

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: P833970

Luminaire Tested: **TTN-D3-750-U-WQ-UPL3**

Issue Date: 5/15/2024

Test Information

Test Method: LM-79-08
Report Number: P833970
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-D3-750-U-WQ-UPL3
Description: TOPTIER NANO LED PARKING GARAGE LUMINAIRE WITH UPLIGHT
5000K, 70 CRI LEDS AND WIDE DISTRIBUTION
Light Source: -
Ballast/Driver: -

Summary

Lumens per Lamp: N/A
Luminaire Lumens: 7847.6 lumens
Efficiency: N/A
Efficacy: 118.5 lumens/watt
Luminous Opening: Vertical Cylinder (Dia: 0.71' x H: 0.1')
IES Classification: Type V - Short
BUG Rating: B3 - U4 - G2

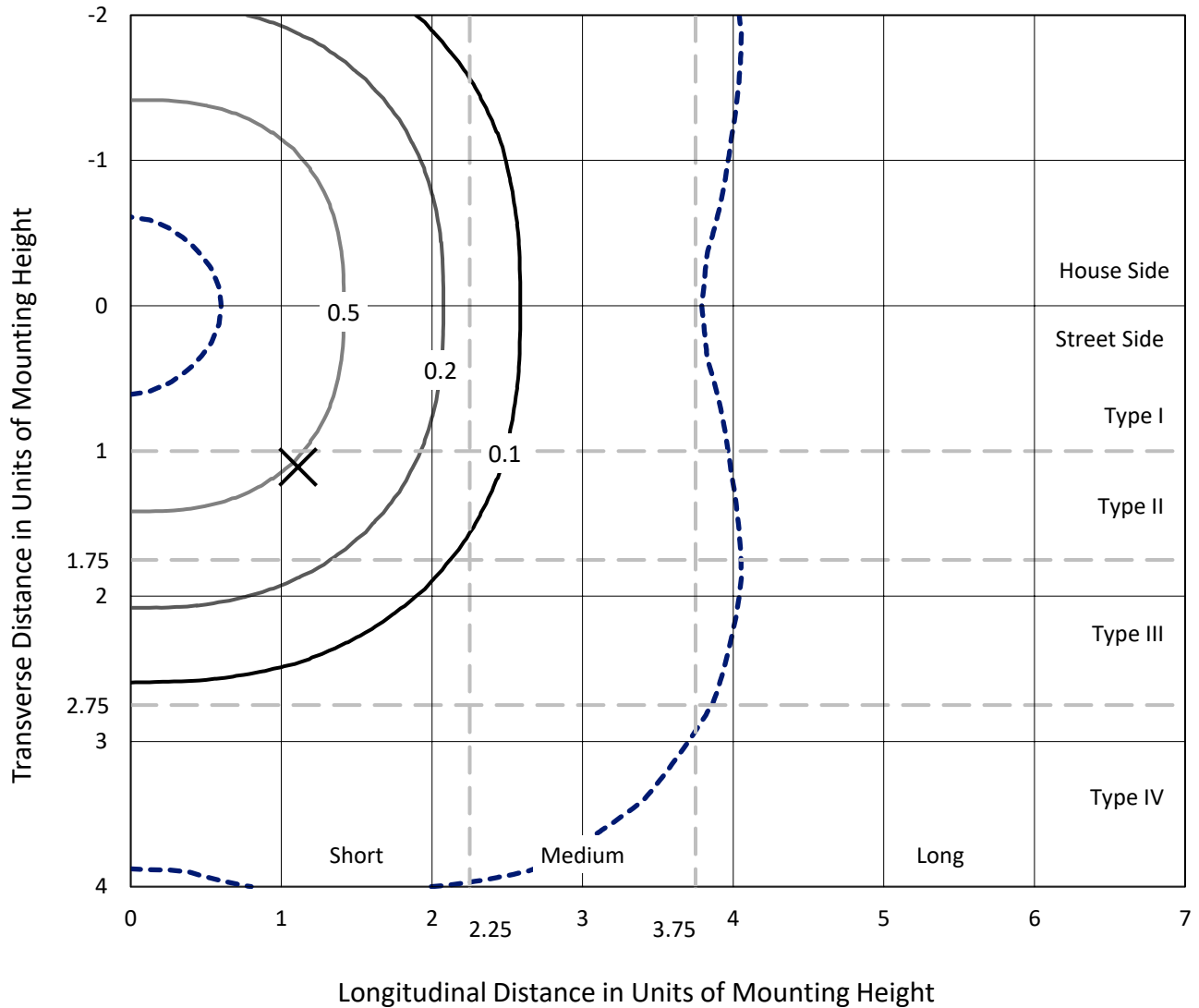
Input Watts (W): 66.2
Input Voltage (V): NR
Input Current (Ain): NR
Voltage Rise (V): NR
Power Factor: NR
Total Harmonic Distortion (THDi): NR
Frequency (hertz): 60
Stabilization Time: NR
Operation Time: NR
Ambient Temperature (°C): NR
Test Distance: 24 FT



REPORT NUMBER: P833970
 CATALOG NUMBER: TTN-D3-750-U-WQ-UPL3

Iso-Footcandle Lines of Horizontal Illumination

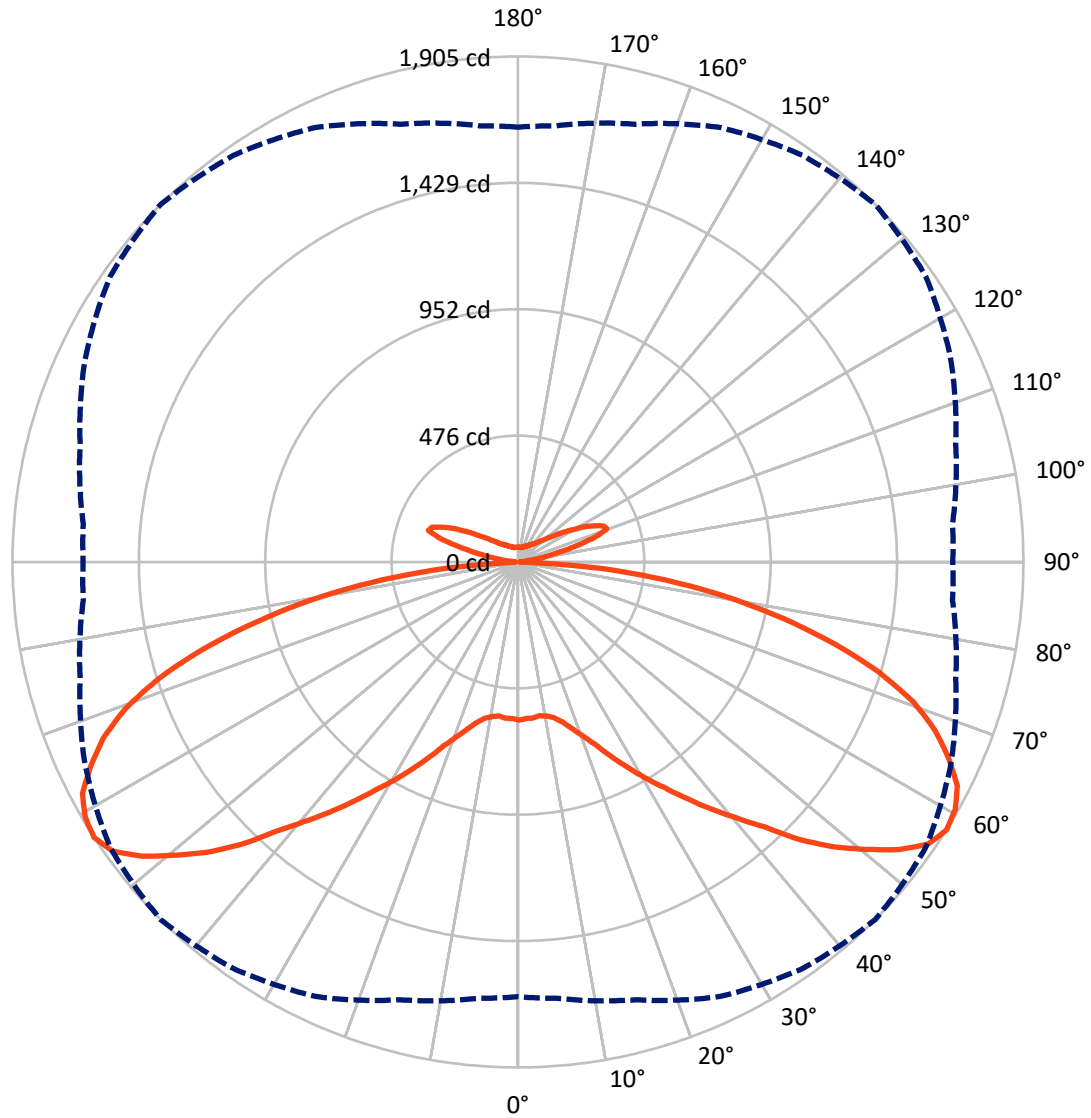
✕ Max cd
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 1 fc
 Type V - Short - N/A

REPORT NUMBER: P833970
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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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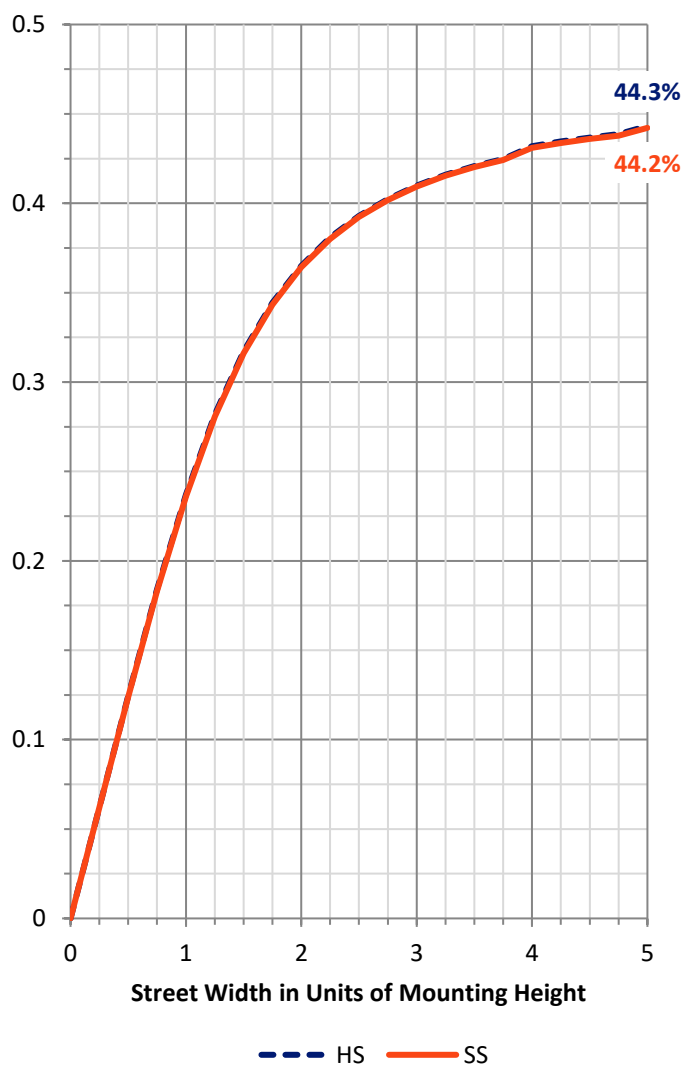
FLUX DISTRIBUTION:

| | | Downward | Upward | Total |
|--------------------|-----------|----------|--------|--------|
| House Side | Lumens | 3518.1 | 405.8 | 3923.8 |
| | % Fixture | 44.8 | 5.2 | 50.0 |
| Street Side | Lumens | 3518.1 | 405.8 | 3923.8 |
| | % Fixture | 44.8 | 5.2 | 50.0 |
| Total | Lumens | 7036.1 | 811.5 | 7847.6 |
| | % Fixture | 89.7 | 10.3 | 100.0 |

ZONAL LUMENS:

| Zone | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10° | 56.0 | 0.7 |
| 10°-20° | 178.9 | 2.3 |
| 20°-30° | 375.3 | 4.8 |
| 30°-40° | 680.9 | 8.7 |
| 40°-50° | 1109.9 | 14.1 |
| 50°-60° | 1553.6 | 19.8 |
| 60°-70° | 1621.9 | 20.7 |
| 70°-80° | 1158.8 | 14.8 |
| 80°-90° | 300.9 | 3.8 |
| 90°-100° | 18.1 | 0.2 |
| 100°-110° | 184.1 | 2.3 |
| 110°-120° | 269.1 | 3.4 |
| 120°-130° | 156.2 | 2.0 |
| 130°-140° | 82.7 | 1.1 |
| 140°-150° | 49.1 | 0.6 |
| 150°-160° | 30.3 | 0.4 |
| 160°-170° | 16.5 | 0.2 |
| 170°-180° | 5.4 | 0.1 |
| 0°-90° | 7036.1 | 89.7 |
| 0°-180° | 7847.6 | 100.0 |

Coefficient of Utilization

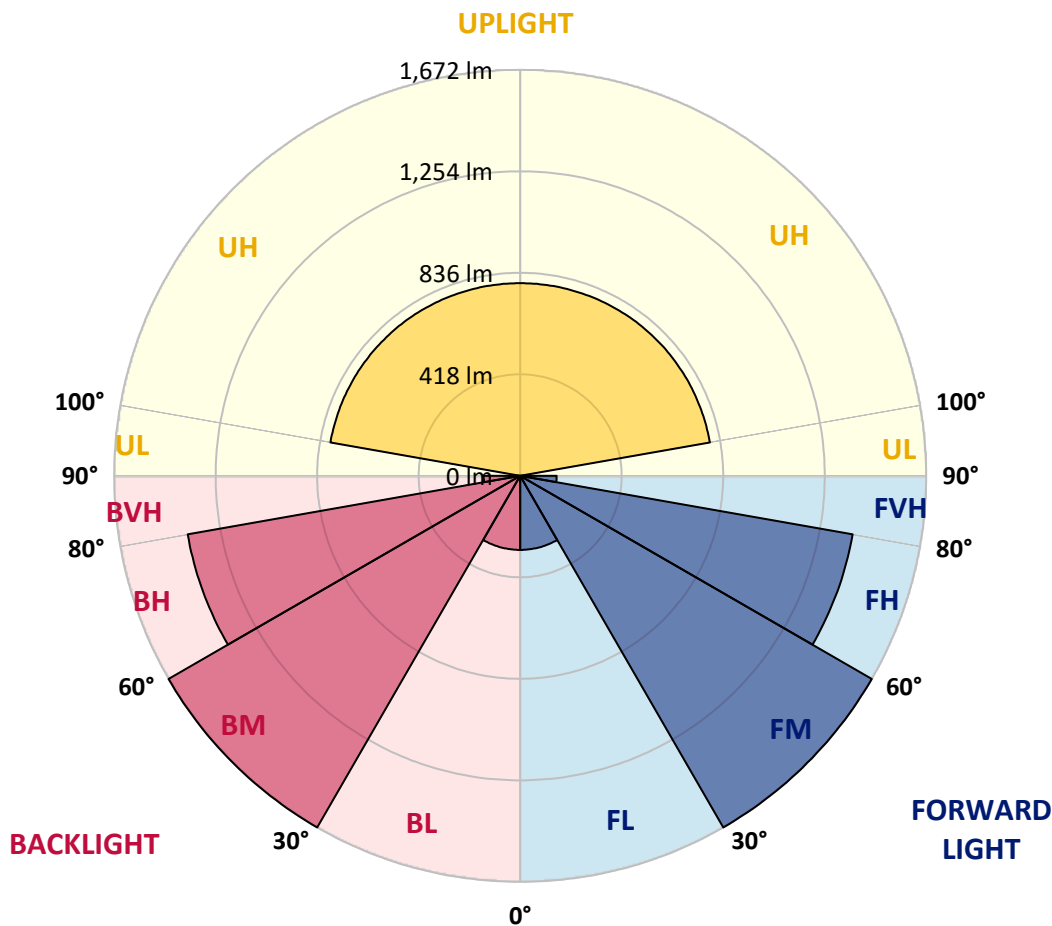


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 CATALOG NUMBER: TTN-D3-750-U-WQ-UPL3

LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | Lumens | % Fixture | Zone Rating/Lumen Limit | | |
|----------------|--------|-----------|-------------------------|---------|---------|
| | | | B | U | G |
| FL (0°-30°) | 305.1 | 3.9 | | | |
| FM (30°-60°) | 1672.2 | 21.3 | | | |
| FH (60°-80°) | 1390.3 | 17.7 | | | G1/1800 |
| FVH (80°-90°) | 150.5 | 1.9 | | | G2/225 |
| BL (0°-30°) | 305.1 | 3.9 | B1/500 | | |
| BM (30°-60°) | 1672.2 | 21.3 | B2/2500 | | |
| BH (60°-80°) | 1390.3 | 17.7 | B3/2500 | | G1/1800 |
| BVH (80°-90°) | 150.5 | 1.9 | | | G2/225 |
| UL (90°-100°) | 18.1 | 0.2 | | U2/50 | |
| UH (100°-180°) | 793.4 | 10.1 | | U4/1000 | |

BUG Rating: B3-U4-G2
 Type V Short





REPORT NUMBER: P833970

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CANDELA DISTRIBUTION (FULL):

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 65° | 75° | 85° | 90° |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0° | 596.3 | 596.3 | 596.3 | 596.3 | 596.3 | 596.3 | 596.3 | 596.3 | 596.3 | 596.3 | 596.3 |
| 2.5° | 590.5 | 590.5 | 590.5 | 590.5 | 590.5 | 590.5 | 590.5 | 590.5 | 590.5 | 590.5 | 590.5 |
| 5° | 590.5 | 590.5 | 590.5 | 590.5 | 590.5 | 590.5 | 590.5 | 590.5 | 590.5 | 590.5 | 590.5 |
| 7.5° | 578.9 | 578.9 | 584.7 | 584.7 | 584.7 | 584.7 | 584.7 | 584.7 | 584.7 | 584.7 | 584.7 |
| 10° | 578.9 | 578.9 | 584.7 | 584.7 | 590.5 | 590.5 | 590.5 | 584.7 | 584.7 | 578.9 | 578.9 |
| 12.5° | 590.5 | 590.5 | 590.5 | 596.3 | 602.1 | 602.1 | 602.1 | 596.3 | 596.3 | 590.5 | 590.5 |
| 15° | 607.9 | 613.7 | 613.7 | 619.5 | 625.3 | 625.3 | 625.3 | 619.5 | 619.5 | 613.7 | 613.7 |
| 17.5° | 642.6 | 642.6 | 642.6 | 648.4 | 654.2 | 660.0 | 660.0 | 648.4 | 648.4 | 642.6 | 648.4 |
| 20° | 677.4 | 683.2 | 683.2 | 688.9 | 694.7 | 700.5 | 694.7 | 688.9 | 683.2 | 683.2 | 683.2 |
| 22.5° | 729.5 | 729.5 | 735.3 | 735.3 | 746.8 | 746.8 | 746.8 | 735.3 | 735.3 | 735.3 | 735.3 |
| 25° | 787.4 | 787.4 | 793.2 | 798.9 | 810.5 | 810.5 | 804.7 | 793.2 | 793.2 | 793.2 | 798.9 |
| 27.5° | 856.8 | 856.8 | 862.6 | 862.6 | 874.2 | 874.2 | 868.4 | 862.6 | 862.6 | 862.6 | 868.4 |
| 30° | 920.5 | 920.5 | 932.1 | 937.9 | 943.7 | 943.7 | 943.7 | 932.1 | 932.1 | 926.3 | 926.3 |
| 32.5° | 978.4 | 984.2 | 990.0 | 1007.4 | 1018.9 | 1013.2 | 1018.9 | 1007.4 | 995.8 | 990.0 | 990.0 |
| 35° | 1042.1 | 1047.9 | 1059.5 | 1076.8 | 1094.2 | 1094.2 | 1094.2 | 1076.8 | 1065.3 | 1053.7 | 1059.5 |
| 37.5° | 1117.4 | 1117.4 | 1134.7 | 1152.1 | 1175.3 | 1181.0 | 1175.3 | 1157.9 | 1140.5 | 1128.9 | 1128.9 |
| 40° | 1198.4 | 1198.4 | 1215.8 | 1233.2 | 1262.1 | 1267.9 | 1262.1 | 1238.9 | 1215.8 | 1210.0 | 1210.0 |
| 42.5° | 1279.5 | 1279.5 | 1302.6 | 1320.0 | 1354.7 | 1366.3 | 1354.7 | 1325.8 | 1302.6 | 1285.3 | 1291.0 |
| 45° | 1366.3 | 1372.1 | 1401.0 | 1435.8 | 1476.3 | 1493.7 | 1476.3 | 1441.6 | 1406.8 | 1372.1 | 1372.1 |
| 47.5° | 1464.7 | 1464.7 | 1499.5 | 1540.0 | 1586.3 | 1603.7 | 1580.5 | 1545.8 | 1499.5 | 1470.5 | 1470.5 |
| 50° | 1528.4 | 1534.2 | 1580.5 | 1632.6 | 1690.5 | 1702.1 | 1684.7 | 1632.6 | 1580.5 | 1540.0 | 1534.2 |
| 52.5° | 1592.1 | 1597.9 | 1650.0 | 1725.3 | 1783.1 | 1800.5 | 1777.4 | 1725.3 | 1650.0 | 1597.9 | 1597.9 |
| 55° | 1632.6 | 1644.2 | 1702.1 | 1783.1 | 1846.8 | 1875.8 | 1841.0 | 1783.1 | 1696.3 | 1638.4 | 1632.6 |
| 57.5° | 1638.4 | 1650.0 | 1707.9 | 1806.3 | 1870.0 | 1904.7 | 1875.8 | 1800.5 | 1707.9 | 1644.2 | 1638.4 |
| 60° | 1626.8 | 1632.6 | 1690.5 | 1794.7 | 1870.0 | 1893.1 | 1870.0 | 1788.9 | 1684.7 | 1632.6 | 1621.0 |
| 62.5° | 1597.9 | 1609.5 | 1667.4 | 1754.2 | 1841.0 | 1858.4 | 1835.3 | 1748.4 | 1661.6 | 1597.9 | 1586.3 |
| 65° | 1505.3 | 1516.8 | 1603.7 | 1690.5 | 1765.8 | 1783.1 | 1765.8 | 1690.5 | 1597.9 | 1505.3 | 1493.7 |
| 67.5° | 1401.0 | 1406.8 | 1493.7 | 1597.9 | 1667.4 | 1696.3 | 1667.4 | 1603.7 | 1487.9 | 1401.0 | 1389.5 |
| 70° | 1291.0 | 1296.8 | 1366.3 | 1476.3 | 1545.8 | 1580.5 | 1551.6 | 1482.1 | 1360.5 | 1285.3 | 1279.5 |
| 72.5° | 1163.7 | 1163.7 | 1233.2 | 1320.0 | 1389.5 | 1424.2 | 1401.0 | 1314.2 | 1221.6 | 1146.3 | 1134.7 |
| 75° | 990.0 | 995.8 | 1071.0 | 1134.7 | 1210.0 | 1233.2 | 1210.0 | 1140.5 | 1053.7 | 978.4 | 966.8 |
| 77.5° | 810.5 | 816.3 | 880.0 | 932.1 | 1001.6 | 1018.9 | 1001.6 | 943.7 | 862.6 | 798.9 | 793.2 |
| 80° | 613.7 | 619.5 | 671.6 | 717.9 | 775.8 | 798.9 | 781.6 | 723.7 | 660.0 | 602.1 | 584.7 |
| 82.5° | 399.5 | 405.3 | 457.4 | 492.1 | 544.2 | 561.6 | 550.0 | 497.9 | 445.8 | 387.9 | 382.1 |
| 85° | 179.5 | 185.3 | 231.6 | 260.5 | 301.1 | 318.4 | 306.8 | 260.5 | 220.0 | 167.9 | 156.3 |
| 87.5° | 17.4 | 17.4 | 17.4 | 17.4 | 17.4 | 23.2 | 23.2 | 17.4 | 17.4 | 17.4 | 17.4 |
| 90° | 6.9 | 6.9 | 8.3 | 8.3 | 8.3 | 8.3 | 8.3 | 8.3 | 8.3 | 6.9 | 6.9 |
| 92.5° | 6.9 | 6.9 | 6.9 | 9.7 | 11.1 | 9.7 | 11.1 | 8.3 | 8.3 | 6.9 | 6.9 |
| 95° | 8.3 | 8.3 | 9.7 | 12.5 | 15.3 | 16.7 | 16.7 | 9.7 | 9.7 | 8.3 | 8.3 |
| 97.5° | 11.1 | 12.5 | 12.5 | 15.3 | 25.0 | 45.8 | 27.8 | 13.9 | 13.9 | 12.5 | 11.1 |
| 100° | 18.0 | 19.4 | 19.4 | 34.7 | 73.6 | 98.6 | 70.8 | 36.1 | 26.4 | 19.4 | 19.4 |
| 102.5° | 58.3 | 61.1 | 75.0 | 112.5 | 166.6 | 151.3 | 127.7 | 120.8 | 83.3 | 66.6 | 63.9 |
| 105° | 148.6 | 147.2 | 158.3 | 187.4 | 233.3 | 229.1 | 211.0 | 191.6 | 165.2 | 152.7 | 152.7 |
| 107.5° | 195.8 | 195.8 | 205.5 | 230.5 | 265.2 | 309.6 | 313.8 | 248.5 | 218.0 | 204.1 | 202.7 |
| 110° | 220.8 | 220.8 | 229.1 | 249.9 | 295.7 | 358.2 | 355.4 | 306.8 | 269.4 | 251.3 | 248.5 |



REPORT NUMBER: P833970
 CATALOG NUMBER: TTN-D3-750-U-WQ-UPL3

CANDELA DISTRIBUTION (continued):

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 65° | 75° | 85° | 90° |
|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 112.5° | 226.3 | 227.7 | 238.8 | 270.7 | 320.7 | 348.5 | 336.0 | 316.6 | 299.9 | 286.0 | 283.2 |
| 115° | 234.6 | 234.6 | 247.1 | 277.7 | 305.5 | 316.6 | 302.7 | 287.4 | 276.3 | 270.7 | 273.5 |
| 117.5° | 231.9 | 236.0 | 238.8 | 255.5 | 273.5 | 281.8 | 274.9 | 254.1 | 245.8 | 243.0 | 238.8 |
| 120° | 215.2 | 215.2 | 218.0 | 226.3 | 236.0 | 240.2 | 237.4 | 223.5 | 216.6 | 215.2 | 212.4 |
| 122.5° | 191.6 | 193.0 | 191.6 | 195.8 | 202.7 | 206.9 | 204.1 | 193.0 | 190.2 | 190.2 | 187.4 |
| 125° | 168.0 | 168.0 | 166.6 | 169.4 | 173.6 | 172.2 | 173.6 | 168.0 | 166.6 | 166.6 | 165.2 |
| 127.5° | 151.3 | 149.9 | 147.2 | 148.6 | 149.9 | 149.9 | 151.3 | 145.8 | 147.2 | 148.6 | 147.2 |
| 130° | 134.7 | 134.7 | 131.9 | 131.9 | 131.9 | 129.1 | 131.9 | 129.1 | 130.5 | 131.9 | 133.3 |
| 132.5° | 119.4 | 119.4 | 115.2 | 113.9 | 113.9 | 113.9 | 115.2 | 113.9 | 116.6 | 119.4 | 119.4 |
| 135° | 106.9 | 106.9 | 102.7 | 104.1 | 104.1 | 102.7 | 104.1 | 102.7 | 105.5 | 106.9 | 106.9 |
| 137.5° | 97.2 | 97.2 | 94.4 | 94.4 | 94.4 | 93.0 | 94.4 | 94.4 | 95.8 | 98.6 | 100.0 |
| 140° | 88.9 | 88.9 | 87.5 | 87.5 | 86.1 | 87.5 | 87.5 | 87.5 | 88.9 | 90.2 | 90.2 |
| 142.5° | 84.7 | 83.3 | 81.9 | 80.5 | 81.9 | 81.9 | 81.9 | 80.5 | 81.9 | 84.7 | 84.7 |
| 145° | 77.8 | 77.8 | 76.4 | 76.4 | 76.4 | 77.8 | 76.4 | 76.4 | 77.8 | 77.8 | 79.1 |
| 147.5° | 73.6 | 73.6 | 72.2 | 73.6 | 73.6 | 73.6 | 73.6 | 72.2 | 73.6 | 73.6 | 75.0 |
| 150° | 72.2 | 70.8 | 69.4 | 70.8 | 70.8 | 69.4 | 69.4 | 69.4 | 69.4 | 70.8 | 70.8 |
| 152.5° | 68.0 | 68.0 | 66.6 | 68.0 | 66.6 | 66.6 | 66.6 | 66.6 | 66.6 | 68.0 | 69.4 |
| 155° | 65.3 | 65.3 | 63.9 | 65.3 | 65.3 | 65.3 | 65.3 | 65.3 | 65.3 | 65.3 | 65.3 |
| 157.5° | 62.5 | 63.9 | 62.5 | 62.5 | 62.5 | 62.5 | 62.5 | 62.5 | 62.5 | 63.9 | 63.9 |
| 160° | 61.1 | 61.1 | 61.1 | 61.1 | 59.7 | 59.7 | 59.7 | 61.1 | 61.1 | 61.1 | 62.5 |
| 162.5° | 59.7 | 59.7 | 59.7 | 59.7 | 58.3 | 58.3 | 58.3 | 58.3 | 59.7 | 59.7 | 61.1 |
| 165° | 59.7 | 58.3 | 58.3 | 58.3 | 56.9 | 56.9 | 56.9 | 56.9 | 58.3 | 59.7 | 58.3 |
| 167.5° | 56.9 | 56.9 | 56.9 | 56.9 | 56.9 | 55.5 | 55.5 | 56.9 | 56.9 | 56.9 | 58.3 |
| 170° | 56.9 | 56.9 | 55.5 | 55.5 | 55.5 | 55.5 | 55.5 | 55.5 | 55.5 | 55.5 | 56.9 |
| 172.5° | 56.9 | 56.9 | 56.9 | 56.9 | 55.5 | 55.5 | 55.5 | 55.5 | 55.5 | 56.9 | 56.9 |
| 175° | 56.9 | 56.9 | 56.9 | 56.9 | 55.5 | 55.5 | 55.5 | 56.9 | 56.9 | 56.9 | 55.5 |
| 177.5° | 56.9 | 56.9 | 56.9 | 56.9 | 55.5 | 56.9 | 56.9 | 56.9 | 56.9 | 56.9 | 56.9 |
| 180° | 56.9 | 56.9 | 56.9 | 56.9 | 56.9 | 56.9 | 56.9 | 56.9 | 56.9 | 56.9 | 56.9 |

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: SP1-2411-284-3

Test Date: 11/21/2024

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

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

Test Information

Test Method: LM-79-2019
 Report Number: SP1-2411-284-3
 Test Lab: COOPER LIGHTING SOLUTIONS
 Photometer: SP1 - 76IN SPHERE
 Measurement Geometry: 4π
 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
 CIE u': 0.2086
 CIE v': 0.4932
 Duv: 0.0061
 CIE x: 0.3502
 CIE y: 0.3680
 CIE z: 0.2818
 Peak Wavelength (nm): 451
 Dominant Wavelength (nm): 569
 Purity: 15.51324
 Rf: 74.6
 Rg: 94.4

| | | | |
|-----------|------|------|-------|
| CRI (Ra): | 72.6 | | |
| R1: | 69.5 | R9: | -24.6 |
| R2: | 77.0 | R10: | 44.8 |
| R3: | 82.2 | R11: | 68.2 |
| R4: | 72.6 | R12: | 36.1 |
| R5: | 69.3 | R13: | 70.5 |
| R6: | 67.6 | R14: | 89.9 |
| R7: | 83.7 | R15: | 63.1 |
| R8: | 58.6 | | |



Test Conditions

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

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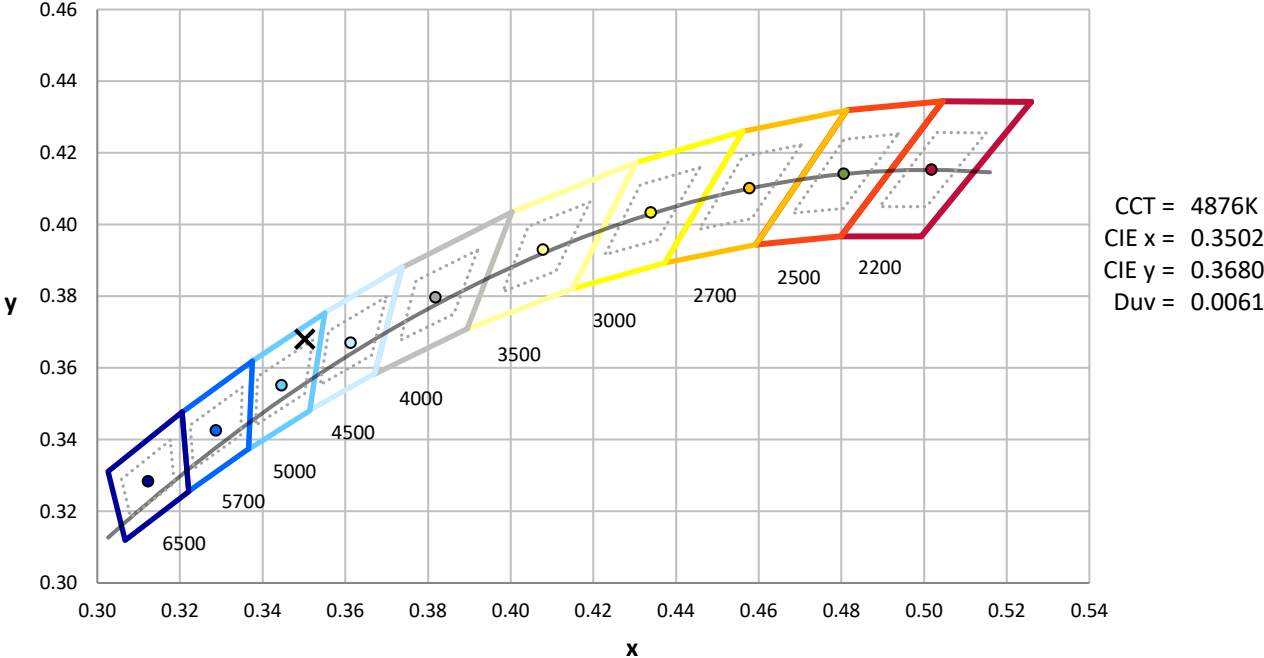
| Measurement and Test Equipment | | | |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 6/18/2024 | 12/18/2024 |
| Power Meter | INXT2011004 |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

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CIE 1931 Chromaticity Diagram



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

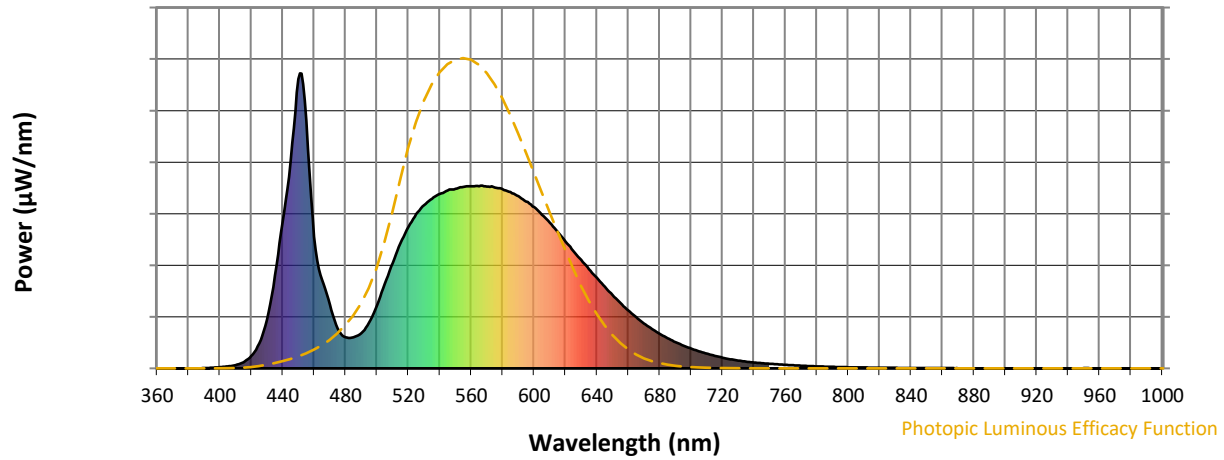


CCT = 4876K
 CIE x = 0.3502
 CIE y = 0.3680
 Duv = 0.0061

Point lies inside the ANSI 5000K 7-step quadrangle

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Photopic Flux vs. Wavelength

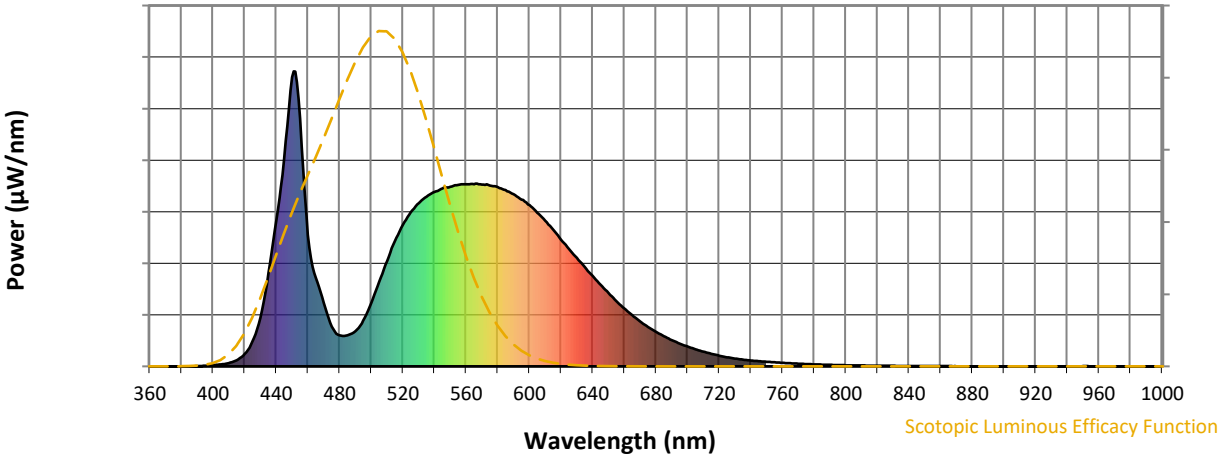


Photopic Lumens: NR

| 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 | 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 | | | |

REPORT NUMBER: SP1-2411-284-3

Scotopic Flux vs. Wavelength

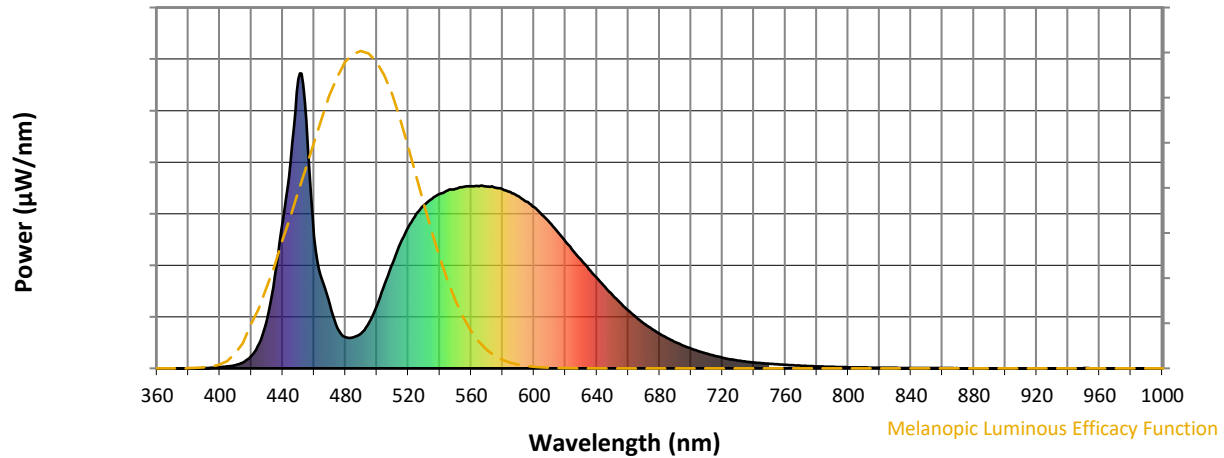


Scotopic Lumens: NR S/P: 1.74

| λ (nm) | Power $\text{W}^{\wedge}/\text{nm}$ | Lumens (ϕ/nm) | λ (nm) | Power $\text{W}^{\wedge}/\text{nm}$ | Lumens (ϕ/nm) | λ (nm) | Power $\text{W}^{\wedge}/\text{nm}$ | Lumens (ϕ/nm) | λ (nm) | Power $\text{W}^{\wedge}/\text{nm}$ | Lumens (ϕ/nm) | λ (nm) | Power $\text{W}^{\wedge}/\text{nm}$ | 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 | | | |

REPORT NUMBER: SP1-2411-284-3

Melanopic Flux vs. Wavelength



Melanopic Lumens: NR

M/P: 3.51

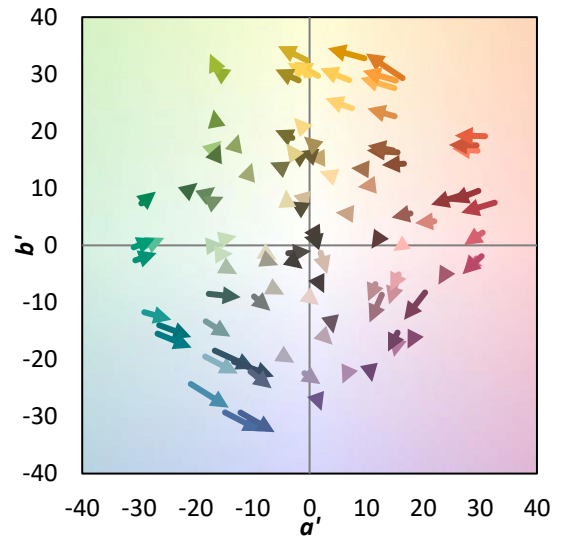
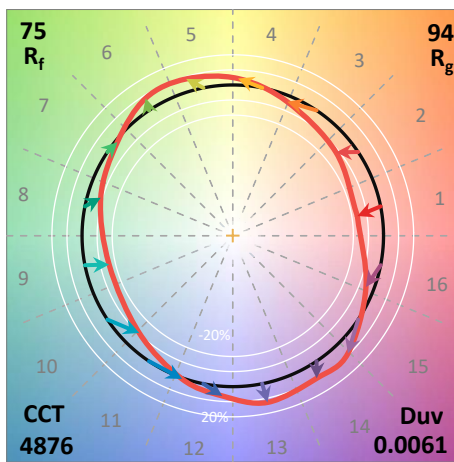
| λ (nm) | Power W [^] /nm | Lumens (φ/nm) | λ (nm) | Power W [^] /nm | Lumens (φ/nm) | λ (nm) | Power W [^] /nm | Lumens (φ/nm) | λ (nm) | Power W [^] /nm | Lumens (φ/nm) | λ (nm) | Power W [^] /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360 | 0 | NR | 490 | 119 | NR | 620 | 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 | | | |

Summary

$R_f = 74.6$
 $R_g = 94.4$
 $CIE R_a = 72.6$
 $R_g = -24.6$

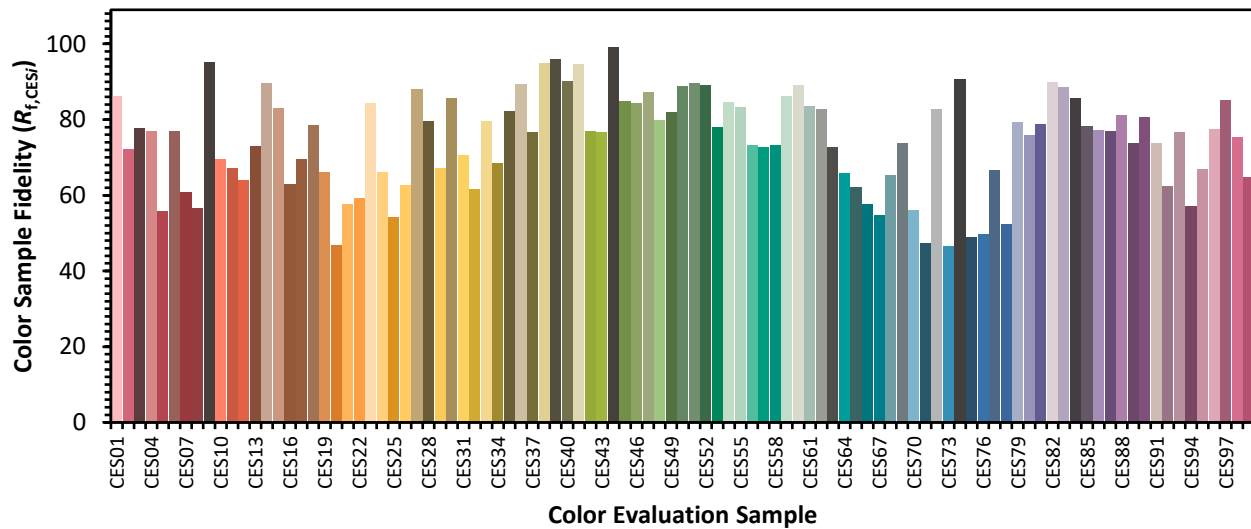


Color Vector Graphics

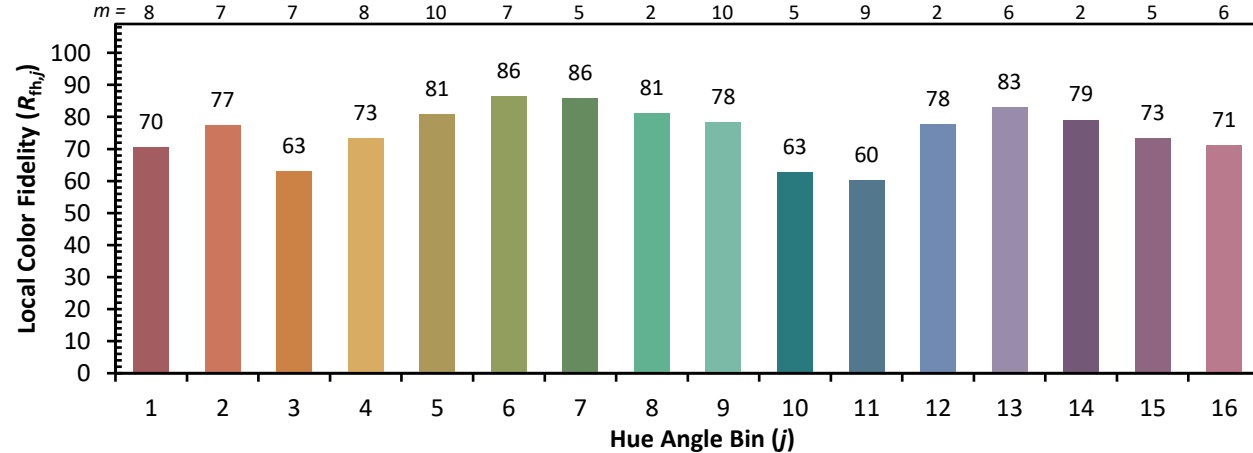
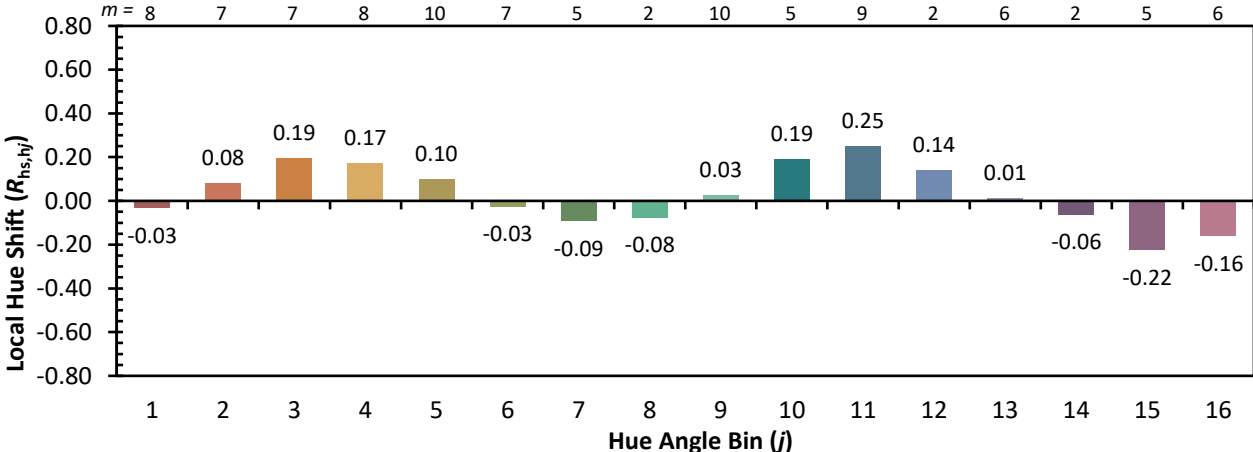
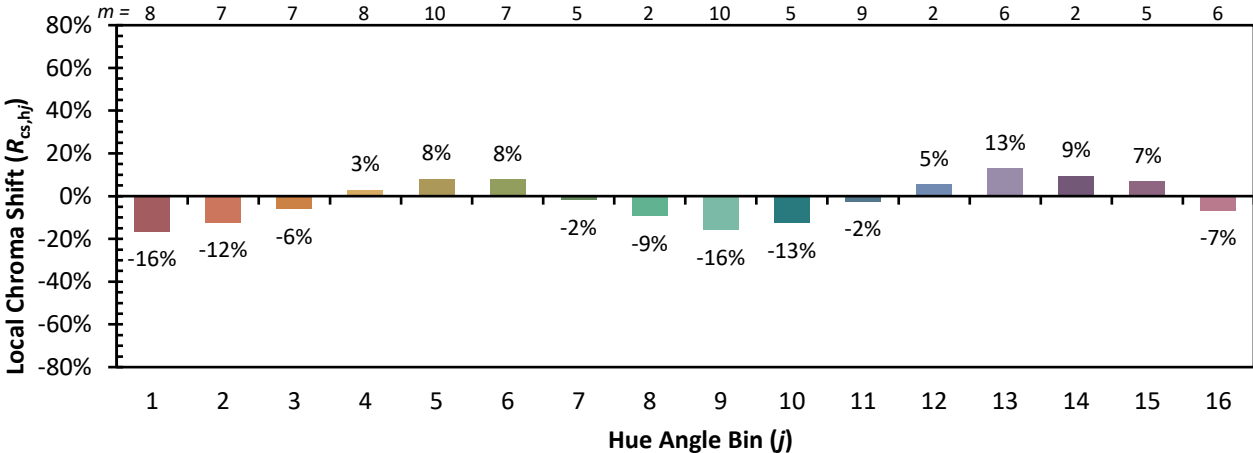


Individual Sample Fidelity Index ($R_{f,i}$)

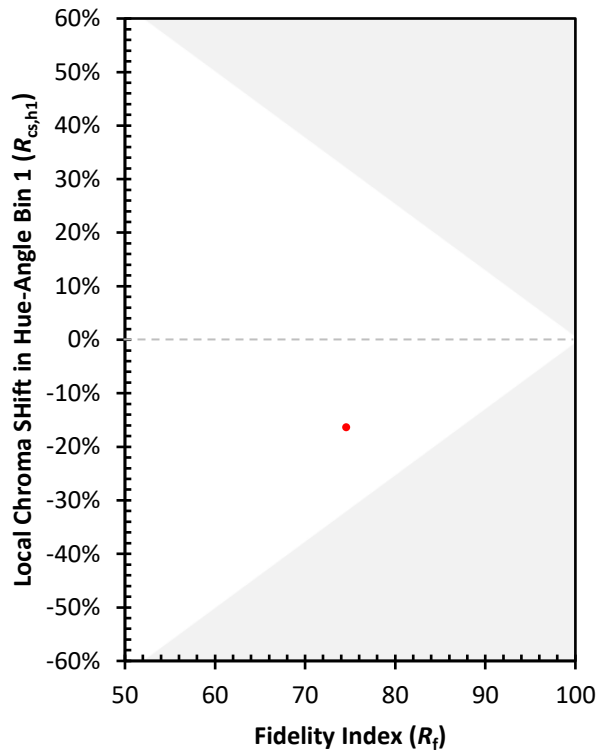
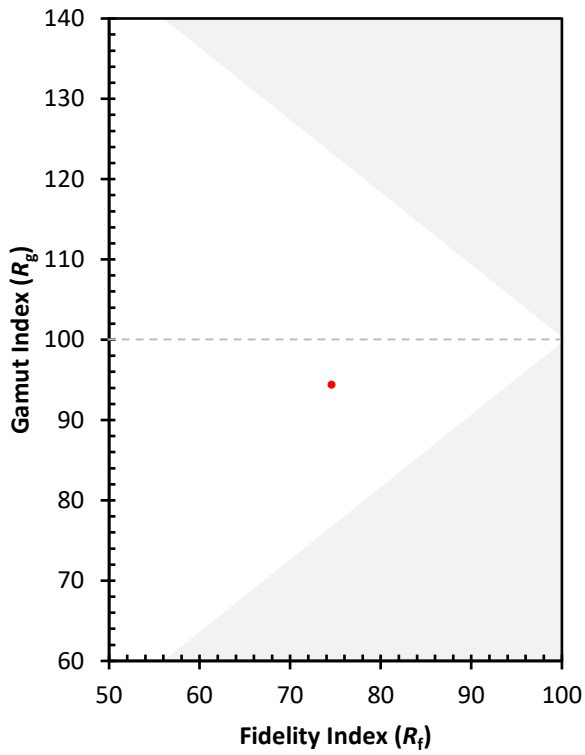
| | | | |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 63 | CES51 = 90 | CES76 = 50 |
| CES02 = 59 | CES27 = 88 | CES52 = 89 | CES77 = 67 |
| CES03 = 30 | CES28 = 80 | CES53 = 78 | CES78 = 52 |
| CES04 = 69 | CES29 = 67 | CES54 = 85 | CES79 = 79 |
| CES05 = 46 | CES30 = 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)