

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: P833191

Luminaire Tested: **TTN-D1-740-U-CQ-UPL1**

Issue Date: 5/15/2024

Test Information

Test Method: LM-79-08
Report Number: P833191
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-D1-740-U-CQ-UPL1
Description: TOPTIER NANO LED PARKING GARAGE LUMINAIRE WITH UPLIGHT
4000K, 70 CRI LEDS AND CONCENTRATED DISTRIBUTION
Light Source: -
Ballast/Driver: -

Summary

Lumens per Lamp: N/A
Luminaire Lumens: 3703.9 lumens
Efficiency: N/A
Efficacy: 127.7 lumens/watt
Luminous Opening: Vertical Cylinder (Dia: 0.71' x H: 0.1')
IES Classification: Type V - Short
BUG Rating: B1 - U3 - G1

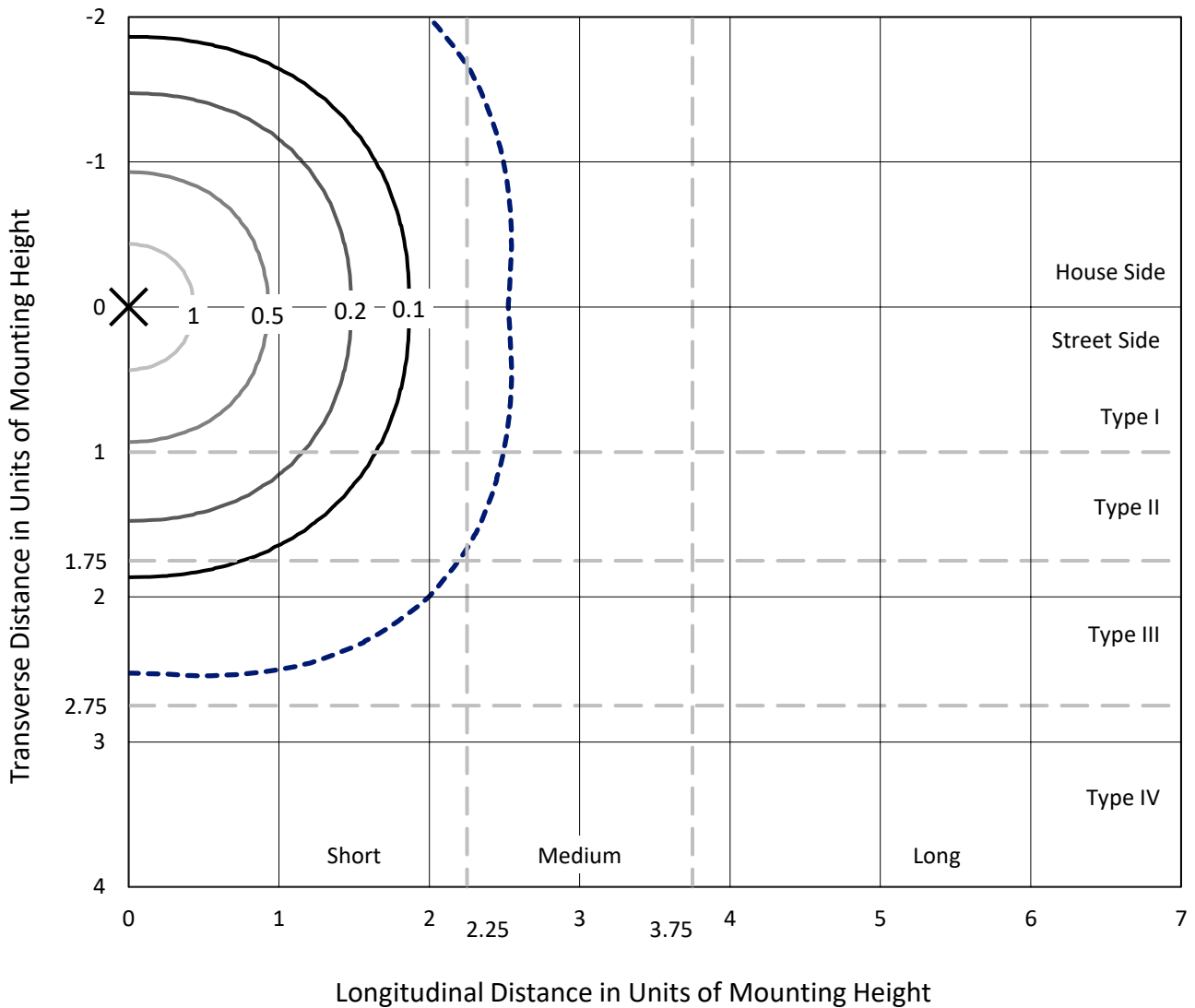
Input Watts (W): 29
Input Voltage (V): NR
Input Current (Ain): NR
Voltage Rise (V): NR
Power Factor: NR
Total Harmonic Distortion (THDi): NR
Frequency (hertz): 60
Stabilization Time: NR
Operation Time: NR
Ambient Temperature (°C): NR
Test Distance: 24 FT



REPORT NUMBER: P833191
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Iso-Footcandle Lines of Horizontal Illumination

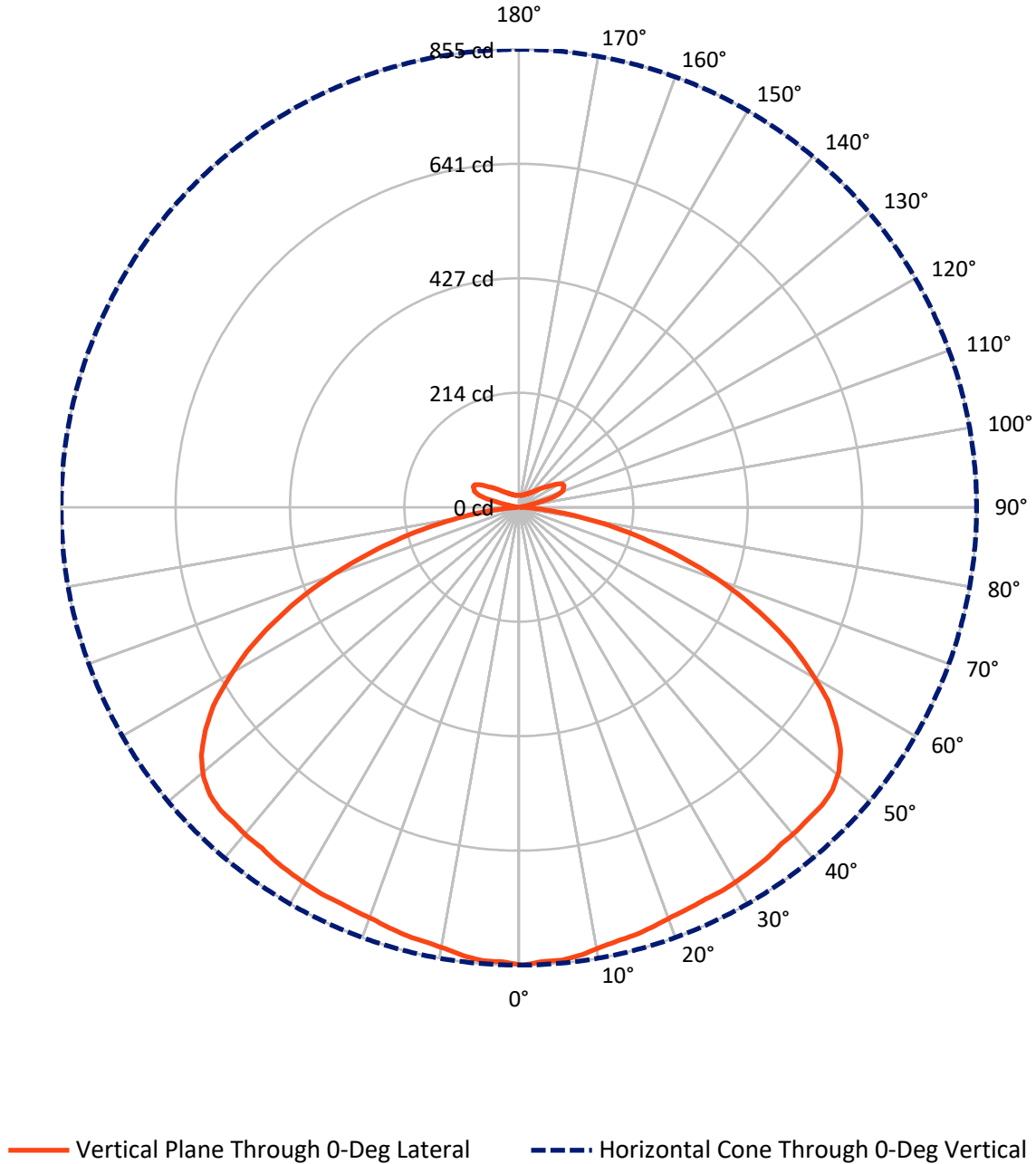
✕ Max cd
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 1.4 fc
 Type V - Short - N/A

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CATALOG NUMBER: TTN-D1-740-U-CQ-UPL1

Luminous Intensity Polar Plot



REPORT NUMBER: P833191
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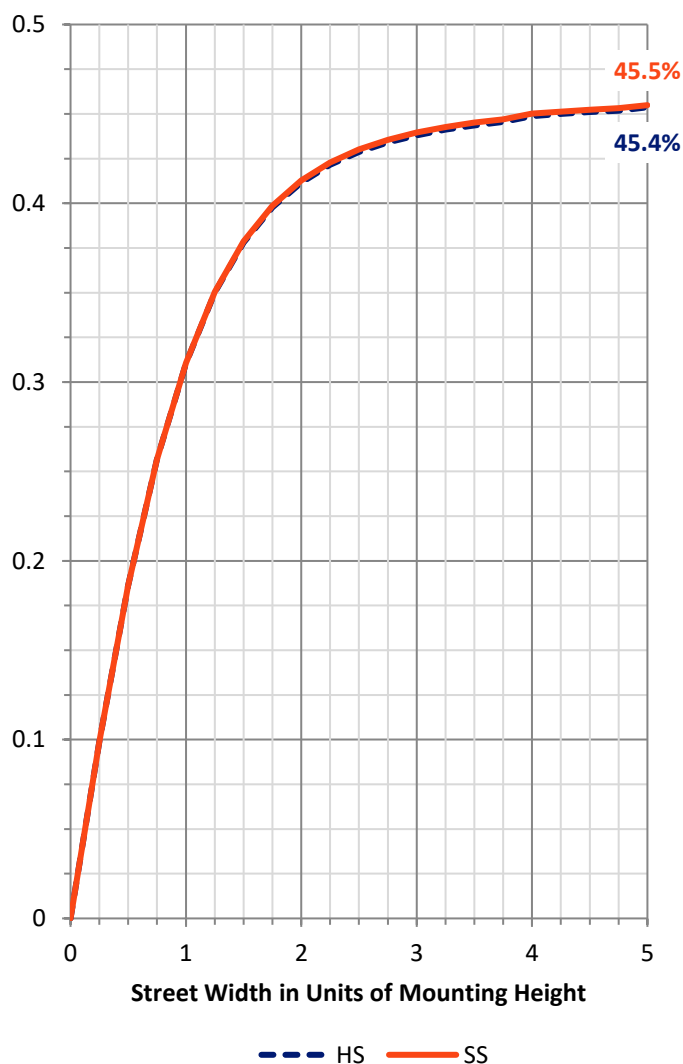
FLUX DISTRIBUTION:

| | | Downward | Upward | Total |
|--------------------|-----------|----------|--------|--------|
| House Side | Lumens | 1690.2 | 161.7 | 1851.9 |
| | % Fixture | 45.6 | 4.4 | 50.0 |
| Street Side | Lumens | 1690.2 | 161.7 | 1851.9 |
| | % Fixture | 45.6 | 4.4 | 50.0 |
| Total | Lumens | 3380.4 | 323.4 | 3703.9 |
| | % Fixture | 91.3 | 8.7 | 100.0 |

ZONAL LUMENS:

| Zone | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10° | 80.6 | 2.2 |
| 10°-20° | 234.0 | 6.3 |
| 20°-30° | 376.8 | 10.2 |
| 30°-40° | 506.8 | 13.7 |
| 40°-50° | 625.3 | 16.9 |
| 50°-60° | 670.9 | 18.1 |
| 60°-70° | 544.0 | 14.7 |
| 70°-80° | 288.3 | 7.8 |
| 80°-90° | 53.8 | 1.5 |
| 90°-100° | 7.2 | 0.2 |
| 100°-110° | 73.4 | 2.0 |
| 110°-120° | 107.3 | 2.9 |
| 120°-130° | 62.3 | 1.7 |
| 130°-140° | 33.0 | 0.9 |
| 140°-150° | 19.6 | 0.5 |
| 150°-160° | 12.1 | 0.3 |
| 160°-170° | 6.6 | 0.2 |
| 170°-180° | 2.1 | 0.1 |
| 0°-90° | 3380.4 | 91.3 |
| 0°-180° | 3703.9 | 100.0 |

Coefficient of Utilization

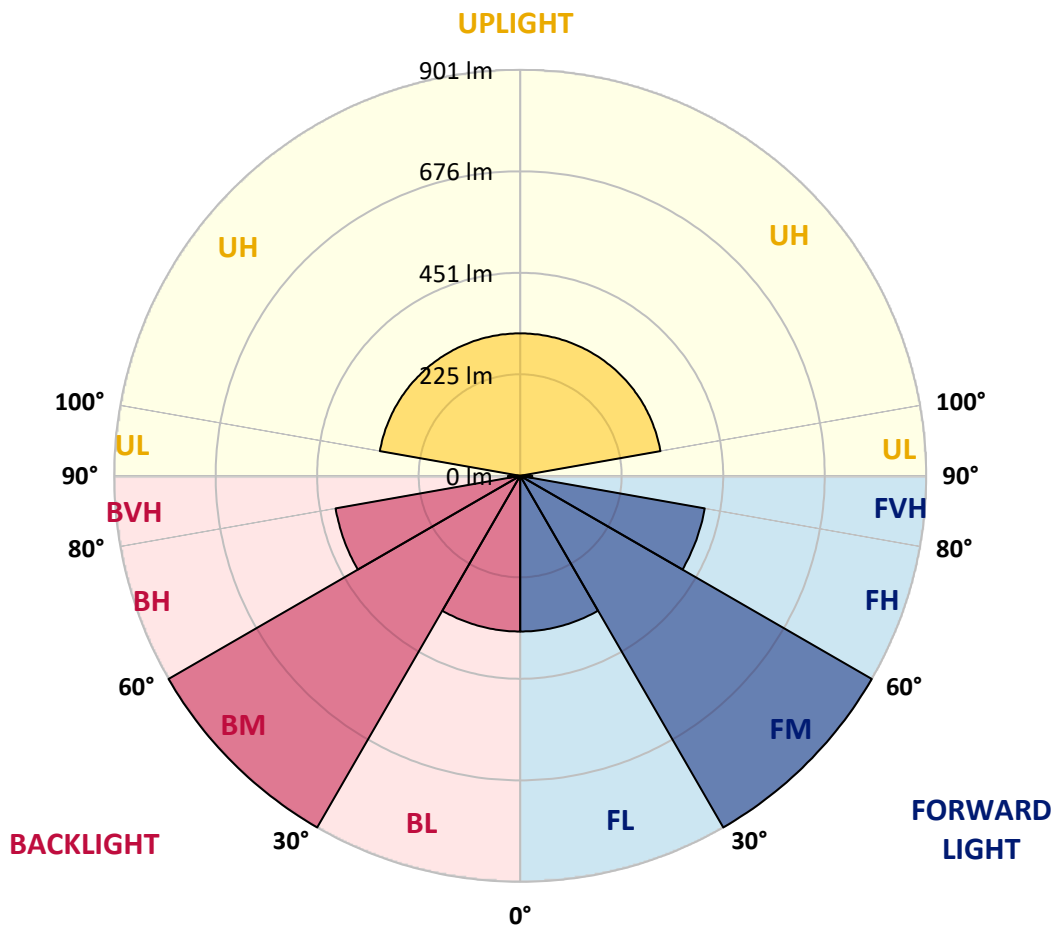


REPORT NUMBER: P833191
 CATALOG NUMBER: TTN-D1-740-U-CQ-UPL1

LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | Lumens | % Fixture | Zone Rating/Lumen Limit | | |
|----------------|--------|-----------|-------------------------|--------|--------|
| | | | B | U | G |
| FL (0°-30°) | 345.7 | 9.3 | | | |
| FM (30°-60°) | 901.5 | 24.3 | | | |
| FH (60°-80°) | 416.2 | 11.2 | | | G0/660 |
| FVH (80°-90°) | 26.9 | 0.7 | | | G1/100 |
| BL (0°-30°) | 345.7 | 9.3 | B1/500 | | |
| BM (30°-60°) | 901.5 | 24.3 | B1/1000 | | |
| BH (60°-80°) | 416.2 | 11.2 | B1/500 | | G0/660 |
| BVH (80°-90°) | 26.9 | 0.7 | | | G1/100 |
| UL (90°-100°) | 7.2 | 0.2 | | U1/10 | |
| UH (100°-180°) | 316.2 | 8.5 | | U3/500 | |

BUG Rating: B1-U3-G1
 Type V Short





REPORT NUMBER: P833191
 CATALOG NUMBER: TTN-D1-740-U-CQ-UPL1

CANDELA DISTRIBUTION (FULL):

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 65° | 75° | 85° | 90° |
|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0° | 854.7 | 854.7 | 854.7 | 854.7 | 854.7 | 854.7 | 854.7 | 854.7 | 854.7 | 854.7 | 854.7 |
| 2.5° | 849.1 | 849.1 | 849.1 | 849.1 | 849.1 | 849.1 | 849.1 | 849.1 | 849.1 | 849.1 | 851.9 |
| 5° | 849.1 | 849.1 | 849.1 | 849.1 | 846.4 | 849.1 | 849.1 | 849.1 | 849.1 | 849.1 | 849.1 |
| 7.5° | 843.6 | 843.6 | 843.6 | 843.6 | 843.6 | 843.6 | 843.6 | 843.6 | 843.6 | 843.6 | 843.6 |
| 10° | 835.3 | 835.3 | 835.3 | 835.3 | 835.3 | 835.3 | 835.3 | 835.3 | 835.3 | 835.3 | 835.3 |
| 12.5° | 829.8 | 829.8 | 829.8 | 829.8 | 829.8 | 829.8 | 829.8 | 829.8 | 829.8 | 829.8 | 829.8 |
| 15° | 827.0 | 827.0 | 827.0 | 827.0 | 827.0 | 827.0 | 827.0 | 827.0 | 827.0 | 824.3 | 824.3 |
| 17.5° | 821.5 | 821.5 | 821.5 | 821.5 | 824.3 | 824.3 | 824.3 | 821.5 | 821.5 | 821.5 | 821.5 |
| 20° | 816.0 | 816.0 | 816.0 | 818.7 | 818.7 | 818.7 | 818.7 | 818.7 | 816.0 | 816.0 | 816.0 |
| 22.5° | 813.2 | 813.2 | 813.2 | 813.2 | 816.0 | 816.0 | 816.0 | 816.0 | 813.2 | 813.2 | 813.2 |
| 25° | 810.4 | 810.4 | 813.2 | 813.2 | 816.0 | 816.0 | 816.0 | 813.2 | 813.2 | 810.4 | 810.4 |
| 27.5° | 810.4 | 810.4 | 813.2 | 813.2 | 816.0 | 816.0 | 816.0 | 816.0 | 813.2 | 810.4 | 810.4 |
| 30° | 807.7 | 810.4 | 810.4 | 813.2 | 816.0 | 816.0 | 816.0 | 813.2 | 810.4 | 807.7 | 807.7 |
| 32.5° | 804.9 | 804.9 | 807.7 | 810.4 | 813.2 | 813.2 | 813.2 | 810.4 | 807.7 | 804.9 | 802.1 |
| 35° | 802.1 | 802.1 | 802.1 | 807.7 | 810.4 | 810.4 | 810.4 | 807.7 | 802.1 | 799.4 | 799.4 |
| 37.5° | 796.6 | 799.4 | 802.1 | 804.9 | 810.4 | 810.4 | 810.4 | 804.9 | 799.4 | 796.6 | 793.8 |
| 40° | 796.6 | 796.6 | 802.1 | 804.9 | 813.2 | 813.2 | 810.4 | 804.9 | 799.4 | 793.8 | 791.1 |
| 42.5° | 793.8 | 796.6 | 802.1 | 810.4 | 818.7 | 818.7 | 816.0 | 807.7 | 799.4 | 793.8 | 791.1 |
| 45° | 793.8 | 793.8 | 802.1 | 813.2 | 824.3 | 827.0 | 821.5 | 813.2 | 802.1 | 791.1 | 791.1 |
| 47.5° | 788.3 | 788.3 | 799.4 | 813.2 | 827.0 | 829.8 | 827.0 | 813.2 | 799.4 | 791.1 | 788.3 |
| 50° | 774.5 | 774.5 | 788.3 | 804.9 | 821.5 | 827.0 | 821.5 | 810.4 | 791.1 | 780.0 | 777.2 |
| 52.5° | 752.3 | 752.3 | 766.2 | 788.3 | 804.9 | 813.2 | 807.7 | 793.8 | 774.5 | 757.9 | 755.1 |
| 55° | 719.1 | 721.9 | 735.7 | 760.6 | 780.0 | 788.3 | 782.8 | 766.2 | 744.0 | 727.4 | 721.9 |
| 57.5° | 680.4 | 680.4 | 699.8 | 724.7 | 744.0 | 752.3 | 746.8 | 730.2 | 705.3 | 688.7 | 683.2 |
| 60° | 627.9 | 630.6 | 647.2 | 680.4 | 699.8 | 708.1 | 702.6 | 683.2 | 655.5 | 636.2 | 630.6 |
| 62.5° | 575.3 | 578.1 | 594.7 | 622.3 | 644.5 | 650.0 | 644.5 | 625.1 | 600.2 | 580.9 | 575.3 |
| 65° | 514.5 | 517.2 | 536.6 | 561.5 | 578.1 | 586.4 | 578.1 | 561.5 | 539.4 | 520.0 | 517.2 |
| 67.5° | 450.9 | 453.6 | 473.0 | 495.1 | 511.7 | 517.2 | 508.9 | 495.1 | 473.0 | 456.4 | 450.9 |
| 70° | 384.5 | 387.2 | 403.8 | 423.2 | 437.0 | 442.6 | 437.0 | 420.4 | 403.8 | 387.2 | 384.5 |
| 72.5° | 315.3 | 318.1 | 334.7 | 351.3 | 362.3 | 367.9 | 359.6 | 348.5 | 331.9 | 318.1 | 315.3 |
| 75° | 248.9 | 248.9 | 262.8 | 276.6 | 287.7 | 290.4 | 284.9 | 276.6 | 262.8 | 251.7 | 246.2 |
| 77.5° | 185.3 | 185.3 | 199.1 | 207.4 | 213.0 | 218.5 | 213.0 | 204.7 | 196.4 | 185.3 | 185.3 |
| 80° | 124.5 | 124.5 | 135.5 | 141.1 | 146.6 | 149.4 | 146.6 | 141.1 | 135.5 | 127.2 | 124.5 |
| 82.5° | 74.7 | 74.7 | 80.2 | 85.7 | 85.7 | 88.5 | 88.5 | 85.7 | 80.2 | 74.7 | 74.7 |
| 85° | 33.2 | 30.4 | 36.0 | 38.7 | 38.7 | 41.5 | 41.5 | 38.7 | 36.0 | 33.2 | 33.2 |
| 87.5° | 2.8 | 5.5 | 5.5 | 8.3 | 8.3 | 8.3 | 8.3 | 8.3 | 5.5 | 5.5 | 5.5 |
| 90° | 2.8 | 2.8 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 2.8 | 2.8 |
| 92.5° | 2.8 | 2.8 | 2.8 | 3.9 | 4.4 | 3.9 | 4.4 | 3.3 | 3.3 | 2.8 | 2.8 |
| 95° | 3.3 | 3.3 | 3.9 | 5.0 | 6.1 | 6.6 | 6.6 | 3.9 | 3.9 | 3.3 | 3.3 |
| 97.5° | 4.4 | 5.0 | 5.0 | 6.1 | 10.0 | 18.3 | 11.1 | 5.5 | 5.5 | 5.0 | 4.4 |
| 100° | 7.2 | 7.7 | 7.7 | 13.8 | 29.3 | 39.3 | 28.2 | 14.4 | 10.5 | 7.7 | 7.7 |
| 102.5° | 23.2 | 24.3 | 29.9 | 44.8 | 66.4 | 60.3 | 50.9 | 48.1 | 33.2 | 26.6 | 25.5 |
| 105° | 59.2 | 58.7 | 63.1 | 74.7 | 93.0 | 91.3 | 84.1 | 76.4 | 65.8 | 60.9 | 60.9 |
| 107.5° | 78.0 | 78.0 | 81.9 | 91.9 | 105.7 | 123.4 | 125.1 | 99.0 | 86.9 | 81.3 | 80.8 |
| 110° | 88.0 | 88.0 | 91.3 | 99.6 | 117.9 | 142.8 | 141.6 | 122.3 | 107.3 | 100.2 | 99.0 |



REPORT NUMBER: P833191
 CATALOG NUMBER: TTN-D1-740-U-CQ-UPL1

CANDELA DISTRIBUTION (continued):

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 65° | 75° | 85° | 90° |
|--------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|
| 112.5° | 90.2 | 90.7 | 95.2 | 107.9 | 127.8 | 138.9 | 133.9 | 126.2 | 119.5 | 114.0 | 112.9 |
| 115° | 93.5 | 93.5 | 98.5 | 110.7 | 121.7 | 126.2 | 120.6 | 114.5 | 110.1 | 107.9 | 109.0 |
| 117.5° | 92.4 | 94.1 | 95.2 | 101.8 | 109.0 | 112.3 | 109.6 | 101.3 | 97.9 | 96.8 | 95.2 |
| 120° | 85.8 | 85.8 | 86.9 | 90.2 | 94.1 | 95.7 | 94.6 | 89.1 | 86.3 | 85.8 | 84.7 |
| 122.5° | 76.4 | 76.9 | 76.4 | 78.0 | 80.8 | 82.4 | 81.3 | 76.9 | 75.8 | 75.8 | 74.7 |
| 125° | 67.0 | 67.0 | 66.4 | 67.5 | 69.2 | 68.6 | 69.2 | 67.0 | 66.4 | 66.4 | 65.8 |
| 127.5° | 60.3 | 59.8 | 58.7 | 59.2 | 59.8 | 59.8 | 60.3 | 58.1 | 58.7 | 59.2 | 58.7 |
| 130° | 53.7 | 53.7 | 52.6 | 52.6 | 52.6 | 51.5 | 52.6 | 51.5 | 52.0 | 52.6 | 53.1 |
| 132.5° | 47.6 | 47.6 | 45.9 | 45.4 | 45.4 | 45.4 | 45.9 | 45.4 | 46.5 | 47.6 | 47.6 |
| 135° | 42.6 | 42.6 | 40.9 | 41.5 | 41.5 | 40.9 | 41.5 | 40.9 | 42.1 | 42.6 | 42.6 |
| 137.5° | 38.7 | 38.7 | 37.6 | 37.6 | 37.6 | 37.1 | 37.6 | 37.6 | 38.2 | 39.3 | 39.8 |
| 140° | 35.4 | 35.4 | 34.9 | 34.9 | 34.3 | 34.9 | 34.9 | 34.9 | 35.4 | 36.0 | 36.0 |
| 142.5° | 33.8 | 33.2 | 32.6 | 32.1 | 32.6 | 32.6 | 32.6 | 32.1 | 32.6 | 33.8 | 33.8 |
| 145° | 31.0 | 31.0 | 30.4 | 30.4 | 30.4 | 31.0 | 30.4 | 30.4 | 31.0 | 31.0 | 31.5 |
| 147.5° | 29.3 | 29.3 | 28.8 | 29.3 | 29.3 | 29.3 | 29.3 | 28.8 | 29.3 | 29.3 | 29.9 |
| 150° | 28.8 | 28.2 | 27.7 | 28.2 | 28.2 | 27.7 | 27.7 | 27.7 | 27.7 | 28.2 | 28.2 |
| 152.5° | 27.1 | 27.1 | 26.6 | 27.1 | 26.6 | 26.6 | 26.6 | 26.6 | 26.6 | 27.1 | 27.7 |
| 155° | 26.0 | 26.0 | 25.5 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 |
| 157.5° | 24.9 | 25.5 | 24.9 | 24.9 | 24.9 | 24.9 | 24.9 | 24.9 | 24.9 | 25.5 | 25.5 |
| 160° | 24.3 | 24.3 | 24.3 | 24.3 | 23.8 | 23.8 | 23.8 | 24.3 | 24.3 | 24.3 | 24.9 |
| 162.5° | 23.8 | 23.8 | 23.8 | 23.8 | 23.2 | 23.2 | 23.2 | 23.2 | 23.8 | 23.8 | 24.3 |
| 165° | 23.8 | 23.2 | 23.2 | 23.2 | 22.7 | 22.7 | 22.7 | 22.7 | 23.2 | 23.8 | 23.2 |
| 167.5° | 22.7 | 22.7 | 22.7 | 22.7 | 22.7 | 22.1 | 22.1 | 22.7 | 22.7 | 22.7 | 23.2 |
| 170° | 22.7 | 22.7 | 22.1 | 22.1 | 22.1 | 22.1 | 22.1 | 22.1 | 22.1 | 22.1 | 22.7 |
| 172.5° | 22.7 | 22.7 | 22.7 | 22.7 | 22.1 | 22.1 | 22.1 | 22.1 | 22.1 | 22.7 | 22.7 |
| 175° | 22.7 | 22.7 | 22.7 | 22.7 | 22.1 | 22.1 | 22.1 | 22.7 | 22.7 | 22.7 | 22.1 |
| 177.5° | 22.7 | 22.7 | 22.7 | 22.7 | 22.1 | 22.7 | 22.7 | 22.7 | 22.7 | 22.7 | 22.7 |
| 180° | 22.7 | 22.7 | 22.7 | 22.7 | 22.7 | 22.7 | 22.7 | 22.7 | 22.7 | 22.7 | 22.7 |

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: SP1-2411-284-2

Test Date: 11/20/2024

Luminaire Tested: TTN-D0-740-U-WQ

Data in this report applies to TT and TTN families of products

Test Information

Test Method: LM-79-2019
 Report Number: SP1-2411-284-2
 Test Lab: COOPER LIGHTING SOLUTIONS
 Photometer: SP1 - 76IN SPHERE
 Measurement Geometry: 4π
 Issue Date: 11/20/2024
 Manufacturer: COOPER LIGHTING SOLUTIONS
 Product Line: MCGRAW EDISON
 Catalog Number: **TTN-D0-740-U-WQ**
 Description: TOPTIER NANO LED PARKING GARAGE LUMINAIRE. 4000K, 70 CRI LEDS AND WIDE DISTRIBUTION

Spectral Parameters

CCT (K): 3863
 CIE u': 0.2247
 CIE v': 0.5111
 Duv: 0.0055
 CIE x: 0.3911
 CIE y: 0.3954
 CIE z: 0.2136
 Peak Wavelength (nm): 448
 Dominant Wavelength (nm): 577
 Purity: 36.03443
 Rf: 74.7
 Rg: 95.4

| | | | |
|-----------|------|------|-------|
| CRI (Ra): | 71.9 | | |
| R1: | 69.4 | R9: | -23.5 |
| R2: | 76.9 | R10: | 45.4 |
| R3: | 83.3 | R11: | 68.7 |
| R4: | 72.7 | R12: | 38.7 |
| R5: | 68.4 | R13: | 70.0 |
| R6: | 67.5 | R14: | 90.3 |
| R7: | 82.0 | R15: | 62.1 |
| R8: | 55.3 | | |



Test Conditions

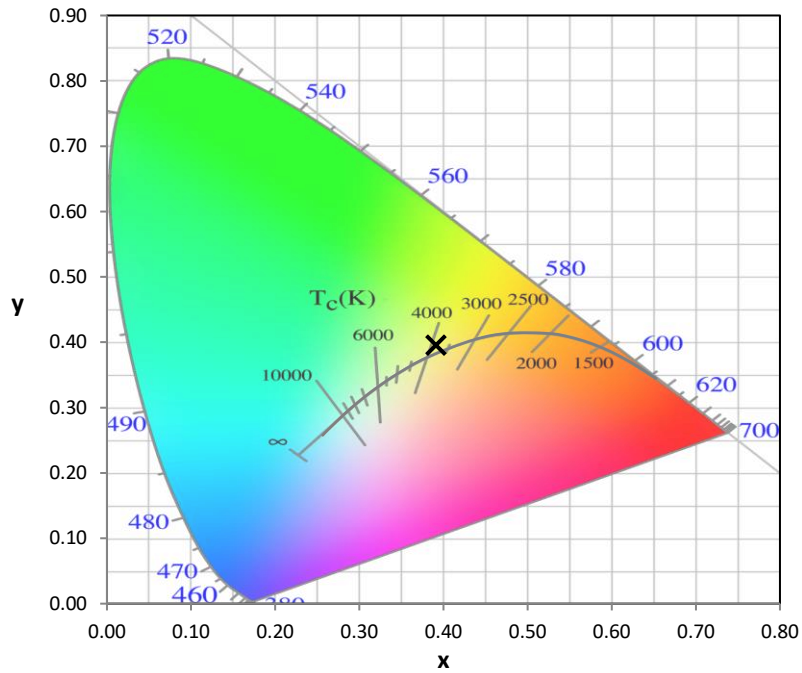
Stabilization Time: 37M
 Operation Time: 1H 37M
 Sphere Temperature (°C): 25.0

REPORT NUMBER: SP1-2411-284-2

| 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 4000K 7-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 | 118 | NR | 620 | 730 | NR | 750 | 25 | NR | 880 | 1 | NR |
| 365 | 0 | NR | 495 | 170 | NR | 625 | 680 | NR | 755 | 22 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 245 | NR | 630 | 630 | NR | 760 | 19 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 338 | NR | 635 | 579 | NR | 765 | 17 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 431 | NR | 640 | 529 | NR | 770 | 14 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 521 | NR | 645 | 477 | NR | 775 | 13 | NR | 905 | 0 | NR |
| 390 | 1 | NR | 520 | 596 | NR | 650 | 429 | NR | 780 | 11 | NR | 910 | 0 | NR |
| 395 | 3 | NR | 525 | 655 | NR | 655 | 383 | NR | 785 | 9 | NR | 915 | 0 | NR |
| 400 | 6 | NR | 530 | 701 | NR | 660 | 338 | NR | 790 | 8 | NR | 920 | 0 | NR |
| 405 | 9 | NR | 535 | 739 | NR | 665 | 298 | NR | 795 | 7 | NR | 925 | 0 | NR |
| 410 | 16 | NR | 540 | 766 | NR | 670 | 261 | NR | 800 | 6 | NR | 930 | 0 | NR |
| 415 | 32 | NR | 545 | 791 | NR | 675 | 228 | NR | 805 | 5 | NR | 935 | 0 | NR |
| 420 | 65 | NR | 550 | 813 | NR | 680 | 200 | NR | 810 | 5 | NR | 940 | 0 | NR |
| 425 | 131 | NR | 555 | 833 | NR | 685 | 173 | NR | 815 | 4 | NR | 945 | 0 | NR |
| 430 | 245 | NR | 560 | 852 | NR | 690 | 151 | NR | 820 | 3 | NR | 950 | 0 | NR |
| 435 | 432 | NR | 565 | 870 | NR | 695 | 130 | NR | 825 | 3 | NR | 955 | 0 | NR |
| 440 | 622 | NR | 570 | 885 | NR | 700 | 112 | NR | 830 | 3 | NR | 960 | 0 | NR |
| 445 | 870 | NR | 575 | 900 | NR | 705 | 97 | NR | 835 | 2 | NR | 965 | 0 | NR |
| 450 | 969 | NR | 580 | 911 | NR | 710 | 83 | NR | 840 | 2 | NR | 970 | 0 | NR |
| 455 | 544 | NR | 585 | 916 | NR | 715 | 71 | NR | 845 | 2 | NR | 975 | 0 | NR |
| 460 | 304 | NR | 590 | 912 | NR | 720 | 60 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 231 | NR | 595 | 901 | NR | 725 | 51 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 142 | NR | 600 | 882 | NR | 730 | 43 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 96 | NR | 605 | 855 | NR | 735 | 37 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 92 | NR | 610 | 820 | NR | 740 | 32 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 96 | NR | 615 | 776 | NR | 745 | 29 | NR | 875 | 1 | NR | | | |

REPORT NUMBER: SP1-2411-284-2

Scotopic Flux vs. Wavelength



Scotopic Lumens: NR

S/P: 1.45

| 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 | 118 | NR | 620 | 730 | NR | 750 | 25 | NR | 880 | 1 | NR |
| 365 | 0 | NR | 495 | 170 | NR | 625 | 680 | NR | 755 | 22 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 245 | NR | 630 | 630 | NR | 760 | 19 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 338 | NR | 635 | 579 | NR | 765 | 17 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 431 | NR | 640 | 529 | NR | 770 | 14 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 521 | NR | 645 | 477 | NR | 775 | 13 | NR | 905 | 0 | NR |
| 390 | 1 | NR | 520 | 596 | NR | 650 | 429 | NR | 780 | 11 | NR | 910 | 0 | NR |
| 395 | 3 | NR | 525 | 655 | NR | 655 | 383 | NR | 785 | 9 | NR | 915 | 0 | NR |
| 400 | 6 | NR | 530 | 701 | NR | 660 | 338 | NR | 790 | 8 | NR | 920 | 0 | NR |
| 405 | 9 | NR | 535 | 739 | NR | 665 | 298 | NR | 795 | 7 | NR | 925 | 0 | NR |
| 410 | 16 | NR | 540 | 766 | NR | 670 | 261 | NR | 800 | 6 | NR | 930 | 0 | NR |
| 415 | 32 | NR | 545 | 791 | NR | 675 | 228 | NR | 805 | 5 | NR | 935 | 0 | NR |
| 420 | 65 | NR | 550 | 813 | NR | 680 | 200 | NR | 810 | 5 | NR | 940 | 0 | NR |
| 425 | 131 | NR | 555 | 833 | NR | 685 | 173 | NR | 815 | 4 | NR | 945 | 0 | NR |
| 430 | 245 | NR | 560 | 852 | NR | 690 | 151 | NR | 820 | 3 | NR | 950 | 0 | NR |
| 435 | 432 | NR | 565 | 870 | NR | 695 | 130 | NR | 825 | 3 | NR | 955 | 0 | NR |
| 440 | 622 | NR | 570 | 885 | NR | 700 | 112 | NR | 830 | 3 | NR | 960 | 0 | NR |
| 445 | 870 | NR | 575 | 900 | NR | 705 | 97 | NR | 835 | 2 | NR | 965 | 0 | NR |
| 450 | 969 | NR | 580 | 911 | NR | 710 | 83 | NR | 840 | 2 | NR | 970 | 0 | NR |
| 455 | 544 | NR | 585 | 916 | NR | 715 | 71 | NR | 845 | 2 | NR | 975 | 0 | NR |
| 460 | 304 | NR | 590 | 912 | NR | 720 | 60 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 231 | NR | 595 | 901 | NR | 725 | 51 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 142 | NR | 600 | 882 | NR | 730 | 43 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 96 | NR | 605 | 855 | NR | 735 | 37 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 92 | NR | 610 | 820 | NR | 740 | 32 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 96 | NR | 615 | 776 | NR | 745 | 29 | NR | 875 | 1 | NR | | | |

REPORT NUMBER: SP1-2411-284-2

Melanopic Flux vs. Wavelength



Melanopic Lumens: NR

M/P: 2.72

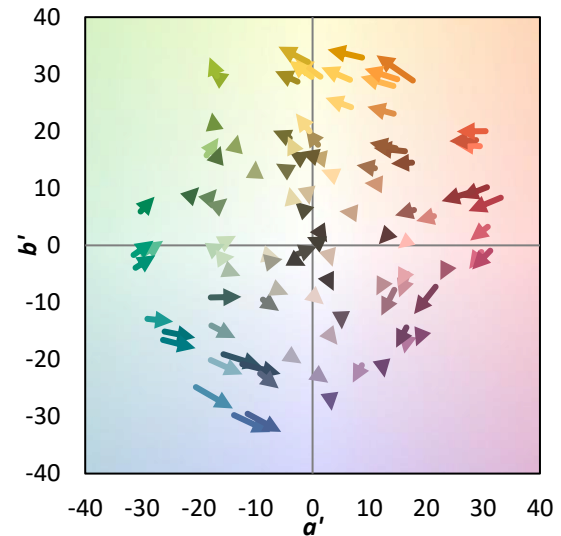
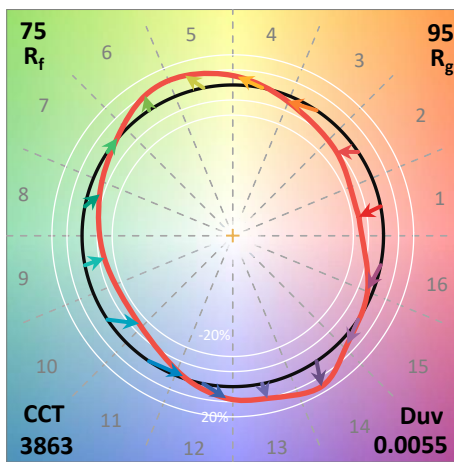
| λ (nm) | Power W [^] /nm | Lumens (φ/nm) | λ (nm) | Power W [^] /nm | Lumens (φ/nm) | λ (nm) | Power W [^] /nm | Lumens (φ/nm) | λ (nm) | Power W [^] /nm | Lumens (φ/nm) | λ (nm) | Power W [^] /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360 | 0 | NR | 490 | 118 | NR | 620 | 730 | NR | 750 | 25 | NR | 880 | 1 | NR |
| 365 | 0 | NR | 495 | 170 | NR | 625 | 680 | NR | 755 | 22 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 245 | NR | 630 | 630 | NR | 760 | 19 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 338 | NR | 635 | 579 | NR | 765 | 17 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 431 | NR | 640 | 529 | NR | 770 | 14 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 521 | NR | 645 | 477 | NR | 775 | 13 | NR | 905 | 0 | NR |
| 390 | 1 | NR | 520 | 596 | NR | 650 | 429 | NR | 780 | 11 | NR | 910 | 0 | NR |
| 395 | 3 | NR | 525 | 655 | NR | 655 | 383 | NR | 785 | 9 | NR | 915 | 0 | NR |
| 400 | 6 | NR | 530 | 701 | NR | 660 | 338 | NR | 790 | 8 | NR | 920 | 0 | NR |
| 405 | 9 | NR | 535 | 739 | NR | 665 | 298 | NR | 795 | 7 | NR | 925 | 0 | NR |
| 410 | 16 | NR | 540 | 766 | NR | 670 | 261 | NR | 800 | 6 | NR | 930 | 0 | NR |
| 415 | 32 | NR | 545 | 791 | NR | 675 | 228 | NR | 805 | 5 | NR | 935 | 0 | NR |
| 420 | 65 | NR | 550 | 813 | NR | 680 | 200 | NR | 810 | 5 | NR | 940 | 0 | NR |
| 425 | 131 | NR | 555 | 833 | NR | 685 | 173 | NR | 815 | 4 | NR | 945 | 0 | NR |
| 430 | 245 | NR | 560 | 852 | NR | 690 | 151 | NR | 820 | 3 | NR | 950 | 0 | NR |
| 435 | 432 | NR | 565 | 870 | NR | 695 | 130 | NR | 825 | 3 | NR | 955 | 0 | NR |
| 440 | 622 | NR | 570 | 885 | NR | 700 | 112 | NR | 830 | 3 | NR | 960 | 0 | NR |
| 445 | 870 | NR | 575 | 900 | NR | 705 | 97 | NR | 835 | 2 | NR | 965 | 0 | NR |
| 450 | 969 | NR | 580 | 911 | NR | 710 | 83 | NR | 840 | 2 | NR | 970 | 0 | NR |
| 455 | 544 | NR | 585 | 916 | NR | 715 | 71 | NR | 845 | 2 | NR | 975 | 0 | NR |
| 460 | 304 | NR | 590 | 912 | NR | 720 | 60 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 231 | NR | 595 | 901 | NR | 725 | 51 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 142 | NR | 600 | 882 | NR | 730 | 43 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 96 | NR | 605 | 855 | NR | 735 | 37 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 92 | NR | 610 | 820 | NR | 740 | 32 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 96 | NR | 615 | 776 | NR | 745 | 29 | NR | 875 | 1 | NR | | | |

Summary

$R_f = 74.7$
 $R_g = 95.4$
 $CIE R_a = 71.9$
 $R_g = -23.5$

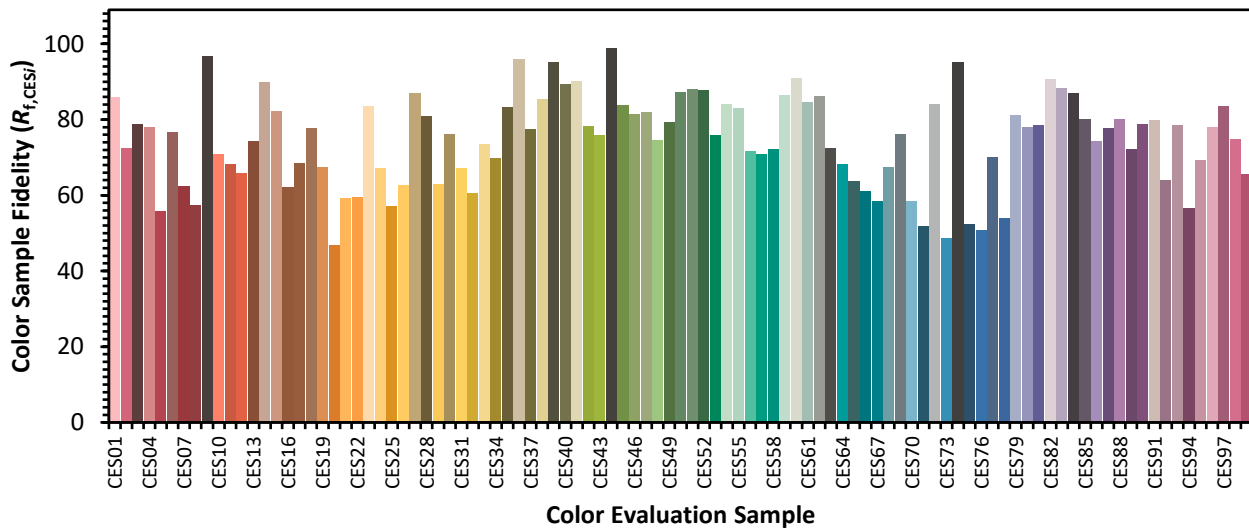


Color Vector Graphics

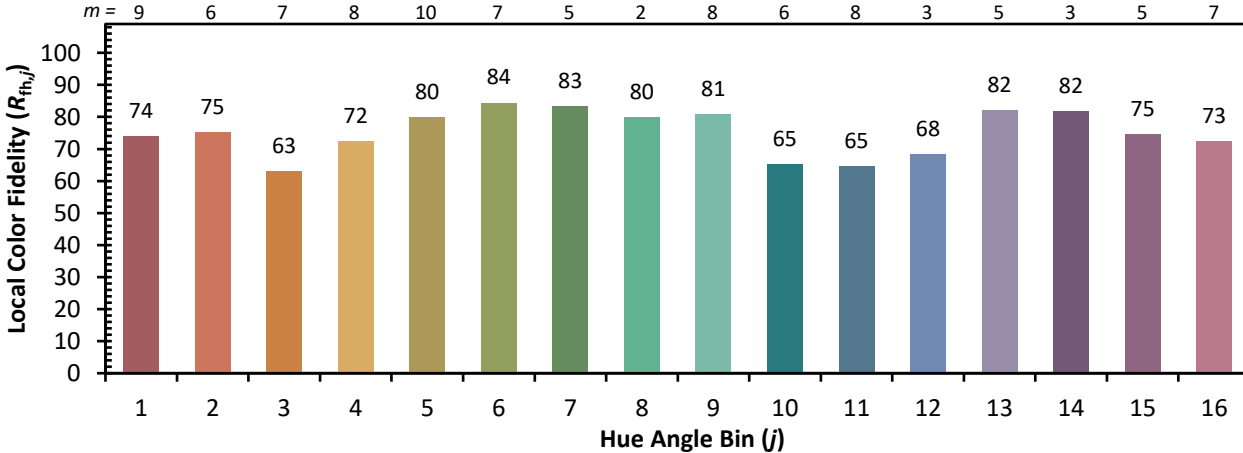


Individual Sample Fidelity Index ($R_{f,i}$)

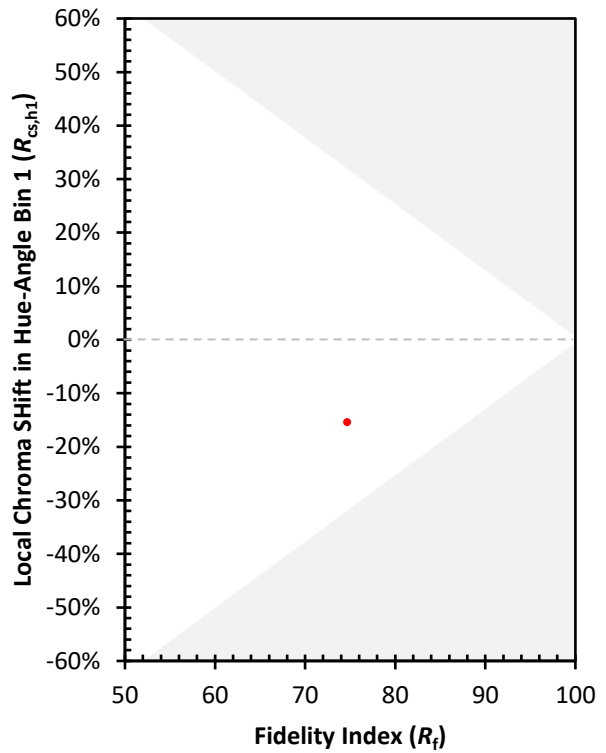
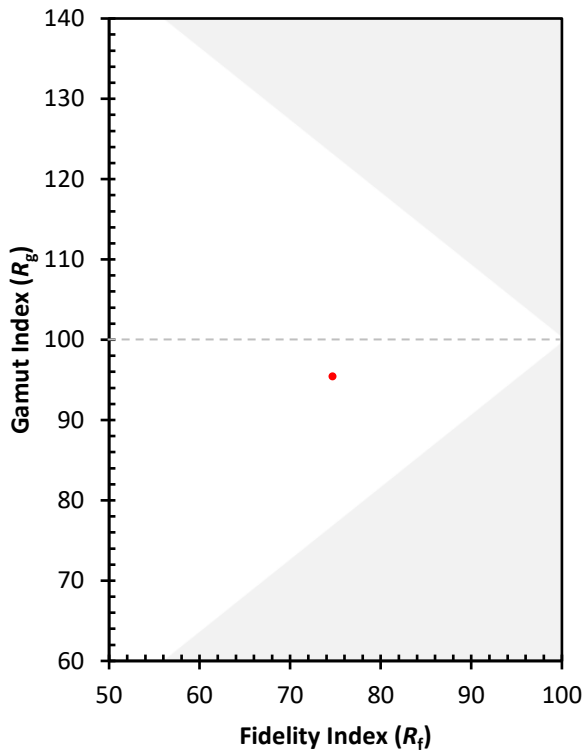
| | | | |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 63 | CES51 = 88 | CES76 = 51 |
| CES02 = 61 | CES27 = 87 | CES52 = 88 | CES77 = 70 |
| CES03 = 30 | CES28 = 81 | CES53 = 76 | CES78 = 54 |
| CES04 = 70 | CES29 = 63 | CES54 = 84 | CES79 = 81 |
| CES05 = 47 | CES30 = 76 | CES55 = 83 | CES80 = 78 |
| CES06 = 50 | CES31 = 67 | CES56 = 72 | CES81 = 79 |
| CES07 = 40 | CES32 = 61 | CES57 = 71 | CES82 = 91 |
| CES08 = 39 | CES33 = 73 | CES58 = 72 | CES83 = 88 |
| CES09 = 29 | CES34 = 70 | CES59 = 86 | CES84 = 87 |
| CES10 = 74 | CES35 = 83 | CES60 = 91 | CES85 = 80 |
| CES11 = 57 | CES36 = 96 | CES61 = 85 | CES86 = 74 |
| CES12 = 63 | CES37 = 77 | CES62 = 86 | CES87 = 78 |
| CES13 = 42 | CES38 = 85 | CES63 = 72 | CES88 = 80 |
| CES14 = 74 | CES39 = 95 | CES64 = 68 | CES89 = 72 |
| CES15 = 71 | CES40 = 89 | CES65 = 64 | CES90 = 79 |
| CES16 = 46 | CES41 = 90 | CES66 = 61 | CES91 = 80 |
| CES17 = 49 | CES42 = 78 | CES67 = 58 | CES92 = 64 |
| CES18 = 56 | CES43 = 76 | CES68 = 67 | CES93 = 78 |
| CES19 = 71 | CES44 = 99 | CES69 = 76 | CES94 = 57 |
| CES20 = 65 | CES45 = 84 | CES70 = 58 | CES95 = 69 |
| CES21 = 86 | CES46 = 81 | CES71 = 52 | CES96 = 78 |
| CES22 = 78 | CES47 = 82 | CES72 = 84 | CES97 = 84 |
| CES23 = 92 | CES48 = 75 | CES73 = 49 | CES98 = 75 |
| CES24 = 91 | CES49 = 79 | CES74 = 95 | CES99 = 66 |
| CES25 = 72 | CES50 = 87 | CES75 = 52 | |



Color Rendition by Hue-Angle Bin



Measure Comparisons



(END OF REPORT)