

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



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

Test Report Prepared for
Cooper Lighting Solutions
(formerly Eaton)

Brand: McGRAW-EDISON

Report Number: P833189

Luminaire Tested: **TTN-D1-735-U-WQ-UPL2**

Issue Date: 5/15/2024

Test Information

Test Method: LM-79-08
Report Number: P833189
REPORT IS FROM IESNA LM-79-08 TEST DATA - UPLIGHT (G3-2308-121-4) AND
Test Lab: INNOVATION CENTER
Issue Date: 5/15/2024
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)
Product Line: McGRAW-EDISON
Catalog Number: TTN-D1-735-U-WQ-UPL2
Description: TOPTIER NANO LED PARKING GARAGE LUMINAIRE WITH UPLIGHT
3500K, 70 CRI LEDS AND WIDE DISTRIBUTION
Light Source: -
Ballast/Driver: -

Summary

Lumens per Lamp: N/A
Luminaire Lumens: 3729.8 lumens
Efficiency: N/A
Efficacy: 120.7 lumens/watt
Luminous Opening: Vertical Cylinder (Dia: 0.71' x H: 0.1')
IES Classification: Type V - Short
BUG Rating: B2 - U4 - G1

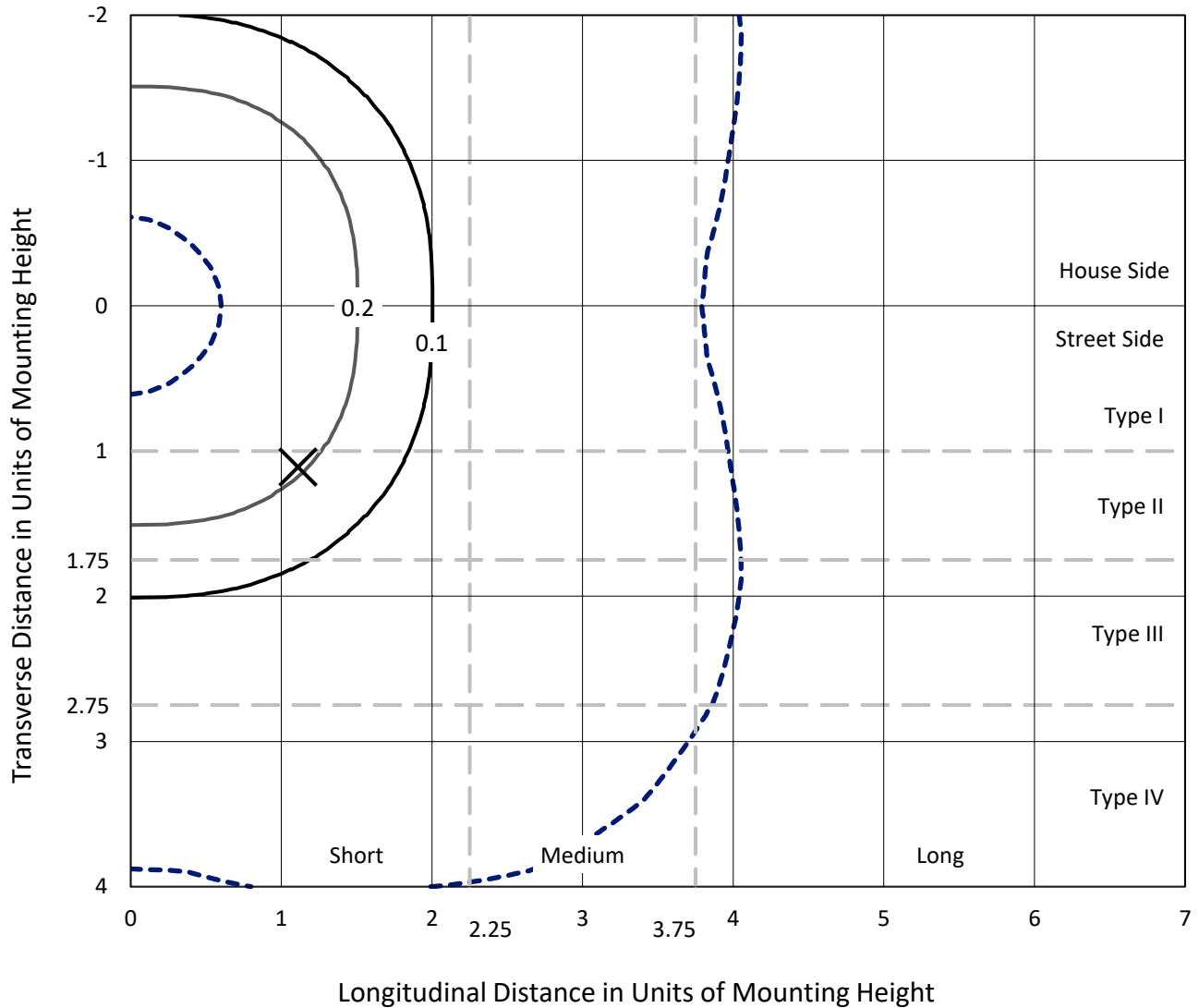
Input Watts (W): 30.9
Input Voltage (V): NR
Input Current (Ain): NR
Voltage Rise (V): NR
Power Factor: NR
Total Harmonic Distortion (THDi): NR
Frequency (hertz): 60
Stabilization Time: NR
Operation Time: NR
Ambient Temperature (°C): NR
Test Distance: 24 FT



REPORT NUMBER: P833189
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Iso-Footcandle Lines of Horizontal Illumination

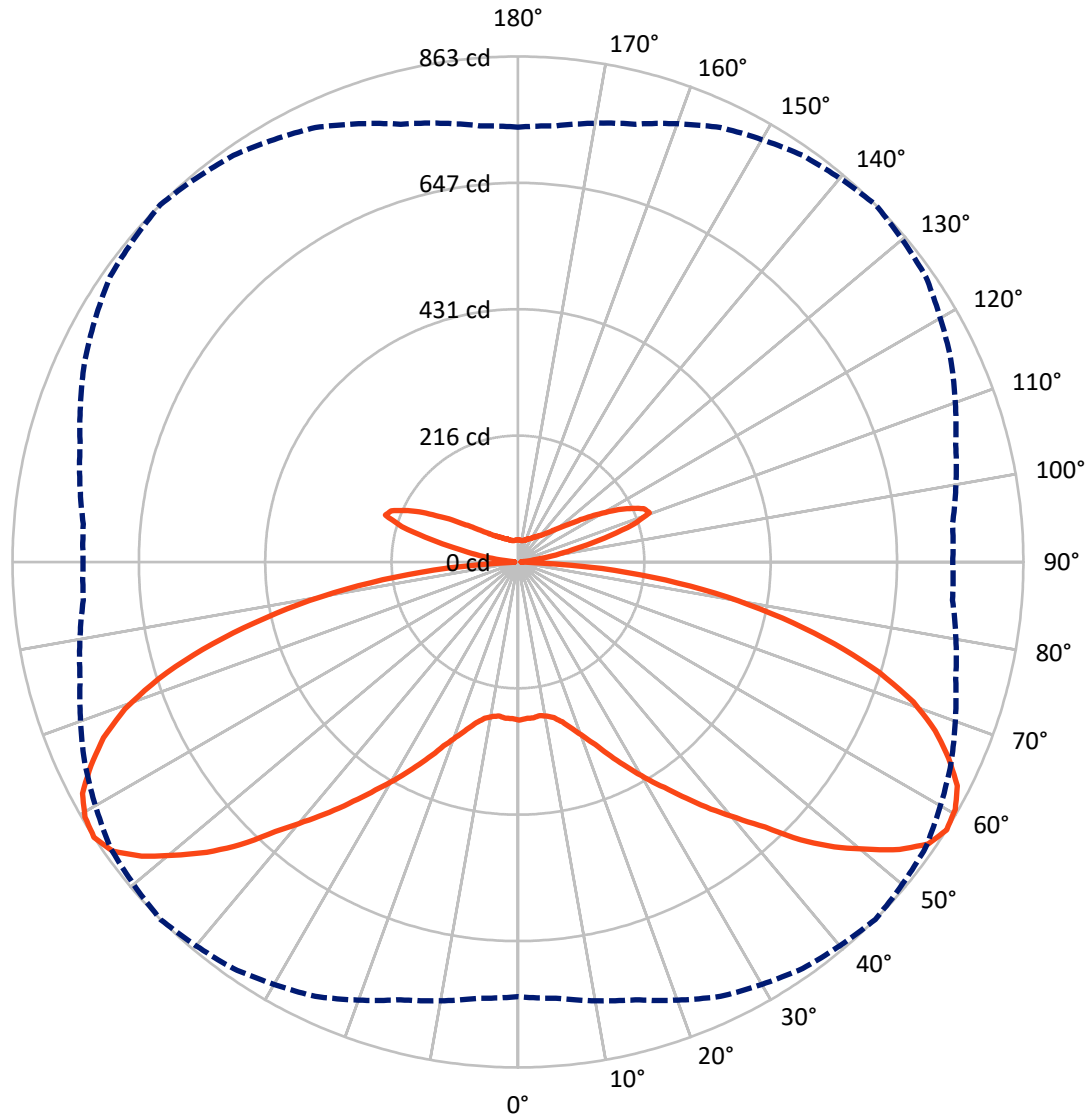
✕ Max cd
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 0.4 fc
 Type V - Short - N/A

REPORT NUMBER: P833189
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Luminous Intensity Polar Plot



— Vertical Plane Through 45-Deg Lateral - - - Horizontal Cone Through 57.5-Deg Vertical

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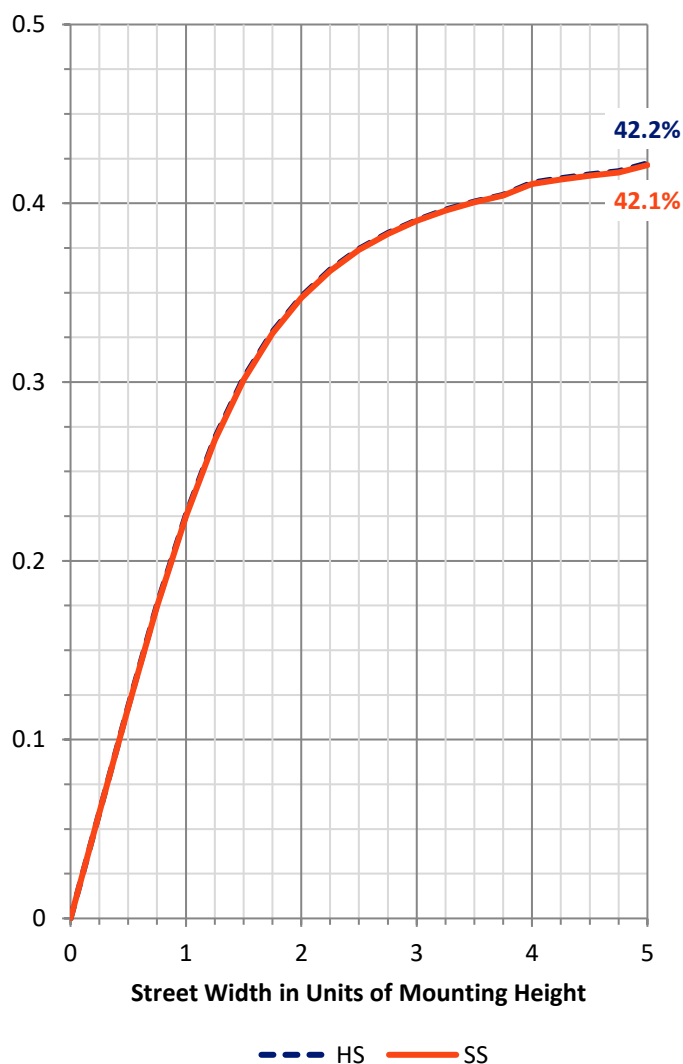
FLUX DISTRIBUTION:

| | | Downward | Upward | Total |
|--------------------|-----------|----------|--------|--------|
| House Side | Lumens | 1593.4 | 271.5 | 1864.9 |
| | % Fixture | 42.7 | 7.3 | 50.0 |
| Street Side | Lumens | 1593.4 | 271.5 | 1864.9 |
| | % Fixture | 42.7 | 7.3 | 50.0 |
| Total | Lumens | 3186.7 | 543.0 | 3729.8 |
| | % Fixture | 85.4 | 14.6 | 100.0 |

ZONAL LUMENS:

| Zone | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10° | 25.4 | 0.7 |
| 10°-20° | 81.0 | 2.2 |
| 20°-30° | 170.0 | 4.6 |
| 30°-40° | 308.3 | 8.3 |
| 40°-50° | 502.7 | 13.5 |
| 50°-60° | 703.6 | 18.9 |
| 60°-70° | 734.5 | 19.7 |
| 70°-80° | 524.8 | 14.1 |
| 80°-90° | 136.5 | 3.7 |
| 90°-100° | 12.1 | 0.3 |
| 100°-110° | 123.2 | 3.3 |
| 110°-120° | 180.1 | 4.8 |
| 120°-130° | 104.5 | 2.8 |
| 130°-140° | 55.4 | 1.5 |
| 140°-150° | 32.9 | 0.9 |
| 150°-160° | 20.2 | 0.5 |
| 160°-170° | 11.0 | 0.3 |
| 170°-180° | 3.6 | 0.1 |
| 0°-90° | 3186.7 | 85.4 |
| 0°-180° | 3729.8 | 100.0 |

Coefficient of Utilization



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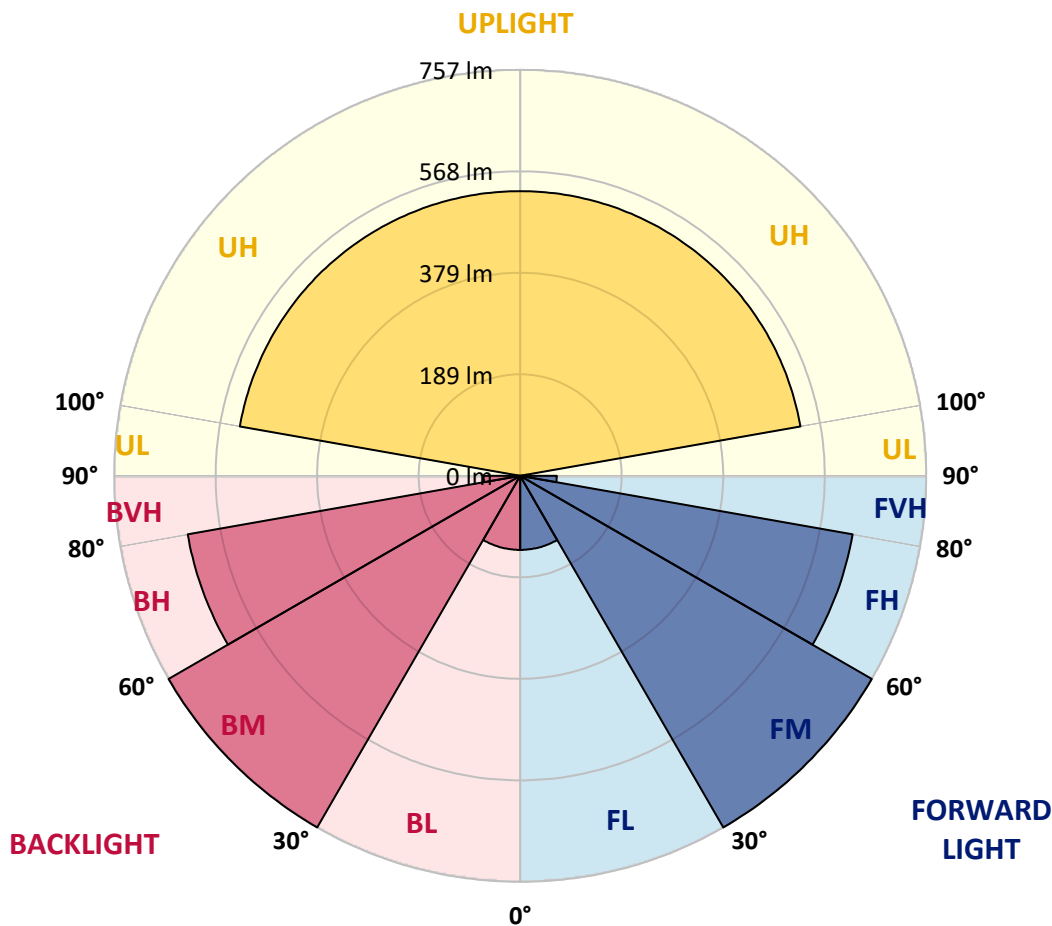
CATALOG NUMBER: TTN-D1-735-U-WQ-UPL2

LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | Lumens | % Fixture | Zone Rating/Lumen Limit | | |
|----------------|--------|-----------|-------------------------|---------|--------|
| | | | B | U | G |
| FL (0°-30°) | 138.2 | 3.7 | | | |
| FM (30°-60°) | 757.3 | 20.3 | | | |
| FH (60°-80°) | 629.7 | 16.9 | | | G0/660 |
| FVH (80°-90°) | 68.3 | 1.8 | | | G1/100 |
| BL (0°-30°) | 138.2 | 3.7 | B1/500 | | |
| BM (30°-60°) | 757.3 | 20.3 | B1/1000 | | |
| BH (60°-80°) | 629.7 | 16.9 | B2/1000 | | G0/660 |
| BVH (80°-90°) | 68.3 | 1.8 | | | G1/100 |
| UL (90°-100°) | 12.1 | 0.3 | | U2/50 | |
| UH (100°-180°) | 530.9 | 14.2 | | U4/1000 | |

BUG Rating: B2-U4-G1

Type V Short





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CANDELA DISTRIBUTION (FULL):

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 65° | 75° | 85° | 90° |
|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0° | 270.1 | 270.1 | 270.1 | 270.1 | 270.1 | 270.1 | 270.1 | 270.1 | 270.1 | 270.1 | 270.1 |
| 2.5° | 267.4 | 267.4 | 267.4 | 267.4 | 267.4 | 267.4 | 267.4 | 267.4 | 267.4 | 267.4 | 267.4 |
| 5° | 267.4 | 267.4 | 267.4 | 267.4 | 267.4 | 267.4 | 267.4 | 267.4 | 267.4 | 267.4 | 267.4 |
| 7.5° | 262.2 | 262.2 | 264.8 | 264.8 | 264.8 | 264.8 | 264.8 | 264.8 | 264.8 | 264.8 | 264.8 |
| 10° | 262.2 | 262.2 | 264.8 | 264.8 | 267.4 | 267.4 | 267.4 | 264.8 | 264.8 | 262.2 | 262.2 |
| 12.5° | 267.4 | 267.4 | 267.4 | 270.1 | 272.7 | 272.7 | 272.7 | 270.1 | 270.1 | 267.4 | 267.4 |
| 15° | 275.3 | 277.9 | 277.9 | 280.5 | 283.2 | 283.2 | 283.2 | 280.5 | 280.5 | 277.9 | 277.9 |
| 17.5° | 291.0 | 291.0 | 291.0 | 293.7 | 296.3 | 298.9 | 298.9 | 293.7 | 293.7 | 291.0 | 293.7 |
| 20° | 306.8 | 309.4 | 309.4 | 312.0 | 314.6 | 317.3 | 314.6 | 312.0 | 309.4 | 309.4 | 309.4 |
| 22.5° | 330.4 | 330.4 | 333.0 | 333.0 | 338.2 | 338.2 | 338.2 | 333.0 | 333.0 | 333.0 | 333.0 |
| 25° | 356.6 | 356.6 | 359.2 | 361.8 | 367.1 | 367.1 | 364.4 | 359.2 | 359.2 | 359.2 | 361.8 |
| 27.5° | 388.0 | 388.0 | 390.7 | 390.7 | 395.9 | 395.9 | 393.3 | 390.7 | 390.7 | 390.7 | 393.3 |
| 30° | 416.9 | 416.9 | 422.1 | 424.7 | 427.4 | 427.4 | 427.4 | 422.1 | 422.1 | 419.5 | 419.5 |
| 32.5° | 443.1 | 445.7 | 448.3 | 456.2 | 461.5 | 458.8 | 461.5 | 456.2 | 451.0 | 448.3 | 448.3 |
| 35° | 471.9 | 474.6 | 479.8 | 487.7 | 495.5 | 495.5 | 495.5 | 487.7 | 482.4 | 477.2 | 479.8 |
| 37.5° | 506.0 | 506.0 | 513.9 | 521.8 | 532.2 | 534.9 | 532.2 | 524.4 | 516.5 | 511.3 | 511.3 |
| 40° | 542.7 | 542.7 | 550.6 | 558.5 | 571.6 | 574.2 | 571.6 | 561.1 | 550.6 | 548.0 | 548.0 |
| 42.5° | 579.4 | 579.4 | 589.9 | 597.8 | 613.5 | 618.8 | 613.5 | 600.4 | 589.9 | 582.1 | 584.7 |
| 45° | 618.8 | 621.4 | 634.5 | 650.2 | 668.6 | 676.5 | 668.6 | 652.9 | 637.1 | 621.4 | 621.4 |
| 47.5° | 663.3 | 663.3 | 679.1 | 697.4 | 718.4 | 726.3 | 715.8 | 700.1 | 679.1 | 666.0 | 666.0 |
| 50° | 692.2 | 694.8 | 715.8 | 739.4 | 765.6 | 770.8 | 763.0 | 739.4 | 715.8 | 697.4 | 694.8 |
| 52.5° | 721.0 | 723.6 | 747.2 | 781.3 | 807.5 | 815.4 | 804.9 | 781.3 | 747.2 | 723.6 | 723.6 |
| 55° | 739.4 | 744.6 | 770.8 | 807.5 | 836.4 | 849.5 | 833.8 | 807.5 | 768.2 | 742.0 | 739.4 |
| 57.5° | 742.0 | 747.2 | 773.5 | 818.0 | 846.9 | 862.6 | 849.5 | 815.4 | 773.5 | 744.6 | 742.0 |
| 60° | 736.8 | 739.4 | 765.6 | 812.8 | 846.9 | 857.4 | 846.9 | 810.2 | 763.0 | 739.4 | 734.1 |
| 62.5° | 723.6 | 728.9 | 755.1 | 794.4 | 833.8 | 841.6 | 831.1 | 791.8 | 752.5 | 723.6 | 718.4 |
| 65° | 681.7 | 686.9 | 726.3 | 765.6 | 799.7 | 807.5 | 799.7 | 765.6 | 723.6 | 681.7 | 676.5 |
| 67.5° | 634.5 | 637.1 | 676.5 | 723.6 | 755.1 | 768.2 | 755.1 | 726.3 | 673.8 | 634.5 | 629.3 |
| 70° | 584.7 | 587.3 | 618.8 | 668.6 | 700.1 | 715.8 | 702.7 | 671.2 | 616.1 | 582.1 | 579.4 |
| 72.5° | 527.0 | 527.0 | 558.5 | 597.8 | 629.3 | 645.0 | 634.5 | 595.2 | 553.2 | 519.1 | 513.9 |
| 75° | 448.3 | 451.0 | 485.1 | 513.9 | 548.0 | 558.5 | 548.0 | 516.5 | 477.2 | 443.1 | 437.9 |
| 77.5° | 367.1 | 369.7 | 398.5 | 422.1 | 453.6 | 461.5 | 453.6 | 427.4 | 390.7 | 361.8 | 359.2 |
| 80° | 277.9 | 280.5 | 304.1 | 325.1 | 351.3 | 361.8 | 354.0 | 327.7 | 298.9 | 272.7 | 264.8 |
| 82.5° | 180.9 | 183.5 | 207.1 | 222.9 | 246.5 | 254.3 | 249.1 | 225.5 | 201.9 | 175.7 | 173.0 |
| 85° | 81.3 | 83.9 | 104.9 | 118.0 | 136.3 | 144.2 | 139.0 | 118.0 | 99.6 | 76.0 | 70.8 |
| 87.5° | 7.9 | 7.9 | 7.9 | 7.9 | 7.9 | 10.5 | 10.5 | 7.9 | 7.9 | 7.9 | 7.9 |
| 90° | 4.6 | 4.6 | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 | 4.6 | 4.6 |
| 92.5° | 4.6 | 4.6 | 4.6 | 6.5 | 7.4 | 6.5 | 7.4 | 5.6 | 5.6 | 4.6 | 4.6 |
| 95° | 5.6 | 5.6 | 6.5 | 8.4 | 10.2 | 11.1 | 11.1 | 6.5 | 6.5 | 5.6 | 5.6 |
| 97.5° | 7.4 | 8.4 | 8.4 | 10.2 | 16.7 | 30.7 | 18.6 | 9.3 | 9.3 | 8.4 | 7.4 |
| 100° | 12.1 | 13.0 | 13.0 | 23.2 | 49.2 | 66.0 | 47.4 | 24.2 | 17.7 | 13.0 | 13.0 |
| 102.5° | 39.0 | 40.9 | 50.2 | 75.3 | 111.5 | 101.3 | 85.5 | 80.8 | 55.7 | 44.6 | 42.7 |
| 105° | 99.4 | 98.5 | 105.9 | 125.4 | 156.1 | 153.3 | 141.2 | 128.2 | 110.6 | 102.2 | 102.2 |
| 107.5° | 131.0 | 131.0 | 137.5 | 154.2 | 177.4 | 207.2 | 210.0 | 166.3 | 145.9 | 136.6 | 135.6 |
| 110° | 147.7 | 147.7 | 153.3 | 167.2 | 197.9 | 239.7 | 237.8 | 205.3 | 180.2 | 168.2 | 166.3 |



REPORT NUMBER: P833189
 CATALOG NUMBER: TTN-D1-735-U-WQ-UPL2

CANDELA DISTRIBUTION (continued):

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 65° | 75° | 85° | 90° |
|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 112.5° | 151.4 | 152.4 | 159.8 | 181.2 | 214.6 | 233.2 | 224.8 | 211.8 | 200.7 | 191.4 | 189.5 |
| 115° | 157.0 | 157.0 | 165.4 | 185.8 | 204.4 | 211.8 | 202.5 | 192.3 | 184.9 | 181.2 | 183.0 |
| 117.5° | 155.1 | 157.9 | 159.8 | 170.9 | 183.0 | 188.6 | 183.9 | 170.0 | 164.4 | 162.6 | 159.8 |
| 120° | 144.0 | 144.0 | 145.9 | 151.4 | 157.9 | 160.7 | 158.9 | 149.6 | 144.9 | 144.0 | 142.1 |
| 122.5° | 128.2 | 129.1 | 128.2 | 131.0 | 135.6 | 138.4 | 136.6 | 129.1 | 127.3 | 127.3 | 125.4 |
| 125° | 112.4 | 112.4 | 111.5 | 113.3 | 116.1 | 115.2 | 116.1 | 112.4 | 111.5 | 111.5 | 110.6 |
| 127.5° | 101.3 | 100.3 | 98.5 | 99.4 | 100.3 | 100.3 | 101.3 | 97.5 | 98.5 | 99.4 | 98.5 |
| 130° | 90.1 | 90.1 | 88.3 | 88.3 | 88.3 | 86.4 | 88.3 | 86.4 | 87.3 | 88.3 | 89.2 |
| 132.5° | 79.9 | 79.9 | 77.1 | 76.2 | 76.2 | 76.2 | 77.1 | 76.2 | 78.0 | 79.9 | 79.9 |
| 135° | 71.5 | 71.5 | 68.7 | 69.7 | 69.7 | 68.7 | 69.7 | 68.7 | 70.6 | 71.5 | 71.5 |
| 137.5° | 65.0 | 65.0 | 63.2 | 63.2 | 63.2 | 62.2 | 63.2 | 63.2 | 64.1 | 66.0 | 66.9 |
| 140° | 59.5 | 59.5 | 58.5 | 58.5 | 57.6 | 58.5 | 58.5 | 58.5 | 59.5 | 60.4 | 60.4 |
| 142.5° | 56.7 | 55.7 | 54.8 | 53.9 | 54.8 | 54.8 | 54.8 | 53.9 | 54.8 | 56.7 | 56.7 |
| 145° | 52.0 | 52.0 | 51.1 | 51.1 | 51.1 | 52.0 | 51.1 | 51.1 | 52.0 | 52.0 | 53.0 |
| 147.5° | 49.2 | 49.2 | 48.3 | 49.2 | 49.2 | 49.2 | 49.2 | 48.3 | 49.2 | 49.2 | 50.2 |
| 150° | 48.3 | 47.4 | 46.5 | 47.4 | 47.4 | 46.5 | 46.5 | 46.5 | 46.5 | 47.4 | 47.4 |
| 152.5° | 45.5 | 45.5 | 44.6 | 45.5 | 44.6 | 44.6 | 44.6 | 44.6 | 44.6 | 45.5 | 46.5 |
| 155° | 43.7 | 43.7 | 42.7 | 43.7 | 43.7 | 43.7 | 43.7 | 43.7 | 43.7 | 43.7 | 43.7 |
| 157.5° | 41.8 | 42.7 | 41.8 | 41.8 | 41.8 | 41.8 | 41.8 | 41.8 | 41.8 | 42.7 | 42.7 |
| 160° | 40.9 | 40.9 | 40.9 | 40.9 | 39.9 | 39.9 | 39.9 | 40.9 | 40.9 | 40.9 | 41.8 |
| 162.5° | 39.9 | 39.9 | 39.9 | 39.9 | 39.0 | 39.0 | 39.0 | 39.0 | 39.9 | 39.9 | 40.9 |
| 165° | 39.9 | 39.0 | 39.0 | 39.0 | 38.1 | 38.1 | 38.1 | 38.1 | 39.0 | 39.9 | 39.0 |
| 167.5° | 38.1 | 38.1 | 38.1 | 38.1 | 38.1 | 37.2 | 37.2 | 38.1 | 38.1 | 38.1 | 39.0 |
| 170° | 38.1 | 38.1 | 37.2 | 37.2 | 37.2 | 37.2 | 37.2 | 37.2 | 37.2 | 37.2 | 38.1 |
| 172.5° | 38.1 | 38.1 | 38.1 | 38.1 | 37.2 | 37.2 | 37.2 | 37.2 | 37.2 | 38.1 | 38.1 |
| 175° | 38.1 | 38.1 | 38.1 | 38.1 | 37.2 | 37.2 | 37.2 | 38.1 | 38.1 | 38.1 | 37.2 |
| 177.5° | 38.1 | 38.1 | 38.1 | 38.1 | 37.2 | 38.1 | 38.1 | 38.1 | 38.1 | 38.1 | 38.1 |
| 180° | 38.1 | 38.1 | 38.1 | 38.1 | 38.1 | 38.1 | 38.1 | 38.1 | 38.1 | 38.1 | 38.1 |

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



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 TT and TTN families of products

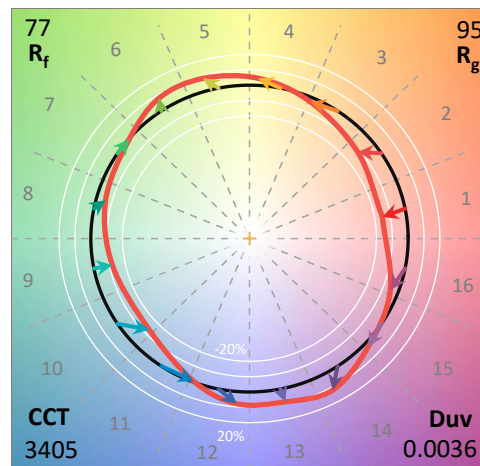
Test Information

Test Method: LM-79-2019
 Report Number: SP1-2411-284-1
 Test Lab: COOPER LIGHTING SOLUTIONS
 Photometer: SP1 - 76IN SPHERE
 Measurement Geometry: 4π
 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
 CIE u': 0.2365
 CIE v': 0.5180
 Duv: 0.0036
 CIE x: 0.4148
 CIE y: 0.4038
 CIE z: 0.1814
 Peak Wavelength (nm): 596
 Dominant Wavelength (nm): 579
 Purity: 45.70672
 Rf: 76.6
 Rg: 95.4

| | | | |
|-----------|------|------|-------|
| CRI (Ra): | 73.9 | | |
| R1: | 71.3 | R9: | -18.0 |
| R2: | 80.3 | R10: | 53.1 |
| R3: | 87.8 | R11: | 68.6 |
| R4: | 73.2 | R12: | 42.6 |
| R5: | 69.8 | R13: | 72.5 |
| R6: | 71.8 | R14: | 92.7 |
| R7: | 82.8 | R15: | 64.3 |
| R8: | 54.1 | | |



Test Conditions

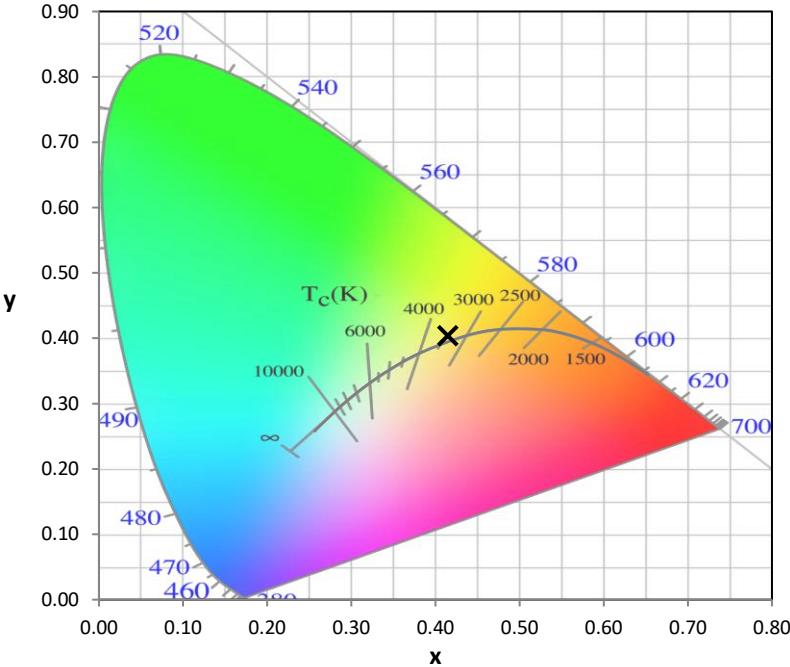
Stabilization Time: 38M
 Operation Time: 1H 38M
 Sphere Temperature (°C): 24.9

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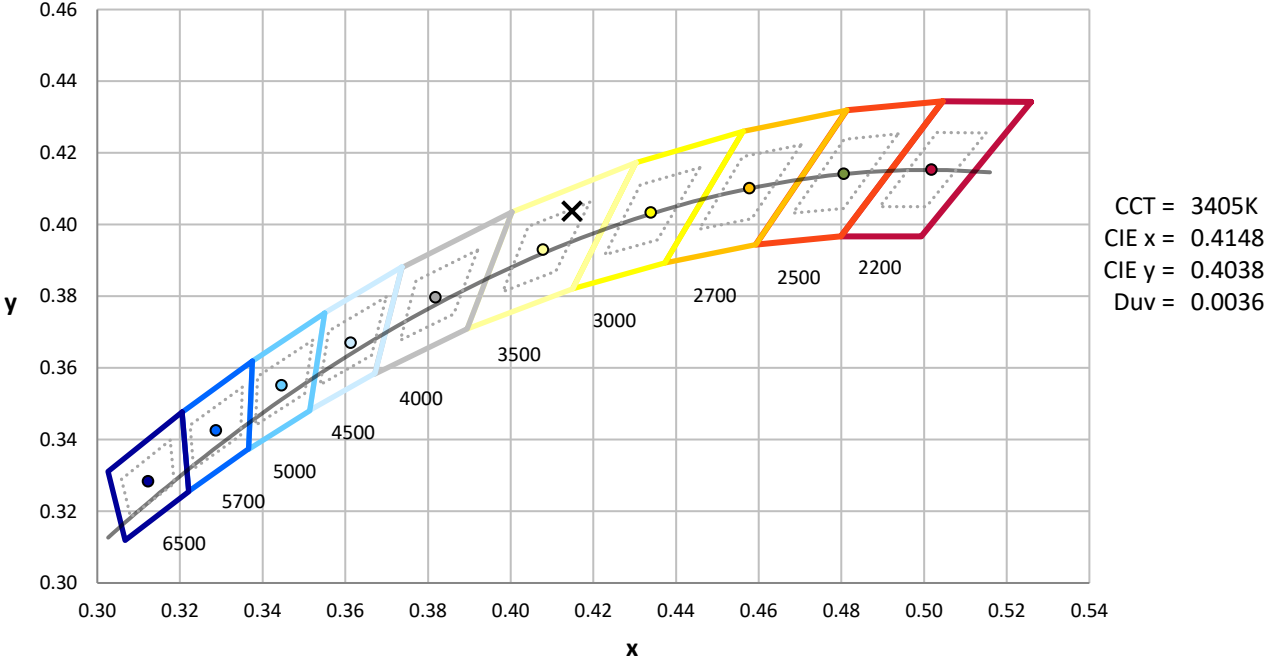
| Measurement and Test Equipment | | | |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 6/18/2024 | 12/18/2024 |
| Power Meter | INXT2011004 | 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



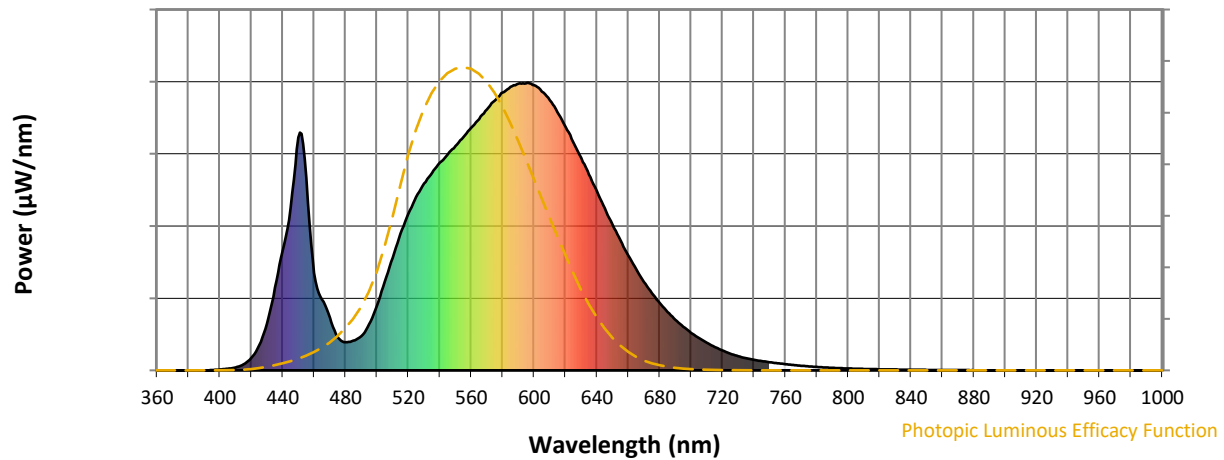
CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles



Point lies inside the ANSI 3500K 4-step quadrangle

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Photopic Flux vs. Wavelength

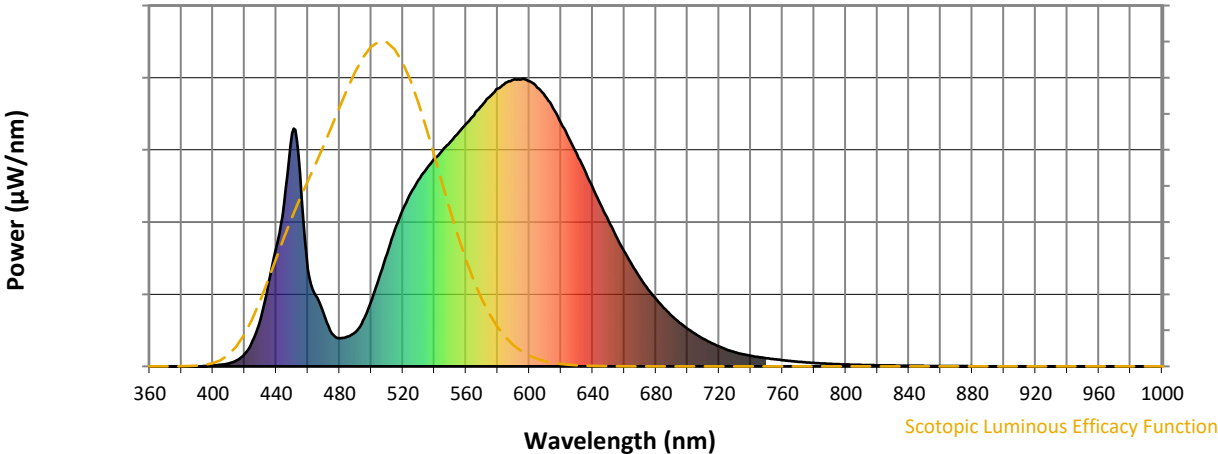


Photopic Lumens: NR

| λ (nm) | Power W [^] /nm | Lumens (ϕ /nm) | λ (nm) | Power W [^] /nm | Lumens (ϕ /nm) | λ (nm) | Power W [^] /nm | Lumens (ϕ /nm) | λ (nm) | Power W [^] /nm | Lumens (ϕ /nm) | λ (nm) | Power W [^] /nm | Lumens (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 | | | |

REPORT NUMBER: SP1-2411-284-1

Scotopic Flux vs. Wavelength



Scotopic Lumens: NR

S/P: 1.33

| λ (nm) | Power W [^] /nm | Lumens (φ/nm) | λ (nm) | Power W [^] /nm | Lumens (φ/nm) | λ (nm) | Power W [^] /nm | Lumens (φ/nm) | λ (nm) | Power W [^] /nm | Lumens (φ/nm) | λ (nm) | Power W [^] /nm | Lumens (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 | | | |

REPORT NUMBER: SP1-2411-284-1

Melanopic Flux vs. Wavelength



Melanopic Lumens: NR

M/P: 2.47

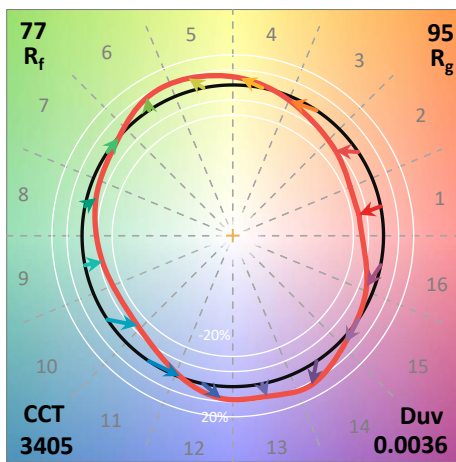
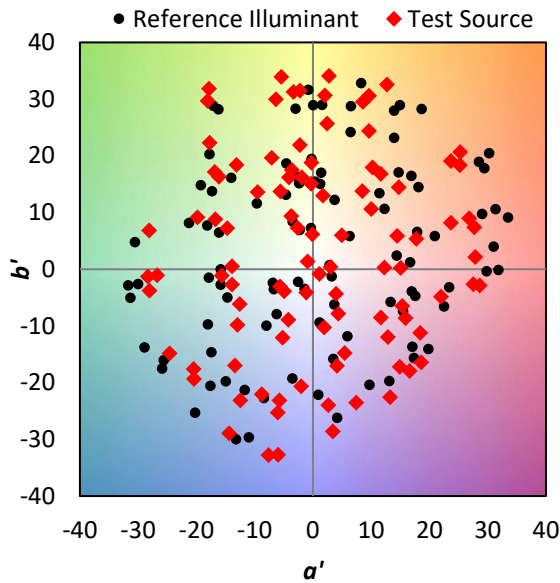
| λ (nm) | Power W [^] /nm | Lumens (φ/nm) | λ (nm) | Power W [^] /nm | Lumens (φ/nm) | λ (nm) | Power W [^] /nm | Lumens (φ/nm) | λ (nm) | Power W [^] /nm | Lumens (φ/nm) | λ (nm) | Power W [^] /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 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 | | | |

Summary

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

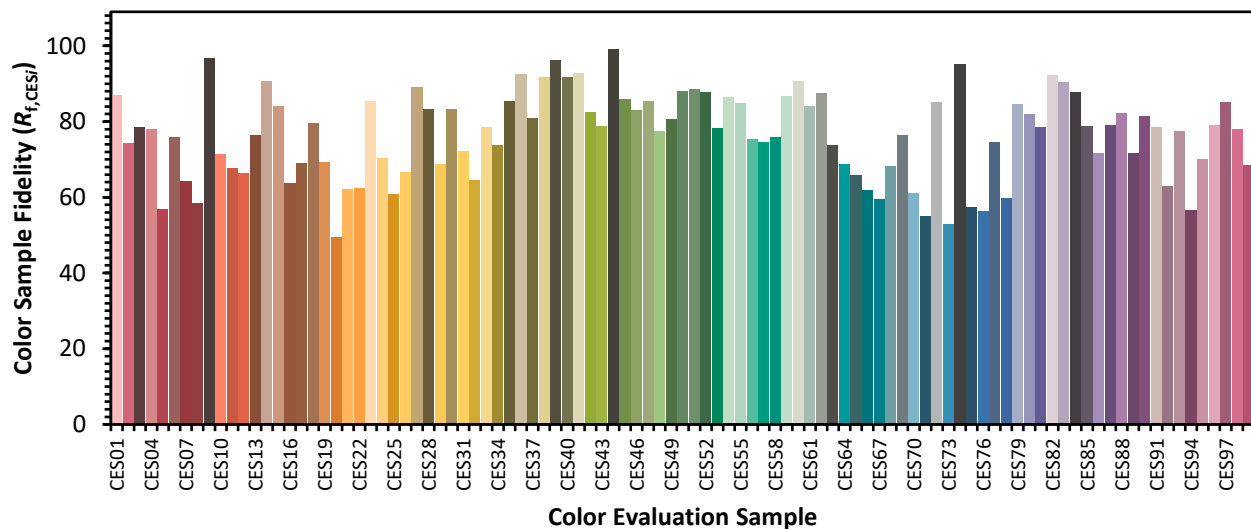


Color Vector Graphics

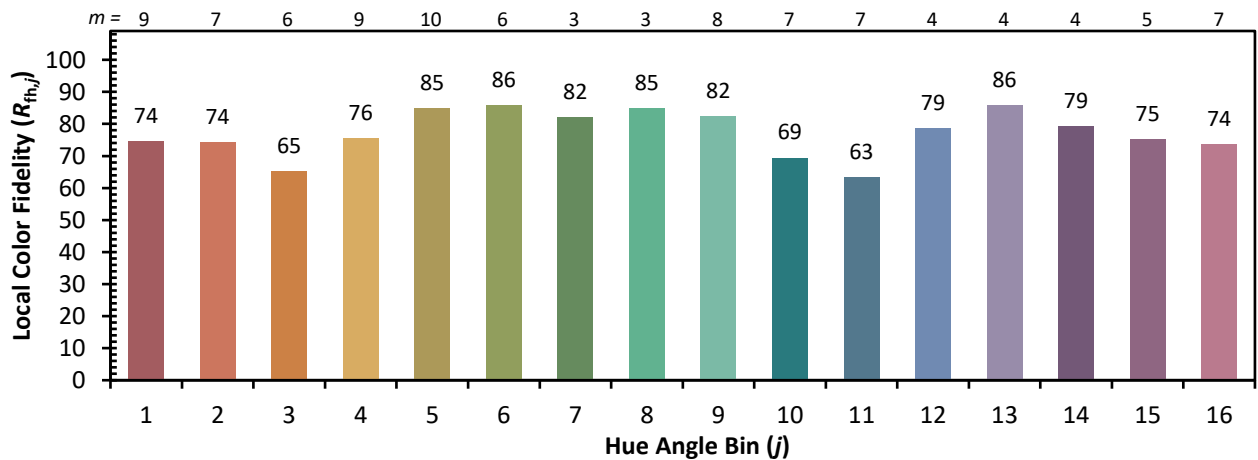
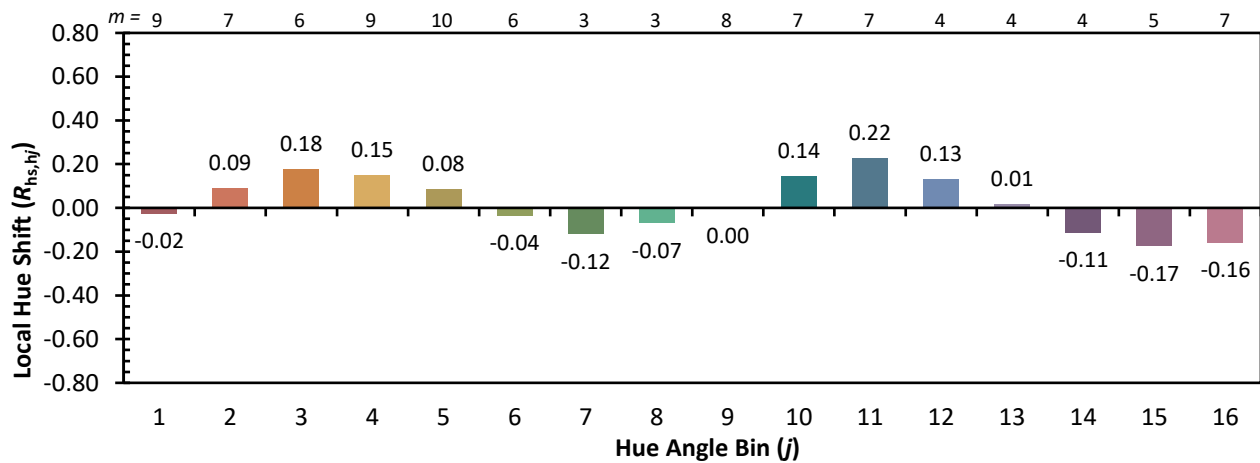
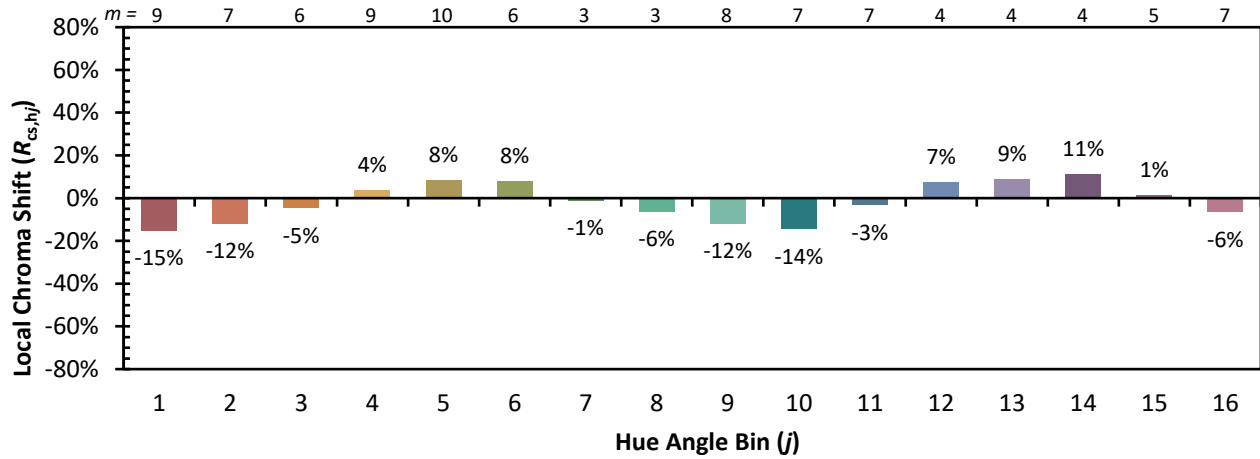


Individual Sample Fidelity Index ($R_{f,i}$)

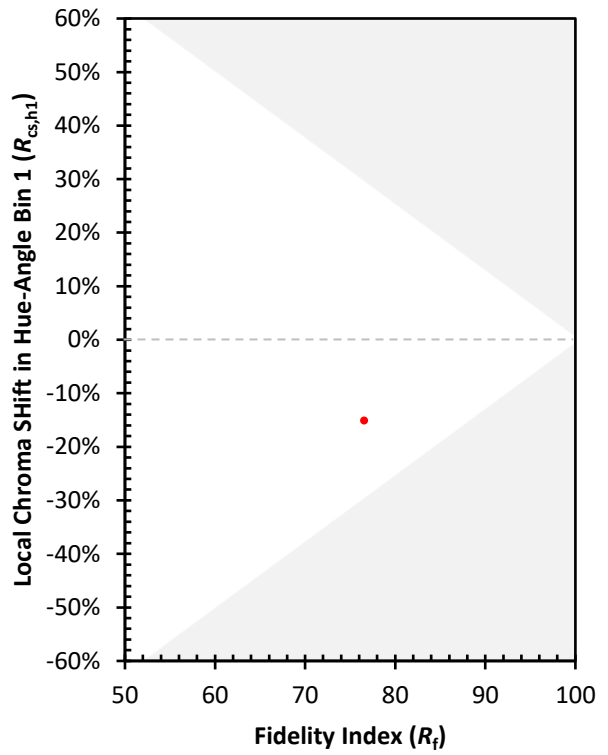
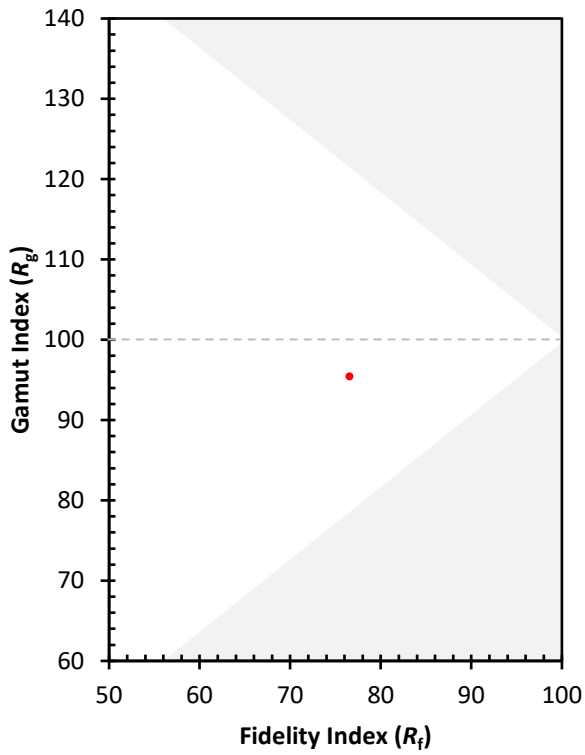
| | | | |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 67 | CES51 = 88 | CES76 = 56 |
| CES02 = 62 | CES27 = 89 | CES52 = 88 | CES77 = 75 |
| CES03 = 31 | CES28 = 83 | CES53 = 78 | CES78 = 60 |
| CES04 = 70 | CES29 = 69 | CES54 = 86 | CES79 = 85 |
| CES05 = 48 | CES30 = 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)