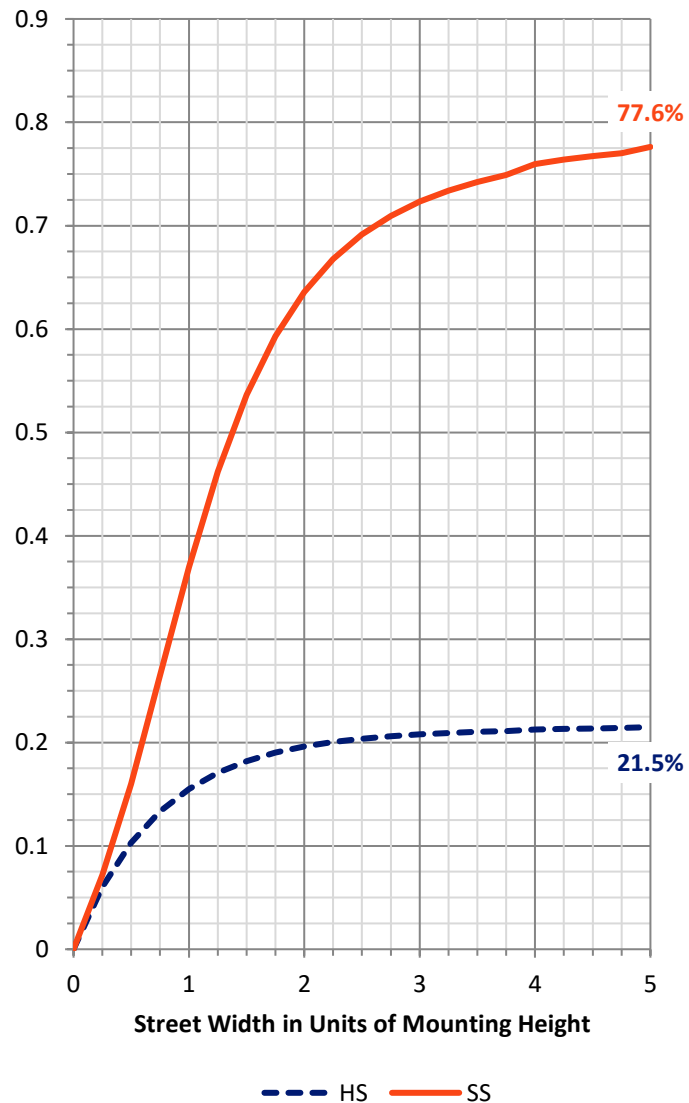
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 497.1    | 0.0    | 497.1  |
|                    | % Fixture | 21.7     | 0.0    | 21.7   |
| <b>Street Side</b> | Lumens    | 1798.6   | 0.0    | 1798.6 |
|                    | % Fixture | 78.3     | 0.0    | 78.3   |
| <b>Total</b>       | Lumens    | 2295.7   | 0.0    | 2295.7 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 16.3   | 0.7       |
| 10°-20°   | 51.8   | 2.3       |
| 20°-30°   | 127.9  | 5.6       |
| 30°-40°   | 248.3  | 10.8      |
| 40°-50°   | 403.6  | 17.6      |
| 50°-60°   | 545.7  | 23.8      |
| 60°-70°   | 531.3  | 23.1      |
| 70°-80°   | 313.1  | 13.6      |
| 80°-90°   | 57.6   | 2.5       |
| 90°-100°  | 0.0    | 0.0       |
| 100°-110° | 0.0    | 0.0       |
| 110°-120° | 0.0    | 0.0       |
| 120°-130° | 0.0    | 0.0       |
| 130°-140° | 0.0    | 0.0       |
| 140°-150° | 0.0    | 0.0       |
| 150°-160° | 0.0    | 0.0       |
| 160°-170° | 0.0    | 0.0       |
| 170°-180° | 0.0    | 0.0       |
| 0°-90°    | 2295.7 | 100.0     |
| 0°-180°   | 2295.7 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P1445250

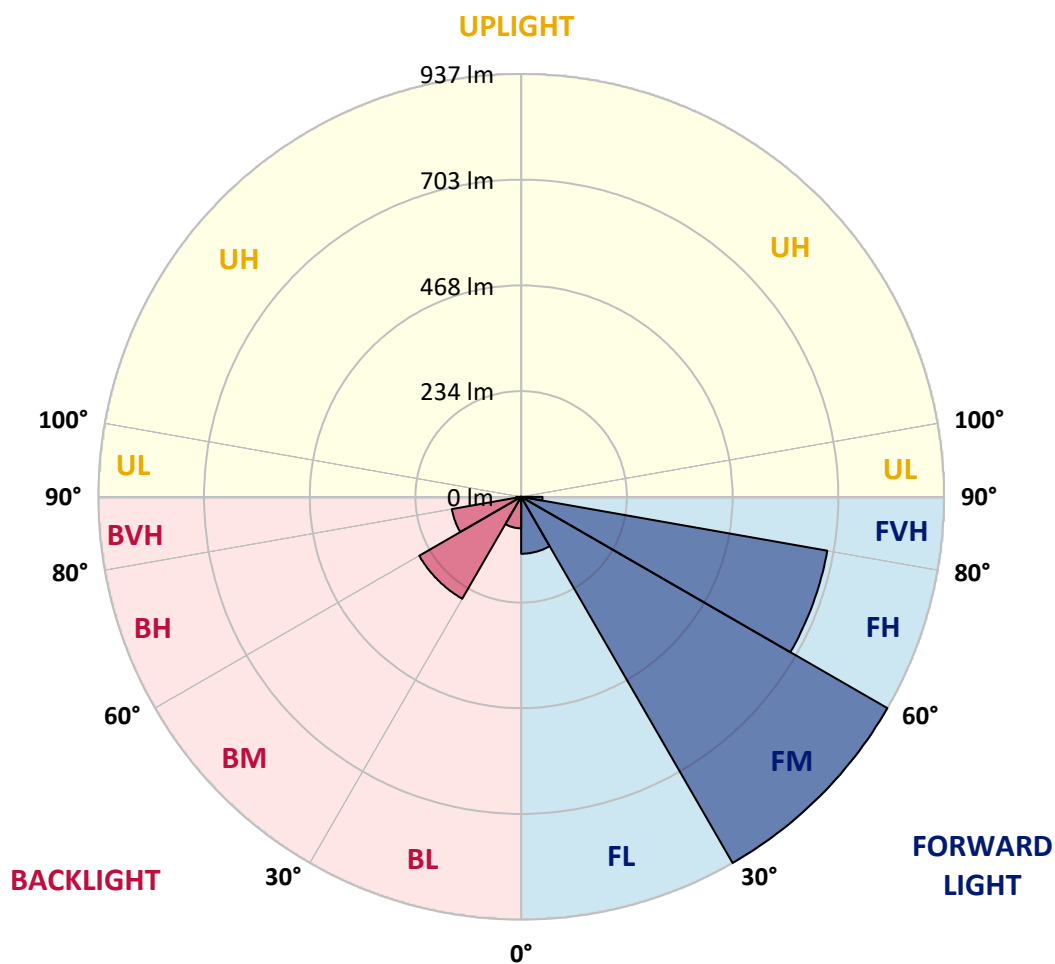
CATALOG NUMBER: TPTN-VA1-750-U-DL-CG-GM

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 126.2  | 5.5       |                         |      |         |
| FM   | (30°-60°)   | 936.8  | 40.8      |                         |      |         |
| FH   | (60°-80°)   | 688.5  | 30.0      |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 47.1   | 2.1       |                         |      | G1/100  |
| BL   | (0°-30°)    | 69.8   | 3.0       | B0/110                  |      |         |
| BM   | (30°-60°)   | 260.8  | 11.4      | B1/1000                 |      |         |
| BH   | (60°-80°)   | 155.9  | 6.8       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 10.5   | 0.5       |                         |      | G1/100  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B1-U0-G1**

Type IV Short



REPORT NUMBER: P1445250

CATALOG NUMBER: TPTN-VA1-750-U-DL-CG-GM

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 33°    | 35°    | 45°    | 55°   | 65°   | 75°   | 85°   |
|-------|--------|--------|--------|--------|--------|--------|--------|-------|-------|-------|-------|
| 0°    | 180.3  | 180.3  | 180.3  | 180.3  | 180.3  | 180.3  | 180.3  | 180.3 | 180.3 | 180.3 | 180.3 |
| 2.5°  | 182.6  | 182.1  | 182.1  | 181.7  | 181.2  | 181.2  | 180.8  | 180.3 | 179.4 | 178.5 | 177.6 |
| 5°    | 191.3  | 190.3  | 188.5  | 186.7  | 184.9  | 184.9  | 184.0  | 183.5 | 182.6 | 182.1 | 181.2 |
| 7.5°  | 182.6  | 182.6  | 181.7  | 179.4  | 176.7  | 176.2  | 172.1  | 170.7 | 172.1 | 171.6 | 172.1 |
| 10°   | 186.7  | 186.2  | 181.2  | 175.3  | 168.4  | 167.1  | 163.4  | 162.0 | 164.8 | 167.5 | 169.8 |
| 12.5° | 200.8  | 200.8  | 195.4  | 187.6  | 180.3  | 178.5  | 170.7  | 168.0 | 168.4 | 171.6 | 174.4 |
| 15°   | 224.1  | 224.1  | 220.0  | 213.6  | 206.8  | 203.1  | 191.3  | 183.5 | 181.2 | 182.6 | 185.3 |
| 17.5° | 259.7  | 257.9  | 260.2  | 251.1  | 241.9  | 238.7  | 220.0  | 205.9 | 199.9 | 200.4 | 201.3 |
| 20°   | 314.5  | 313.6  | 313.6  | 307.7  | 291.7  | 285.3  | 260.2  | 235.1 | 224.6 | 223.2 | 222.3 |
| 22.5° | 384.3  | 382.1  | 383.0  | 375.7  | 356.0  | 350.6  | 311.8  | 276.6 | 255.2 | 248.8 | 248.3 |
| 25°   | 464.7  | 465.1  | 466.0  | 456.0  | 432.7  | 427.7  | 376.1  | 325.0 | 291.2 | 278.9 | 275.7 |
| 27.5° | 545.9  | 545.9  | 540.5  | 525.8  | 509.0  | 500.3  | 444.1  | 378.4 | 331.4 | 313.1 | 304.5 |
| 30°   | 619.0  | 618.5  | 606.6  | 585.2  | 567.8  | 561.9  | 499.8  | 428.6 | 369.7 | 342.3 | 331.4 |
| 32.5° | 689.7  | 688.3  | 667.3  | 648.6  | 636.3  | 627.2  | 560.1  | 477.0 | 406.7 | 370.2 | 356.5 |
| 35°   | 761.8  | 753.6  | 729.4  | 713.9  | 700.7  | 690.2  | 623.5  | 526.3 | 443.2 | 399.9 | 382.5 |
| 37.5° | 825.3  | 823.0  | 794.7  | 782.8  | 767.8  | 762.3  | 691.5  | 577.0 | 482.0 | 429.5 | 410.8 |
| 40°   | 887.4  | 886.5  | 864.1  | 852.2  | 839.0  | 831.2  | 763.7  | 632.2 | 524.5 | 461.9 | 440.9 |
| 42.5° | 943.1  | 944.9  | 933.0  | 925.3  | 913.8  | 907.9  | 837.2  | 690.2 | 565.6 | 492.5 | 470.2 |
| 45°   | 1005.6 | 1006.0 | 1003.8 | 1000.6 | 990.1  | 990.5  | 916.1  | 751.8 | 611.7 | 525.8 | 500.7 |
| 47.5° | 1063.1 | 1066.8 | 1072.2 | 1072.7 | 1071.8 | 1067.2 | 1000.1 | 810.7 | 655.0 | 556.0 | 529.5 |
| 50°   | 1104.2 | 1110.1 | 1130.2 | 1136.6 | 1134.8 | 1133.4 | 1067.2 | 870.5 | 689.7 | 582.4 | 549.6 |
| 52.5° | 1143.4 | 1148.0 | 1177.2 | 1197.8 | 1197.3 | 1194.1 | 1130.7 | 922.5 | 723.5 | 601.2 | 568.3 |
| 55°   | 1162.6 | 1165.3 | 1203.2 | 1236.1 | 1242.0 | 1242.5 | 1188.2 | 960.4 | 742.7 | 613.0 | 577.9 |
| 57.5° | 1149.8 | 1156.2 | 1199.6 | 1238.4 | 1257.6 | 1253.4 | 1205.1 | 975.5 | 740.8 | 605.3 | 571.5 |
| 60°   | 1120.2 | 1129.3 | 1170.8 | 1215.1 | 1239.8 | 1233.8 | 1188.6 | 969.5 | 724.4 | 585.6 | 557.3 |
| 62.5° | 1075.0 | 1086.4 | 1127.0 | 1169.9 | 1199.1 | 1201.0 | 1158.5 | 951.7 | 693.8 | 561.4 | 535.0 |
| 65°   | 988.2  | 1003.3 | 1063.6 | 1110.6 | 1138.4 | 1145.3 | 1099.2 | 909.3 | 654.1 | 524.9 | 493.4 |
| 67.5° | 893.3  | 903.3  | 951.7  | 1020.7 | 1035.3 | 1044.8 | 1017.9 | 839.0 | 602.5 | 467.4 | 442.8 |
| 70°   | 785.1  | 800.6  | 839.0  | 906.5  | 925.7  | 932.6  | 916.6  | 752.3 | 528.6 | 404.0 | 390.3 |
| 72.5° | 664.2  | 670.5  | 713.9  | 764.6  | 793.8  | 802.5  | 785.6  | 652.3 | 447.3 | 336.9 | 326.4 |
| 75°   | 520.8  | 530.9  | 564.2  | 614.4  | 646.4  | 644.1  | 641.3  | 534.1 | 354.2 | 268.4 | 257.9 |
| 77.5° | 386.6  | 392.1  | 424.5  | 461.0  | 487.0  | 489.3  | 488.4  | 407.2 | 265.7 | 195.4 | 188.1 |
| 80°   | 252.4  | 259.3  | 283.0  | 311.8  | 329.1  | 336.9  | 334.1  | 283.9 | 182.1 | 131.5 | 126.0 |
| 82.5° | 142.9  | 144.7  | 162.5  | 178.0  | 199.5  | 198.1  | 203.6  | 173.0 | 110.9 | 77.1  | 70.3  |
| 85°   | 50.7   | 53.9   | 63.0   | 79.4   | 88.1   | 94.0   | 94.9   | 81.3  | 49.8  | 34.7  | 26.0  |
| 87.5° | 5.0    | 5.0    | 8.7    | 12.8   | 16.4   | 17.3   | 17.8   | 18.3  | 14.6  | 11.4  | 3.7   |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   |

REPORT NUMBER: P1445250

CATALOG NUMBER: TPTN-VA1-750-U-DL-CG-GM

**CANDELA DISTRIBUTION (continued):**

|       | 90°   | 95°   | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 180.3 | 180.3 | 180.3 | 180.3 | 180.3 | 180.3 | 180.3 | 180.3 | 180.3 | 180.3 | 180.3 |
| 2.5°  | 177.6 | 176.7 | 174.8 | 173.0 | 172.5 | 170.7 | 170.3 | 169.8 | 168.9 | 168.9 | 168.4 |
| 5°    | 179.4 | 178.5 | 175.7 | 172.5 | 169.3 | 166.6 | 164.3 | 162.0 | 160.2 | 158.8 | 158.8 |
| 7.5°  | 173.0 | 173.5 | 173.5 | 171.2 | 166.6 | 161.6 | 155.7 | 151.1 | 147.0 | 145.2 | 144.2 |
| 10°   | 170.3 | 171.6 | 171.2 | 168.9 | 164.3 | 157.5 | 149.7 | 142.4 | 136.5 | 132.8 | 132.4 |
| 12.5° | 175.3 | 175.3 | 173.9 | 170.3 | 163.9 | 155.2 | 146.1 | 136.5 | 129.6 | 125.5 | 125.1 |
| 15°   | 186.2 | 185.8 | 180.8 | 173.9 | 164.8 | 154.7 | 144.2 | 133.7 | 125.1 | 120.5 | 120.0 |
| 17.5° | 201.8 | 199.5 | 191.3 | 179.4 | 167.1 | 154.7 | 142.9 | 131.5 | 122.3 | 116.9 | 115.9 |
| 20°   | 220.9 | 216.4 | 203.6 | 186.2 | 169.8 | 155.7 | 142.0 | 129.6 | 120.5 | 114.6 | 114.1 |
| 22.5° | 244.7 | 237.4 | 217.3 | 194.0 | 174.4 | 157.5 | 142.0 | 128.7 | 120.0 | 115.5 | 115.5 |
| 25°   | 268.4 | 258.4 | 232.8 | 202.7 | 178.9 | 158.8 | 142.0 | 129.6 | 122.3 | 119.1 | 118.7 |
| 27.5° | 294.4 | 280.3 | 247.9 | 212.7 | 183.5 | 160.7 | 142.9 | 130.1 | 124.6 | 122.3 | 122.3 |
| 30°   | 318.2 | 302.2 | 263.4 | 222.3 | 188.5 | 163.0 | 144.7 | 131.5 | 126.0 | 125.1 | 124.2 |
| 32.5° | 340.5 | 321.8 | 278.0 | 231.4 | 194.5 | 165.2 | 146.1 | 132.8 | 127.8 | 126.9 | 126.4 |
| 35°   | 365.2 | 344.6 | 291.2 | 240.1 | 199.0 | 168.9 | 147.9 | 135.1 | 130.1 | 129.2 | 129.2 |
| 37.5° | 391.6 | 366.1 | 306.7 | 249.2 | 203.6 | 172.5 | 149.7 | 138.3 | 133.3 | 132.4 | 131.9 |
| 40°   | 417.2 | 388.9 | 322.3 | 258.4 | 209.1 | 175.3 | 152.0 | 141.0 | 136.9 | 136.0 | 135.6 |
| 42.5° | 444.6 | 412.2 | 337.3 | 266.6 | 214.5 | 178.0 | 155.2 | 145.2 | 141.5 | 139.7 | 139.2 |
| 45°   | 469.7 | 434.6 | 351.0 | 275.2 | 219.6 | 181.2 | 158.8 | 150.2 | 146.5 | 144.7 | 144.2 |
| 47.5° | 493.9 | 453.7 | 363.8 | 281.6 | 223.7 | 183.5 | 162.5 | 154.3 | 151.5 | 149.7 | 148.8 |
| 50°   | 513.5 | 469.2 | 372.9 | 285.7 | 226.4 | 184.9 | 165.2 | 157.9 | 155.7 | 152.9 | 152.5 |
| 52.5° | 527.7 | 481.6 | 379.3 | 288.9 | 226.9 | 184.9 | 167.1 | 162.0 | 159.3 | 156.6 | 155.7 |
| 55°   | 534.5 | 486.1 | 378.9 | 287.6 | 224.1 | 183.5 | 167.1 | 163.0 | 160.7 | 157.5 | 157.0 |
| 57.5° | 530.0 | 479.7 | 370.2 | 279.8 | 217.7 | 178.5 | 164.3 | 160.2 | 157.9 | 155.2 | 155.2 |
| 60°   | 515.8 | 466.5 | 356.5 | 267.9 | 207.7 | 170.3 | 158.4 | 155.2 | 152.9 | 150.6 | 150.6 |
| 62.5° | 493.4 | 447.3 | 339.2 | 250.1 | 195.4 | 160.7 | 150.6 | 147.9 | 146.5 | 144.2 | 143.8 |
| 65°   | 454.6 | 409.9 | 314.5 | 231.4 | 178.9 | 148.4 | 139.7 | 138.8 | 136.9 | 133.7 | 133.3 |
| 67.5° | 409.9 | 368.8 | 278.4 | 208.1 | 159.8 | 132.8 | 126.4 | 125.5 | 123.7 | 121.0 | 121.4 |
| 70°   | 359.7 | 323.2 | 241.0 | 179.4 | 136.5 | 115.9 | 110.5 | 109.1 | 107.7 | 107.3 | 106.8 |
| 72.5° | 303.1 | 272.1 | 201.8 | 146.5 | 114.1 | 97.7  | 93.1  | 92.2  | 91.3  | 90.8  | 90.4  |
| 75°   | 235.5 | 214.5 | 161.1 | 115.5 | 90.4  | 78.5  | 74.4  | 73.9  | 73.9  | 73.0  | 72.1  |
| 77.5° | 173.5 | 156.1 | 117.3 | 84.0  | 65.3  | 57.1  | 55.7  | 55.7  | 56.1  | 55.7  | 54.3  |
| 80°   | 115.0 | 104.1 | 76.7  | 55.7  | 43.4  | 37.9  | 37.9  | 38.3  | 38.8  | 38.3  | 38.8  |
| 82.5° | 61.2  | 57.5  | 43.4  | 32.4  | 25.6  | 22.4  | 22.8  | 23.3  | 24.2  | 23.3  | 24.2  |
| 85°   | 22.4  | 22.8  | 19.2  | 14.6  | 12.3  | 11.4  | 11.9  | 12.3  | 12.8  | 12.3  | 12.3  |
| 87.5° | 1.4   | 4.6   | 7.8   | 6.8   | 5.9   | 5.9   | 5.9   | 5.9   | 5.9   | 5.5   | 5.0   |
| 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: SP1-2411-284-3

Test Date: 11/21/2024

Luminaire Tested: TTN-D0-750-U-WQ

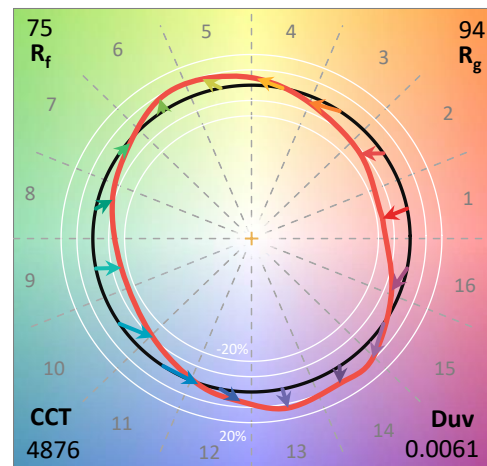
Data in this report applies to families of products including TTN-D0-750-U-WQ

### Test Information

Test Method: LM-79-2019  
 Report Number: SP1-2411-284-3  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 11/21/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: MCGRAW EDISON  
 Catalog Number: **TTN-D0-750-U-WQ**  
 Description: TOPTIER NANO LED PARKING GARAGE LUMINAIRE. 5000K, 70 CRI LEDS AND WIDE DISTRIBUTION

### Spectral Parameters

|                           |          |           |      |      |       |
|---------------------------|----------|-----------|------|------|-------|
| CCT (K):                  | 4876     | CRI (Ra): | 72.6 |      |       |
| CIE u':                   | 0.2086   | R1:       | 69.5 | R9:  | -24.6 |
| CIE v':                   | 0.4932   | R2:       | 77.0 | R10: | 44.8  |
| Duv:                      | 0.0061   | R3:       | 82.2 | R11: | 68.2  |
| CIE x:                    | 0.3502   | R4:       | 72.6 | R12: | 36.1  |
| CIE y:                    | 0.3680   | R5:       | 69.3 | R13: | 70.5  |
| CIE z:                    | 0.2818   | R6:       | 67.6 | R14: | 89.9  |
| Peak Wavelength (nm):     | 451      | R7:       | 83.7 | R15: | 63.1  |
| Dominant Wavelength (nm): | 569      | R8:       | 58.6 |      |       |
| Purity:                   | 15.51324 |           |      |      |       |
| Rf:                       | 74.6     |           |      |      |       |
| Rg:                       | 94.4     |           |      |      |       |



### Test Conditions

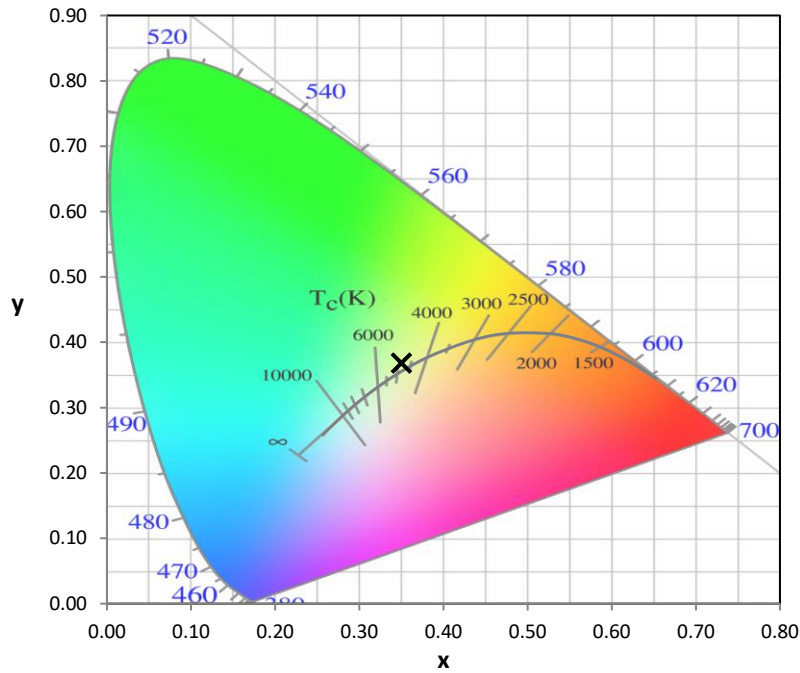
Stabilization Time: 51M  
 Operation Time: 1H 51M  
 Sphere Temperature (°C): 24.9

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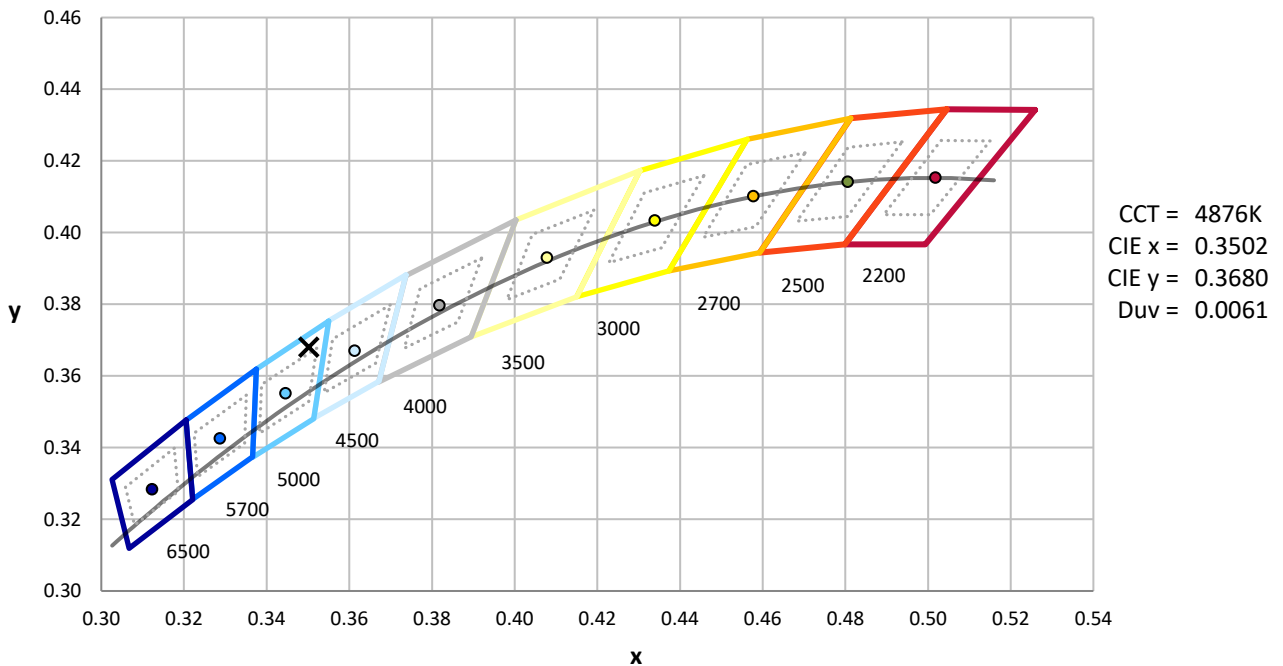
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date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

REPORT NUMBER: SP1-2411-284-3

**CIE 1931 Chromaticity Diagram**



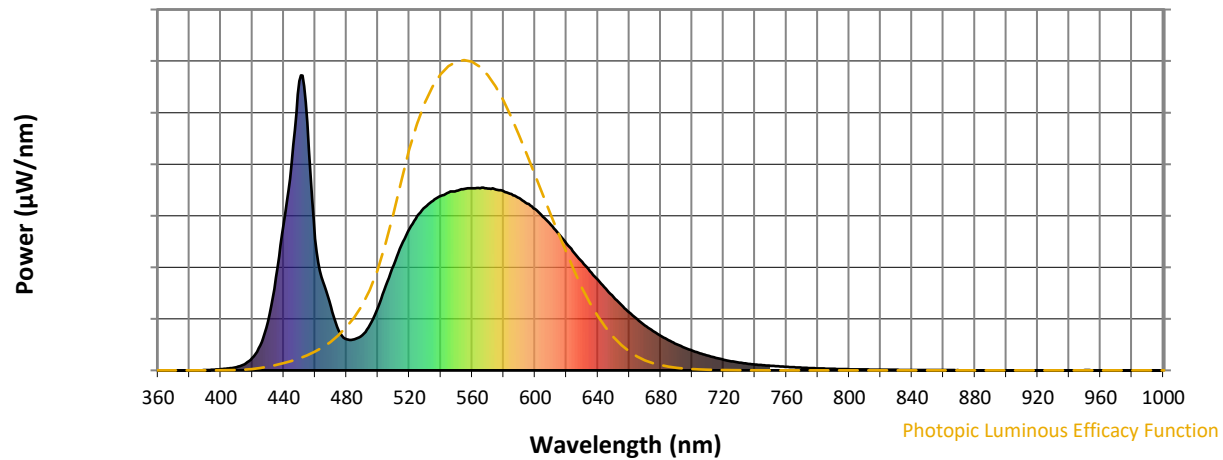
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 5000K 7-step quadrangle

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### Photopic Flux vs. Wavelength

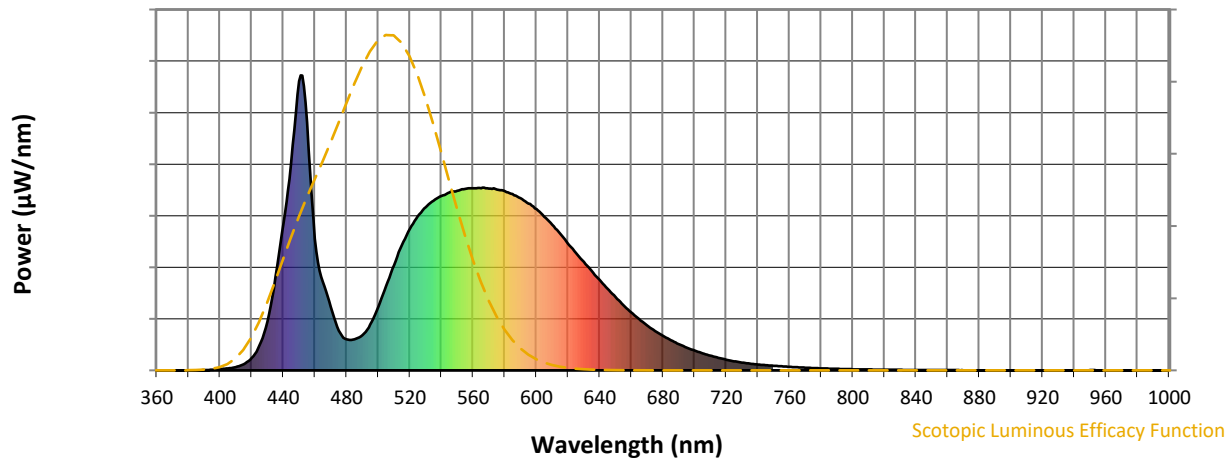


### Photopic Lumens: NR

| 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       | 430                         | NR               | 750       | 16                          | NR               | 880       | 0                           | NR               |
| 365       | 0                           | NR               | 495       | 156                         | NR               | 625       | 398                         | NR               | 755       | 14                          | NR               | 885       | 0                           | NR               |
| 370       | 0                           | NR               | 500       | 214                         | NR               | 630       | 368                         | NR               | 760       | 12                          | NR               | 890       | 0                           | NR               |
| 375       | 0                           | NR               | 505       | 286                         | NR               | 635       | 336                         | NR               | 765       | 11                          | NR               | 895       | 0                           | NR               |
| 380       | 0                           | NR               | 510       | 357                         | NR               | 640       | 306                         | NR               | 770       | 9                           | NR               | 900       | 0                           | NR               |
| 385       | 0                           | NR               | 515       | 425                         | NR               | 645       | 276                         | NR               | 775       | 8                           | NR               | 905       | 0                           | NR               |
| 390       | 1                           | NR               | 520       | 480                         | NR               | 650       | 248                         | NR               | 780       | 7                           | NR               | 910       | 0                           | NR               |
| 395       | 2                           | NR               | 525       | 523                         | NR               | 655       | 221                         | NR               | 785       | 6                           | NR               | 915       | 0                           | NR               |
| 400       | 4                           | NR               | 530       | 554                         | NR               | 660       | 196                         | NR               | 790       | 5                           | NR               | 920       | 0                           | NR               |
| 405       | 7                           | NR               | 535       | 575                         | NR               | 665       | 173                         | NR               | 795       | 4                           | NR               | 925       | 0                           | NR               |
| 410       | 11                          | NR               | 540       | 592                         | NR               | 670       | 152                         | NR               | 800       | 4                           | NR               | 930       | 0                           | NR               |
| 415       | 21                          | NR               | 545       | 603                         | NR               | 675       | 133                         | NR               | 805       | 3                           | NR               | 935       | 0                           | NR               |
| 420       | 42                          | NR               | 550       | 609                         | NR               | 680       | 117                         | NR               | 810       | 3                           | NR               | 940       | 0                           | NR               |
| 425       | 85                          | NR               | 555       | 615                         | NR               | 685       | 102                         | NR               | 815       | 3                           | NR               | 945       | 0                           | NR               |
| 430       | 165                         | NR               | 560       | 617                         | NR               | 690       | 89                          | NR               | 820       | 2                           | NR               | 950       | 1                           | NR               |
| 435       | 316                         | NR               | 565       | 617                         | NR               | 695       | 77                          | NR               | 825       | 2                           | NR               | 955       | 0                           | NR               |
| 440       | 497                         | NR               | 570       | 616                         | NR               | 700       | 67                          | NR               | 830       | 2                           | NR               | 960       | 0                           | NR               |
| 445       | 702                         | NR               | 575       | 613                         | NR               | 705       | 58                          | NR               | 835       | 2                           | NR               | 965       | 0                           | NR               |
| 450       | 981                         | NR               | 580       | 607                         | NR               | 710       | 50                          | NR               | 840       | 1                           | NR               | 970       | 0                           | NR               |
| 455       | 840                         | NR               | 585       | 598                         | NR               | 715       | 43                          | NR               | 845       | 1                           | NR               | 975       | 0                           | NR               |
| 460       | 446                         | NR               | 590       | 583                         | NR               | 720       | 36                          | NR               | 850       | 1                           | NR               | 980       | 0                           | NR               |
| 465       | 300                         | NR               | 595       | 566                         | NR               | 725       | 31                          | NR               | 855       | 1                           | NR               | 985       | 0                           | NR               |
| 470       | 215                         | NR               | 600       | 546                         | NR               | 730       | 26                          | NR               | 860       | 1                           | NR               | 990       | 0                           | NR               |
| 475       | 135                         | NR               | 605       | 521                         | NR               | 735       | 23                          | NR               | 865       | 1                           | NR               | 995       | 0                           | NR               |
| 480       | 105                         | NR               | 610       | 494                         | NR               | 740       | 20                          | NR               | 870       | 1                           | NR               | 1000      | 0                           | NR               |
| 485       | 106                         | NR               | 615       | 463                         | NR               | 745       | 18                          | NR               | 875       | 0                           | NR               |           |                             |                  |

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### Scotopic Flux vs. Wavelength



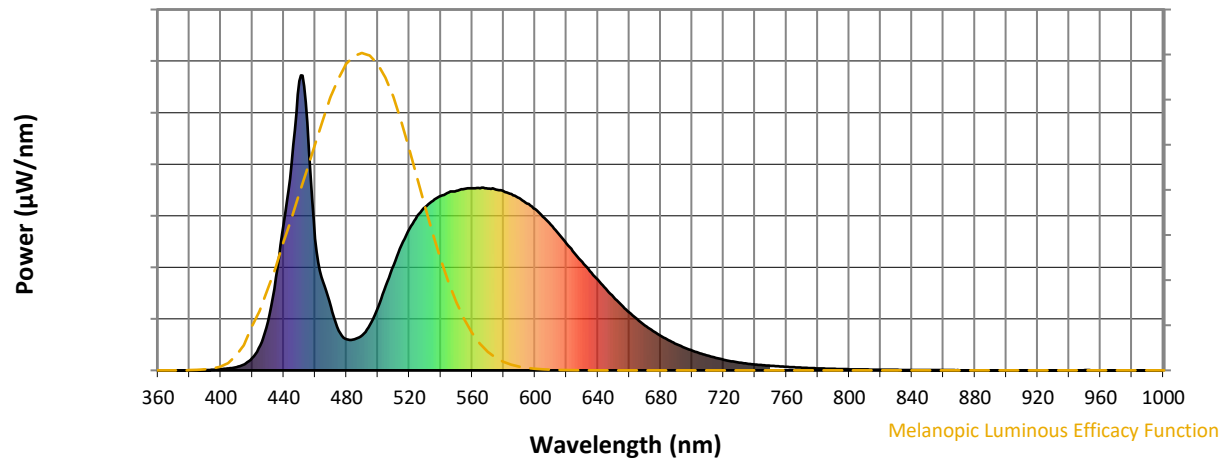
Scotopic Lumens: NR

S/P: 1.74

| λ (nm) | Power W <sup>^</sup> /nm | Lumens (Φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (Φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (Φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (Φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (Φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360    | 0                        | NR            | 490    | 119                      | NR            | 620    | 430                      | NR            | 750    | 16                       | NR            | 880    | 0                        | NR            |
| 365    | 0                        | NR            | 495    | 156                      | NR            | 625    | 398                      | NR            | 755    | 14                       | NR            | 885    | 0                        | NR            |
| 370    | 0                        | NR            | 500    | 214                      | NR            | 630    | 368                      | NR            | 760    | 12                       | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 286                      | NR            | 635    | 336                      | NR            | 765    | 11                       | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 357                      | NR            | 640    | 306                      | NR            | 770    | 9                        | NR            | 900    | 0                        | NR            |
| 385    | 0                        | NR            | 515    | 425                      | NR            | 645    | 276                      | NR            | 775    | 8                        | NR            | 905    | 0                        | NR            |
| 390    | 1                        | NR            | 520    | 480                      | NR            | 650    | 248                      | NR            | 780    | 7                        | NR            | 910    | 0                        | NR            |
| 395    | 2                        | NR            | 525    | 523                      | NR            | 655    | 221                      | NR            | 785    | 6                        | NR            | 915    | 0                        | NR            |
| 400    | 4                        | NR            | 530    | 554                      | NR            | 660    | 196                      | NR            | 790    | 5                        | NR            | 920    | 0                        | NR            |
| 405    | 7                        | NR            | 535    | 575                      | NR            | 665    | 173                      | NR            | 795    | 4                        | NR            | 925    | 0                        | NR            |
| 410    | 11                       | NR            | 540    | 592                      | NR            | 670    | 152                      | NR            | 800    | 4                        | NR            | 930    | 0                        | NR            |
| 415    | 21                       | NR            | 545    | 603                      | NR            | 675    | 133                      | NR            | 805    | 3                        | NR            | 935    | 0                        | NR            |
| 420    | 42                       | NR            | 550    | 609                      | NR            | 680    | 117                      | NR            | 810    | 3                        | NR            | 940    | 0                        | NR            |
| 425    | 85                       | NR            | 555    | 615                      | NR            | 685    | 102                      | NR            | 815    | 3                        | NR            | 945    | 0                        | NR            |
| 430    | 165                      | NR            | 560    | 617                      | NR            | 690    | 89                       | NR            | 820    | 2                        | NR            | 950    | 1                        | NR            |
| 435    | 316                      | NR            | 565    | 617                      | NR            | 695    | 77                       | NR            | 825    | 2                        | NR            | 955    | 0                        | NR            |
| 440    | 497                      | NR            | 570    | 616                      | NR            | 700    | 67                       | NR            | 830    | 2                        | NR            | 960    | 0                        | NR            |
| 445    | 702                      | NR            | 575    | 613                      | NR            | 705    | 58                       | NR            | 835    | 2                        | NR            | 965    | 0                        | NR            |
| 450    | 981                      | NR            | 580    | 607                      | NR            | 710    | 50                       | NR            | 840    | 1                        | NR            | 970    | 0                        | NR            |
| 455    | 840                      | NR            | 585    | 598                      | NR            | 715    | 43                       | NR            | 845    | 1                        | NR            | 975    | 0                        | NR            |
| 460    | 446                      | NR            | 590    | 583                      | NR            | 720    | 36                       | NR            | 850    | 1                        | NR            | 980    | 0                        | NR            |
| 465    | 300                      | NR            | 595    | 566                      | NR            | 725    | 31                       | NR            | 855    | 1                        | NR            | 985    | 0                        | NR            |
| 470    | 215                      | NR            | 600    | 546                      | NR            | 730    | 26                       | NR            | 860    | 1                        | NR            | 990    | 0                        | NR            |
| 475    | 135                      | NR            | 605    | 521                      | NR            | 735    | 23                       | NR            | 865    | 1                        | NR            | 995    | 0                        | NR            |
| 480    | 105                      | NR            | 610    | 494                      | NR            | 740    | 20                       | NR            | 870    | 1                        | NR            | 1000   | 0                        | NR            |
| 485    | 106                      | NR            | 615    | 463                      | NR            | 745    | 18                       | NR            | 875    | 0                        | NR            |        |                          |               |

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### Melanopic Flux vs. Wavelength



Melanopic Lumens: NR

M/P: 3.51

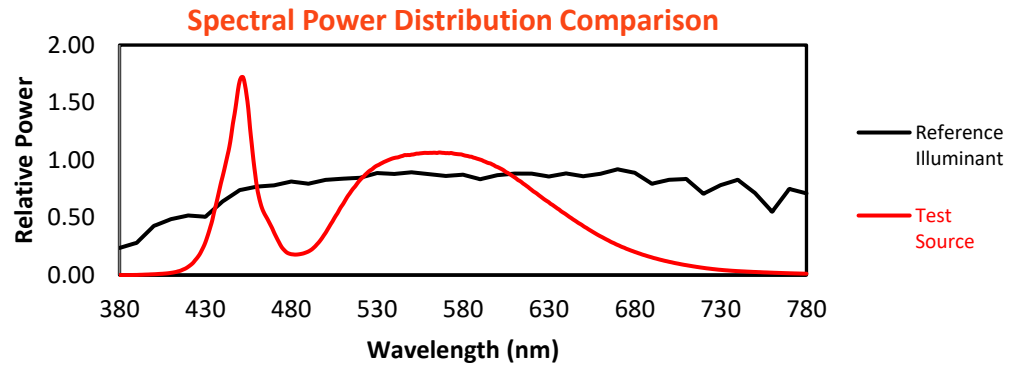
| λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) |
|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|
| 360       | 0                           | NR               | 490       | 119                         | NR               | 620       | 430                         | NR               | 750       | 16                          | NR               | 880       | 0                           | NR               |
| 365       | 0                           | NR               | 495       | 156                         | NR               | 625       | 398                         | NR               | 755       | 14                          | NR               | 885       | 0                           | NR               |
| 370       | 0                           | NR               | 500       | 214                         | NR               | 630       | 368                         | NR               | 760       | 12                          | NR               | 890       | 0                           | NR               |
| 375       | 0                           | NR               | 505       | 286                         | NR               | 635       | 336                         | NR               | 765       | 11                          | NR               | 895       | 0                           | NR               |
| 380       | 0                           | NR               | 510       | 357                         | NR               | 640       | 306                         | NR               | 770       | 9                           | NR               | 900       | 0                           | NR               |
| 385       | 0                           | NR               | 515       | 425                         | NR               | 645       | 276                         | NR               | 775       | 8                           | NR               | 905       | 0                           | NR               |
| 390       | 1                           | NR               | 520       | 480                         | NR               | 650       | 248                         | NR               | 780       | 7                           | NR               | 910       | 0                           | NR               |
| 395       | 2                           | NR               | 525       | 523                         | NR               | 655       | 221                         | NR               | 785       | 6                           | NR               | 915       | 0                           | NR               |
| 400       | 4                           | NR               | 530       | 554                         | NR               | 660       | 196                         | NR               | 790       | 5                           | NR               | 920       | 0                           | NR               |
| 405       | 7                           | NR               | 535       | 575                         | NR               | 665       | 173                         | NR               | 795       | 4                           | NR               | 925       | 0                           | NR               |
| 410       | 11                          | NR               | 540       | 592                         | NR               | 670       | 152                         | NR               | 800       | 4                           | NR               | 930       | 0                           | NR               |
| 415       | 21                          | NR               | 545       | 603                         | NR               | 675       | 133                         | NR               | 805       | 3                           | NR               | 935       | 0                           | NR               |
| 420       | 42                          | NR               | 550       | 609                         | NR               | 680       | 117                         | NR               | 810       | 3                           | NR               | 940       | 0                           | NR               |
| 425       | 85                          | NR               | 555       | 615                         | NR               | 685       | 102                         | NR               | 815       | 3                           | NR               | 945       | 0                           | NR               |
| 430       | 165                         | NR               | 560       | 617                         | NR               | 690       | 89                          | NR               | 820       | 2                           | NR               | 950       | 1                           | NR               |
| 435       | 316                         | NR               | 565       | 617                         | NR               | 695       | 77                          | NR               | 825       | 2                           | NR               | 955       | 0                           | NR               |
| 440       | 497                         | NR               | 570       | 616                         | NR               | 700       | 67                          | NR               | 830       | 2                           | NR               | 960       | 0                           | NR               |
| 445       | 702                         | NR               | 575       | 613                         | NR               | 705       | 58                          | NR               | 835       | 2                           | NR               | 965       | 0                           | NR               |
| 450       | 981                         | NR               | 580       | 607                         | NR               | 710       | 50                          | NR               | 840       | 1                           | NR               | 970       | 0                           | NR               |
| 455       | 840                         | NR               | 585       | 598                         | NR               | 715       | 43                          | NR               | 845       | 1                           | NR               | 975       | 0                           | NR               |
| 460       | 446                         | NR               | 590       | 583                         | NR               | 720       | 36                          | NR               | 850       | 1                           | NR               | 980       | 0                           | NR               |
| 465       | 300                         | NR               | 595       | 566                         | NR               | 725       | 31                          | NR               | 855       | 1                           | NR               | 985       | 0                           | NR               |
| 470       | 215                         | NR               | 600       | 546                         | NR               | 730       | 26                          | NR               | 860       | 1                           | NR               | 990       | 0                           | NR               |
| 475       | 135                         | NR               | 605       | 521                         | NR               | 735       | 23                          | NR               | 865       | 1                           | NR               | 995       | 0                           | NR               |
| 480       | 105                         | NR               | 610       | 494                         | NR               | 740       | 20                          | NR               | 870       | 1                           | NR               | 1000      | 0                           | NR               |
| 485       | 106                         | NR               | 615       | 463                         | NR               | 745       | 18                          | NR               | 875       | 0                           | NR               |           |                             |                  |

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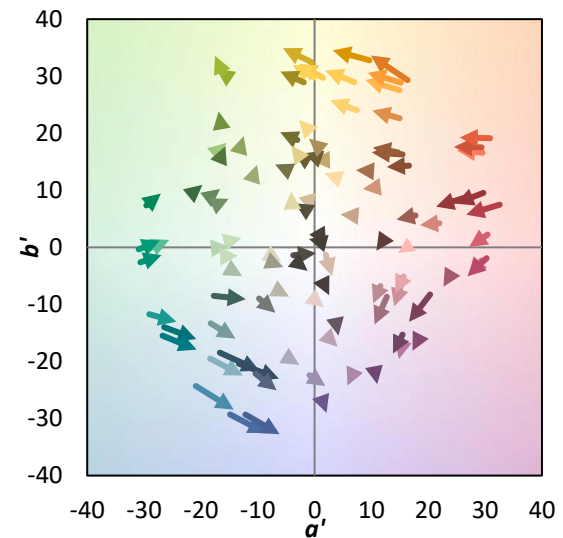
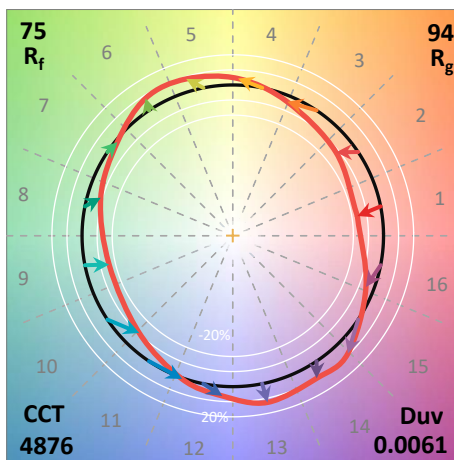
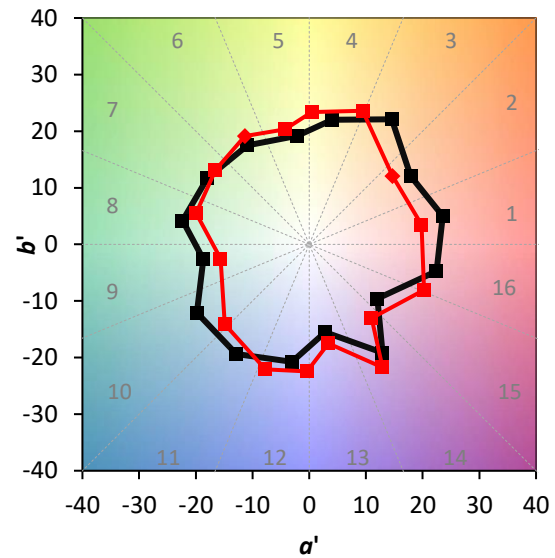
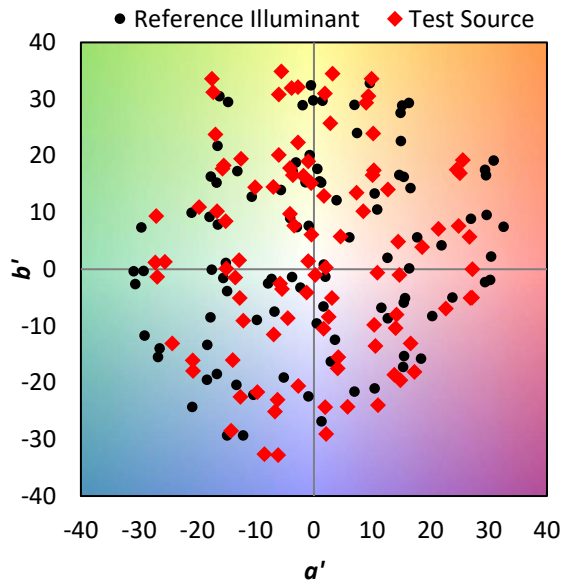
TM-30-18

### Summary

$R_f = 74.6$   
 $R_g = 94.4$   
 $\text{CIE } R_a = 72.6$   
 $R_g = -24.6$

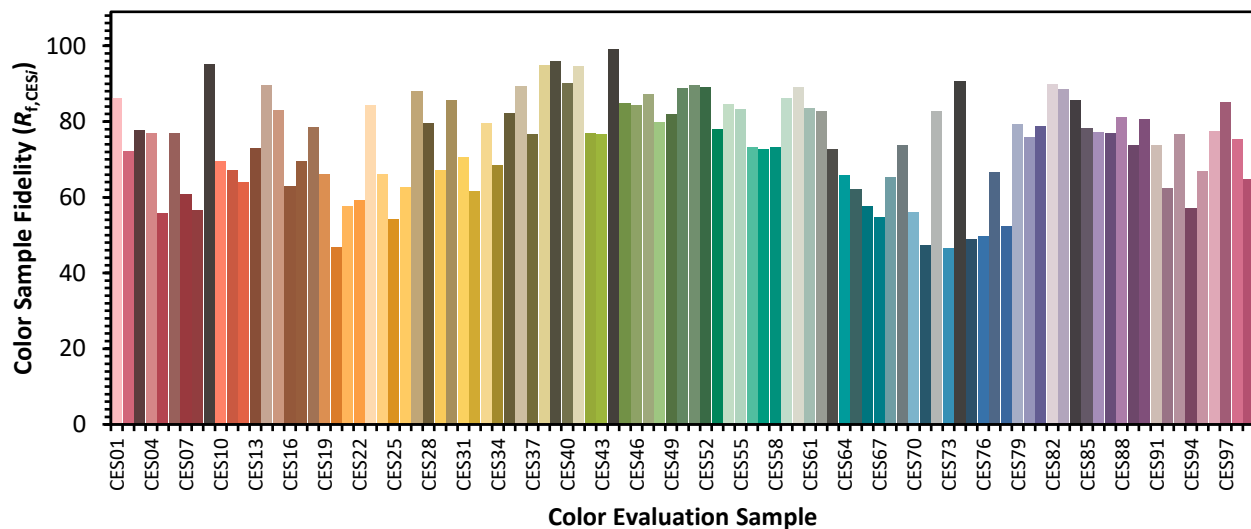


### Color Vector Graphics

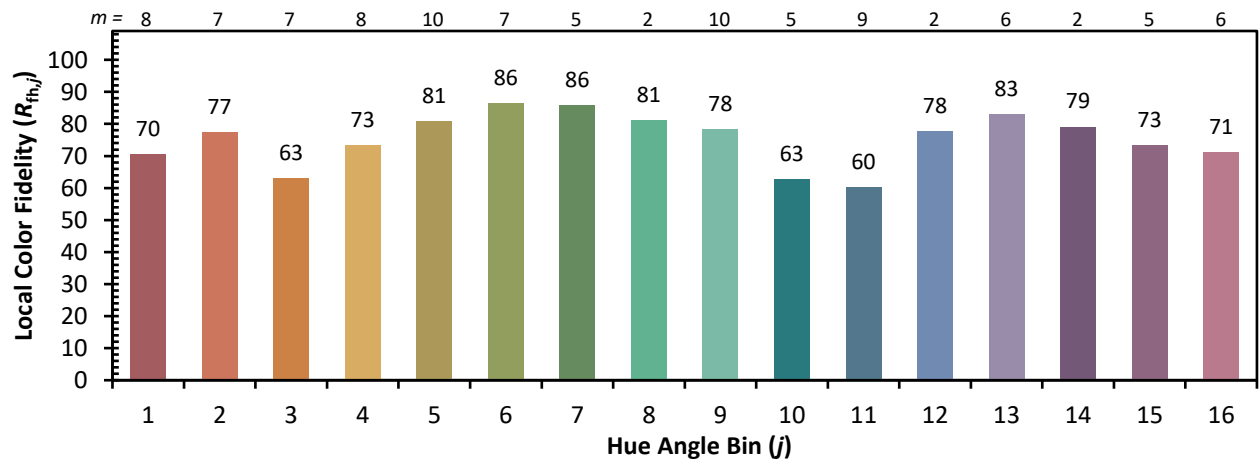
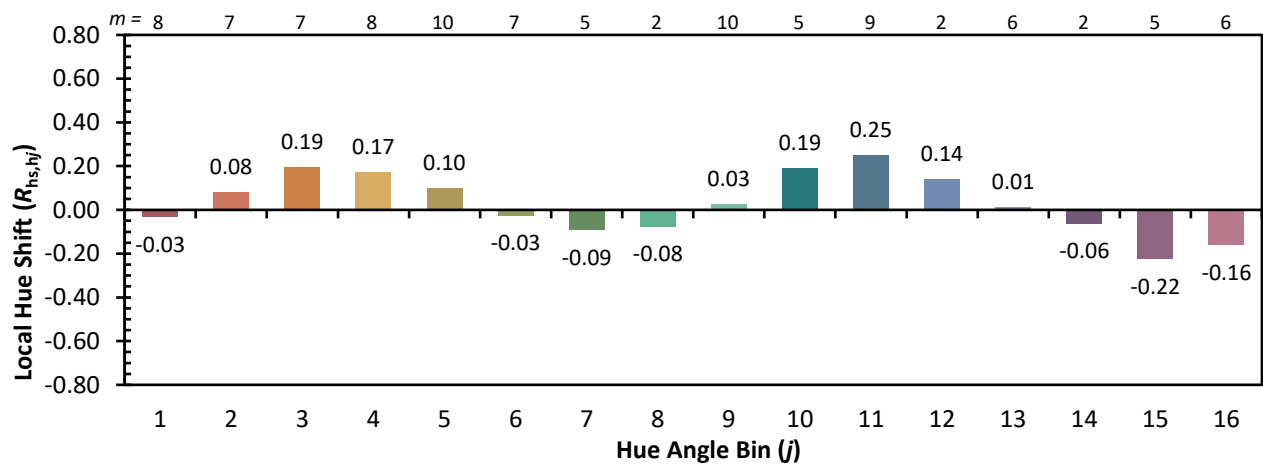
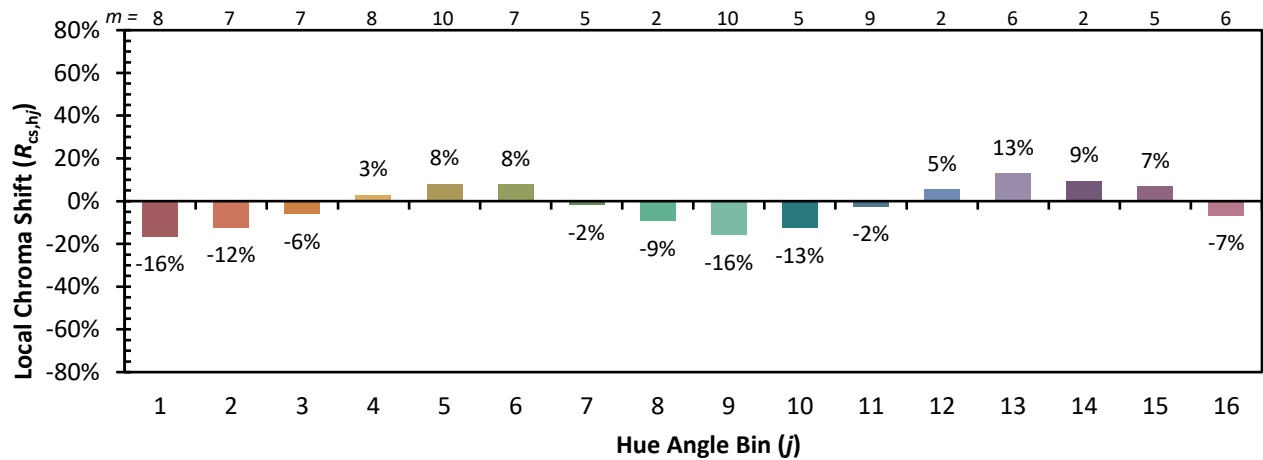


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

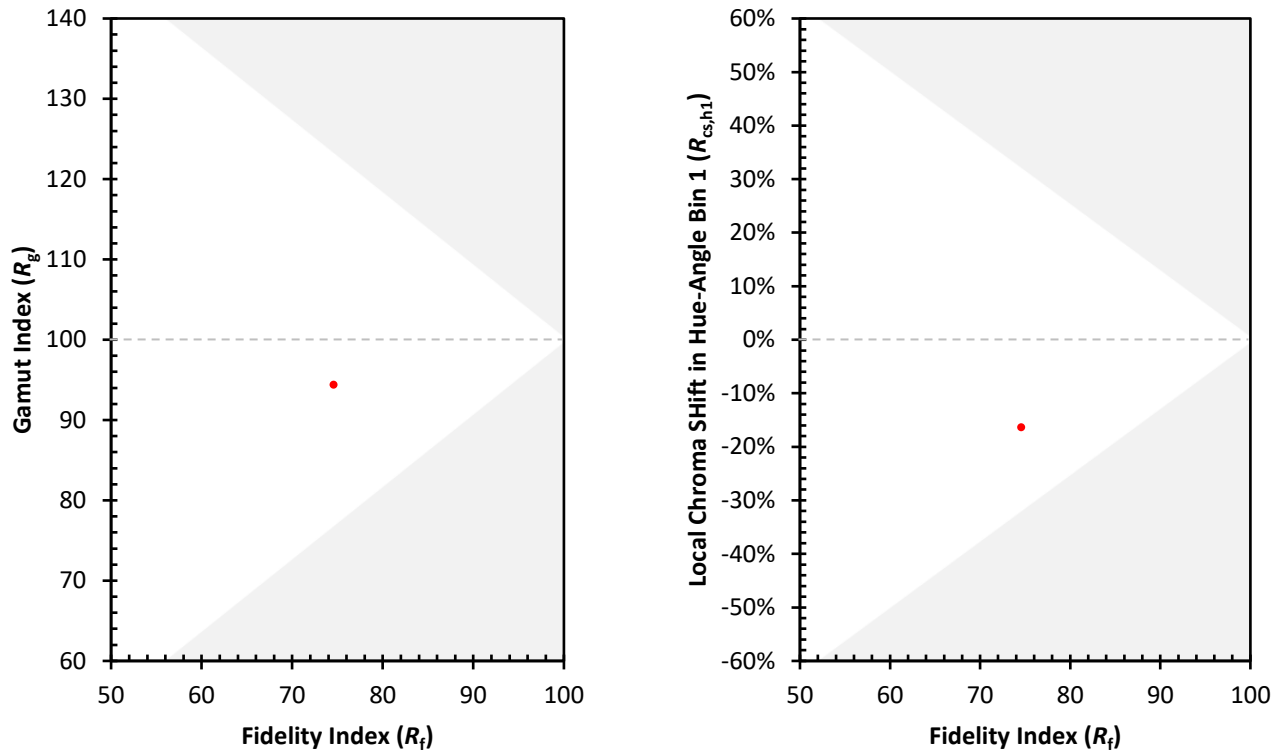
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 63 | CES51 = 90 | CES76 = 50 |
| CES02 = 59 | CES27 = 88 | CES52 = 89 | CES77 = 67 |
| CES03 = 30 | CES28 = 80 | CES53 = 78 | CES78 = 52 |
| CES04 = 69 | CES29 = 67 | CES54 = 85 | CES79 = 79 |
| CES05 = 46 | CES30 = 86 | CES55 = 83 | CES80 = 76 |
| CES06 = 50 | CES31 = 70 | CES56 = 73 | CES81 = 79 |
| CES07 = 39 | CES32 = 62 | CES57 = 73 | CES82 = 90 |
| CES08 = 38 | CES33 = 80 | CES58 = 73 | CES83 = 89 |
| CES09 = 29 | CES34 = 69 | CES59 = 86 | CES84 = 86 |
| CES10 = 72 | CES35 = 82 | CES60 = 89 | CES85 = 78 |
| CES11 = 55 | CES36 = 89 | CES61 = 83 | CES86 = 77 |
| CES12 = 61 | CES37 = 77 | CES62 = 83 | CES87 = 77 |
| CES13 = 41 | CES38 = 95 | CES63 = 73 | CES88 = 81 |
| CES14 = 74 | CES39 = 96 | CES64 = 66 | CES89 = 74 |
| CES15 = 70 | CES40 = 90 | CES65 = 62 | CES90 = 81 |
| CES16 = 46 | CES41 = 95 | CES66 = 58 | CES91 = 74 |
| CES17 = 49 | CES42 = 77 | CES67 = 55 | CES92 = 62 |
| CES18 = 55 | CES43 = 77 | CES68 = 65 | CES93 = 77 |
| CES19 = 71 | CES44 = 99 | CES69 = 74 | CES94 = 57 |
| CES20 = 64 | CES45 = 85 | CES70 = 56 | CES95 = 67 |
| CES21 = 85 | CES46 = 84 | CES71 = 47 | CES96 = 77 |
| CES22 = 77 | CES47 = 87 | CES72 = 83 | CES97 = 85 |
| CES23 = 91 | CES48 = 80 | CES73 = 46 | CES98 = 75 |
| CES24 = 90 | CES49 = 82 | CES74 = 91 | CES99 = 65 |
| CES25 = 71 | CES50 = 89 | CES75 = 49 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)