

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: P834034

Luminaire Tested: **TTN-D3-830-U-DL-CG-UPL1**

Issue Date: 5/15/2024

**Test Information**

Test Method: LM-79-08  
Report Number: P834034  
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-D3-830-U-DL-CG-UPL1  
Description: TOPTIER NANO LED PARKING GARAGE LUMINAIRE WITH UPLIGHT  
3000K, 80 CRI LEDS AND DRIVE LANE DISTRIBUTION WITH CLEAR GLASS  
Light Source: -  
Ballast/Driver: -

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 6220.9 lumens  
Efficiency: N/A  
Efficacy: 100.7 lumens/watt  
Luminous Opening: Vertical Cylinder (Dia: 0.71' x H: 0.1')  
IES Classification: Type IV - Short  
BUG Rating: B1 - U3 - G2  
  
Input Watts (W): 61.8  
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

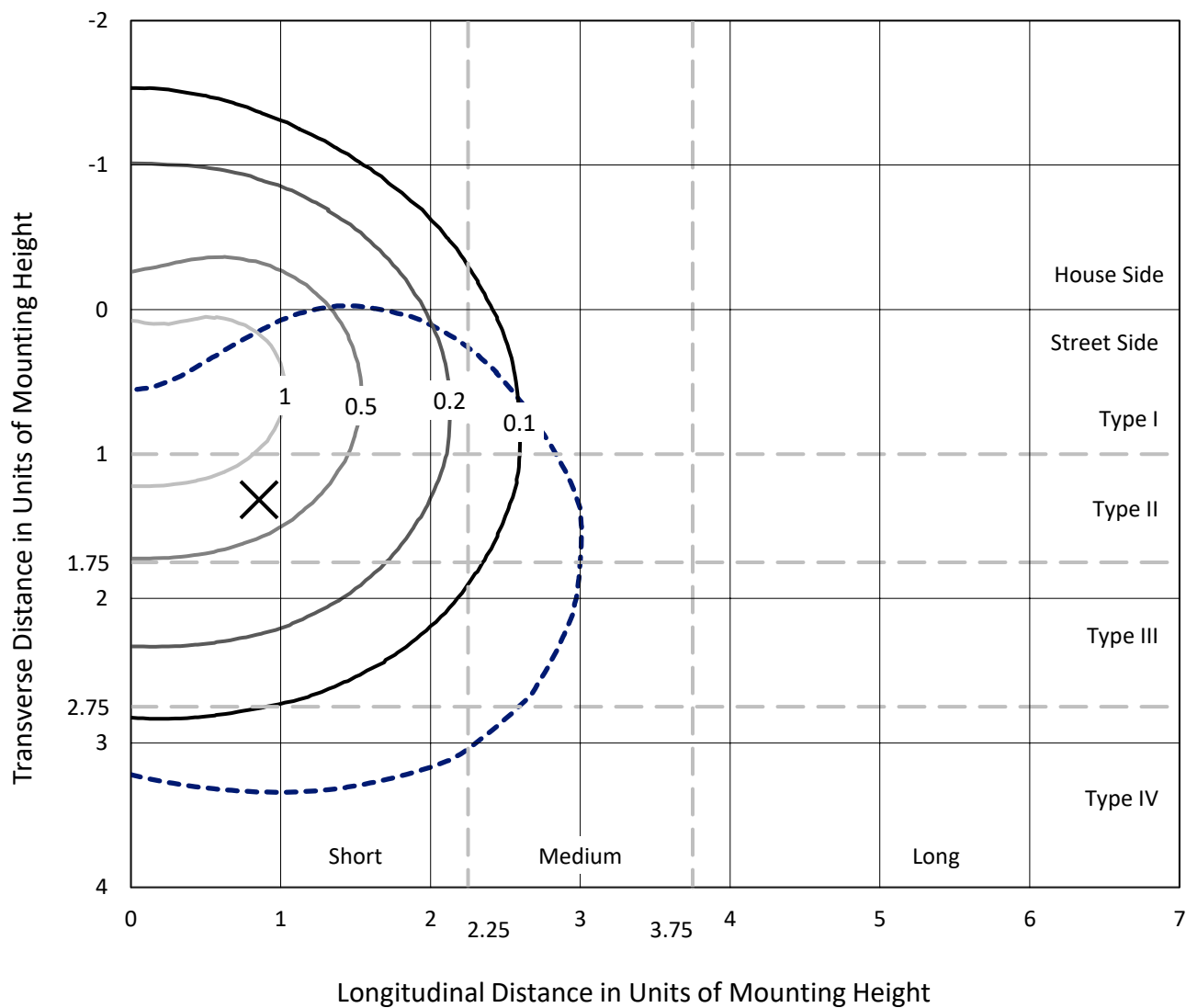


REPORT NUMBER: P834034  
 CATALOG NUMBER: TTN-D3-830-U-DL-CG-UPL1

## Iso-Footcandle Lines of Horizontal Illumination

✕ Max cd

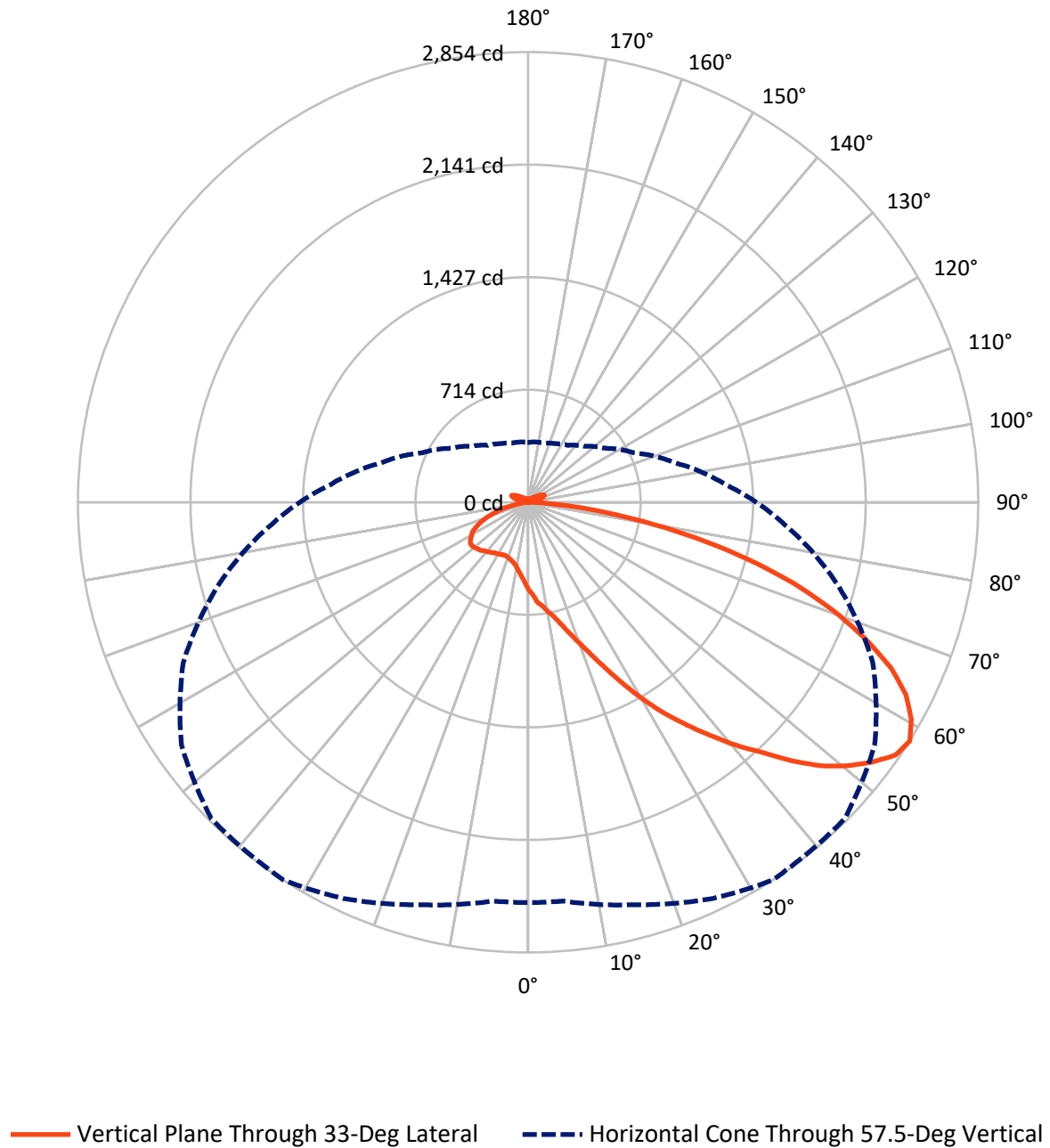
--- 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 1.5 fc  
 Type IV - Short - N/A

REPORT NUMBER: P834034  
CATALOG NUMBER: TTN-D3-830-U-DL-CG-UPL1

## Luminous Intensity Polar Plot



REPORT NUMBER: P834034

CATALOG NUMBER: TTN-D3-830-U-DL-CG-UPL1

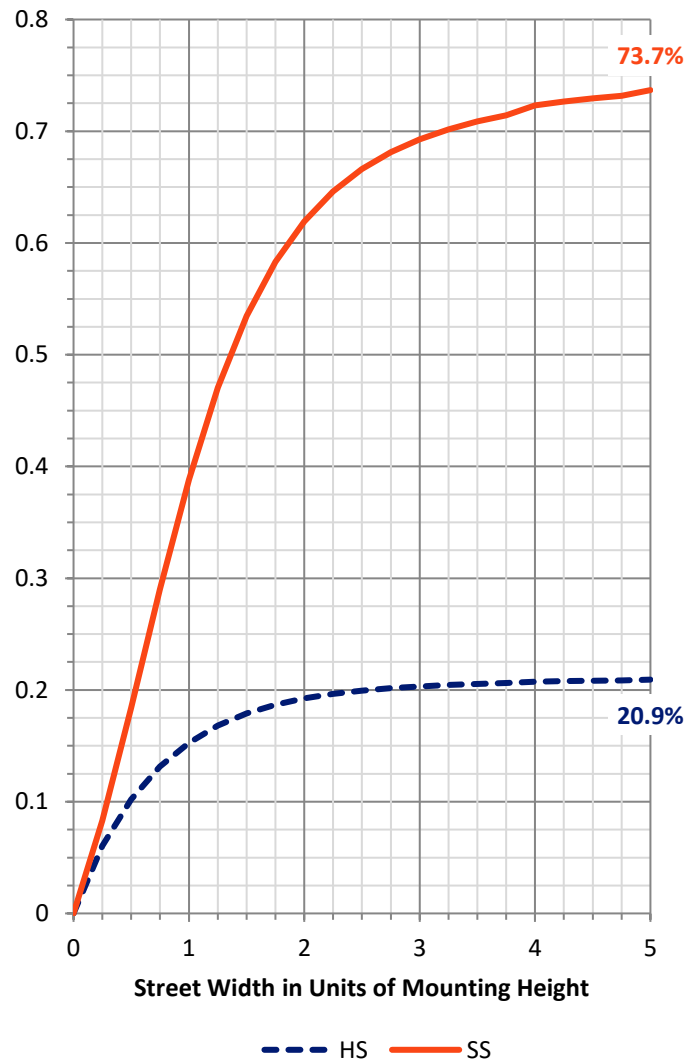
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 1307.6   | 147.7  | 1455.3 |
|                    | % Fixture | 21.0     | 2.4    | 23.4   |
| <b>Street Side</b> | Lumens    | 4617.8   | 147.7  | 4765.5 |
|                    | % Fixture | 74.2     | 2.4    | 76.6   |
| <b>Total</b>       | Lumens    | 5925.4   | 295.5  | 6220.9 |
|                    | % Fixture | 95.3     | 4.7    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 53.1   | 0.9       |
| 10°-20°   | 172.3  | 2.8       |
| 20°-30°   | 363.3  | 5.8       |
| 30°-40°   | 659.8  | 10.6      |
| 40°-50°   | 1042.6 | 16.8      |
| 50°-60°   | 1384.6 | 22.3      |
| 60°-70°   | 1332.7 | 21.4      |
| 70°-80°   | 782.3  | 12.6      |
| 80°-90°   | 134.7  | 2.2       |
| 90°-100°  | 6.6    | 0.1       |
| 100°-110° | 67.0   | 1.1       |
| 110°-120° | 98.0   | 1.6       |
| 120°-130° | 56.9   | 0.9       |
| 130°-140° | 30.1   | 0.5       |
| 140°-150° | 17.9   | 0.3       |
| 150°-160° | 11.0   | 0.2       |
| 160°-170° | 6.0    | 0.1       |
| 170°-180° | 2.0    | 0.0       |
| 0°-90°    | 5925.4 | 95.3      |
| 0°-180°   | 6220.9 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P834034

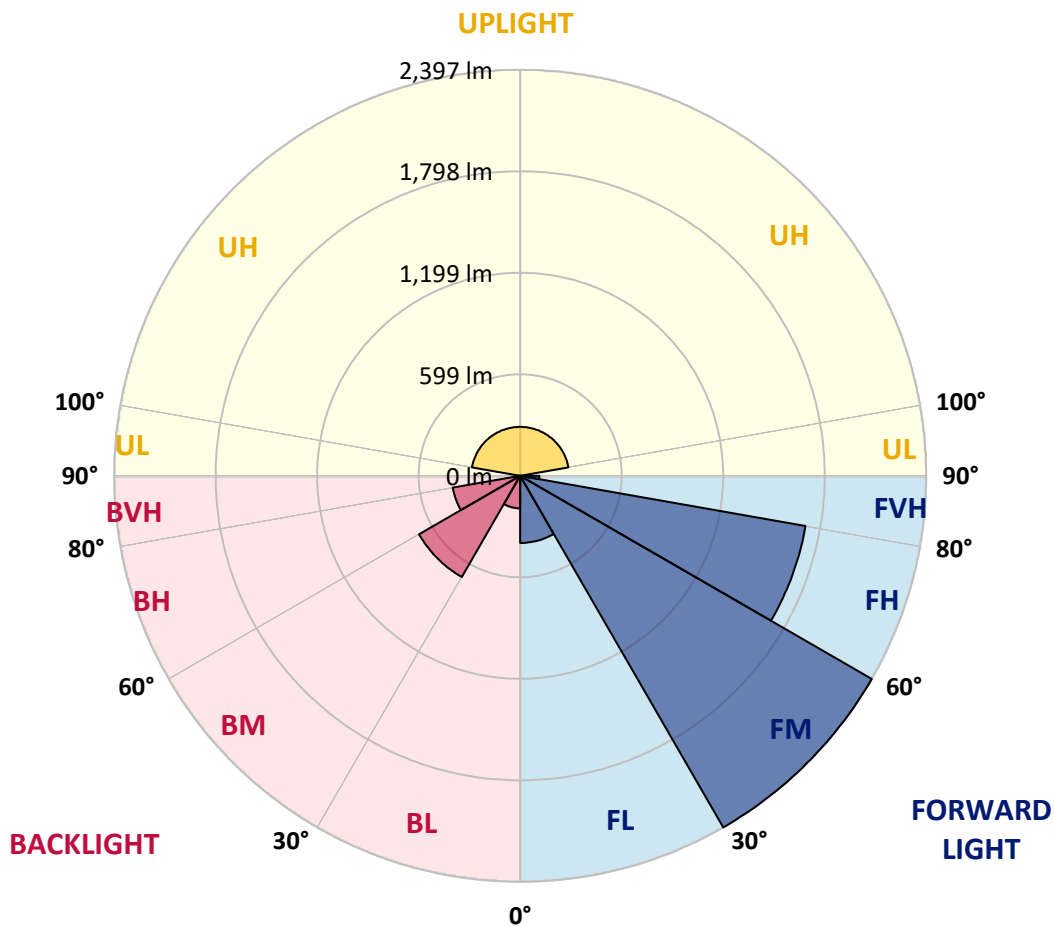
CATALOG NUMBER: TTN-D3-830-U-DL-CG-UPL1

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |        |         |
|------|-------------|--------|-----------|-------------------------|--------|---------|
|      |             |        |           | B                       | U      | G       |
| FL   | (0°-30°)    | 396.4  | 6.4       |                         |        |         |
| FM   | (30°-60°)   | 2397.1 | 38.5      |                         |        |         |
| FH   | (60°-80°)   | 1710.7 | 27.5      |                         |        | G1/1800 |
| FVH  | (80°-90°)   | 113.6  | 1.8       |                         |        | G2/225  |
| BL   | (0°-30°)    | 192.3  | 3.1       | B1/500                  |        |         |
| BM   | (30°-60°)   | 689.9  | 11.1      | B1/1000                 |        |         |
| BH   | (60°-80°)   | 404.3  | 6.5       | B1/500                  |        | G1/500  |
| BVH  | (80°-90°)   | 21.1   | 0.3       |                         |        | G1/100  |
| UL   | (90°-100°)  | 6.6    | 0.1       |                         | U1/10  |         |
| UH   | (100°-180°) | 288.9  | 4.6       |                         | U3/500 |         |

**BUG Rating: B1-U3-G2**

Type IV Short



REPORT NUMBER: P834034

CATALOG NUMBER: TTN-D3-830-U-DL-CG-UPL1

**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 5°     | 15°    | 25°    | 33°    | 35°    | 45°    | 55°    | 65°    | 75°    | 85°    |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°     | 555.3  | 555.3  | 555.3  | 555.3  | 555.3  | 555.3  | 555.3  | 555.3  | 555.3  | 555.3  | 555.3  |
| 2.5°   | 591.6  | 596.8  | 591.6  | 591.6  | 586.5  | 586.5  | 581.3  | 576.1  | 570.9  | 565.7  | 555.3  |
| 5°     | 659.1  | 659.1  | 653.9  | 643.5  | 638.4  | 633.2  | 622.8  | 607.2  | 596.8  | 581.3  | 565.7  |
| 7.5°   | 690.3  | 690.3  | 685.1  | 674.7  | 664.3  | 659.1  | 643.5  | 622.8  | 607.2  | 586.5  | 565.7  |
| 10°    | 731.8  | 737.0  | 726.6  | 716.2  | 705.8  | 700.6  | 679.9  | 653.9  | 628.0  | 602.0  | 570.9  |
| 12.5°  | 778.5  | 783.7  | 778.5  | 762.9  | 747.3  | 742.2  | 721.4  | 690.3  | 659.1  | 622.8  | 586.5  |
| 15°    | 840.8  | 851.1  | 835.6  | 825.2  | 809.6  | 804.4  | 778.5  | 742.2  | 705.8  | 659.1  | 612.4  |
| 17.5°  | 913.4  | 918.6  | 908.2  | 892.7  | 882.3  | 877.1  | 851.1  | 809.6  | 757.7  | 705.8  | 648.7  |
| 20°    | 996.5  | 1001.6 | 996.5  | 975.7  | 965.3  | 960.1  | 934.2  | 887.5  | 825.2  | 768.1  | 695.4  |
| 22.5°  | 1095.1 | 1105.4 | 1089.9 | 1074.3 | 1063.9 | 1063.9 | 1032.8 | 980.9  | 908.2  | 835.6  | 752.5  |
| 25°    | 1209.2 | 1224.8 | 1204.0 | 1193.7 | 1183.3 | 1178.1 | 1152.2 | 1089.9 | 1006.8 | 918.6  | 814.8  |
| 27.5°  | 1349.4 | 1359.7 | 1344.2 | 1339.0 | 1318.2 | 1318.2 | 1276.7 | 1204.0 | 1115.8 | 1012.0 | 892.7  |
| 30°    | 1473.9 | 1484.3 | 1473.9 | 1473.9 | 1458.4 | 1453.2 | 1411.6 | 1339.0 | 1230.0 | 1105.4 | 960.1  |
| 32.5°  | 1593.3 | 1603.7 | 1598.5 | 1603.7 | 1598.5 | 1593.3 | 1541.4 | 1463.5 | 1354.6 | 1193.7 | 1027.6 |
| 35°    | 1712.7 | 1728.2 | 1723.0 | 1738.6 | 1733.4 | 1728.2 | 1686.7 | 1593.3 | 1463.5 | 1302.7 | 1100.3 |
| 37.5°  | 1837.2 | 1852.8 | 1852.8 | 1868.4 | 1873.5 | 1873.5 | 1826.8 | 1728.2 | 1582.9 | 1401.3 | 1183.3 |
| 40°    | 1972.2 | 1987.7 | 1987.7 | 2013.7 | 2024.0 | 2024.0 | 1972.2 | 1873.5 | 1712.7 | 1510.3 | 1271.5 |
| 42.5°  | 2101.9 | 2117.5 | 2122.7 | 2148.6 | 2164.2 | 2169.4 | 2127.8 | 2013.7 | 1826.8 | 1619.2 | 1354.6 |
| 45°    | 2226.5 | 2242.0 | 2257.6 | 2309.5 | 2335.4 | 2330.3 | 2299.1 | 2179.7 | 1972.2 | 1733.4 | 1442.8 |
| 47.5°  | 2345.8 | 2366.6 | 2392.5 | 2460.0 | 2496.3 | 2491.1 | 2470.4 | 2335.4 | 2107.1 | 1842.4 | 1520.6 |
| 50°    | 2439.2 | 2454.8 | 2506.7 | 2579.4 | 2626.1 | 2631.3 | 2600.1 | 2470.4 | 2221.3 | 1925.4 | 1577.7 |
| 52.5°  | 2511.9 | 2532.7 | 2594.9 | 2698.7 | 2735.1 | 2750.6 | 2714.3 | 2584.6 | 2335.4 | 1998.1 | 1624.4 |
| 55°    | 2563.8 | 2563.8 | 2657.2 | 2776.6 | 2828.5 | 2838.9 | 2838.9 | 2678.0 | 2402.9 | 2044.8 | 1650.4 |
| 57.5°  | 2537.8 | 2537.8 | 2641.6 | 2771.4 | 2854.4 | 2849.2 | 2838.9 | 2683.2 | 2413.3 | 2034.4 | 1634.8 |
| 60°    | 2465.2 | 2480.8 | 2579.4 | 2709.1 | 2792.1 | 2787.0 | 2755.8 | 2615.7 | 2361.4 | 1992.9 | 1603.7 |
| 62.5°  | 2366.6 | 2392.5 | 2496.3 | 2594.9 | 2688.4 | 2703.9 | 2662.4 | 2537.8 | 2273.2 | 1930.6 | 1546.6 |
| 65°    | 2179.7 | 2216.1 | 2345.8 | 2454.8 | 2527.5 | 2558.6 | 2506.7 | 2392.5 | 2153.8 | 1811.3 | 1427.2 |
| 67.5°  | 1972.2 | 1998.1 | 2107.1 | 2262.8 | 2304.3 | 2335.4 | 2309.5 | 2190.1 | 1987.7 | 1619.2 | 1292.3 |
| 70°    | 1733.4 | 1774.9 | 1847.6 | 2003.3 | 2050.0 | 2081.1 | 2081.1 | 1961.8 | 1769.7 | 1422.0 | 1131.4 |
| 72.5°  | 1453.2 | 1499.9 | 1588.1 | 1702.3 | 1764.6 | 1785.3 | 1780.1 | 1681.5 | 1510.3 | 1204.0 | 954.9  |
| 75°    | 1147.0 | 1183.3 | 1287.1 | 1370.1 | 1437.6 | 1453.2 | 1448.0 | 1364.9 | 1209.2 | 970.5  | 757.7  |
| 77.5°  | 845.9  | 882.3  | 960.1  | 1022.4 | 1084.7 | 1074.3 | 1074.3 | 1012.0 | 913.4  | 721.4  | 576.1  |
| 80°    | 555.3  | 586.5  | 653.9  | 674.7  | 742.2  | 737.0  | 737.0  | 690.3  | 622.8  | 482.7  | 384.1  |
| 82.5°  | 306.2  | 332.2  | 378.9  | 399.6  | 441.1  | 430.8  | 435.9  | 404.8  | 363.3  | 269.9  | 218.0  |
| 85°    | 109.0  | 129.7  | 155.7  | 171.3  | 192.0  | 192.0  | 192.0  | 166.1  | 155.7  | 103.8  | 88.2   |
| 87.5°  | 5.2    | 10.4   | 20.8   | 20.8   | 31.1   | 31.1   | 31.1   | 20.8   | 20.8   | 5.2    | 5.2    |
| 90°    | 2.5    | 2.5    | 3.0    | 3.0    | 3.0    | 3.0    | 3.0    | 3.0    | 3.0    | 3.0    | 2.5    |
| 92.5°  | 2.5    | 2.5    | 2.5    | 3.5    | 3.9    | 4.0    | 3.5    | 4.0    | 3.0    | 3.0    | 2.5    |
| 95°    | 3.0    | 3.0    | 3.5    | 4.5    | 5.4    | 5.6    | 6.1    | 6.1    | 3.5    | 3.5    | 3.0    |
| 97.5°  | 4.0    | 4.5    | 4.5    | 5.6    | 8.4    | 9.1    | 16.7   | 10.1   | 5.1    | 5.1    | 4.5    |
| 100°   | 6.6    | 7.1    | 7.1    | 12.6   | 24.0   | 26.8   | 35.9   | 25.8   | 13.1   | 9.6    | 7.1    |
| 102.5° | 21.2   | 22.2   | 27.3   | 40.9   | 56.7   | 60.7   | 55.1   | 46.5   | 44.0   | 30.3   | 24.3   |
| 105°   | 54.1   | 53.6   | 57.6   | 68.2   | 81.6   | 84.9   | 83.4   | 76.8   | 69.8   | 60.2   | 55.6   |
| 107.5° | 71.3   | 71.3   | 74.8   | 83.9   | 94.1   | 96.6   | 112.7  | 114.2  | 90.5   | 79.4   | 74.3   |
| 110°   | 80.4   | 80.4   | 83.4   | 91.0   | 104.4  | 107.7  | 130.4  | 129.4  | 111.7  | 98.1   | 91.5   |

REPORT NUMBER: P834034

CATALOG NUMBER: TTN-D3-830-U-DL-CG-UPL1

**CANDELA DISTRIBUTION (continued):**

|        | 0°   | 5°   | 15°  | 25°   | 33°   | 35°   | 45°   | 55°   | 65°   | 75°   | 85°   |
|--------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|
| 112.5° | 82.4 | 82.9 | 86.9 | 98.6  | 113.2 | 116.8 | 126.9 | 122.3 | 115.3 | 109.2 | 104.1 |
| 115°   | 85.4 | 85.4 | 90.0 | 101.1 | 109.2 | 111.2 | 115.3 | 110.2 | 104.6 | 100.6 | 98.6  |
| 117.5° | 84.4 | 85.9 | 86.9 | 93.0  | 98.3  | 99.6  | 102.6 | 100.1 | 92.5  | 89.5  | 88.5  |
| 120°   | 78.4 | 78.4 | 79.4 | 82.4  | 85.2  | 85.9  | 87.5  | 86.4  | 81.4  | 78.9  | 78.4  |
| 122.5° | 69.8 | 70.3 | 69.8 | 71.3  | 73.3  | 73.8  | 75.3  | 74.3  | 70.3  | 69.3  | 69.3  |
| 125°   | 61.2 | 61.2 | 60.7 | 61.7  | 62.9  | 63.2  | 62.7  | 63.2  | 61.2  | 60.7  | 60.7  |
| 127.5° | 55.1 | 54.6 | 53.6 | 54.1  | 54.5  | 54.6  | 54.6  | 55.1  | 53.1  | 53.6  | 54.1  |
| 130°   | 49.0 | 49.0 | 48.0 | 48.0  | 48.0  | 48.0  | 47.0  | 48.0  | 47.0  | 47.5  | 48.0  |
| 132.5° | 43.5 | 43.5 | 42.0 | 41.5  | 41.5  | 41.5  | 41.5  | 42.0  | 41.5  | 42.5  | 43.5  |
| 135°   | 38.9 | 38.9 | 37.4 | 37.9  | 37.9  | 37.9  | 37.4  | 37.9  | 37.4  | 38.4  | 38.9  |
| 137.5° | 35.4 | 35.4 | 34.4 | 34.4  | 34.4  | 34.4  | 33.9  | 34.4  | 34.4  | 34.9  | 35.9  |
| 140°   | 32.4 | 32.4 | 31.8 | 31.8  | 31.4  | 31.3  | 31.8  | 31.8  | 31.8  | 32.4  | 32.9  |
| 142.5° | 30.8 | 30.3 | 29.8 | 29.3  | 29.7  | 29.8  | 29.8  | 29.8  | 29.3  | 29.8  | 30.8  |
| 145°   | 28.3 | 28.3 | 27.8 | 27.8  | 27.8  | 27.8  | 28.3  | 27.8  | 27.8  | 28.3  | 28.3  |
| 147.5° | 26.8 | 26.8 | 26.3 | 26.8  | 26.8  | 26.8  | 26.8  | 26.8  | 26.3  | 26.8  | 26.8  |
| 150°   | 26.3 | 25.8 | 25.3 | 25.8  | 25.8  | 25.8  | 25.3  | 25.3  | 25.3  | 25.3  | 25.8  |
| 152.5° | 24.8 | 24.8 | 24.3 | 24.8  | 24.4  | 24.3  | 24.3  | 24.3  | 24.3  | 24.3  | 24.8  |
| 155°   | 23.8 | 23.8 | 23.3 | 23.8  | 23.8  | 23.8  | 23.8  | 23.8  | 23.8  | 23.8  | 23.8  |
| 157.5° | 22.7 | 23.3 | 22.7 | 22.7  | 22.7  | 22.7  | 22.7  | 22.7  | 22.7  | 22.7  | 23.3  |
| 160°   | 22.2 | 22.2 | 22.2 | 22.2  | 21.8  | 21.7  | 21.7  | 21.7  | 22.2  | 22.2  | 22.2  |
| 162.5° | 21.7 | 21.7 | 21.7 | 21.7  | 21.3  | 21.2  | 21.2  | 21.2  | 21.2  | 21.7  | 21.7  |
| 165°   | 21.7 | 21.2 | 21.2 | 21.2  | 20.8  | 20.7  | 20.7  | 20.7  | 20.7  | 21.2  | 21.7  |
| 167.5° | 20.7 | 20.7 | 20.7 | 20.7  | 20.7  | 20.7  | 20.2  | 20.2  | 20.7  | 20.7  | 20.7  |
| 170°   | 20.7 | 20.7 | 20.2 | 20.2  | 20.2  | 20.2  | 20.2  | 20.2  | 20.2  | 20.2  | 20.2  |
| 172.5° | 20.7 | 20.7 | 20.7 | 20.7  | 20.3  | 20.2  | 20.2  | 20.2  | 20.2  | 20.2  | 20.7  |
| 175°   | 20.7 | 20.7 | 20.7 | 20.7  | 20.3  | 20.2  | 20.2  | 20.2  | 20.7  | 20.7  | 20.7  |
| 177.5° | 20.7 | 20.7 | 20.7 | 20.7  | 20.3  | 20.2  | 20.7  | 20.7  | 20.7  | 20.7  | 20.7  |
| 180°   | 20.7 | 20.7 | 20.7 | 20.7  | 20.7  | 20.7  | 20.7  | 20.7  | 20.7  | 20.7  | 20.7  |

REPORT NUMBER: P834034

CATALOG NUMBER: TTN-D3-830-U-DL-CG-UPL1

**CANDELA DISTRIBUTION (continued):**

|        | 90°    | 95°    | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|--------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°     | 555.3  | 555.3  | 555.3 | 555.3 | 555.3 | 555.3 | 555.3 | 555.3 | 555.3 | 555.3 | 555.3 |
| 2.5°   | 550.1  | 544.9  | 539.7 | 529.4 | 524.2 | 519.0 | 513.8 | 508.6 | 508.6 | 508.6 | 508.6 |
| 5°     | 555.3  | 550.1  | 534.6 | 519.0 | 503.4 | 487.8 | 477.5 | 472.3 | 467.1 | 461.9 | 461.9 |
| 7.5°   | 555.3  | 544.9  | 524.2 | 503.4 | 487.8 | 467.1 | 451.5 | 435.9 | 425.6 | 420.4 | 420.4 |
| 10°    | 560.5  | 544.9  | 519.0 | 498.2 | 472.3 | 446.3 | 425.6 | 404.8 | 394.4 | 384.1 | 384.1 |
| 12.5°  | 570.9  | 555.3  | 519.0 | 493.0 | 461.9 | 430.8 | 404.8 | 384.1 | 368.5 | 358.1 | 358.1 |
| 15°    | 591.6  | 570.9  | 529.4 | 493.0 | 456.7 | 420.4 | 394.4 | 368.5 | 352.9 | 342.5 | 342.5 |
| 17.5°  | 622.8  | 596.8  | 544.9 | 493.0 | 451.5 | 415.2 | 384.1 | 358.1 | 337.3 | 327.0 | 327.0 |
| 20°    | 659.1  | 628.0  | 565.7 | 503.4 | 451.5 | 410.0 | 378.9 | 347.7 | 327.0 | 316.6 | 316.6 |
| 22.5°  | 711.0  | 664.3  | 591.6 | 519.0 | 461.9 | 415.2 | 373.7 | 342.5 | 321.8 | 311.4 | 311.4 |
| 25°    | 768.1  | 716.2  | 622.8 | 539.7 | 472.3 | 415.2 | 373.7 | 342.5 | 321.8 | 311.4 | 306.2 |
| 27.5°  | 830.4  | 773.3  | 659.1 | 560.5 | 482.7 | 425.6 | 378.9 | 342.5 | 321.8 | 311.4 | 311.4 |
| 30°    | 887.5  | 820.0  | 695.4 | 586.5 | 498.2 | 430.8 | 384.1 | 347.7 | 321.8 | 311.4 | 311.4 |
| 32.5°  | 949.7  | 871.9  | 731.8 | 612.4 | 513.8 | 441.1 | 389.2 | 352.9 | 327.0 | 316.6 | 311.4 |
| 35°    | 1012.0 | 923.8  | 768.1 | 633.2 | 529.4 | 451.5 | 394.4 | 358.1 | 332.2 | 321.8 | 321.8 |
| 37.5°  | 1079.5 | 980.9  | 804.4 | 659.1 | 544.9 | 461.9 | 404.8 | 363.3 | 337.3 | 327.0 | 327.0 |
| 40°    | 1152.2 | 1038.0 | 840.8 | 679.9 | 560.5 | 472.3 | 415.2 | 373.7 | 347.7 | 337.3 | 337.3 |
| 42.5°  | 1224.8 | 1100.3 | 882.3 | 705.8 | 576.1 | 482.7 | 420.4 | 384.1 | 358.1 | 347.7 | 347.7 |
| 45°    | 1297.5 | 1152.2 | 918.6 | 731.8 | 591.6 | 498.2 | 435.9 | 394.4 | 368.5 | 358.1 | 358.1 |
| 47.5°  | 1364.9 | 1209.2 | 949.7 | 747.3 | 607.2 | 508.6 | 441.1 | 404.8 | 378.9 | 373.7 | 368.5 |
| 50°    | 1411.6 | 1245.6 | 970.5 | 762.9 | 612.4 | 513.8 | 451.5 | 410.0 | 389.2 | 378.9 | 378.9 |
| 52.5°  | 1448.0 | 1281.9 | 986.1 | 773.3 | 617.6 | 519.0 | 456.7 | 420.4 | 399.6 | 389.2 | 384.1 |
| 55°    | 1468.7 | 1287.1 | 986.1 | 762.9 | 612.4 | 519.0 | 456.7 | 420.4 | 399.6 | 389.2 | 389.2 |
| 57.5°  | 1448.0 | 1261.1 | 965.3 | 742.2 | 596.8 | 503.4 | 441.1 | 410.0 | 389.2 | 384.1 | 378.9 |
| 60°    | 1406.5 | 1219.6 | 923.8 | 711.0 | 570.9 | 477.5 | 420.4 | 394.4 | 378.9 | 373.7 | 368.5 |
| 62.5°  | 1349.4 | 1167.7 | 882.3 | 669.5 | 534.6 | 446.3 | 404.8 | 373.7 | 363.3 | 358.1 | 352.9 |
| 65°    | 1235.2 | 1069.1 | 814.8 | 617.6 | 487.8 | 410.0 | 368.5 | 347.7 | 337.3 | 327.0 | 321.8 |
| 67.5°  | 1110.6 | 960.1  | 721.4 | 555.3 | 430.8 | 368.5 | 332.2 | 311.4 | 295.8 | 295.8 | 290.6 |
| 70°    | 975.7  | 845.9  | 622.8 | 472.3 | 373.7 | 321.8 | 285.4 | 269.9 | 259.5 | 259.5 | 254.3 |
| 72.5°  | 814.8  | 711.0  | 519.0 | 384.1 | 306.2 | 264.7 | 238.7 | 223.2 | 218.0 | 218.0 | 212.8 |
| 75°    | 653.9  | 560.5  | 410.0 | 301.0 | 238.7 | 207.6 | 186.8 | 176.5 | 171.3 | 171.3 | 166.1 |
| 77.5°  | 482.7  | 410.0  | 295.8 | 218.0 | 171.3 | 150.5 | 134.9 | 129.7 | 124.6 | 124.6 | 119.4 |
| 80°    | 321.8  | 269.9  | 192.0 | 140.1 | 103.8 | 93.4  | 83.0  | 83.0  | 77.8  | 83.0  | 77.8  |
| 82.5°  | 176.5  | 145.3  | 103.8 | 72.7  | 51.9  | 46.7  | 41.5  | 41.5  | 46.7  | 46.7  | 41.5  |
| 85°    | 67.5   | 51.9   | 36.3  | 20.8  | 15.6  | 15.6  | 15.6  | 15.6  | 15.6  | 15.6  | 10.4  |
| 87.5°  | 5.2    | 5.2    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 90°    | 2.5    | 2.5    | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 2.5   | 2.5   |
| 92.5°  | 2.5    | 2.5    | 3.0   | 3.0   | 4.0   | 3.5   | 4.0   | 3.5   | 2.5   | 2.5   | 2.5   |
| 95°    | 3.0    | 3.0    | 3.5   | 3.5   | 6.1   | 6.1   | 5.6   | 4.5   | 3.5   | 3.0   | 3.0   |
| 97.5°  | 4.0    | 4.5    | 5.1   | 5.1   | 10.1  | 16.7  | 9.1   | 5.6   | 4.5   | 4.5   | 4.0   |
| 100°   | 7.1    | 7.1    | 9.6   | 13.1  | 25.8  | 35.9  | 26.8  | 12.6  | 7.1   | 7.1   | 6.6   |
| 102.5° | 23.3   | 24.3   | 30.3  | 44.0  | 46.5  | 55.1  | 60.7  | 40.9  | 27.3  | 22.2  | 21.2  |
| 105°   | 55.6   | 55.6   | 60.2  | 69.8  | 76.8  | 83.4  | 84.9  | 68.2  | 57.6  | 53.6  | 54.1  |
| 107.5° | 73.8   | 74.3   | 79.4  | 90.5  | 114.2 | 112.7 | 96.6  | 83.9  | 74.8  | 71.3  | 71.3  |
| 110°   | 90.5   | 91.5   | 98.1  | 111.7 | 129.4 | 130.4 | 107.7 | 91.0  | 83.4  | 80.4  | 80.4  |

REPORT NUMBER: P834034

CATALOG NUMBER: TTN-D3-830-U-DL-CG-UPL1

**CANDELA DISTRIBUTION (continued):**

|        | 90°   | 95°   | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165° | 175° | 180° |
|--------|-------|-------|-------|-------|-------|-------|-------|-------|------|------|------|
| 112.5° | 103.1 | 104.1 | 109.2 | 115.3 | 122.3 | 126.9 | 116.8 | 98.6  | 86.9 | 82.9 | 82.4 |
| 115°   | 99.6  | 98.6  | 100.6 | 104.6 | 110.2 | 115.3 | 111.2 | 101.1 | 90.0 | 85.4 | 85.4 |
| 117.5° | 86.9  | 88.5  | 89.5  | 92.5  | 100.1 | 102.6 | 99.6  | 93.0  | 86.9 | 85.9 | 84.4 |
| 120°   | 77.3  | 78.4  | 78.9  | 81.4  | 86.4  | 87.5  | 85.9  | 82.4  | 79.4 | 78.4 | 78.4 |
| 122.5° | 68.2  | 69.3  | 69.3  | 70.3  | 74.3  | 75.3  | 73.8  | 71.3  | 69.8 | 70.3 | 69.8 |
| 125°   | 60.2  | 60.7  | 60.7  | 61.2  | 63.2  | 62.7  | 63.2  | 61.7  | 60.7 | 61.2 | 61.2 |
| 127.5° | 53.6  | 54.1  | 53.6  | 53.1  | 55.1  | 54.6  | 54.6  | 54.1  | 53.6 | 54.6 | 55.1 |
| 130°   | 48.5  | 48.0  | 47.5  | 47.0  | 48.0  | 47.0  | 48.0  | 48.0  | 48.0 | 49.0 | 49.0 |
| 132.5° | 43.5  | 43.5  | 42.5  | 41.5  | 42.0  | 41.5  | 41.5  | 41.5  | 42.0 | 43.5 | 43.5 |
| 135°   | 38.9  | 38.9  | 38.4  | 37.4  | 37.9  | 37.4  | 37.9  | 37.9  | 37.4 | 38.9 | 38.9 |
| 137.5° | 36.4  | 35.9  | 34.9  | 34.4  | 34.4  | 33.9  | 34.4  | 34.4  | 34.4 | 35.4 | 35.4 |
| 140°   | 32.9  | 32.9  | 32.4  | 31.8  | 31.8  | 31.8  | 31.3  | 31.8  | 31.8 | 32.4 | 32.4 |
| 142.5° | 30.8  | 30.8  | 29.8  | 29.3  | 29.8  | 29.8  | 29.8  | 29.3  | 29.8 | 30.3 | 30.8 |
| 145°   | 28.8  | 28.3  | 28.3  | 27.8  | 27.8  | 28.3  | 27.8  | 27.8  | 27.8 | 28.3 | 28.3 |
| 147.5° | 27.3  | 26.8  | 26.8  | 26.3  | 26.8  | 26.8  | 26.8  | 26.8  | 26.3 | 26.8 | 26.8 |
| 150°   | 25.8  | 25.8  | 25.3  | 25.3  | 25.3  | 25.3  | 25.8  | 25.8  | 25.3 | 25.8 | 26.3 |
| 152.5° | 25.3  | 24.8  | 24.3  | 24.3  | 24.3  | 24.3  | 24.3  | 24.8  | 24.3 | 24.8 | 24.8 |
| 155°   | 23.8  | 23.8  | 23.8  | 23.8  | 23.8  | 23.8  | 23.8  | 23.8  | 23.3 | 23.8 | 23.8 |
| 157.5° | 23.3  | 23.3  | 22.7  | 22.7  | 22.7  | 22.7  | 22.7  | 22.7  | 22.7 | 23.3 | 22.7 |
| 160°   | 22.7  | 22.2  | 22.2  | 22.2  | 21.7  | 21.7  | 21.7  | 22.2  | 22.2 | 22.2 | 22.2 |
| 162.5° | 22.2  | 21.7  | 21.7  | 21.2  | 21.2  | 21.2  | 21.2  | 21.7  | 21.7 | 21.7 | 21.7 |
| 165°   | 21.2  | 21.7  | 21.2  | 20.7  | 20.7  | 20.7  | 20.7  | 21.2  | 21.2 | 21.2 | 21.7 |
| 167.5° | 21.2  | 20.7  | 20.7  | 20.7  | 20.2  | 20.2  | 20.7  | 20.7  | 20.7 | 20.7 | 20.7 |
| 170°   | 20.7  | 20.2  | 20.2  | 20.2  | 20.2  | 20.2  | 20.2  | 20.2  | 20.2 | 20.7 | 20.7 |
| 172.5° | 20.7  | 20.7  | 20.2  | 20.2  | 20.2  | 20.2  | 20.2  | 20.7  | 20.7 | 20.7 | 20.7 |
| 175°   | 20.2  | 20.7  | 20.7  | 20.7  | 20.2  | 20.2  | 20.2  | 20.7  | 20.7 | 20.7 | 20.7 |
| 177.5° | 20.7  | 20.7  | 20.7  | 20.7  | 20.7  | 20.7  | 20.2  | 20.7  | 20.7 | 20.7 | 20.7 |
| 180°   | 20.7  | 20.7  | 20.7  | 20.7  | 20.7  | 20.7  | 20.7  | 20.7  | 20.7 | 20.7 | 20.7 |

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

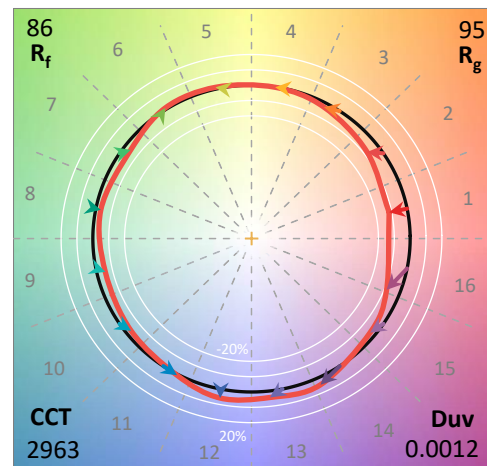
### Test Information

Test Method: LM-79-2019  
 Report Number: SP1-2411-284-4  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 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  
 R<sub>f</sub>: 86.1  
 R<sub>g</sub>: 94.9

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



### Test Conditions

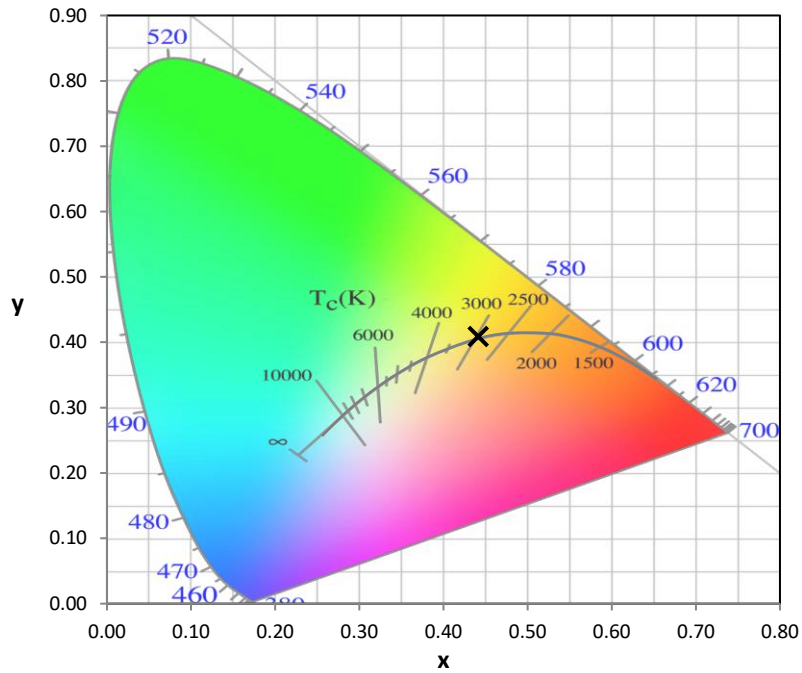
Stabilization Time: 37M  
 Operation Time: 1H 37M  
 Sphere Temperature (°C): 25.0

REPORT NUMBER: SP1-2411-284-4

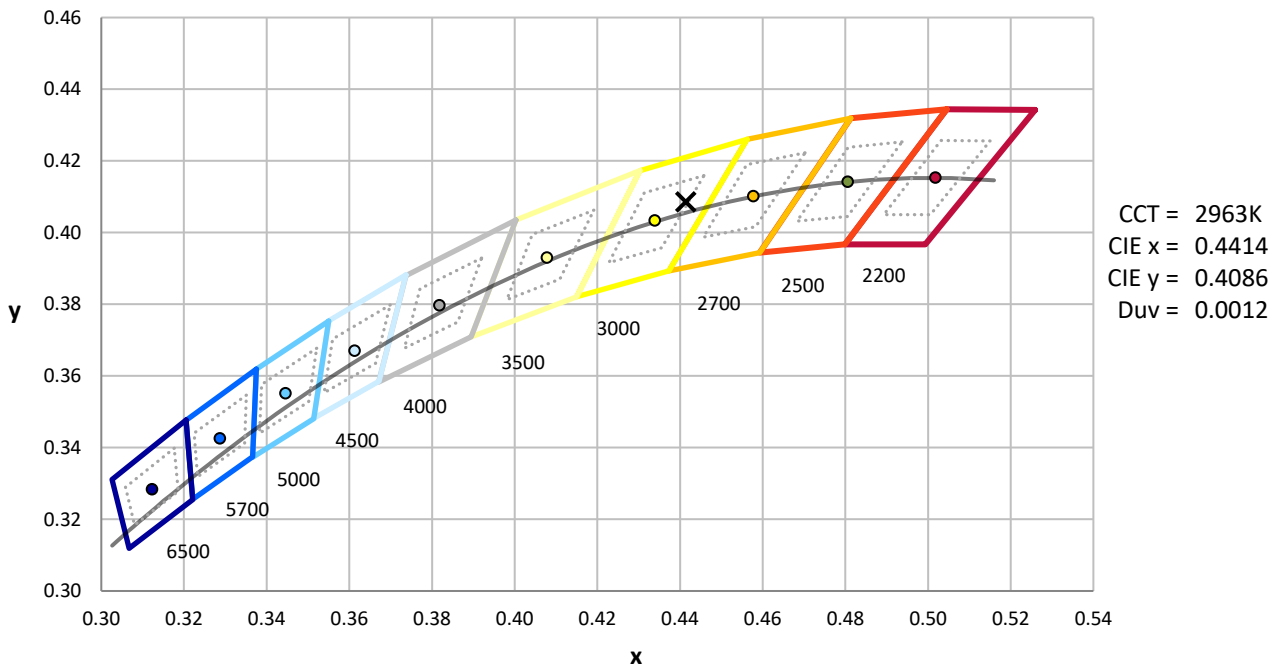
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 6/18/2024        | 12/18/2024           |
| Power Meter                    | INXT2011004           | 2/8/2024         | 2/8/2025             |
| AC Power Source                | IN0063                | 10/22/2024       | 10/22/2025           |
| DC Power Source                | IN0208                | 10/22/2024       | 10/22/2025           |
| Sphere Thermometer             | IN0085                | 10/22/2024       | 10/22/2025           |
| Room Thermometer               | IN0046                | 10/22/2024       | 10/22/2025           |

REPORT NUMBER: SP1-2411-284-4

**CIE 1931 Chromaticity Diagram**



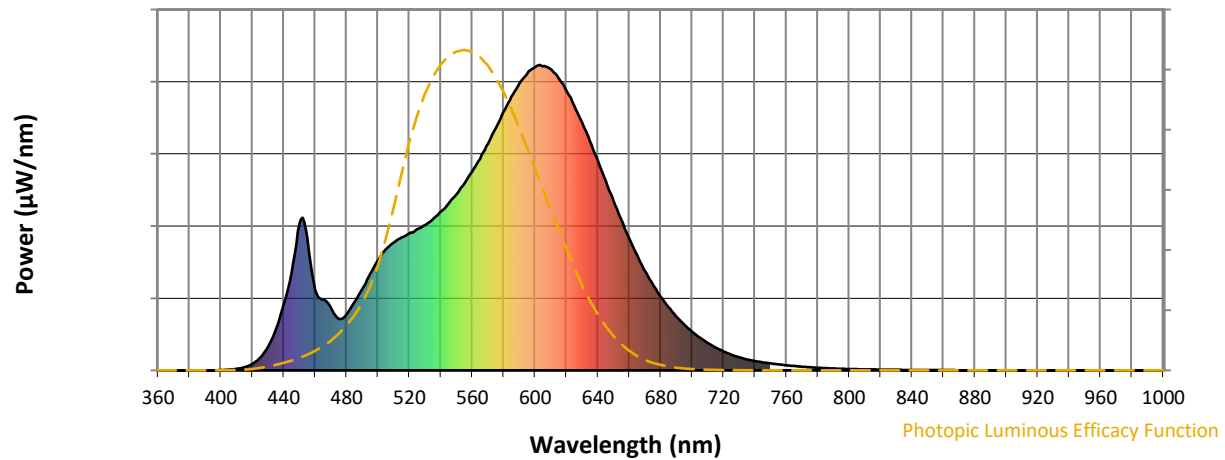
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 3000K 4-step quadrangle

REPORT NUMBER: SP1-2411-284-4

### Photopic Flux vs. Wavelength

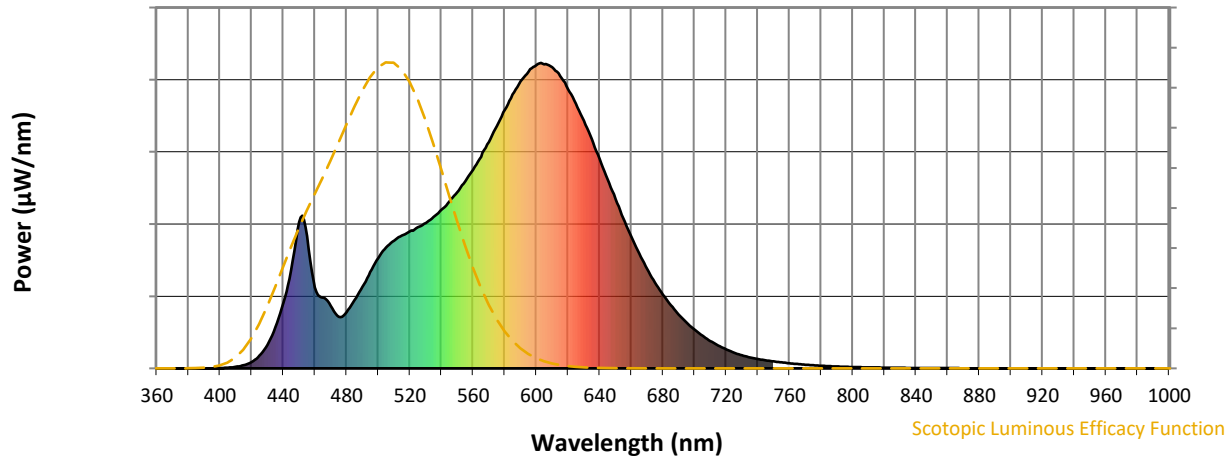


### Photopic Lumens: NR

| λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) |
|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|
| 360       | 0                           | NR               | 490       | 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



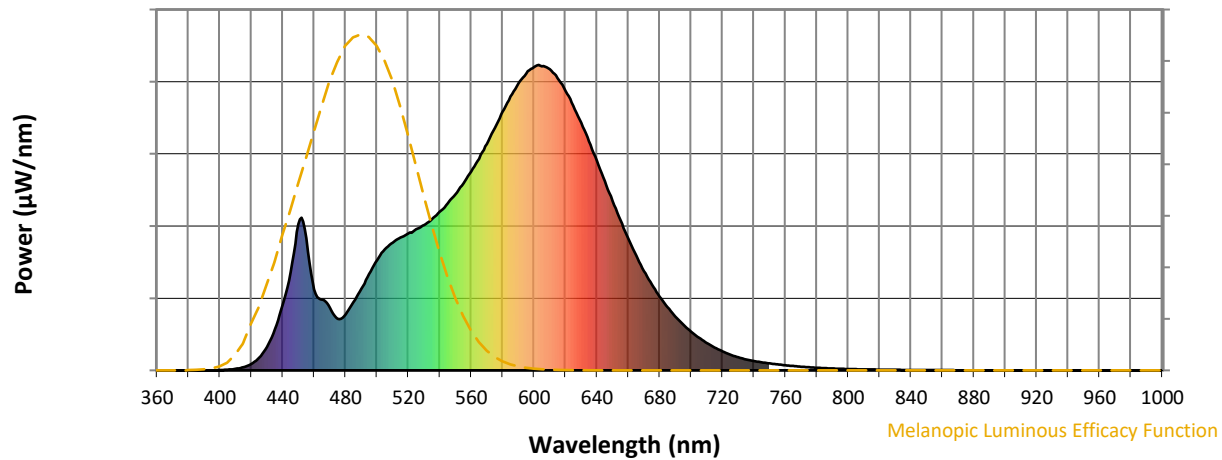
Scotopic Lumens: NR

S/P: 1.34

| λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(Φ/nm) |
|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|
| 360       | 0                           | NR               | 490       | 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

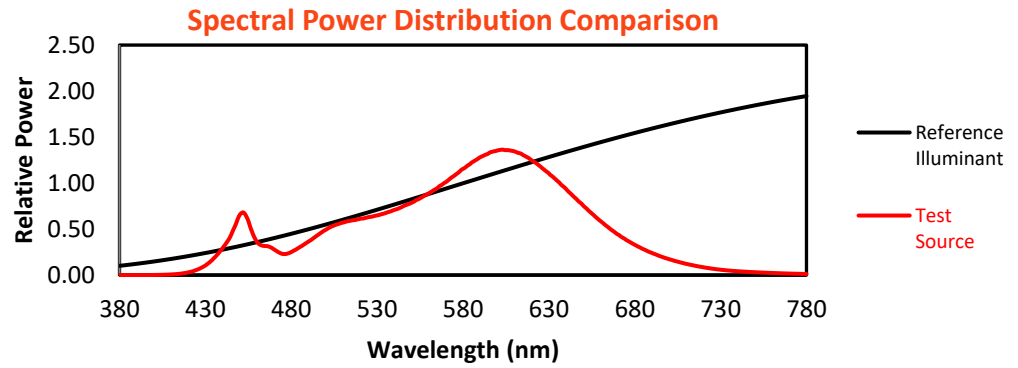
| λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) |
|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|
| 360       | 0                           | NR               | 490       | 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

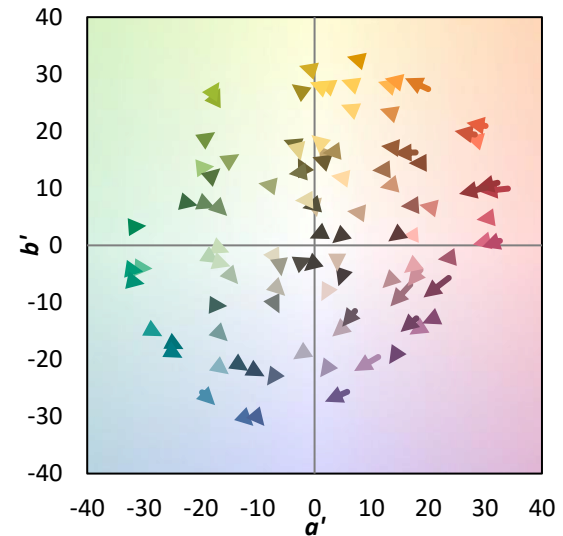
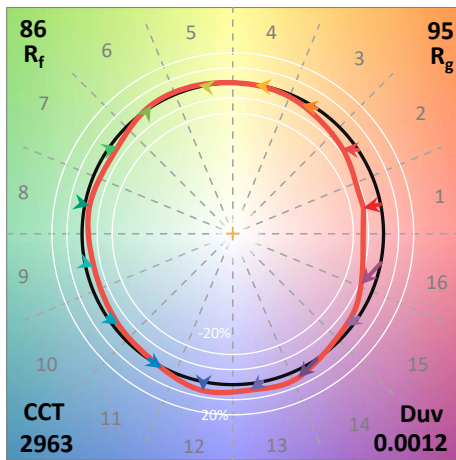
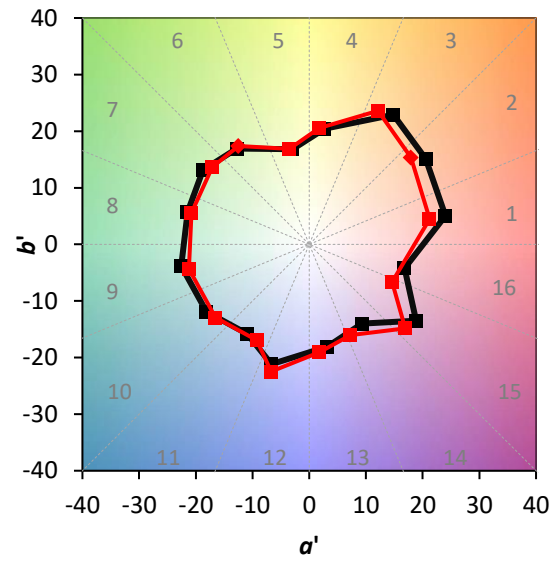
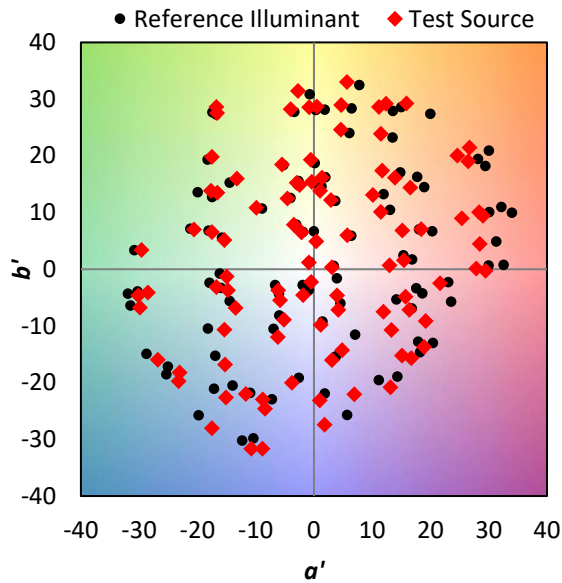
TM-30-18

### Summary

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

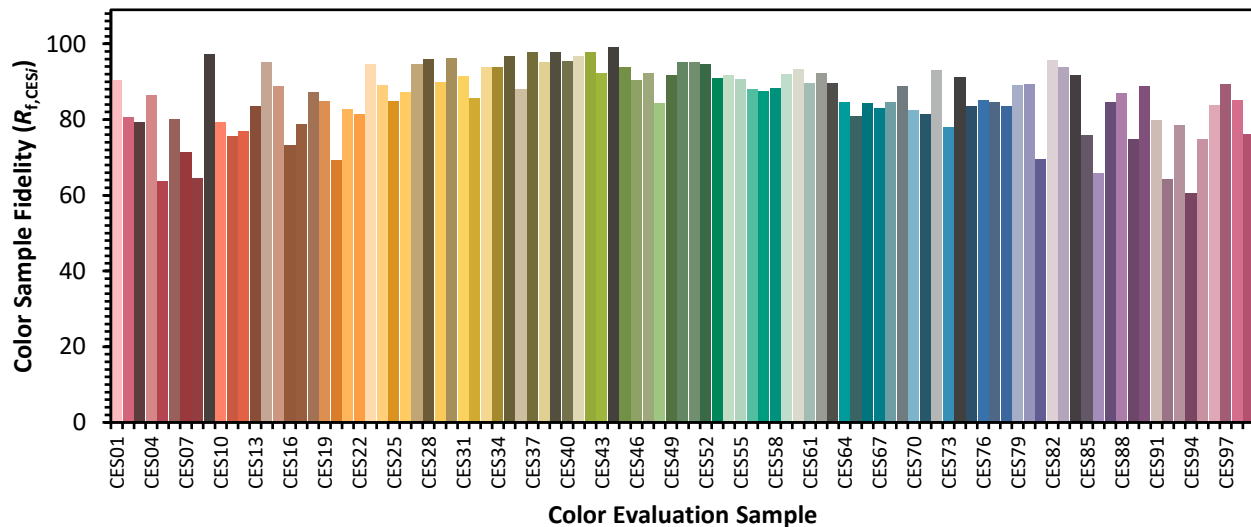


### Color Vector Graphics

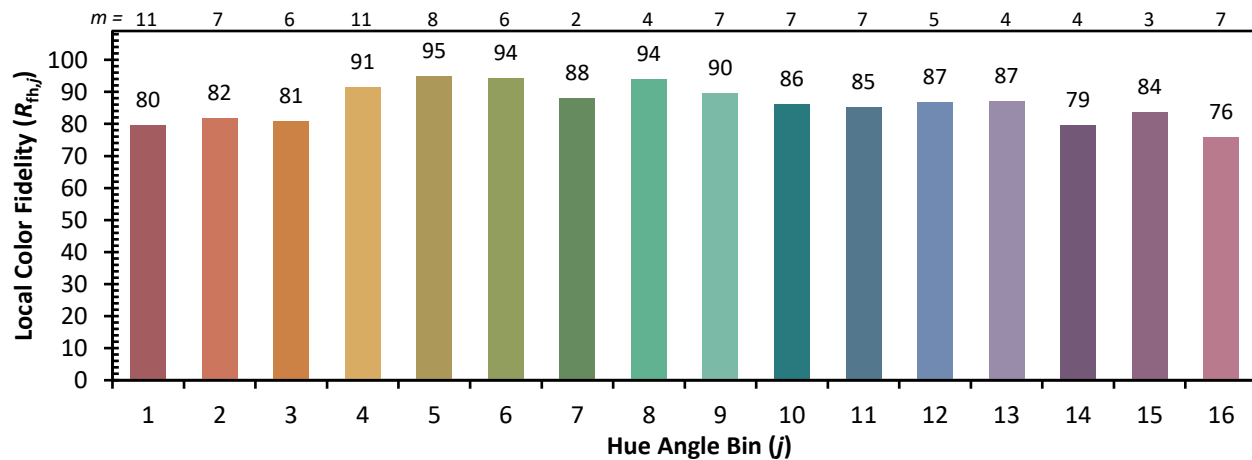
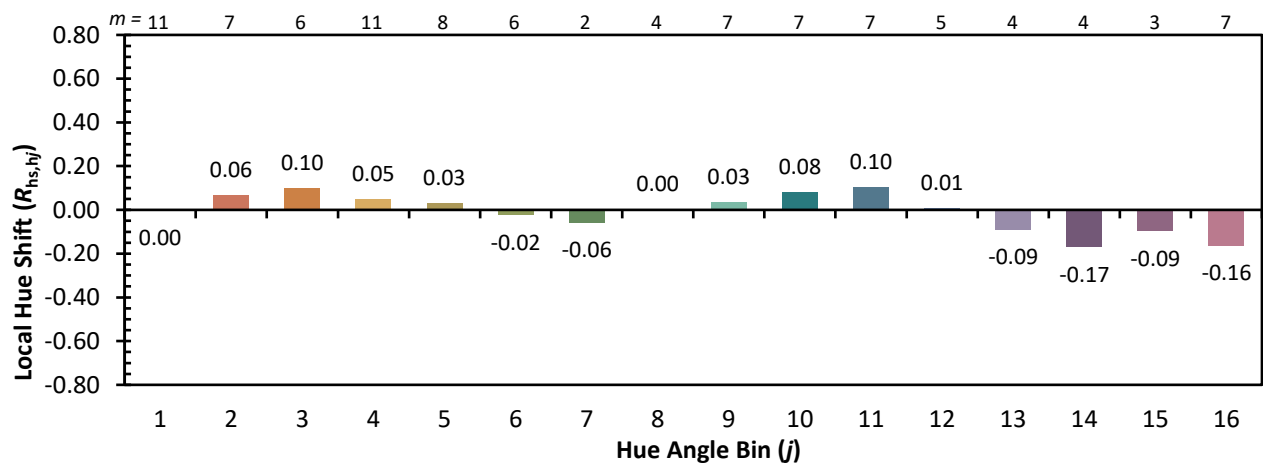
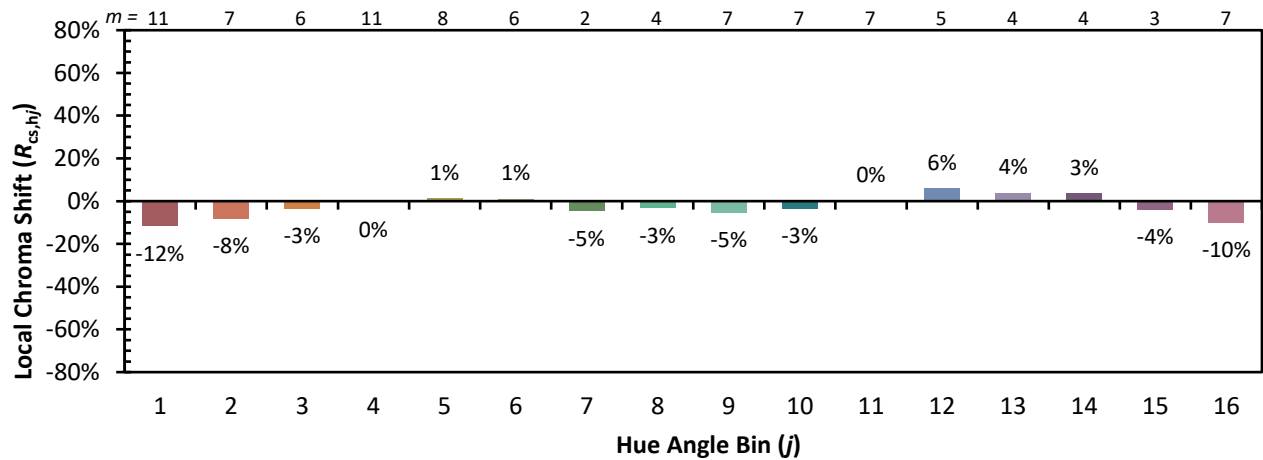


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

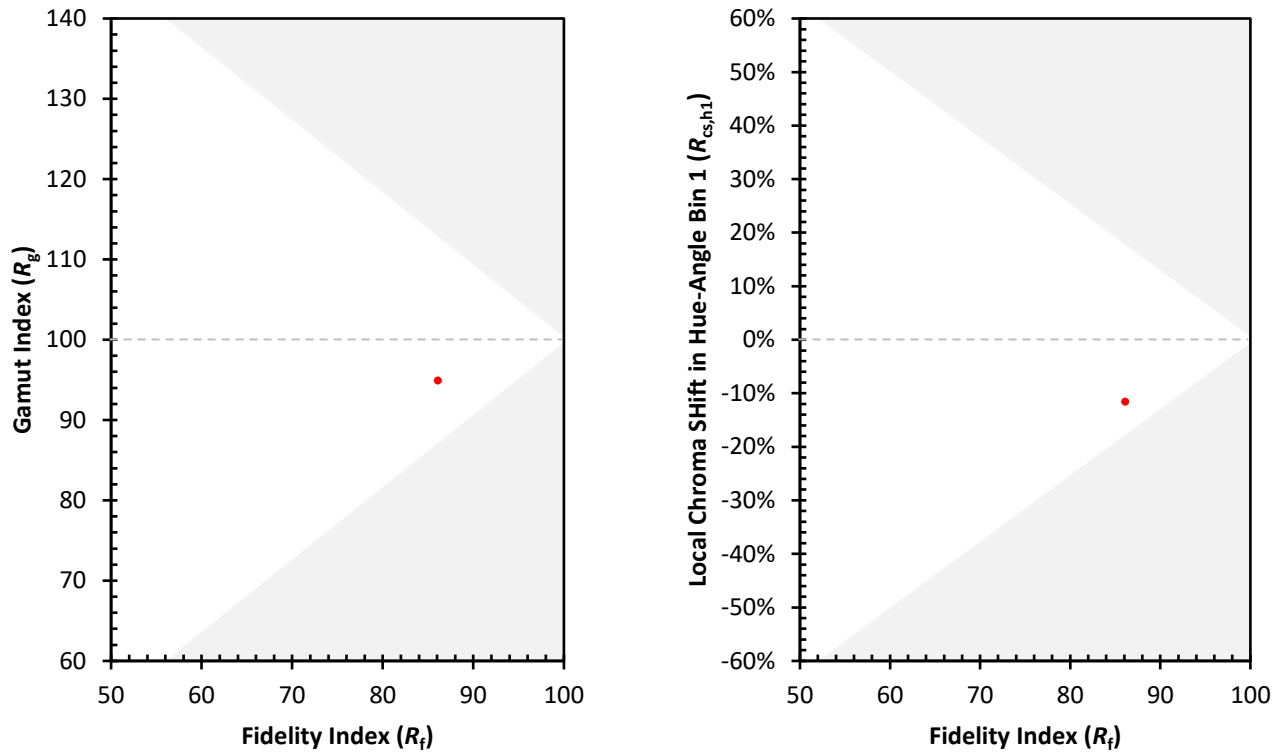
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 87 | CES51 = 95 | CES76 = 85 |
| CES02 = 63 | CES27 = 95 | CES52 = 95 | CES77 = 85 |
| CES03 = 31 | CES28 = 96 | CES53 = 91 | CES78 = 83 |
| CES04 = 70 | CES29 = 90 | CES54 = 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)