

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: P832646

Luminaire Tested: **TTN-D2-830-U-DL-CG**

Issue Date: 5/14/2024

Test Information

Test Method: LM-79-08
Report Number: P832646
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2312-254-15)
Test Lab: INNOVATION CENTER
Issue Date: 5/14/2024
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)
Product Line: MCGRAW-EDISON
Catalog Number: TTN-D2-830-U-DL-CG
Description: TOPTIER NANO LED PARKING GARAGE LUMINAIRE
3000K, 80 CRI LEDS AND DRIVE LANE DISTRIBUTION WITH CLEAR GLASS
Light Source: -
Ballast/Driver: -

Summary

Lumens per Lamp: N/A
Luminaire Lumens: 4452 lumens
Efficiency: N/A
Efficacy: 104.8 lumens/watt
Luminous Opening: Circular (Dia: 0.71' x H: 0')
IES Classification: Type IV - Short
BUG Rating: B1 - U0 - G1

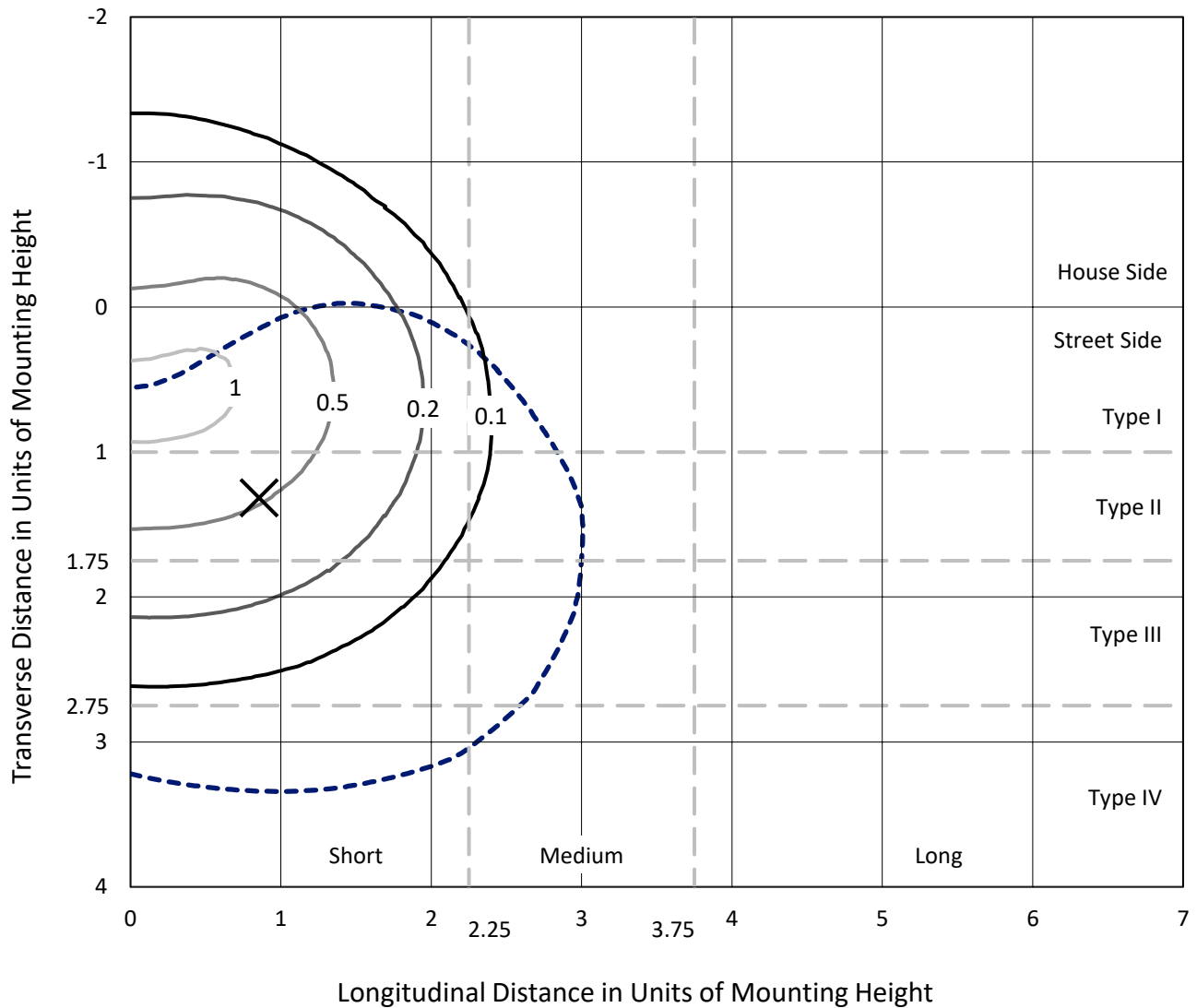
Input Watts (W): 42.5
Input Voltage (V): NR
Input Current (Ain): NR
Voltage Rise (V): NR
Power Factor: NR
Total Harmonic Distortion (THDi): NR
Frequency (hertz): 60
Stabilization Time: NR
Operation Time: NR
Ambient Temperature (°C): NR
Test Distance: 24 FT



REPORT NUMBER: P832646
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Iso-Footcandle Lines of Horizontal Illumination

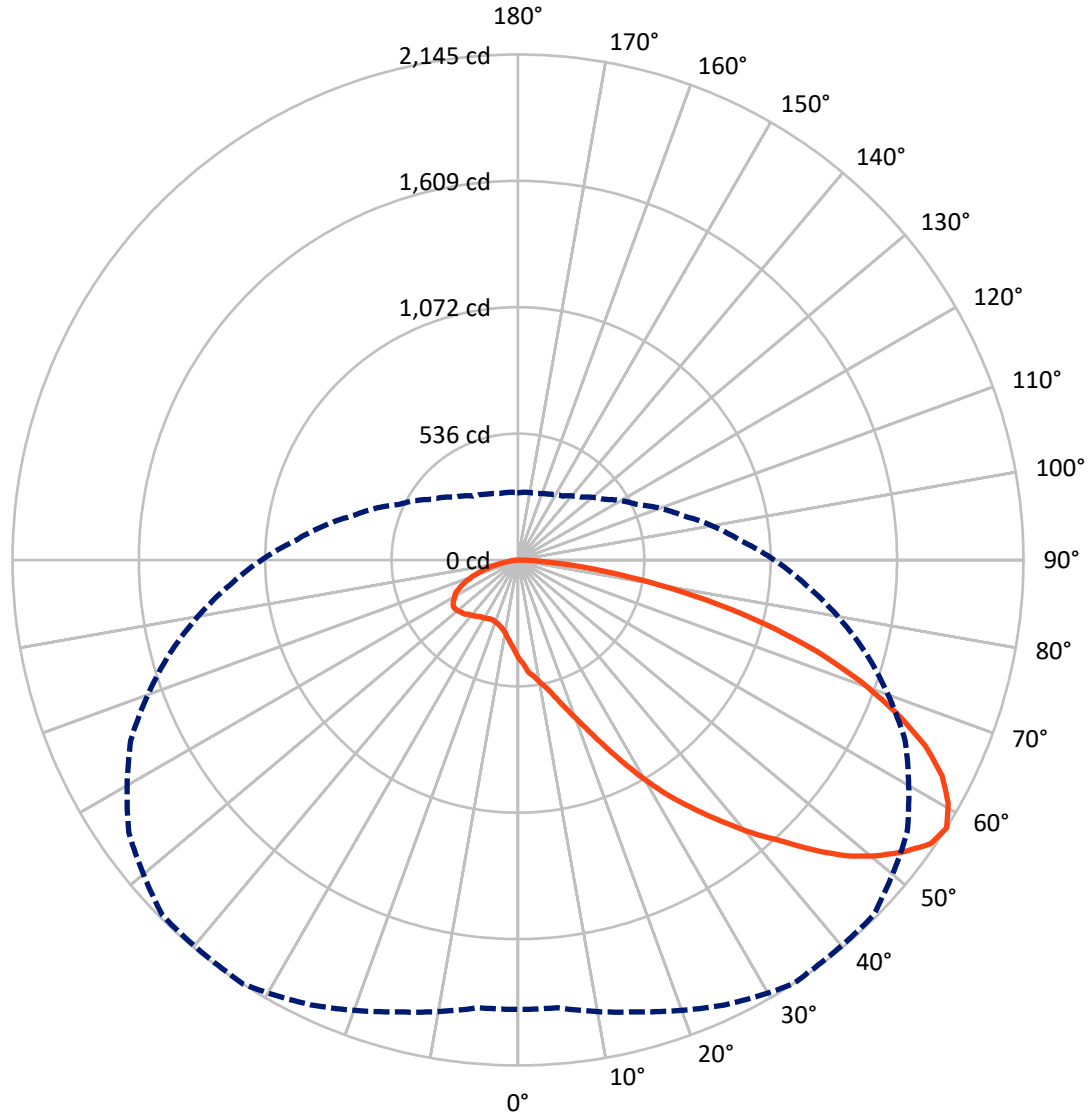
✕ Max cd
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 1.2 fc
 Type IV - Short - N/A

REPORT NUMBER: P832646
CATALOG NUMBER: TTN-D2-830-U-DL-CG

Luminous Intensity Polar Plot



— Vertical Plane Through 33-Deg Lateral - - - Horizontal Cone Through 57.5-Deg Vertical

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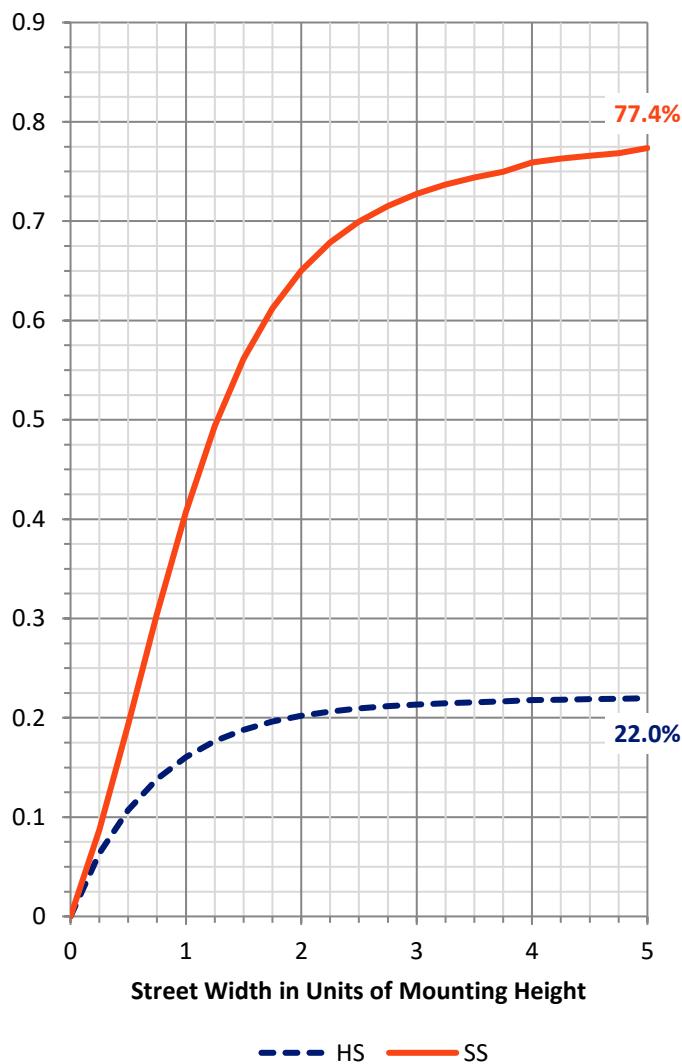
FLUX DISTRIBUTION:

| | | Downward | Upward | Total |
|--------------------|-----------|----------|--------|--------|
| House Side | Lumens | 982.4 | 0.0 | 982.4 |
| | % Fixture | 22.1 | 0.0 | 22.1 |
| Street Side | Lumens | 3469.6 | 0.0 | 3469.6 |
| | % Fixture | 77.9 | 0.0 | 77.9 |
| Total | Lumens | 4452.0 | 0.0 | 4452.0 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

Coefficient of Utilization

ZONAL LUMENS:

| Zone | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10° | 39.9 | 0.9 |
| 10°-20° | 129.5 | 2.9 |
| 20°-30° | 273.0 | 6.1 |
| 30°-40° | 495.8 | 11.1 |
| 40°-50° | 783.4 | 17.6 |
| 50°-60° | 1040.4 | 23.4 |
| 60°-70° | 1001.4 | 22.5 |
| 70°-80° | 587.8 | 13.2 |
| 80°-90° | 100.9 | 2.3 |
| 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° | 4452.0 | 100.0 |
| 0°-180° | 4452.0 | 100.0 |



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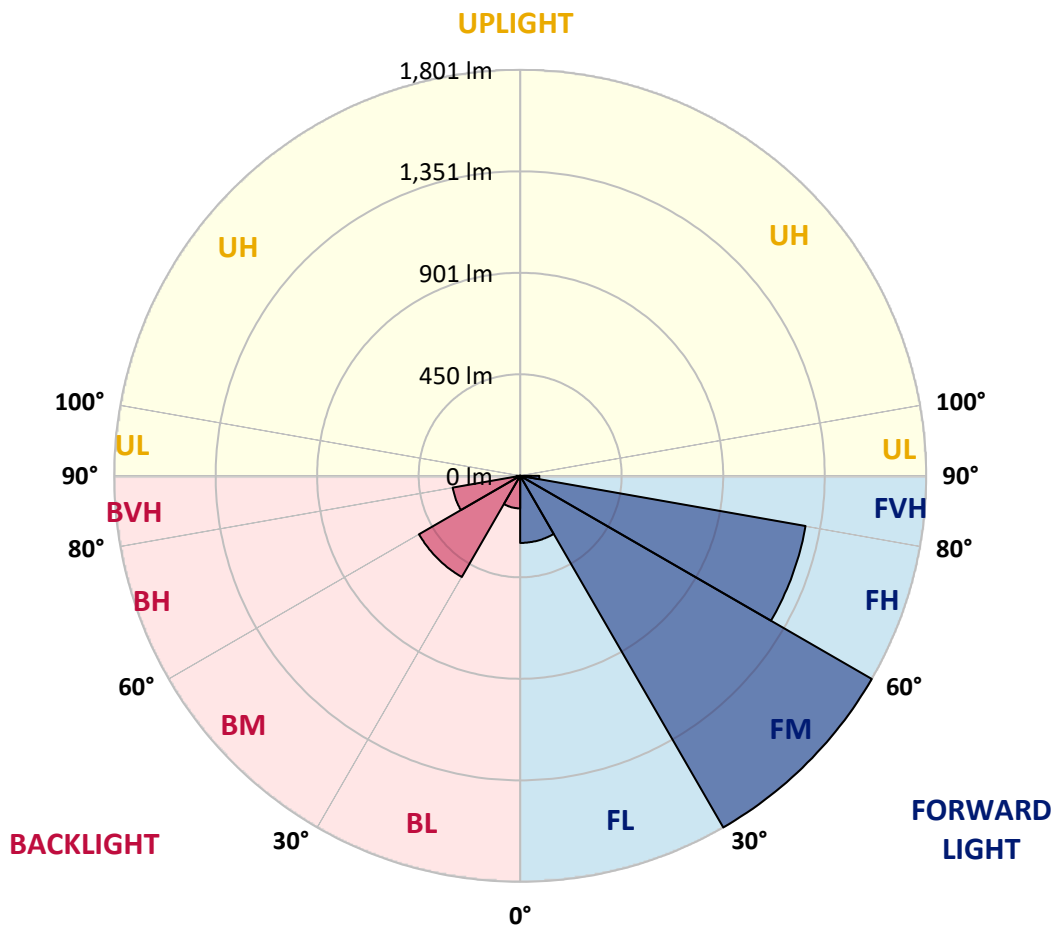
CATALOG NUMBER: TTN-D2-830-U-DL-CG

LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | Lumens | % Fixture | Zone Rating/Lumen Limit | | |
|----------------|--------|-----------|-------------------------|------|---------|
| | | | B | U | G |
| FL (0°-30°) | 297.8 | 6.7 | | | |
| FM (30°-60°) | 1801.1 | 40.5 | | | |
| FH (60°-80°) | 1285.4 | 28.9 | | | G1/1800 |
| FVH (80°-90°) | 85.2 | 1.9 | | | G1/100 |
| BL (0°-30°) | 144.5 | 3.2 | B1/500 | | |
| BM (30°-60°) | 518.4 | 11.6 | B1/1000 | | |
| BH (60°-80°) | 303.8 | 6.8 | B1/500 | | G1/500 |
| BVH (80°-90°) | 15.7 | 0.4 | | | 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





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CANDELA DISTRIBUTION (FULL):

| | 0° | 5° | 15° | 25° | 33° | 35° | 45° | 55° | 65° | 75° | 85° |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0° | 417.3 | 417.3 | 417.3 | 417.3 | 417.3 | 417.3 | 417.3 | 417.3 | 417.3 | 417.3 | 417.3 |
| 2.5° | 444.6 | 448.5 | 444.6 | 444.6 | 440.7 | 440.7 | 436.8 | 432.9 | 429.0 | 425.1 | 417.3 |
| 5° | 495.3 | 495.3 | 491.4 | 483.6 | 479.7 | 475.8 | 468.0 | 456.3 | 448.5 | 436.8 | 425.1 |
| 7.5° | 518.7 | 518.7 | 514.8 | 507.0 | 499.2 | 495.3 | 483.6 | 468.0 | 456.3 | 440.7 | 425.1 |
| 10° | 549.8 | 553.7 | 545.9 | 538.1 | 530.3 | 526.4 | 510.9 | 491.4 | 471.9 | 452.4 | 429.0 |
| 12.5° | 584.9 | 588.8 | 584.9 | 573.2 | 561.5 | 557.6 | 542.0 | 518.7 | 495.3 | 468.0 | 440.7 |
| 15° | 631.7 | 639.5 | 627.8 | 620.0 | 608.3 | 604.4 | 584.9 | 557.6 | 530.3 | 495.3 | 460.2 |
| 17.5° | 686.3 | 690.2 | 682.4 | 670.7 | 662.9 | 659.0 | 639.5 | 608.3 | 569.3 | 530.3 | 487.5 |
| 20° | 748.7 | 752.6 | 748.7 | 733.1 | 725.3 | 721.4 | 701.9 | 666.8 | 620.0 | 577.1 | 522.6 |
| 22.5° | 822.8 | 830.6 | 818.9 | 807.2 | 799.4 | 799.4 | 776.0 | 737.0 | 682.4 | 627.8 | 565.4 |
| 25° | 908.6 | 920.3 | 904.7 | 896.9 | 889.1 | 885.2 | 865.7 | 818.9 | 756.5 | 690.2 | 612.2 |
| 27.5° | 1013.9 | 1021.7 | 1010.0 | 1006.1 | 990.5 | 990.5 | 959.3 | 904.7 | 838.4 | 760.4 | 670.7 |
| 30° | 1107.5 | 1115.3 | 1107.5 | 1107.5 | 1095.8 | 1091.9 | 1060.7 | 1006.1 | 924.2 | 830.6 | 721.4 |
| 32.5° | 1197.2 | 1205.0 | 1201.1 | 1205.0 | 1201.1 | 1197.2 | 1158.2 | 1099.7 | 1017.8 | 896.9 | 772.1 |
| 35° | 1286.9 | 1298.6 | 1294.7 | 1306.4 | 1302.5 | 1298.6 | 1267.4 | 1197.2 | 1099.7 | 978.8 | 826.7 |
| 37.5° | 1380.5 | 1392.2 | 1392.2 | 1403.9 | 1407.8 | 1407.8 | 1372.7 | 1298.6 | 1189.4 | 1052.9 | 889.1 |
| 40° | 1481.9 | 1493.6 | 1493.6 | 1513.1 | 1520.9 | 1520.9 | 1481.9 | 1407.8 | 1286.9 | 1134.8 | 955.4 |
| 42.5° | 1579.3 | 1591.0 | 1594.9 | 1614.4 | 1626.1 | 1630.0 | 1598.8 | 1513.1 | 1372.7 | 1216.7 | 1017.8 |
| 45° | 1672.9 | 1684.6 | 1696.3 | 1735.3 | 1754.8 | 1750.9 | 1727.5 | 1637.8 | 1481.9 | 1302.5 | 1084.1 |
| 47.5° | 1762.6 | 1778.2 | 1797.7 | 1848.4 | 1875.7 | 1871.8 | 1856.2 | 1754.8 | 1583.2 | 1384.4 | 1142.6 |
| 50° | 1832.8 | 1844.5 | 1883.5 | 1938.1 | 1973.2 | 1977.1 | 1953.7 | 1856.2 | 1669.0 | 1446.8 | 1185.5 |
| 52.5° | 1887.4 | 1903.0 | 1949.8 | 2027.8 | 2055.1 | 2066.8 | 2039.5 | 1942.0 | 1754.8 | 1501.4 | 1220.6 |
| 55° | 1926.4 | 1926.4 | 1996.6 | 2086.3 | 2125.3 | 2133.1 | 2133.1 | 2012.2 | 1805.5 | 1536.5 | 1240.1 |
| 57.5° | 1906.9 | 1906.9 | 1984.9 | 2082.4 | 2144.8 | 2140.9 | 2133.1 | 2016.1 | 1813.3 | 1528.7 | 1228.4 |
| 60° | 1852.3 | 1864.0 | 1938.1 | 2035.6 | 2098.0 | 2094.1 | 2070.7 | 1965.4 | 1774.3 | 1497.5 | 1205.0 |
| 62.5° | 1778.2 | 1797.7 | 1875.7 | 1949.8 | 2020.0 | 2031.7 | 2000.5 | 1906.9 | 1708.0 | 1450.7 | 1162.1 |
| 65° | 1637.8 | 1665.1 | 1762.6 | 1844.5 | 1899.1 | 1922.5 | 1883.5 | 1797.7 | 1618.3 | 1361.0 | 1072.4 |
| 67.5° | 1481.9 | 1501.4 | 1583.2 | 1700.2 | 1731.4 | 1754.8 | 1735.3 | 1645.6 | 1493.6 | 1216.7 | 971.0 |
| 70° | 1302.5 | 1333.7 | 1388.3 | 1505.3 | 1540.4 | 1563.8 | 1563.8 | 1474.1 | 1329.8 | 1068.5 | 850.1 |
| 72.5° | 1091.9 | 1127.0 | 1193.3 | 1279.1 | 1325.9 | 1341.5 | 1337.6 | 1263.5 | 1134.8 | 904.7 | 717.5 |
| 75° | 861.8 | 889.1 | 967.1 | 1029.5 | 1080.2 | 1091.9 | 1088.0 | 1025.6 | 908.6 | 729.2 | 569.3 |
| 77.5° | 635.6 | 662.9 | 721.4 | 768.2 | 815.0 | 807.2 | 807.2 | 760.4 | 686.3 | 542.0 | 432.9 |
| 80° | 417.3 | 440.7 | 491.4 | 507.0 | 557.6 | 553.7 | 553.7 | 518.7 | 468.0 | 362.7 | 288.6 |
| 82.5° | 230.1 | 249.6 | 284.7 | 300.3 | 331.5 | 323.7 | 327.6 | 304.2 | 273.0 | 202.8 | 163.8 |
| 85° | 81.9 | 97.5 | 117.0 | 128.7 | 144.3 | 144.3 | 144.3 | 124.8 | 117.0 | 78.0 | 66.3 |
| 87.5° | 3.9 | 7.8 | 15.6 | 15.6 | 23.4 | 23.4 | 23.4 | 15.6 | 15.6 | 3.9 | 3.9 |
| 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: P832646
 CATALOG NUMBER: TTN-D2-830-U-DL-CG

CANDELA DISTRIBUTION (continued):

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0° | 417.3 | 417.3 | 417.3 | 417.3 | 417.3 | 417.3 | 417.3 | 417.3 | 417.3 | 417.3 | 417.3 |
| 2.5° | 413.4 | 409.5 | 405.6 | 397.8 | 393.9 | 390.0 | 386.1 | 382.2 | 382.2 | 382.2 | 382.2 |
| 5° | 417.3 | 413.4 | 401.7 | 390.0 | 378.3 | 366.6 | 358.8 | 354.9 | 351.0 | 347.1 | 347.1 |
| 7.5° | 417.3 | 409.5 | 393.9 | 378.3 | 366.6 | 351.0 | 339.3 | 327.6 | 319.8 | 315.9 | 315.9 |
| 10° | 421.2 | 409.5 | 390.0 | 374.4 | 354.9 | 335.4 | 319.8 | 304.2 | 296.4 | 288.6 | 288.6 |
| 12.5° | 429.0 | 417.3 | 390.0 | 370.5 | 347.1 | 323.7 | 304.2 | 288.6 | 276.9 | 269.1 | 269.1 |
| 15° | 444.6 | 429.0 | 397.8 | 370.5 | 343.2 | 315.9 | 296.4 | 276.9 | 265.2 | 257.4 | 257.4 |
| 17.5° | 468.0 | 448.5 | 409.5 | 370.5 | 339.3 | 312.0 | 288.6 | 269.1 | 253.5 | 245.7 | 245.7 |
| 20° | 495.3 | 471.9 | 425.1 | 378.3 | 339.3 | 308.1 | 284.7 | 261.3 | 245.7 | 237.9 | 237.9 |
| 22.5° | 534.2 | 499.2 | 444.6 | 390.0 | 347.1 | 312.0 | 280.8 | 257.4 | 241.8 | 234.0 | 234.0 |
| 25° | 577.1 | 538.1 | 468.0 | 405.6 | 354.9 | 312.0 | 280.8 | 257.4 | 241.8 | 234.0 | 230.1 |
| 27.5° | 623.9 | 581.0 | 495.3 | 421.2 | 362.7 | 319.8 | 284.7 | 257.4 | 241.8 | 234.0 | 234.0 |
| 30° | 666.8 | 616.1 | 522.6 | 440.7 | 374.4 | 323.7 | 288.6 | 261.3 | 241.8 | 234.0 | 234.0 |
| 32.5° | 713.6 | 655.1 | 549.8 | 460.2 | 386.1 | 331.5 | 292.5 | 265.2 | 245.7 | 237.9 | 234.0 |
| 35° | 760.4 | 694.1 | 577.1 | 475.8 | 397.8 | 339.3 | 296.4 | 269.1 | 249.6 | 241.8 | 241.8 |
| 37.5° | 811.1 | 737.0 | 604.4 | 495.3 | 409.5 | 347.1 | 304.2 | 273.0 | 253.5 | 245.7 | 245.7 |
| 40° | 865.7 | 779.9 | 631.7 | 510.9 | 421.2 | 354.9 | 312.0 | 280.8 | 261.3 | 253.5 | 253.5 |
| 42.5° | 920.3 | 826.7 | 662.9 | 530.3 | 432.9 | 362.7 | 315.9 | 288.6 | 269.1 | 261.3 | 261.3 |
| 45° | 974.9 | 865.7 | 690.2 | 549.8 | 444.6 | 374.4 | 327.6 | 296.4 | 276.9 | 269.1 | 269.1 |
| 47.5° | 1025.6 | 908.6 | 713.6 | 561.5 | 456.3 | 382.2 | 331.5 | 304.2 | 284.7 | 280.8 | 276.9 |
| 50° | 1060.7 | 935.9 | 729.2 | 573.2 | 460.2 | 386.1 | 339.3 | 308.1 | 292.5 | 284.7 | 284.7 |
| 52.5° | 1088.0 | 963.2 | 740.9 | 581.0 | 464.1 | 390.0 | 343.2 | 315.9 | 300.3 | 292.5 | 288.6 |
| 55° | 1103.6 | 967.1 | 740.9 | 573.2 | 460.2 | 390.0 | 343.2 | 315.9 | 300.3 | 292.5 | 292.5 |
| 57.5° | 1088.0 | 947.6 | 725.3 | 557.6 | 448.5 | 378.3 | 331.5 | 308.1 | 292.5 | 288.6 | 284.7 |
| 60° | 1056.8 | 916.4 | 694.1 | 534.2 | 429.0 | 358.8 | 315.9 | 296.4 | 284.7 | 280.8 | 276.9 |
| 62.5° | 1013.9 | 877.4 | 662.9 | 503.1 | 401.7 | 335.4 | 304.2 | 280.8 | 273.0 | 269.1 | 265.2 |
| 65° | 928.1 | 803.3 | 612.2 | 464.1 | 366.6 | 308.1 | 276.9 | 261.3 | 253.5 | 245.7 | 241.8 |
| 67.5° | 834.5 | 721.4 | 542.0 | 417.3 | 323.7 | 276.9 | 249.6 | 234.0 | 222.3 | 222.3 | 218.4 |
| 70° | 733.1 | 635.6 | 468.0 | 354.9 | 280.8 | 241.8 | 214.5 | 202.8 | 195.0 | 195.0 | 191.1 |
| 72.5° | 612.2 | 534.2 | 390.0 | 288.6 | 230.1 | 198.9 | 179.4 | 167.7 | 163.8 | 163.8 | 159.9 |
| 75° | 491.4 | 421.2 | 308.1 | 226.2 | 179.4 | 156.0 | 140.4 | 132.6 | 128.7 | 128.7 | 124.8 |
| 77.5° | 362.7 | 308.1 | 222.3 | 163.8 | 128.7 | 113.1 | 101.4 | 97.5 | 93.6 | 93.6 | 89.7 |
| 80° | 241.8 | 202.8 | 144.3 | 105.3 | 78.0 | 70.2 | 62.4 | 62.4 | 58.5 | 62.4 | 58.5 |
| 82.5° | 132.6 | 109.2 | 78.0 | 54.6 | 39.0 | 35.1 | 31.2 | 31.2 | 35.1 | 35.1 | 31.2 |
| 85° | 50.7 | 39.0 | 27.3 | 15.6 | 11.7 | 11.7 | 11.7 | 11.7 | 11.7 | 11.7 | 7.8 |
| 87.5° | 3.9 | 3.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 90° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

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: SP1-2411-284-4

Test Date: 11/22/2024

Luminaire Tested: TTN-D0-830-U-WQ

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

Test Information

Test Method: LM-79-2019
 Report Number: SP1-2411-284-4
 Test Lab: COOPER LIGHTING SOLUTIONS
 Photometer: SP1 - 76IN SPHERE
 Measurement Geometry: 4π
 Issue Date: 11/22/2024
 Manufacturer: COOPER LIGHTING SOLUTIONS
 Product Line: MCGRAW EDISON
 Catalog Number: **TTN-D0-830-U-WQ**
 Description: TOPTIER NANO LED PARKING GARAGE LUMINAIRE. 3000K, 80 CRI LEDS AND WIDE DISTRIBUTION

Spectral Parameters

CCT (K): 2963
 CIE u': 0.2515
 CIE v': 0.5238
 Duv: 0.0012
 CIE x: 0.4414
 CIE y: 0.4086
 CIE z: 0.1501
 Peak Wavelength (nm): 603
 Dominant Wavelength (nm): 582
 Purity: 55.12798
 Rf: 86.1
 Rg: 94.9

| | | | |
|-----------|------|------|------|
| CRI (Ra): | 82.9 | | |
| R1: | 81.4 | R9: | 3.9 |
| R2: | 91.9 | R10: | 82.5 |
| R3: | 95.2 | R11: | 82.3 |
| R4: | 81.6 | R12: | 76.5 |
| R5: | 82.3 | R13: | 83.9 |
| R6: | 91.4 | R14: | 97.8 |
| R7: | 82.0 | R15: | 72.6 |
| R8: | 57.2 | | |



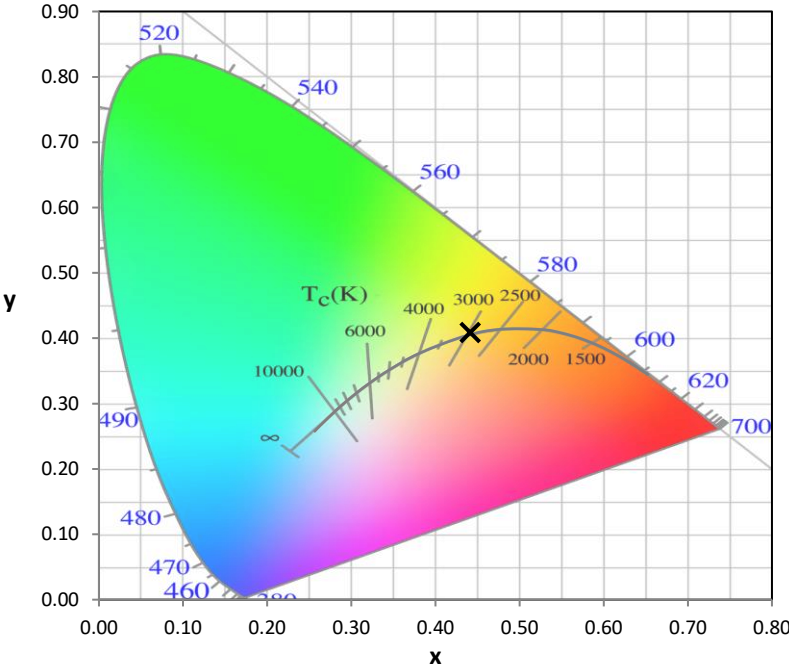
Test Conditions
 Stabilization Time: 37M
 Operation Time: 1H 37M
 Sphere Temperature (°C): 25.0

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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 3000K 4-step quadrangle

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Photopic Flux vs. Wavelength

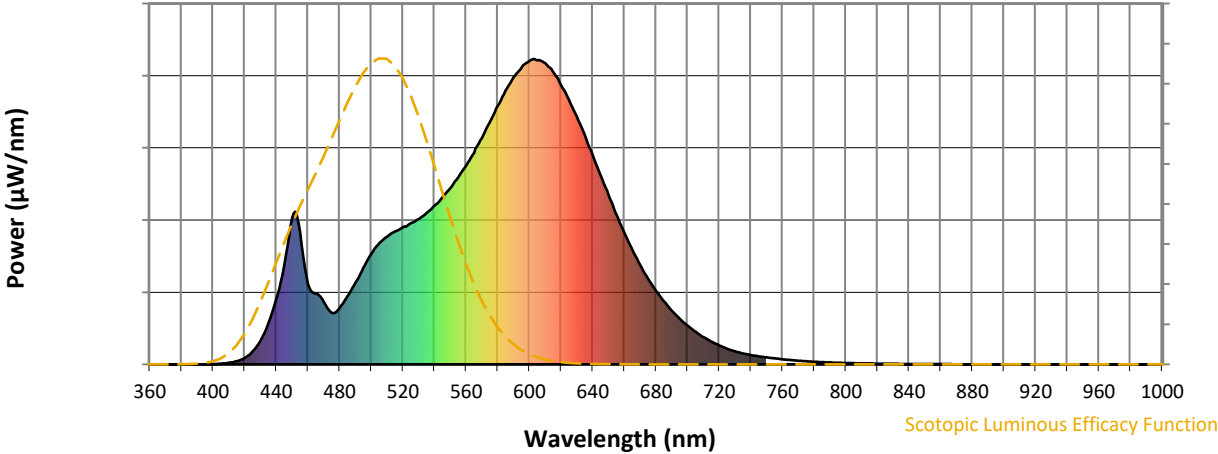


Photopic Lumens: NR

| 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 | 267 | NR | 620 | 915 | NR | 750 | 23 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 315 | NR | 625 | 866 | NR | 755 | 20 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 360 | NR | 630 | 811 | NR | 760 | 17 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 396 | NR | 635 | 750 | NR | 765 | 14 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 418 | NR | 640 | 686 | NR | 770 | 12 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 435 | NR | 645 | 619 | NR | 775 | 10 | NR | 905 | 0 | NR |
| 390 | 0 | NR | 520 | 448 | NR | 650 | 554 | NR | 780 | 9 | NR | 910 | 0 | NR |
| 395 | 0 | NR | 525 | 462 | NR | 655 | 491 | NR | 785 | 7 | NR | 915 | 0 | NR |
| 400 | 1 | NR | 530 | 476 | NR | 660 | 431 | NR | 790 | 6 | NR | 920 | 0 | NR |
| 405 | 2 | NR | 535 | 495 | NR | 665 | 376 | NR | 795 | 5 | NR | 925 | 0 | NR |
| 410 | 5 | NR | 540 | 520 | NR | 670 | 325 | NR | 800 | 4 | NR | 930 | 0 | NR |
| 415 | 10 | NR | 545 | 547 | NR | 675 | 280 | NR | 805 | 4 | NR | 935 | 0 | NR |
| 420 | 21 | NR | 550 | 576 | NR | 680 | 241 | NR | 810 | 3 | NR | 940 | 0 | NR |
| 425 | 42 | NR | 555 | 612 | NR | 685 | 207 | NR | 815 | 3 | NR | 945 | 0 | NR |
| 430 | 77 | NR | 560 | 651 | NR | 690 | 176 | NR | 820 | 2 | NR | 950 | 0 | NR |
| 435 | 135 | NR | 565 | 693 | NR | 695 | 149 | NR | 825 | 2 | NR | 955 | 0 | NR |
| 440 | 215 | NR | 570 | 741 | NR | 700 | 127 | NR | 830 | 2 | NR | 960 | 0 | NR |
| 445 | 321 | NR | 575 | 793 | NR | 705 | 107 | NR | 835 | 2 | NR | 965 | 0 | NR |
| 450 | 479 | NR | 580 | 847 | NR | 710 | 89 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 432 | NR | 585 | 897 | NR | 715 | 75 | NR | 845 | 1 | NR | 975 | 0 | NR |
| 460 | 265 | NR | 590 | 940 | NR | 720 | 62 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 231 | NR | 595 | 971 | NR | 725 | 51 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 204 | NR | 600 | 993 | NR | 730 | 43 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 168 | NR | 605 | 996 | NR | 735 | 36 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 183 | NR | 610 | 986 | NR | 740 | 31 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 223 | NR | 615 | 957 | NR | 745 | 26 | NR | 875 | 0 | NR | | | |

REPORT NUMBER: SP1-2411-284-4

Scotopic Flux vs. Wavelength

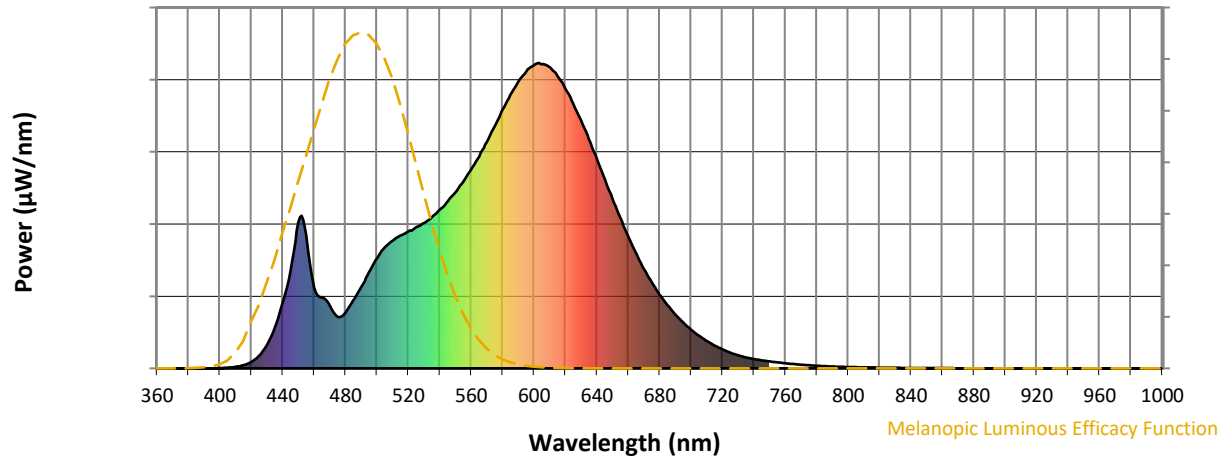


Scotopic Lumens: NR S/P: 1.34

| 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 | 267 | NR | 620 | 915 | NR | 750 | 23 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 315 | NR | 625 | 866 | NR | 755 | 20 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 360 | NR | 630 | 811 | NR | 760 | 17 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 396 | NR | 635 | 750 | NR | 765 | 14 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 418 | NR | 640 | 686 | NR | 770 | 12 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 435 | NR | 645 | 619 | NR | 775 | 10 | NR | 905 | 0 | NR |
| 390 | 0 | NR | 520 | 448 | NR | 650 | 554 | NR | 780 | 9 | NR | 910 | 0 | NR |
| 395 | 0 | NR | 525 | 462 | NR | 655 | 491 | NR | 785 | 7 | NR | 915 | 0 | NR |
| 400 | 1 | NR | 530 | 476 | NR | 660 | 431 | NR | 790 | 6 | NR | 920 | 0 | NR |
| 405 | 2 | NR | 535 | 495 | NR | 665 | 376 | NR | 795 | 5 | NR | 925 | 0 | NR |
| 410 | 5 | NR | 540 | 520 | NR | 670 | 325 | NR | 800 | 4 | NR | 930 | 0 | NR |
| 415 | 10 | NR | 545 | 547 | NR | 675 | 280 | NR | 805 | 4 | NR | 935 | 0 | NR |
| 420 | 21 | NR | 550 | 576 | NR | 680 | 241 | NR | 810 | 3 | NR | 940 | 0 | NR |
| 425 | 42 | NR | 555 | 612 | NR | 685 | 207 | NR | 815 | 3 | NR | 945 | 0 | NR |
| 430 | 77 | NR | 560 | 651 | NR | 690 | 176 | NR | 820 | 2 | NR | 950 | 0 | NR |
| 435 | 135 | NR | 565 | 693 | NR | 695 | 149 | NR | 825 | 2 | NR | 955 | 0 | NR |
| 440 | 215 | NR | 570 | 741 | NR | 700 | 127 | NR | 830 | 2 | NR | 960 | 0 | NR |
| 445 | 321 | NR | 575 | 793 | NR | 705 | 107 | NR | 835 | 2 | NR | 965 | 0 | NR |
| 450 | 479 | NR | 580 | 847 | NR | 710 | 89 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 432 | NR | 585 | 897 | NR | 715 | 75 | NR | 845 | 1 | NR | 975 | 0 | NR |
| 460 | 265 | NR | 590 | 940 | NR | 720 | 62 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 231 | NR | 595 | 971 | NR | 725 | 51 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 204 | NR | 600 | 993 | NR | 730 | 43 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 168 | NR | 605 | 996 | NR | 735 | 36 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 183 | NR | 610 | 986 | NR | 740 | 31 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 223 | NR | 615 | 957 | NR | 745 | 26 | NR | 875 | 0 | NR | | | |

REPORT NUMBER: SP1-2411-284-4

Melanopic Flux vs. Wavelength



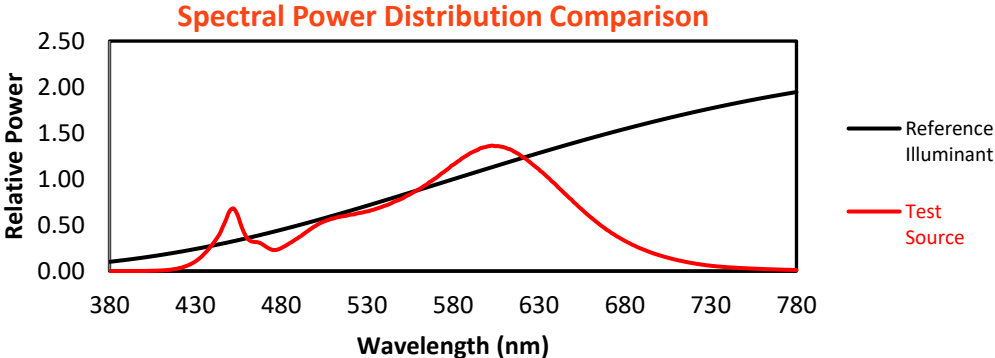
Melanopic Lumens: NR

M/P: 2.58

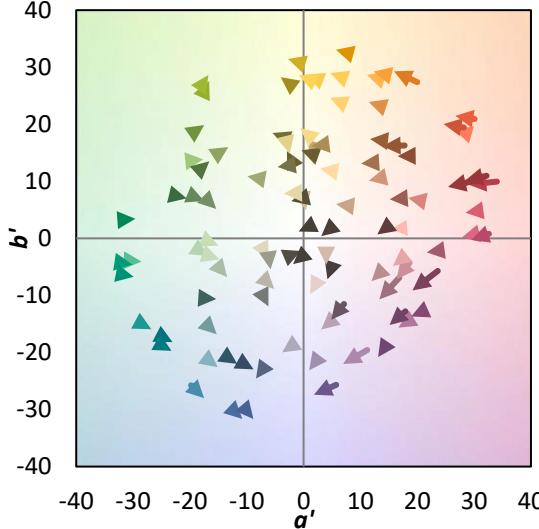
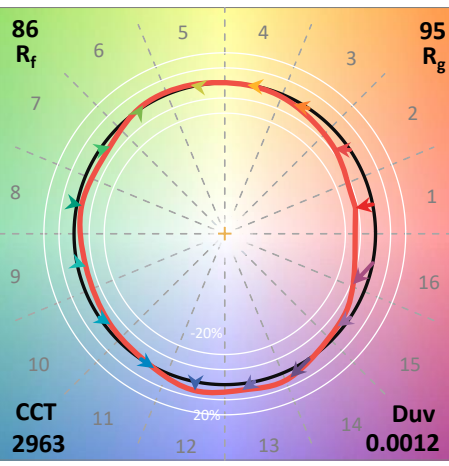
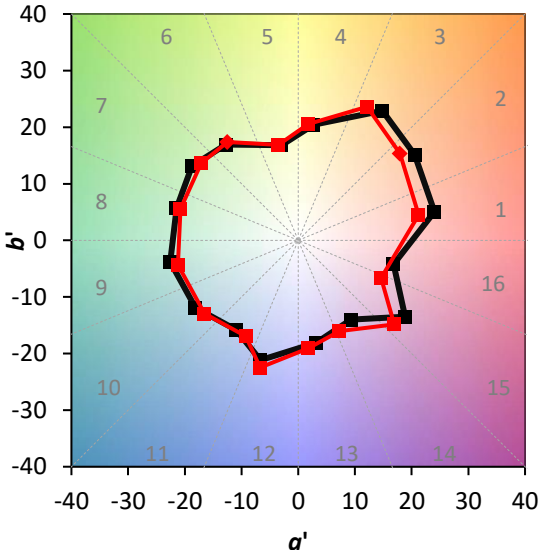
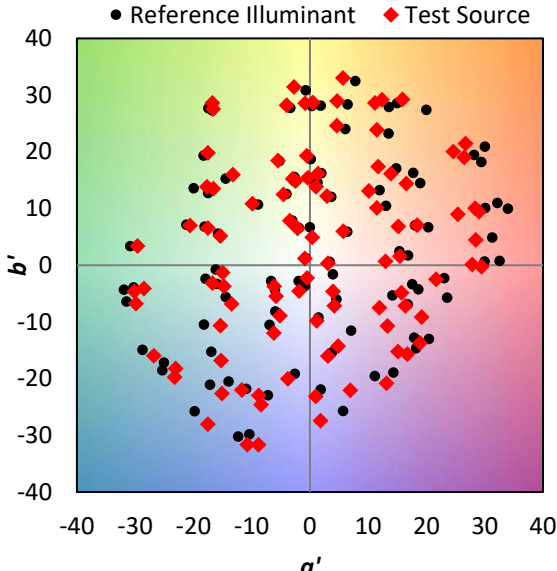
| λ (nm) | Power W [^] /nm | Lumens (φ/nm) | λ (nm) | Power W [^] /nm | Lumens (φ/nm) | λ (nm) | Power W [^] /nm | Lumens (φ/nm) | λ (nm) | Power W [^] /nm | Lumens (φ/nm) | λ (nm) | Power W [^] /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360 | 0 | NR | 490 | 267 | NR | 620 | 915 | NR | 750 | 23 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 315 | NR | 625 | 866 | NR | 755 | 20 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 360 | NR | 630 | 811 | NR | 760 | 17 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 396 | NR | 635 | 750 | NR | 765 | 14 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 418 | NR | 640 | 686 | NR | 770 | 12 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 435 | NR | 645 | 619 | NR | 775 | 10 | NR | 905 | 0 | NR |
| 390 | 0 | NR | 520 | 448 | NR | 650 | 554 | NR | 780 | 9 | NR | 910 | 0 | NR |
| 395 | 0 | NR | 525 | 462 | NR | 655 | 491 | NR | 785 | 7 | NR | 915 | 0 | NR |
| 400 | 1 | NR | 530 | 476 | NR | 660 | 431 | NR | 790 | 6 | NR | 920 | 0 | NR |
| 405 | 2 | NR | 535 | 495 | NR | 665 | 376 | NR | 795 | 5 | NR | 925 | 0 | NR |
| 410 | 5 | NR | 540 | 520 | NR | 670 | 325 | NR | 800 | 4 | NR | 930 | 0 | NR |
| 415 | 10 | NR | 545 | 547 | NR | 675 | 280 | NR | 805 | 4 | NR | 935 | 0 | NR |
| 420 | 21 | NR | 550 | 576 | NR | 680 | 241 | NR | 810 | 3 | NR | 940 | 0 | NR |
| 425 | 42 | NR | 555 | 612 | NR | 685 | 207 | NR | 815 | 3 | NR | 945 | 0 | NR |
| 430 | 77 | NR | 560 | 651 | NR | 690 | 176 | NR | 820 | 2 | NR | 950 | 0 | NR |
| 435 | 135 | NR | 565 | 693 | NR | 695 | 149 | NR | 825 | 2 | NR | 955 | 0 | NR |
| 440 | 215 | NR | 570 | 741 | NR | 700 | 127 | NR | 830 | 2 | NR | 960 | 0 | NR |
| 445 | 321 | NR | 575 | 793 | NR | 705 | 107 | NR | 835 | 2 | NR | 965 | 0 | NR |
| 450 | 479 | NR | 580 | 847 | NR | 710 | 89 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 432 | NR | 585 | 897 | NR | 715 | 75 | NR | 845 | 1 | NR | 975 | 0 | NR |
| 460 | 265 | NR | 590 | 940 | NR | 720 | 62 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 231 | NR | 595 | 971 | NR | 725 | 51 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 204 | NR | 600 | 993 | NR | 730 | 43 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 168 | NR | 605 | 996 | NR | 735 | 36 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 183 | NR | 610 | 986 | NR | 740 | 31 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 223 | NR | 615 | 957 | NR | 745 | 26 | NR | 875 | 0 | NR | | | |

Summary

$R_f = 86.1$
 $R_g = 94.9$
 CIE $R_a = 82.9$
 $R_9 = 3.9$



Color Vector Graphics

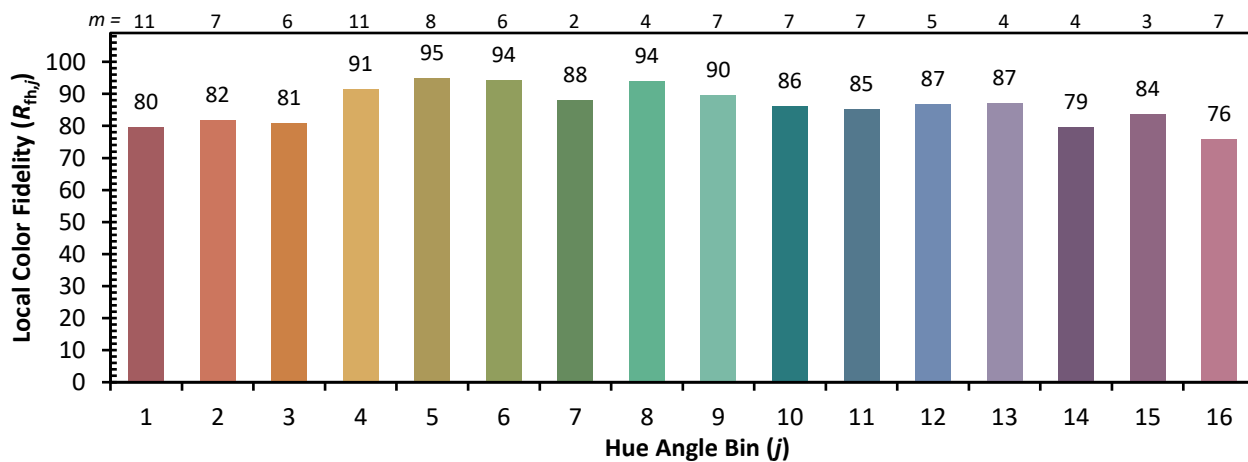
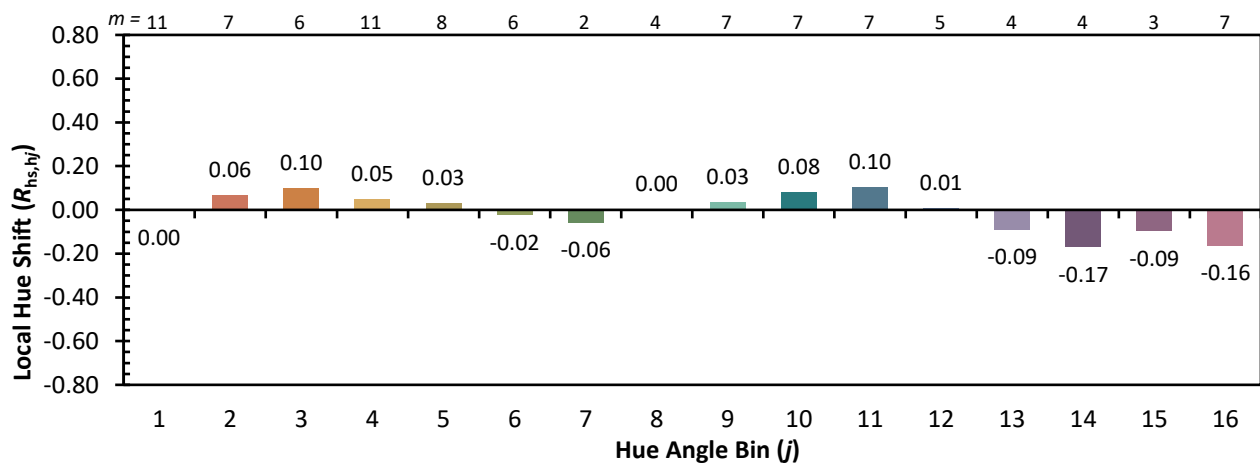
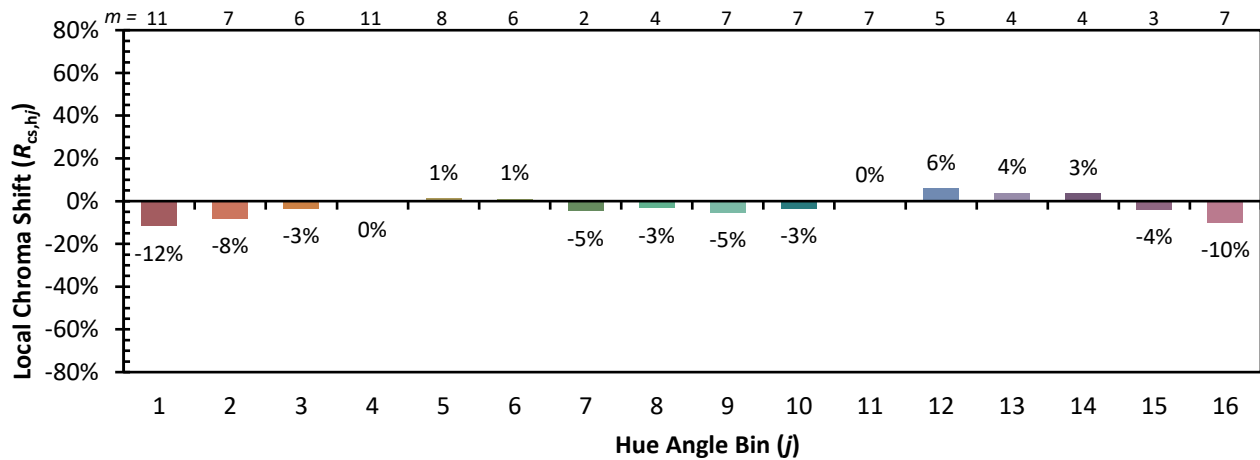


Individual Sample Fidelity Index ($R_{f,i}$)

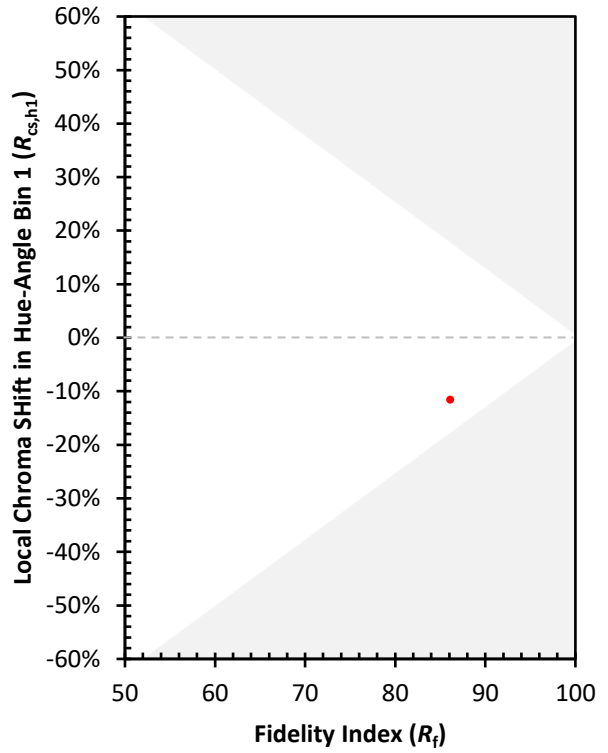
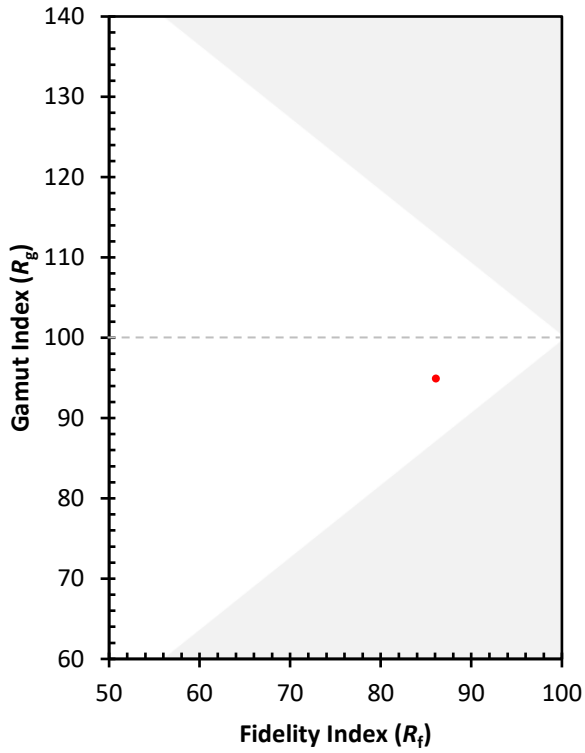
| | | | |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 87 | CES51 = 95 | CES76 = 85 |
| CES02 = 63 | CES27 = 95 | CES52 = 95 | CES77 = 85 |
| CES03 = 31 | CES28 = 96 | CES53 = 91 | CES78 = 83 |
| CES04 = 70 | CES29 = 90 | CES54 = 92 | CES79 = 89 |
| CES05 = 50 | CES30 = 96 | CES55 = 91 | CES80 = 89 |
| CES06 = 51 | CES31 = 92 | CES56 = 88 | CES81 = 70 |
| CES07 = 42 | CES32 = 86 | CES57 = 87 | CES82 = 96 |
| CES08 = 41 | CES33 = 94 | CES58 = 88 | CES83 = 94 |
| CES09 = 29 | CES34 = 94 | CES59 = 92 | CES84 = 92 |
| CES10 = 76 | CES35 = 97 | CES60 = 93 | CES85 = 76 |
| CES11 = 59 | CES36 = 88 | CES61 = 90 | CES86 = 66 |
| CES12 = 65 | CES37 = 98 | CES62 = 92 | CES87 = 85 |
| CES13 = 44 | CES38 = 95 | CES63 = 90 | CES88 = 87 |
| CES14 = 74 | CES39 = 98 | CES64 = 85 | CES89 = 75 |
| CES15 = 72 | CES40 = 96 | CES65 = 81 | CES90 = 89 |
| CES16 = 48 | CES41 = 97 | CES66 = 84 | CES91 = 80 |
| CES17 = 50 | CES42 = 98 | CES67 = 83 | CES92 = 64 |
| CES18 = 57 | CES43 = 92 | CES68 = 85 | CES93 = 79 |
| CES19 = 72 | CES44 = 99 | CES69 = 89 | CES94 = 61 |
| CES20 = 67 | CES45 = 94 | CES70 = 83 | CES95 = 75 |
| CES21 = 87 | CES46 = 91 | CES71 = 81 | CES96 = 84 |
| CES22 = 79 | CES47 = 92 | CES72 = 93 | CES97 = 89 |
| CES23 = 92 | CES48 = 84 | CES73 = 78 | CES98 = 85 |
| CES24 = 91 | CES49 = 92 | CES74 = 91 | CES99 = 76 |
| CES25 = 72 | CES50 = 95 | CES75 = 84 | |



Color Rendition by Hue-Angle Bin



Measure Comparisons



(END OF REPORT)