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: P821281

Luminaire Tested: **TT-D2-740-24VDC-DL-UPL**

Issue Date: 7/23/2020

Report Generated By 670245763

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Peachtree City, GA 30269

Scaled Data Report

**Test Information**

| | |
|---|---|
| Test Method: | LM-79-08 |
| Report Number: | P821281 |
| | REPORT IS FROM IESNA LM-79-08 TEST DATA - UPLIGHT (G2-2002-677-1) AND |
| Test Lab: | INNOVATION CENTER |
| Issue Date: | 7/23/2020 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS (FORMERLY EATON) |
| Product Line: | McGRAW-EDISON |
| Catalog Number: | TT-D2-740-24VDC-DL-UPL |
| Description: | TOPTIER LED PARKING GARAGE LUMINAIRE WITH UPLIGHT |
| | 4000K, 70 CRI LEDS AND DRIVE LANE DISTRIBUTION |
| Light Source: | - |
| Ballast/Driver: | ELECTRONIC DRIVER |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 5364.7 lumens |
| Efficiency: | N/A |
| Efficacy: | 141.2 lumens/watt |
| Luminous Opening: | Vertical Cylinder (Dia: 1.12' x H: 0.1') |
| IES Classification: | Type IV - Short |
| BUG Rating: | B2 - U4 - G3 |

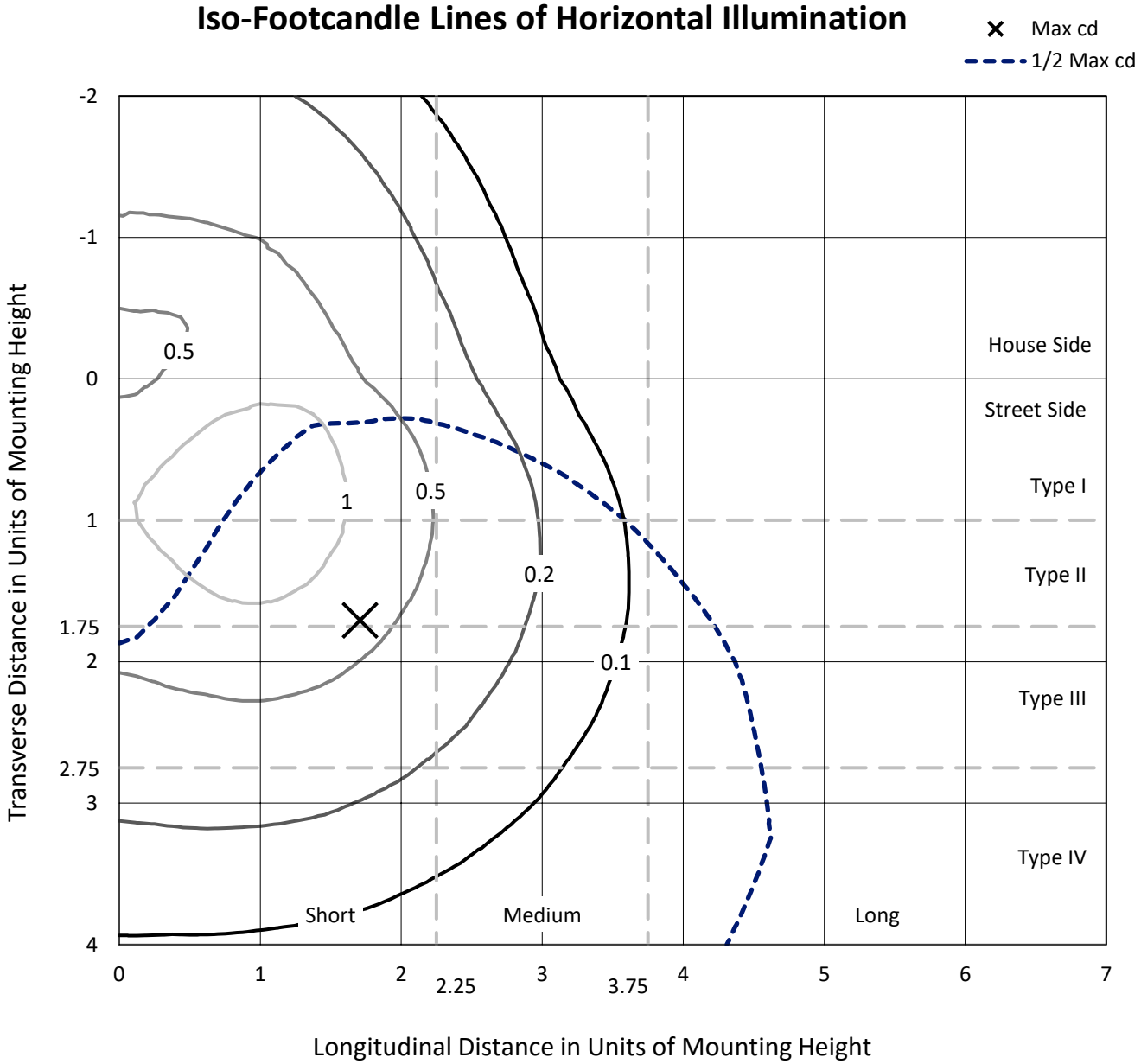
| | |
|---|---|
| Input Watts (W): | 38 |
| Input Voltage (V): | NR |
| Input Current (Ain): | NR |
| Voltage Rise (V): | NR |
| Power Factor: | NR |
| Total Harmonic Distortion (THDi): | NR |
| Frequency (hertz): | 60 |
| Stabilization Time: | NR |
| Operation Time: | NR |
| Ambient Temperature (°C): | NR |
| Test Distance: | 25 FT |

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## Iso-Footcandle Lines of Horizontal Illumination



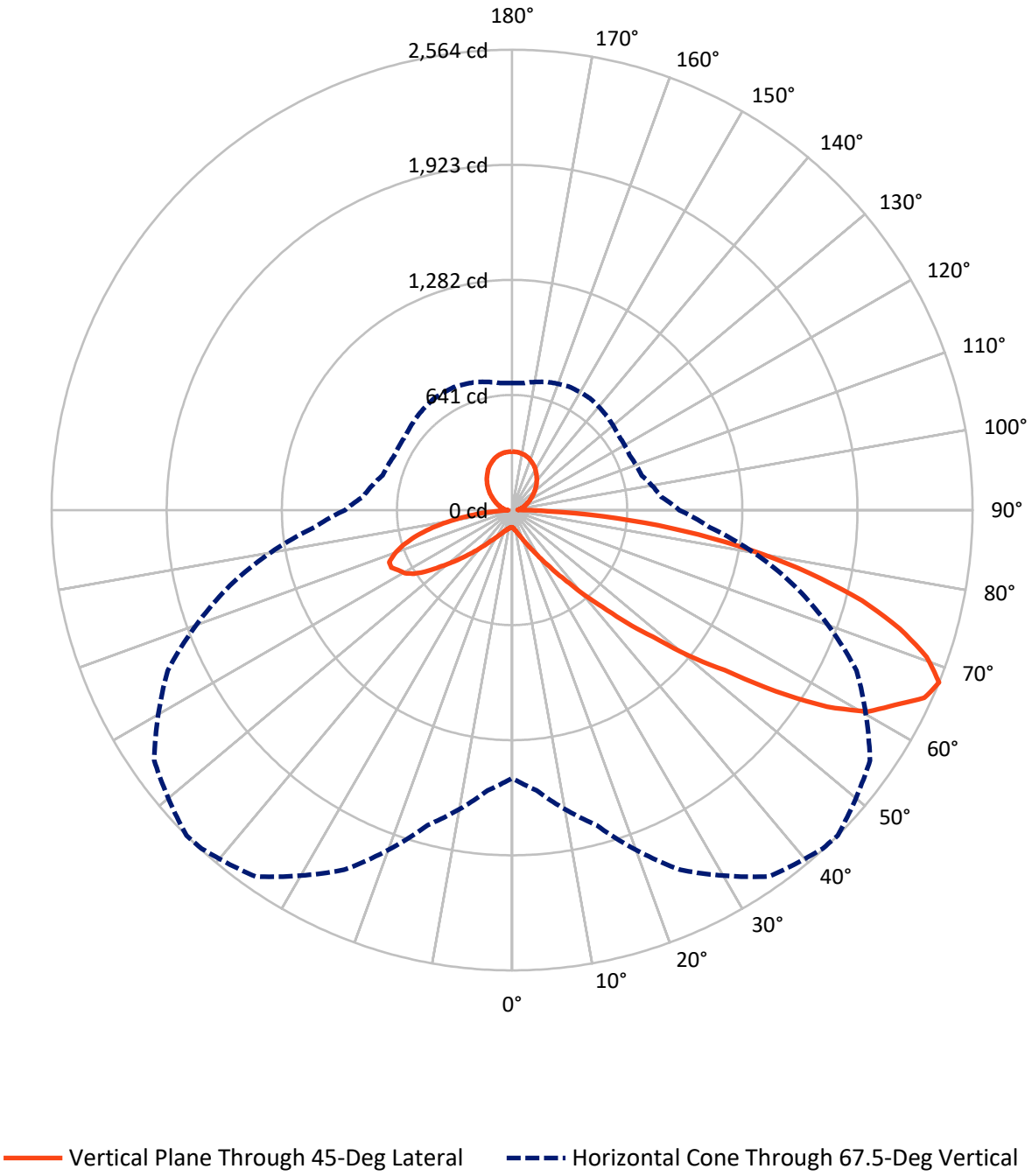

Based on 15 foot mounting height. Maximum calculated value = 1.5 fc
Type IV - Short - N/A

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## Luminous Intensity Polar Plot



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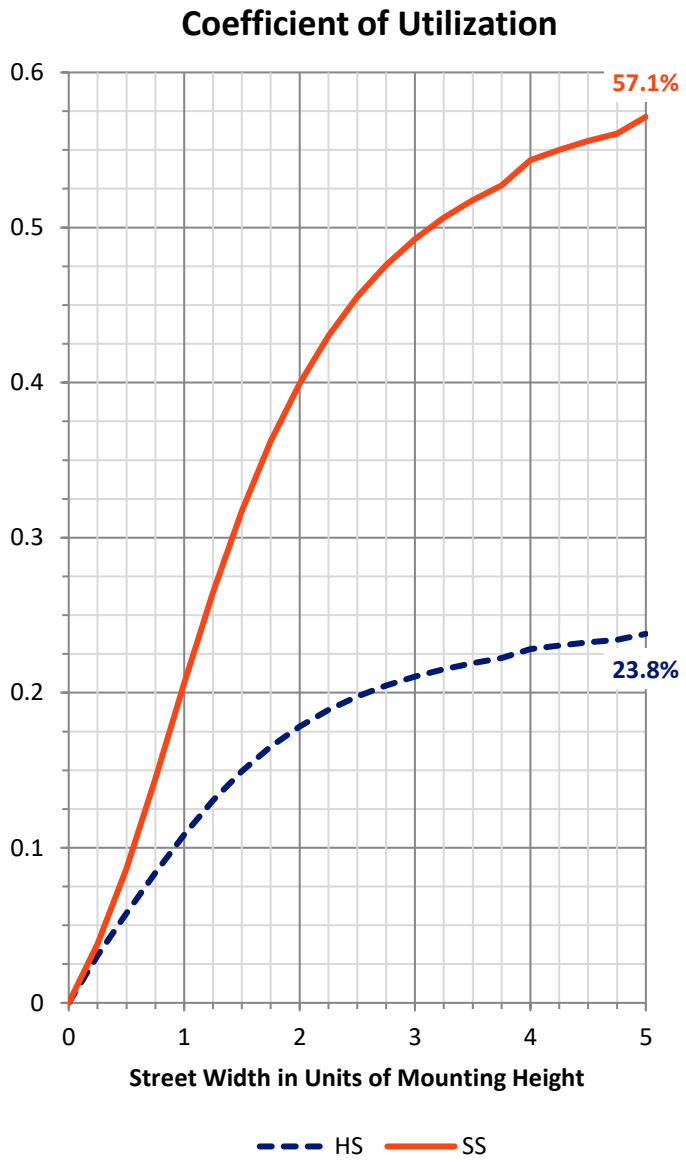
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**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 1306.1 | 442.7 | 1748.9 |
| | % Fixture | 24.3 | 8.3 | 32.6 |
| **Street Side** | Lumens | 3173.1 | 442.7 | 3615.8 |
| | % Fixture | 59.1 | 8.3 | 67.4 |
| **Total** | Lumens | 4479.2 | 885.5 | 5364.7 |
| | % Fixture | 83.5 | 16.5 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 10.0 | 0.2 |
| 10°-20° | 37.1 | 0.7 |
| 20°-30° | 87.8 | 1.6 |
| 30°-40° | 198.7 | 3.7 |
| 40°-50° | 442.9 | 8.3 |
| 50°-60° | 890.5 | 16.6 |
| 60°-70° | 1307.9 | 24.4 |
| 70°-80° | 1150.0 | 21.4 |
| 80°-90° | 354.4 | 6.6 |
| 90°-100° | 45.4 | 0.8 |
| 100°-110° | 70.3 | 1.3 |
| 110°-120° | 97.7 | 1.8 |
| 120°-130° | 126.6 | 2.4 |
| 130°-140° | 147.6 | 2.8 |
| 140°-150° | 149.5 | 2.8 |
| 150°-160° | 129.8 | 2.4 |
| 160°-170° | 87.7 | 1.6 |
| 170°-180° | 30.8 | 0.6 |
| 0°-90° | 4479.2 | 83.5 |
| 0°-180° | 5364.7 | 100.0 |



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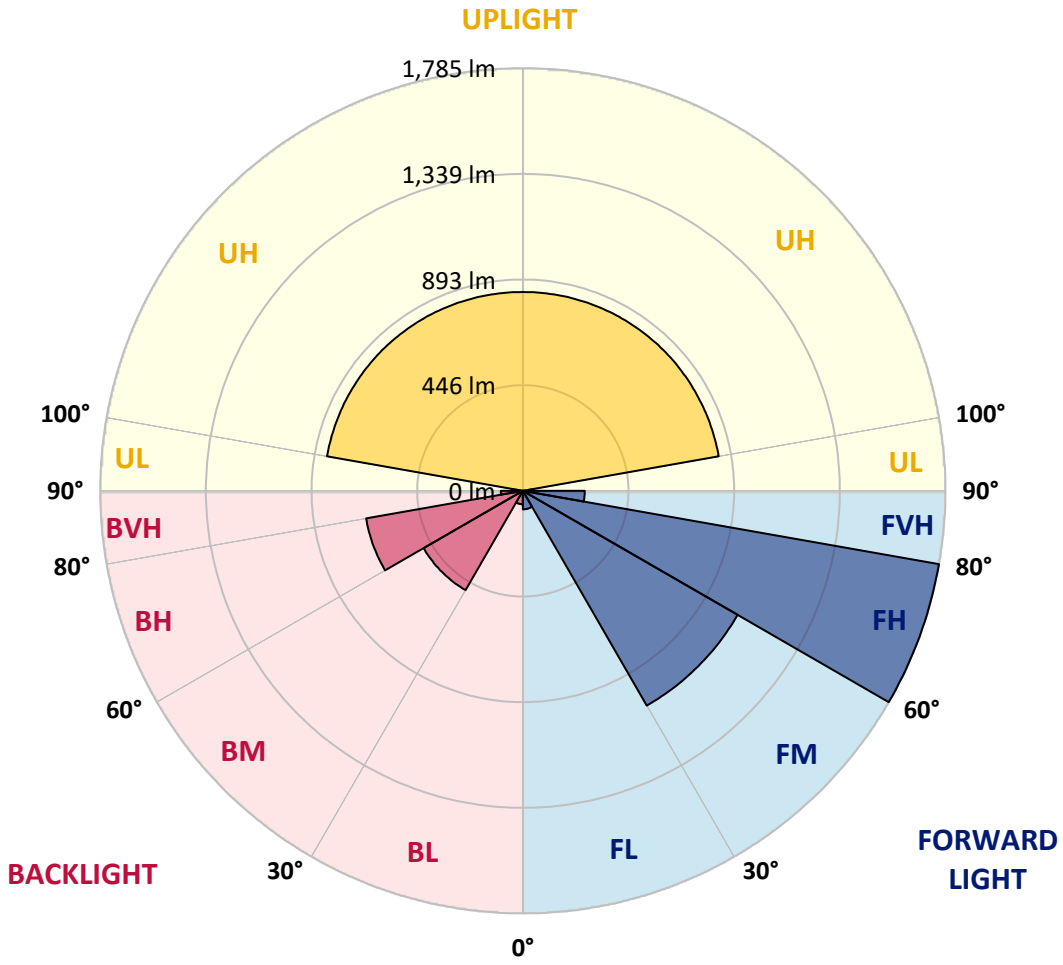
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## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 78.1 | 1.5 | | | |
| FM | (30°-60°) | 1047.9 | 19.5 | | | |
| FH | (60°-80°) | 1785.4 | 33.3 | | | G1/1800 |
| FVH | (80°-90°) | 261.5 | 4.9 | | | G3/500 |
| BL | (0°-30°) | 56.8 | 1.1 | B0/110 | | |
| BM | (30°-60°) | 484.1 | 9.0 | B1/1000 | | |
| BH | (60°-80°) | 672.5 | 12.5 | B2/1000 | | G2/1000 |
| BVH | (80°-90°) | 92.8 | 1.7 | | | G1/100 |
| UL | (90°-100°) | 45.4 | 0.8 | | U2/50 | |
| UH | (100°-180°) | 840.1 | 15.7 | | U4/1000 | |

**BUG Rating: B2-U4-G3**
Type IV Short



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**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 42.5° | 45° | 55° | 65° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 97.1 | 97.1 | 97.1 | 97.1 | 97.1 | 97.1 | *97.1* | 97.1 | 97.1 | 97.1 | 97.1 |
| 2.5° | 101.3 | 100.4 | 100.4 | 100.4 | 99.6 | 99.6 | *99.6* | 99.6 | 98.7 | 98.7 | 98.7 |
| 5° | 107.1 | 106.3 | 107.1 | 105.4 | 104.6 | 104.6 | *103.8* | 103.8 | 102.9 | 102.1 | 101.3 |
| 7.5° | 115.5 | 114.6 | 114.6 | 113.0 | 112.1 | 111.3 | *111.3* | 109.6 | 108.8 | 107.1 | 105.4 |
| 10° | 124.7 | 124.7 | 123.8 | 123.0 | 121.3 | 119.7 | *119.7* | 117.1 | 116.3 | 113.8 | 111.3 |
| 12.5° | 135.6 | 135.6 | 135.6 | 133.9 | 132.2 | 131.4 | *129.7* | 128.0 | 125.5 | 121.3 | 118.8 |
| 15° | 148.9 | 148.9 | 148.9 | 147.3 | 145.6 | 143.9 | *143.1* | 139.7 | 135.6 | 131.4 | 126.4 |
| 17.5° | 165.7 | 164.0 | 164.0 | 162.3 | 160.7 | 159.8 | *158.2* | 154.8 | 148.9 | 143.9 | 137.2 |
| 20° | 184.1 | 183.3 | 182.4 | 182.4 | 180.7 | 179.1 | *178.2* | 173.2 | 166.5 | 157.3 | 148.9 |
| 22.5° | 205.0 | 204.2 | 204.2 | 205.8 | 205.0 | 202.5 | *202.5* | 195.0 | 185.8 | 174.9 | 162.3 |
| 25° | 231.0 | 230.1 | 231.8 | 235.1 | 235.1 | 233.5 | *231.0* | 223.4 | 210.0 | 195.0 | 179.9 |
| 27.5° | 259.4 | 258.6 | 261.9 | 267.8 | 269.4 | 266.9 | *265.3* | 256.9 | 241.8 | 221.7 | 200.0 |
| 30° | 293.7 | 294.5 | 303.8 | 310.4 | 314.6 | 313.0 | *312.1* | 302.9 | 278.6 | 255.2 | 226.8 |
| 32.5° | 335.6 | 333.0 | 344.8 | 355.6 | 363.2 | 367.3 | *364.8* | 354.0 | 333.0 | 296.2 | 260.2 |
| 35° | 379.9 | 380.7 | 395.0 | 410.9 | 428.4 | 430.1 | *435.1* | 424.2 | 395.8 | 352.3 | 302.1 |
| 37.5° | 437.6 | 430.9 | 449.4 | 479.5 | 500.4 | 518.8 | *515.5* | 508.8 | 475.3 | 417.6 | 348.9 |
| 40° | 489.5 | 487.8 | 513.8 | 555.6 | 594.1 | 620.9 | *624.2* | 615.9 | 571.5 | 489.5 | 399.1 |
| 42.5° | 548.9 | 554.0 | 589.9 | 647.7 | 706.2 | 744.7 | *735.5* | 731.3 | 679.5 | 574.9 | 467.8 |
| 45° | 609.2 | 625.9 | 671.9 | 755.6 | 824.2 | 879.5 | *895.4* | 881.1 | 817.5 | 709.6 | 554.8 |
| 47.5° | 682.0 | 704.6 | 761.5 | 874.4 | 986.6 | 1051.0 | *1054.3* | 1097.0 | 1000.8 | 839.3 | 645.2 |
| 50° | 778.2 | 788.2 | 867.7 | 1005.8 | 1159.8 | 1250.2 | *1276.1* | 1276.9 | 1180.7 | 969.8 | 747.2 |
| 52.5° | 872.8 | 880.3 | 984.9 | 1163.1 | 1372.3 | 1475.2 | *1481.1* | 1513.7 | 1382.4 | 1180.7 | 893.7 |
| 55° | 986.6 | 983.2 | 1127.1 | 1341.4 | 1588.2 | 1738.0 | *1781.5* | 1825.9 | 1658.5 | 1347.2 | 977.4 |
| 57.5° | 1097.0 | 1092.0 | 1265.2 | 1546.4 | 1883.6 | 2032.5 | *2068.5* | 2036.7 | 1788.2 | 1416.7 | 1018.4 |
| 60° | 1199.1 | 1216.7 | 1427.6 | 1773.1 | 2112.0 | 2254.3 | *2278.6* | 2192.4 | 1871.9 | 1470.2 | 1044.3 |
| 62.5° | 1305.4 | 1340.5 | 1595.7 | 1962.3 | 2286.9 | 2389.0 | *2390.7* | 2289.4 | 2011.6 | 1574.0 | 1128.8 |
| 65° | 1405.0 | 1461.0 | 1726.3 | 2123.8 | 2409.1 | 2511.2 | *2522.9* | 2431.7 | 2148.9 | 1664.4 | 1143.0 |
| 67.5° | *1492.8* | *1567.3* | *1816.7* | *2210.8* | *2491.9* | *2558.0* | *2563.9* | *2432.5* | *2116.2* | *1627.5* | *1103.7* |
| 70° | 1563.9 | 1624.2 | 1872.7 | 2212.5 | 2434.2 | 2452.6 | *2448.4* | 2308.7 | 2025.9 | 1554.7 | 1037.6 |
| 72.5° | 1591.6 | 1640.9 | 1845.9 | 2108.7 | 2264.3 | 2260.2 | *2256.8* | 2127.9 | 1876.9 | 1433.4 | 942.2 |
| 75° | 1552.2 | 1566.5 | 1699.5 | 1886.9 | 1985.7 | 2009.1 | *2012.5* | 1896.2 | 1646.8 | 1253.5 | 808.3 |
| 77.5° | 1389.9 | 1382.4 | 1484.5 | 1608.3 | 1682.8 | 1699.5 | *1696.2* | 1599.1 | 1380.7 | 1041.8 | 677.8 |
| 80° | 1102.0 | 1117.9 | 1181.5 | 1263.5 | 1338.0 | 1356.4 | *1344.7* | 1271.1 | 1074.4 | 812.5 | 520.5 |
| 82.5° | 770.7 | 789.9 | 843.5 | 905.4 | 961.5 | 961.5 | *972.3* | 901.2 | 761.5 | 583.2 | 364.0 |
| 85° | 415.9 | 405.0 | 463.6 | 533.9 | 574.0 | 581.6 | *585.7* | 562.3 | 471.1 | 352.3 | 215.9 |
| 87.5° | 68.6 | 73.6 | 91.2 | 139.7 | 159.0 | 184.1 | *195.8* | 153.1 | 92.9 | 59.4 | 43.5 |
| 90° | 32.0 | 31.0 | 31.0 | 31.0 | 31.0 | 31.0 | *31.0* | 31.0 | 31.0 | 31.0 | 31.0 |
| 92.5° | 37.0 | 37.0 | 36.0 | 36.0 | 36.0 | 36.0 | *36.0* | 36.0 | 36.0 | 36.0 | 36.0 |
| 95° | 42.0 | 42.0 | 42.0 | 41.0 | 41.0 | 41.0 | *41.0* | 41.0 | 41.0 | 41.0 | 41.0 |
| 97.5° | 48.0 | 48.0 | 47.0 | 47.0 | 47.0 | 47.0 | *47.0* | 47.0 | 47.0 | 47.0 | 47.0 |
| 100° | 53.0 | 53.0 | 53.0 | 53.0 | 53.0 | 53.0 | *53.0* | 53.0 | 53.0 | 53.0 | 53.0 |
| 102.5° | 60.0 | 59.0 | 60.0 | 60.0 | 59.0 | 59.0 | *59.0* | 59.0 | 60.0 | 60.0 | 60.0 |
| 105° | 66.0 | 66.0 | 66.0 | 66.0 | 66.0 | 66.0 | *66.0* | 66.0 | 67.0 | 66.0 | 66.0 |
| 107.5° | 73.0 | 73.0 | 73.0 | 74.0 | 74.0 | 74.0 | *74.0* | 74.0 | 74.0 | 73.0 | 74.0 |
| 110° | 80.0 | 80.0 | 81.0 | 81.0 | 81.0 | 81.0 | *81.0* | 81.0 | 81.0 | 81.0 | 81.0 |

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**CANDELA DISTRIBUTION (continued):**

| | 0° | 5° | 15° | 25° | 35° | 42.5° | 45° | 55° | 65° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 112.5° | 89.0 | 89.0 | 89.0 | 89.0 | 89.0 | 89.8 | *90.0* | 90.0 | 90.0 | 90.0 | 90.0 |
| 115° | 97.0 | 97.0 | 98.0 | 98.0 | 98.0 | 98.0 | *98.0* | 99.0 | 99.0 | 98.0 | 98.0 |
| 117.5° | 107.0 | 107.0 | 107.0 | 107.0 | 107.0 | 107.8 | *108.0* | 108.0 | 108.0 | 108.0 | 108.0 |
| 120° | 117.0 | 117.0 | 117.0 | 118.0 | 118.0 | 118.0 | *118.0* | 119.0 | 119.0 | 118.0 | 118.0 |
| 122.5° | 129.0 | 128.0 | 129.0 | 129.0 | 129.0 | 129.0 | *129.0* | 130.0 | 130.0 | 130.0 | 130.0 |
| 125° | 140.0 | 140.0 | 141.0 | 141.0 | 141.0 | 141.0 | *141.0* | 142.0 | 142.0 | 142.0 | 142.0 |
| 127.5° | 153.0 | 153.0 | 153.0 | 153.0 | 153.0 | 153.8 | *154.0* | 154.0 | 154.0 | 154.0 | 154.0 |
| 130° | 165.0 | 165.0 | 166.0 | 166.0 | 166.0 | 166.0 | *166.0* | 167.0 | 167.0 | 167.0 | 167.0 |
| 132.5° | 179.0 | 178.0 | 179.0 | 178.0 | 178.0 | 178.8 | *179.0* | 179.0 | 180.0 | 179.0 | 180.0 |
| 135° | 191.0 | 191.0 | 191.0 | 191.0 | 191.0 | 191.8 | *192.0* | 192.0 | 192.0 | 192.0 | 192.0 |
| 137.5° | 204.0 | 203.0 | 204.0 | 203.0 | 203.0 | 203.8 | *204.0* | 204.0 | 204.0 | 204.0 | 204.0 |
| 140° | 216.0 | 215.0 | 216.0 | 215.0 | 216.0 | 216.0 | *216.0* | 216.0 | 216.0 | 216.0 | 216.0 |
| 142.5° | 228.0 | 227.0 | 228.0 | 227.0 | 227.0 | 227.8 | *228.0* | 228.0 | 228.0 | 228.0 | 228.0 |
| 145° | 239.0 | 239.0 | 239.0 | 238.0 | 239.0 | 239.0 | *239.0* | 239.0 | 239.0 | 239.0 | 239.0 |
| 147.5° | 250.0 | 249.0 | 250.0 | 249.0 | 249.0 | 249.8 | *250.0* | 250.0 | 250.0 | 250.0 | 250.0 |
| 150° | 263.0 | 262.0 | 263.0 | 262.0 | 263.0 | 263.0 | *263.0* | 263.0 | 263.0 | 263.0 | 263.0 |
| 152.5° | 273.0 | 273.0 | 273.0 | 273.0 | 273.0 | 273.0 | *273.0* | 273.0 | 273.0 | 273.0 | 273.0 |
| 155° | 282.0 | 282.0 | 283.0 | 282.0 | 282.0 | 282.0 | *282.0* | 283.0 | 282.0 | 282.0 | 282.0 |
| 157.5° | 290.0 | 290.0 | 290.0 | 290.0 | 290.0 | 290.0 | *290.0* | 291.0 | 291.0 | 290.0 | 291.0 |
| 160° | 298.0 | 298.0 | 299.0 | 298.0 | 298.0 | 298.0 | *298.0* | 299.0 | 298.0 | 298.0 | 298.0 |
| 162.5° | 306.0 | 305.0 | 306.0 | 305.0 | 306.0 | 306.0 | *306.0* | 306.0 | 306.0 | 306.0 | 306.0 |
| 165° | 311.0 | 311.0 | 312.0 | 311.0 | 311.0 | 311.0 | *311.0* | 312.0 | 311.0 | 311.0 | 311.0 |
| 167.5° | 316.0 | 315.0 | 316.0 | 316.0 | 316.0 | 316.0 | *316.0* | 316.0 | 316.0 | 316.0 | 316.0 |
| 170° | 319.0 | 319.0 | 320.0 | 319.0 | 319.0 | 319.0 | *319.0* | 320.0 | 319.0 | 319.0 | 319.0 |
| 172.5° | 323.0 | 323.0 | 323.0 | 323.0 | 323.0 | 323.0 | *323.0* | 323.0 | 323.0 | 323.0 | 323.0 |
| 175° | 324.0 | 324.0 | 325.0 | 324.0 | 325.0 | 324.2 | *324.0* | 325.0 | 324.0 | 324.0 | 324.0 |
| 177.5° | 325.0 | 325.0 | 326.0 | 325.0 | 325.0 | 325.0 | *325.0* | 325.0 | 325.0 | 325.0 | 325.0 |
| 180° | 326.0 | 326.0 | 326.0 | 326.0 | 326.0 | 326.0 | *326.0* | 326.0 | 326.0 | 326.0 | 326.0 |

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**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 97.1 | 97.1 | 97.1 | 97.1 | 97.1 | 97.1 | 97.1 | 97.1 | 97.1 | 97.1 | 97.1 |
| 2.5° | 98.7 | 97.9 | 97.1 | 96.2 | 96.2 | 95.4 | 95.4 | 95.4 | 96.2 | 96.2 | 96.2 |
| 5° | 101.3 | 100.4 | 99.6 | 98.7 | 97.1 | 97.1 | 97.1 | 97.1 | 97.1 | 97.1 | 97.1 |
| 7.5° | 105.4 | 103.8 | 102.9 | 101.3 | 99.6 | 99.6 | 98.7 | 98.7 | 98.7 | 99.6 | 98.7 |
| 10° | 110.5 | 108.8 | 107.1 | 104.6 | 103.8 | 102.9 | 102.1 | 102.1 | 102.9 | 102.9 | 102.1 |
| 12.5° | 116.3 | 115.5 | 112.1 | 109.6 | 107.9 | 107.1 | 106.3 | 107.1 | 106.3 | 107.1 | 107.1 |
| 15° | 124.7 | 122.2 | 118.0 | 115.5 | 113.0 | 112.1 | 111.3 | 112.1 | 112.1 | 113.0 | 112.1 |
| 17.5° | 133.9 | 130.5 | 126.4 | 122.2 | 118.8 | 118.0 | 118.0 | 118.0 | 118.8 | 119.7 | 118.8 |
| 20° | 144.8 | 140.6 | 134.7 | 129.7 | 126.4 | 125.5 | 125.5 | 126.4 | 127.2 | 128.0 | 128.0 |
| 22.5° | 155.6 | 152.3 | 143.9 | 137.2 | 135.6 | 134.7 | 133.9 | 135.6 | 137.2 | 138.1 | 138.9 |
| 25° | 172.4 | 165.7 | 155.6 | 148.1 | 144.8 | 144.8 | 145.6 | 147.3 | 148.1 | 149.8 | 148.9 |
| 27.5° | 189.9 | 182.4 | 169.9 | 159.8 | 157.3 | 156.5 | 158.2 | 159.8 | 163.2 | 163.2 | 162.3 |
| 30° | 214.2 | 201.7 | 185.8 | 176.6 | 169.9 | 170.7 | 173.2 | 175.7 | 179.1 | 180.7 | 180.7 |
| 32.5° | 241.8 | 228.4 | 206.7 | 192.5 | 189.1 | 189.9 | 190.8 | 195.0 | 198.3 | 201.7 | 199.2 |
| 35° | 277.8 | 261.1 | 234.3 | 218.4 | 210.0 | 209.2 | 212.5 | 217.6 | 220.9 | 222.6 | 222.6 |
| 37.5° | 317.1 | 295.4 | 261.9 | 248.5 | 238.5 | 237.6 | 238.5 | 242.7 | 246.9 | 248.5 | 251.9 |
| 40° | 364.8 | 338.1 | 298.7 | 277.0 | 269.4 | 267.8 | 271.1 | 277.0 | 277.0 | 279.5 | 280.3 |
| 42.5° | 423.4 | 389.1 | 345.6 | 317.1 | 307.9 | 307.9 | 307.1 | 312.1 | 312.1 | 312.1 | 310.4 |
| 45° | 497.9 | 459.4 | 402.5 | 373.2 | 357.3 | 348.9 | 351.4 | 348.1 | 347.3 | 349.8 | 342.2 |
| 47.5° | 569.8 | 521.3 | 454.4 | 422.6 | 406.7 | 401.7 | 392.5 | 389.9 | 385.8 | 385.8 | 374.9 |
| 50° | 653.5 | 593.3 | 528.8 | 483.7 | 468.6 | 454.4 | 446.8 | 435.1 | 422.6 | 420.1 | 415.9 |
| 52.5° | 793.3 | 718.0 | 616.7 | 568.2 | 529.7 | 515.5 | 497.9 | 482.8 | 467.8 | 456.0 | 462.7 |
| 55° | 850.2 | 773.2 | 677.0 | 630.1 | 603.3 | 589.9 | 557.3 | 537.2 | 514.6 | 497.9 | 507.1 |
| 57.5° | 878.6 | 794.9 | 705.4 | 670.3 | 662.7 | 650.2 | 625.9 | 591.6 | 565.7 | 544.7 | 546.4 |
| 60° | 894.5 | 806.7 | 720.5 | 688.7 | 684.5 | 692.9 | 680.3 | 656.9 | 616.7 | 595.8 | 593.3 |
| 62.5° | 955.6 | 863.6 | 763.1 | 718.0 | 708.8 | 714.6 | 718.0 | 703.7 | 670.3 | 642.6 | 635.1 |
| 65° | 968.2 | 870.3 | 771.5 | 742.2 | 743.1 | 744.7 | 747.2 | 732.2 | 715.4 | 681.1 | 674.4 |
| 67.5° | *930.5* | *834.3* | *746.4* | *722.1* | *723.8* | *743.1* | *758.1* | *757.3* | *738.9* | *709.6* | *707.1* |
| 70° | 873.6 | 779.9 | 698.7 | 677.0 | 681.1 | 698.7 | 731.3 | 748.1 | 744.7 | 725.5 | 729.7 |
| 72.5° | 784.9 | 701.2 | 630.1 | 613.4 | 623.4 | 640.1 | 671.1 | 701.2 | 718.8 | 723.0 | 732.2 |
| 75° | 681.1 | 614.2 | 547.3 | 537.2 | 544.7 | 564.0 | 592.4 | 627.6 | 666.1 | 687.0 | 692.9 |
| 77.5° | 562.3 | 501.2 | 451.9 | 445.2 | 456.0 | 473.6 | 502.1 | 529.7 | 573.2 | 610.0 | 618.4 |
| 80° | 440.1 | 387.4 | 352.3 | 346.4 | 353.1 | 368.2 | 389.9 | 412.5 | 454.4 | 482.8 | 487.0 |
| 82.5° | 305.4 | 273.6 | 251.0 | 247.7 | 251.9 | 257.7 | 275.3 | 296.2 | 319.7 | 342.2 | 344.8 |
| 85° | 177.4 | 157.3 | 151.5 | 146.4 | 155.6 | 155.6 | 159.8 | 171.5 | 183.3 | 184.9 | 189.9 |
| 87.5° | 32.6 | 31.0 | 31.8 | 23.4 | 29.3 | 20.9 | 20.9 | 26.8 | 20.1 | 23.4 | 19.2 |
| 90° | 31.0 | 31.0 | 31.0 | 31.0 | 31.0 | 31.0 | 31.0 | 31.0 | 31.0 | 31.0 | 32.0 |
| 92.5° | 36.0 | 36.0 | 36.0 | 36.0 | 36.0 | 36.0 | 36.0 | 36.0 | 36.0 | 37.0 | 37.0 |
| 95° | 41.0 | 41.0 | 41.0 | 41.0 | 41.0 | 41.0 | 41.0 | 41.0 | 42.0 | 42.0 | 42.0 |
| 97.5° | 47.0 | 47.0 | 47.0 | 47.0 | 47.0 | 47.0 | 47.0 | 47.0 | 47.0 | 48.0 | 48.0 |
| 100° | 53.0 | 53.0 | 53.0 | 53.0 | 53.0 | 53.0 | 53.0 | 53.0 | 53.0 | 53.0 | 53.0 |
| 102.5° | 59.0 | 60.0 | 60.0 | 60.0 | 59.0 | 59.0 | 59.0 | 60.0 | 60.0 | 59.0 | 60.0 |
| 105° | 66.0 | 66.0 | 66.0 | 67.0 | 66.0 | 66.0 | 66.0 | 66.0 | 66.0 | 66.0 | 66.0 |
| 107.5° | 73.0 | 74.0 | 73.0 | 74.0 | 74.0 | 74.0 | 74.0 | 74.0 | 73.0 | 73.0 | 73.0 |
| 110° | 81.0 | 81.0 | 81.0 | 81.0 | 81.0 | 81.0 | 81.0 | 81.0 | 81.0 | 80.0 | 80.0 |

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

Scaled Data Report

REPORT NUMBER: P821281
CATALOG NUMBER: TT-D2-740-24VDC-DL-UPL

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 112.5° | 89.0 | 90.0 | 90.0 | 90.0 | 90.0 | 90.0 | 89.0 | 89.0 | 89.0 | 89.0 | 89.0 |
| 115° | 98.0 | 98.0 | 98.0 | 99.0 | 99.0 | 98.0 | 98.0 | 98.0 | 98.0 | 97.0 | 97.0 |
| 117.5° | 107.0 | 108.0 | 108.0 | 108.0 | 108.0 | 108.0 | 107.0 | 107.0 | 107.0 | 107.0 | 107.0 |
| 120° | 118.0 | 118.0 | 118.0 | 119.0 | 119.0 | 118.0 | 118.0 | 118.0 | 117.0 | 117.0 | 117.0 |
| 122.5° | 129.0 | 130.0 | 130.0 | 130.0 | 130.0 | 129.0 | 129.0 | 129.0 | 129.0 | 128.0 | 129.0 |
| 125° | 141.0 | 142.0 | 142.0 | 142.0 | 142.0 | 141.0 | 141.0 | 141.0 | 141.0 | 140.0 | 140.0 |
| 127.5° | 154.0 | 154.0 | 154.0 | 154.0 | 154.0 | 154.0 | 153.0 | 153.0 | 153.0 | 153.0 | 153.0 |
| 130° | 166.0 | 167.0 | 167.0 | 167.0 | 167.0 | 166.0 | 166.0 | 166.0 | 166.0 | 165.0 | 165.0 |
| 132.5° | 179.0 | 180.0 | 179.0 | 180.0 | 179.0 | 179.0 | 178.0 | 178.0 | 179.0 | 178.0 | 179.0 |
| 135° | 192.0 | 192.0 | 192.0 | 192.0 | 192.0 | 192.0 | 191.0 | 191.0 | 191.0 | 191.0 | 191.0 |
| 137.5° | 204.0 | 204.0 | 204.0 | 204.0 | 204.0 | 204.0 | 203.0 | 203.0 | 204.0 | 203.0 | 204.0 |
| 140° | 216.0 | 216.0 | 216.0 | 216.0 | 216.0 | 216.0 | 216.0 | 215.0 | 216.0 | 215.0 | 216.0 |
| 142.5° | 228.0 | 228.0 | 228.0 | 228.0 | 228.0 | 228.0 | 227.0 | 227.0 | 228.0 | 227.0 | 228.0 |
| 145° | 239.0 | 239.0 | 239.0 | 239.0 | 239.0 | 239.0 | 239.0 | 238.0 | 239.0 | 239.0 | 239.0 |
| 147.5° | 250.0 | 250.0 | 250.0 | 250.0 | 250.0 | 250.0 | 249.0 | 249.0 | 250.0 | 249.0 | 250.0 |
| 150° | 263.0 | 263.0 | 263.0 | 263.0 | 263.0 | 263.0 | 263.0 | 262.0 | 263.0 | 262.0 | 263.0 |
| 152.5° | 273.0 | 273.0 | 273.0 | 273.0 | 273.0 | 273.0 | 273.0 | 273.0 | 273.0 | 273.0 | 273.0 |
| 155° | 282.0 | 282.0 | 282.0 | 282.0 | 283.0 | 282.0 | 282.0 | 282.0 | 283.0 | 282.0 | 282.0 |
| 157.5° | 290.0 | 291.0 | 290.0 | 291.0 | 291.0 | 290.0 | 290.0 | 290.0 | 290.0 | 290.0 | 290.0 |
| 160° | 298.0 | 298.0 | 298.0 | 298.0 | 299.0 | 298.0 | 298.0 | 298.0 | 299.0 | 298.0 | 298.0 |
| 162.5° | 306.0 | 306.0 | 306.0 | 306.0 | 306.0 | 306.0 | 306.0 | 305.0 | 306.0 | 305.0 | 306.0 |
| 165° | 311.0 | 311.0 | 311.0 | 311.0 | 312.0 | 311.0 | 311.0 | 311.0 | 312.0 | 311.0 | 311.0 |
| 167.5° | 316.0 | 316.0 | 316.0 | 316.0 | 316.0 | 316.0 | 316.0 | 316.0 | 316.0 | 315.0 | 316.0 |
| 170° | 319.0 | 319.0 | 319.0 | 319.0 | 320.0 | 319.0 | 319.0 | 319.0 | 320.0 | 319.0 | 319.0 |
| 172.5° | 323.0 | 323.0 | 323.0 | 323.0 | 323.0 | 323.0 | 323.0 | 323.0 | 323.0 | 323.0 | 323.0 |
| 175° | 324.0 | 324.0 | 324.0 | 324.0 | 325.0 | 324.0 | 325.0 | 324.0 | 325.0 | 324.0 | 324.0 |
| 177.5° | 325.0 | 325.0 | 325.0 | 325.0 | 325.0 | 325.0 | 325.0 | 325.0 | 326.0 | 325.0 | 325.0 |
| 180° | 326.0 | 326.0 | 326.0 | 326.0 | 326.0 | 326.0 | 326.0 | 326.0 | 326.0 | 326.0 | 326.0 |

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

Streetworks

Report Number: SP1-2407-176-5

Test Date: 09/24/2024

Luminaire Tested: MEM2-HTN-VA-30-740-U-WQ

Data in this report applies to families of products including MEM2-HTN-VA-30-740-U-WQ

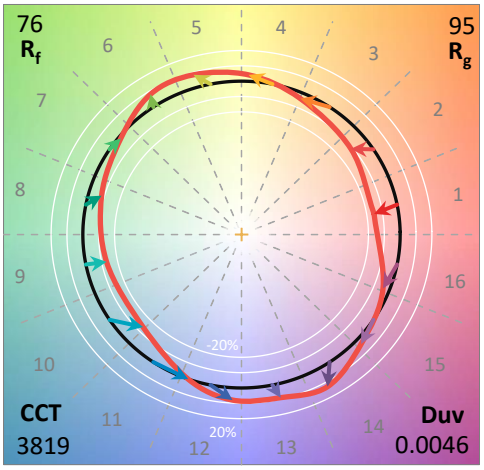
Report Generated By FNC07603 / LDUCLS01DT446
Version: v7.04

## Test Information

| | |
|---|---|
| Test Method: | LM-79-2019 |
| Report Number: | SP1-2407-176-5 |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Photometer: | SP1 - 76IN SPHERE |
| Measurement Geometry: | 4π |
| Issue Date: | 09/27/2024 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS |
| Product Line: | Streetworks |
| Catalog Number: | **MEM2-HTN-VA-30-740-U-WQ** |
| Description: | EPIC MODERN VISUAL COMFORT 30W WAVESTREAM WIDE |

## Spectral Parameters

| | | | | | |
|---|---|---|---|---|---|
| CCT (K): | 3819 | CRI (Ra): | 72.9 | | |
| CIE u': | 0.2261 | R1: | 70.1 | R9: | -21.5 |
| CIE v': | 0.5108 | R2: | 78.4 | R10: | 48.5 |
| Duv: | 0.0046 | R3: | 85.0 | R11: | 68.4 |
| CIE x: | 0.3926 | R4: | 72.9 | R12: | 39.0 |
| CIE y: | 0.3942 | R5: | 69.1 | R13: | 71.1 |
| CIE z: | 0.2132 | R6: | 69.2 | R14: | 91.3 |
| Peak Wavelength (nm): | 450 | R7: | 82.8 | R15: | 63.2 |
| Dominant Wavelength (nm): | 577 | R8: | 55.4 | | |
| Purity: | 36.15483 | | | | |
| Rf: | 75.6 | | | | |
| Rg: | 94.8 | | | | |




## Test Conditions

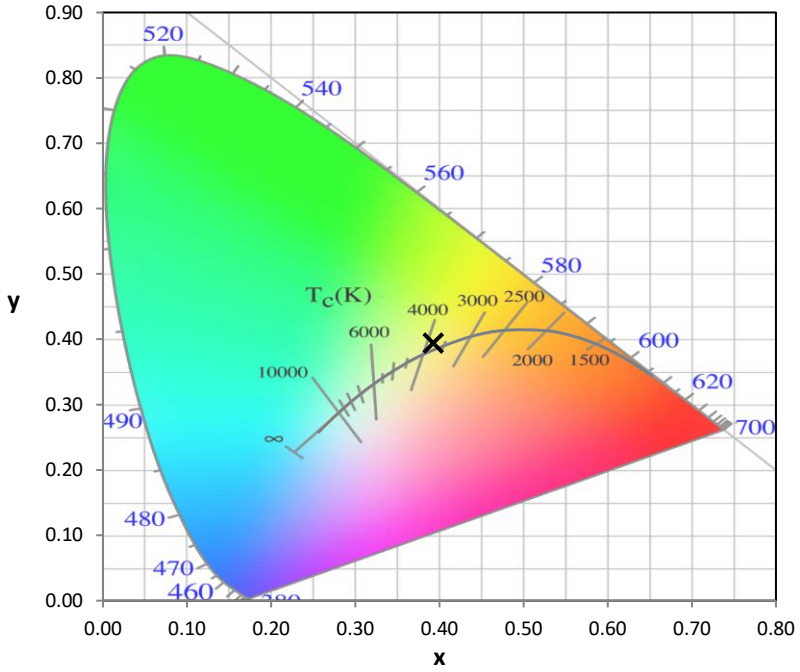
| | |
|---|---|
| Stabilization Time: | 30M |
| Operation Time: | 1H 30M |
| Sphere Temperature (°C): | 25.2 |

REPORT NUMBER: SP1-2407-176-5

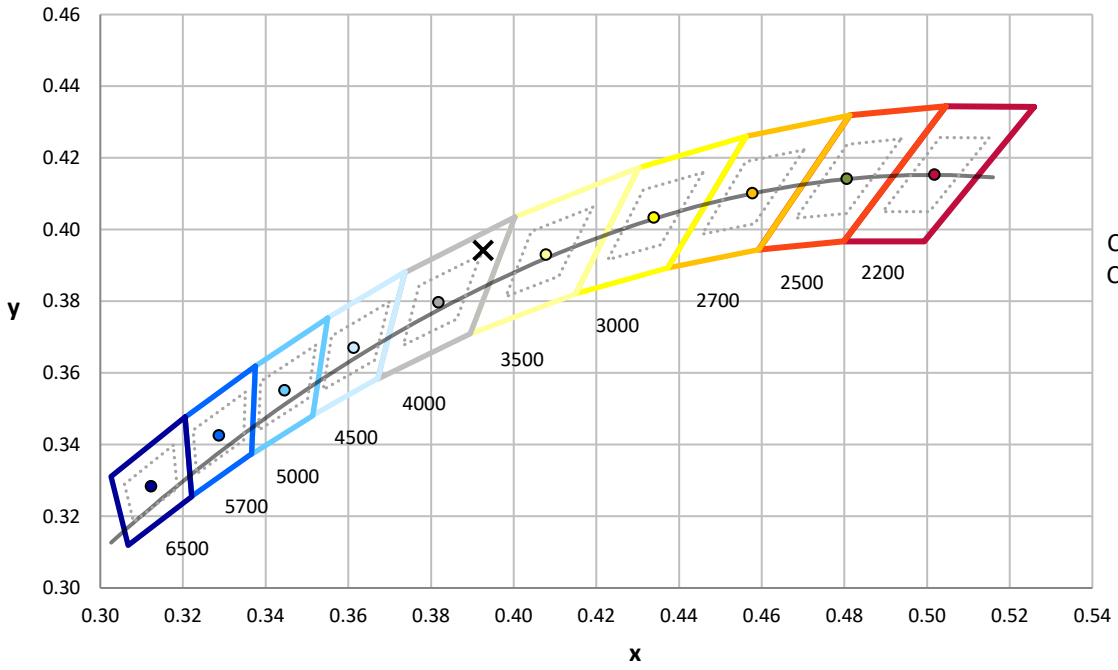
| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 6/18/2024 | 12/18/2024 |
| Power Meter | INXT2011004 | 2/8/2024 | 2/8/2025 |
| AC Power Source | IN0063 | 10/24/2023 | 10/24/2024 |
| DC Power Source | IN0208 | 10/24/2023 | 10/24/2024 |
| Sphere Thermometer | IN0085 | 10/24/2023 | 10/24/2024 |
| Room Thermometer | IN0046 | 10/24/2023 | 10/24/2024 |

REPORT NUMBER: SP1-2407-176-5

## CIE 1931 Chromaticity Diagram




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

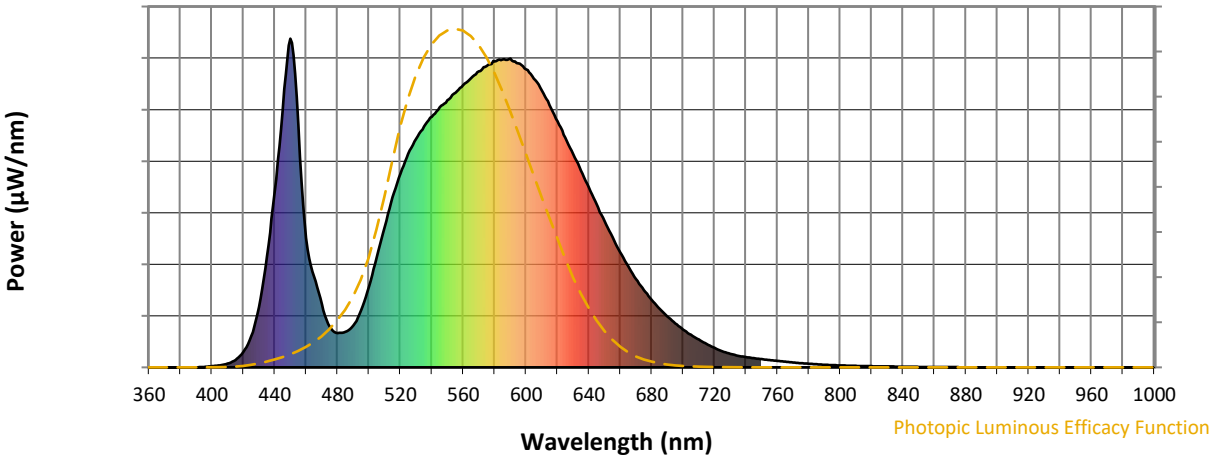



CCT = 3819K
CIE x = 0.3926
CIE y = 0.3942
Duv = 0.0046

Point lies inside the ANSI 4000K 7-step quadrangle

REPORT NUMBER: SP1-2407-176-5

## Photopic Flux vs. Wavelength

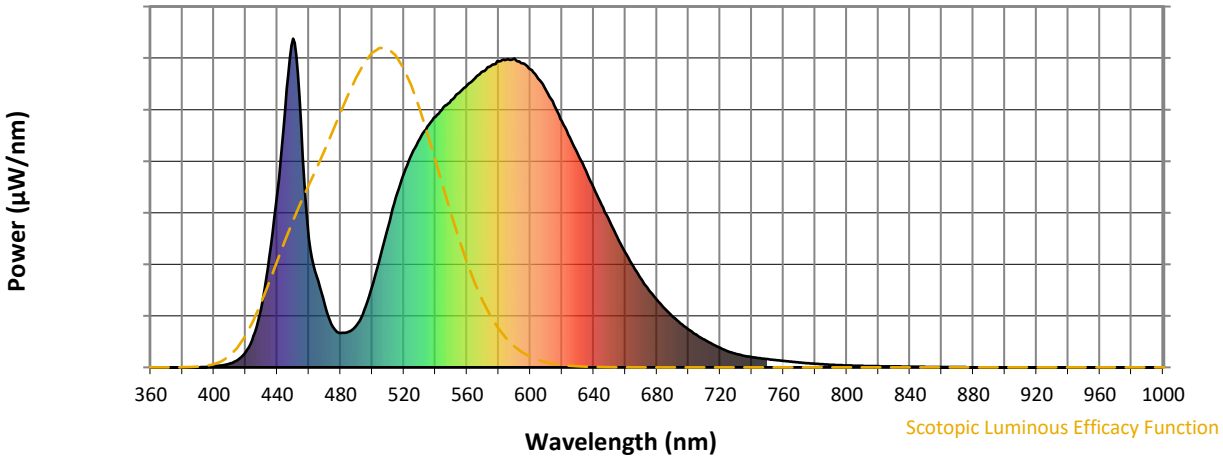



## Photopic Lumens: NR

| 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 | 127 | NR | 620 | 748 | NR | 750 | 25 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 173 | NR | 625 | 699 | NR | 755 | 22 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 246 | NR | 630 | 648 | NR | 760 | 20 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 335 | NR | 635 | 599 | NR | 765 | 17 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 427 | NR | 640 | 547 | NR | 770 | 15 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 517 | NR | 645 | 495 | NR | 775 | 13 | NR | 905 | 0 | NR |
| 390 | 0 | NR | 520 | 589 | NR | 650 | 445 | NR | 780 | 11 | NR | 910 | 0 | NR |
| 395 | 1 | NR | 525 | 649 | NR | 655 | 396 | NR | 785 | 9 | NR | 915 | 0 | NR |
| 400 | 4 | NR | 530 | 695 | NR | 660 | 349 | NR | 790 | 8 | NR | 920 | 0 | NR |
| 405 | 6 | NR | 535 | 733 | NR | 665 | 308 | NR | 795 | 7 | NR | 925 | 0 | NR |
| 410 | 11 | NR | 540 | 763 | NR | 670 | 269 | NR | 800 | 6 | NR | 930 | 0 | NR |
| 415 | 23 | NR | 545 | 792 | NR | 675 | 235 | NR | 805 | 5 | NR | 935 | 0 | NR |
| 420 | 46 | NR | 550 | 813 | NR | 680 | 205 | NR | 810 | 5 | NR | 940 | 0 | NR |
| 425 | 95 | NR | 555 | 835 | NR | 685 | 178 | NR | 815 | 4 | NR | 945 | 0 | NR |
| 430 | 183 | NR | 560 | 859 | NR | 690 | 155 | NR | 820 | 3 | NR | 950 | 0 | NR |
| 435 | 338 | NR | 565 | 880 | NR | 695 | 134 | NR | 825 | 3 | NR | 955 | 0 | NR |
| 440 | 534 | NR | 570 | 900 | NR | 700 | 115 | NR | 830 | 3 | NR | 960 | 0 | NR |
| 445 | 782 | NR | 575 | 918 | NR | 705 | 99 | NR | 835 | 2 | NR | 965 | 0 | NR |
| 450 | 1000 | NR | 580 | 931 | NR | 710 | 84 | NR | 840 | 2 | NR | 970 | 0 | NR |
| 455 | 739 | NR | 585 | 937 | NR | 715 | 71 | NR | 845 | 2 | NR | 975 | 0 | NR |
| 460 | 393 | NR | 590 | 939 | NR | 720 | 59 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 276 | NR | 595 | 925 | NR | 725 | 49 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 190 | NR | 600 | 907 | NR | 730 | 41 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 123 | NR | 605 | 878 | NR | 735 | 35 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 105 | NR | 610 | 842 | NR | 740 | 31 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 108 | NR | 615 | 797 | NR | 745 | 28 | NR | 875 | 1 | NR | | | |

REPORT NUMBER: SP1-2407-176-5

## Scotopic Flux vs. Wavelength

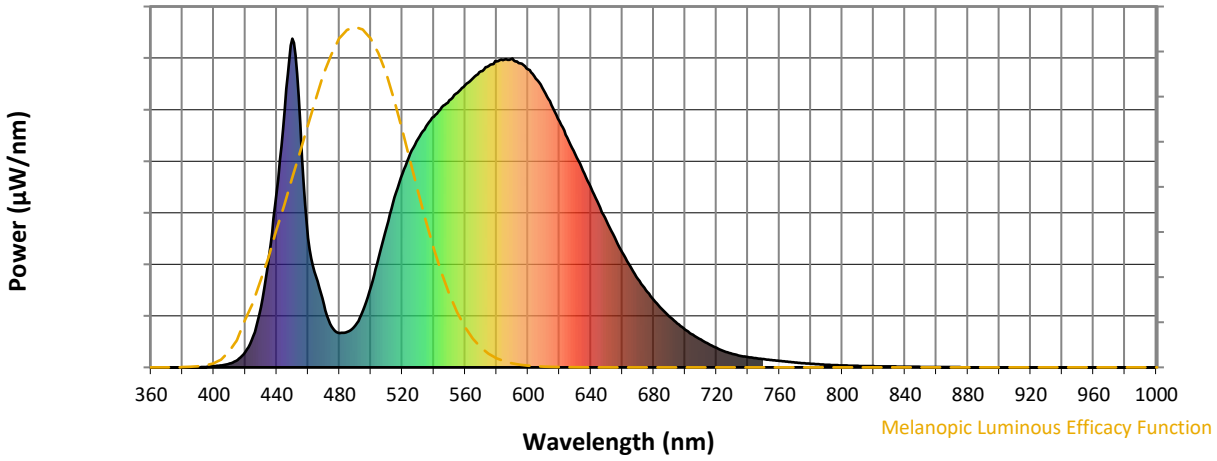



**Scotopic Lumens: NR** **S/P: 1.45**

| λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 360 | 0 | NR | 490 | 127 | NR | 620 | 748 | NR | 750 | 25 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 173 | NR | 625 | 699 | NR | 755 | 22 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 246 | NR | 630 | 648 | NR | 760 | 20 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 335 | NR | 635 | 599 | NR | 765 | 17 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 427 | NR | 640 | 547 | NR | 770 | 15 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 517 | NR | 645 | 495 | NR | 775 | 13 | NR | 905 | 0 | NR |
| 390 | 0 | NR | 520 | 589 | NR | 650 | 445 | NR | 780 | 11 | NR | 910 | 0 | NR |
| 395 | 1 | NR | 525 | 649 | NR | 655 | 396 | NR | 785 | 9 | NR | 915 | 0 | NR |
| 400 | 4 | NR | 530 | 695 | NR | 660 | 349 | NR | 790 | 8 | NR | 920 | 0 | NR |
| 405 | 6 | NR | 535 | 733 | NR | 665 | 308 | NR | 795 | 7 | NR | 925 | 0 | NR |
| 410 | 11 | NR | 540 | 763 | NR | 670 | 269 | NR | 800 | 6 | NR | 930 | 0 | NR |
| 415 | 23 | NR | 545 | 792 | NR | 675 | 235 | NR | 805 | 5 | NR | 935 | 0 | NR |
| 420 | 46 | NR | 550 | 813 | NR | 680 | 205 | NR | 810 | 5 | NR | 940 | 0 | NR |
| 425 | 95 | NR | 555 | 835 | NR | 685 | 178 | NR | 815 | 4 | NR | 945 | 0 | NR |
| 430 | 183 | NR | 560 | 859 | NR | 690 | 155 | NR | 820 | 3 | NR | 950 | 0 | NR |
| 435 | 338 | NR | 565 | 880 | NR | 695 | 134 | NR | 825 | 3 | NR | 955 | 0 | NR |
| 440 | 534 | NR | 570 | 900 | NR | 700 | 115 | NR | 830 | 3 | NR | 960 | 0 | NR |
| 445 | 782 | NR | 575 | 918 | NR | 705 | 99 | NR | 835 | 2 | NR | 965 | 0 | NR |
| 450 | 1000 | NR | 580 | 931 | NR | 710 | 84 | NR | 840 | 2 | NR | 970 | 0 | NR |
| 455 | 739 | NR | 585 | 937 | NR | 715 | 71 | NR | 845 | 2 | NR | 975 | 0 | NR |
| 460 | 393 | NR | 590 | 939 | NR | 720 | 59 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 276 | NR | 595 | 925 | NR | 725 | 49 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 190 | NR | 600 | 907 | NR | 730 | 41 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 123 | NR | 605 | 878 | NR | 735 | 35 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 105 | NR | 610 | 842 | NR | 740 | 31 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 108 | NR | 615 | 797 | NR | 745 | 28 | NR | 875 | 1 | NR | | | |

REPORT NUMBER: SP1-2407-176-5

## Melanopic Flux vs. Wavelength




**Melanopic Lumens: NR** **M/P: 2.76**

| 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 | 127 | NR | 620 | 748 | NR | 750 | 25 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 173 | NR | 625 | 699 | NR | 755 | 22 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 246 | NR | 630 | 648 | NR | 760 | 20 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 335 | NR | 635 | 599 | NR | 765 | 17 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 427 | NR | 640 | 547 | NR | 770 | 15 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 517 | NR | 645 | 495 | NR | 775 | 13 | NR | 905 | 0 | NR |
| 390 | 0 | NR | 520 | 589 | NR | 650 | 445 | NR | 780 | 11 | NR | 910 | 0 | NR |
| 395 | 1 | NR | 525 | 649 | NR | 655 | 396 | NR | 785 | 9 | NR | 915 | 0 | NR |
| 400 | 4 | NR | 530 | 695 | NR | 660 | 349 | NR | 790 | 8 | NR | 920 | 0 | NR |
| 405 | 6 | NR | 535 | 733 | NR | 665 | 308 | NR | 795 | 7 | NR | 925 | 0 | NR |
| 410 | 11 | NR | 540 | 763 | NR | 670 | 269 | NR | 800 | 6 | NR | 930 | 0 | NR |
| 415 | 23 | NR | 545 | 792 | NR | 675 | 235 | NR | 805 | 5 | NR | 935 | 0 | NR |
| 420 | 46 | NR | 550 | 813 | NR | 680 | 205 | NR | 810 | 5 | NR | 940 | 0 | NR |
| 425 | 95 | NR | 555 | 835 | NR | 685 | 178 | NR | 815 | 4 | NR | 945 | 0 | NR |
| 430 | 183 | NR | 560 | 859 | NR | 690 | 155 | NR | 820 | 3 | NR | 950 | 0 | NR |
| 435 | 338 | NR | 565 | 880 | NR | 695 | 134 | NR | 825 | 3 | NR | 955 | 0 | NR |
| 440 | 534 | NR | 570 | 900 | NR | 700 | 115 | NR | 830 | 3 | NR | 960 | 0 | NR |
| 445 | 782 | NR | 575 | 918 | NR | 705 | 99 | NR | 835 | 2 | NR | 965 | 0 | NR |
| 450 | 1000 | NR | 580 | 931 | NR | 710 | 84 | NR | 840 | 2 | NR | 970 | 0 | NR |
| 455 | 739 | NR | 585 | 937 | NR | 715 | 71 | NR | 845 | 2 | NR | 975 | 0 | NR |
| 460 | 393 | NR | 590 | 939 | NR | 720 | 59 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 276 | NR | 595 | 925 | NR | 725 | 49 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 190 | NR | 600 | 907 | NR | 730 | 41 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 123 | NR | 605 | 878 | NR | 735 | 35 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 105 | NR | 610 | 842 | NR | 740 | 31 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 108 | NR | 615 | 797 | NR | 745 | 28 | NR | 875 | 1 | NR | | | |

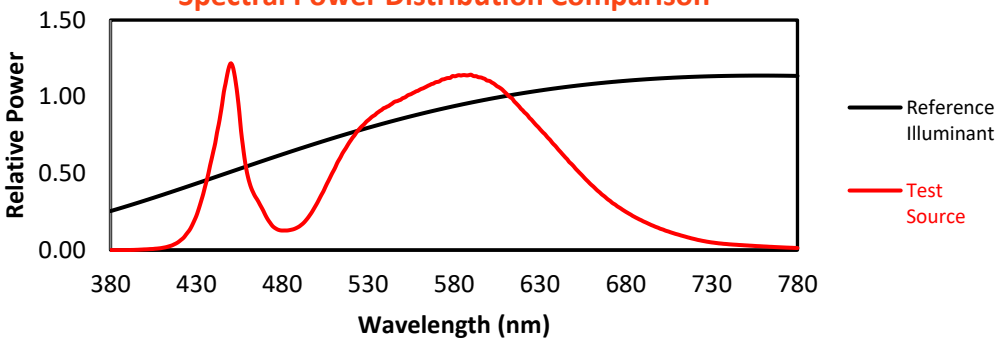
REPORT NUMBER: SP1-2407-176-5

# TM-30-18

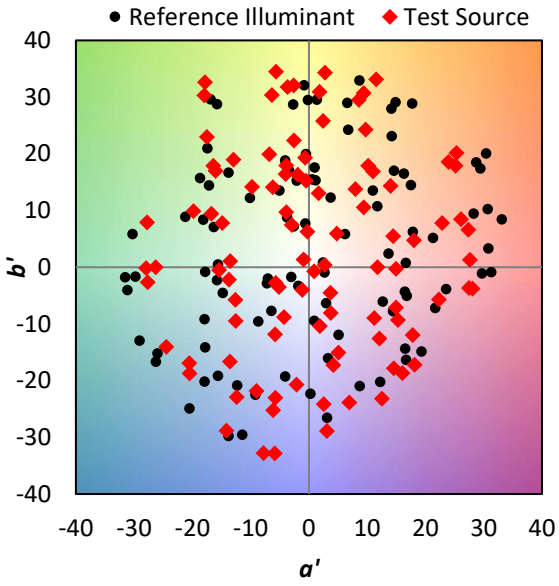
## Summary

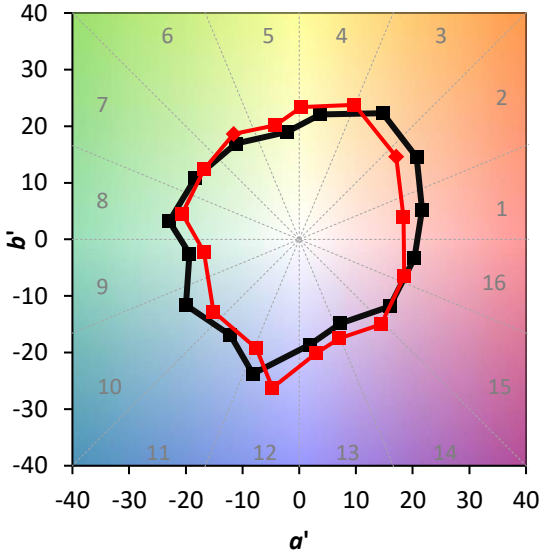
$R_f$ = 75.6
$R_g$ = 94.8
CIE $R_a$ = 72.9
$R_9$ = -21.5

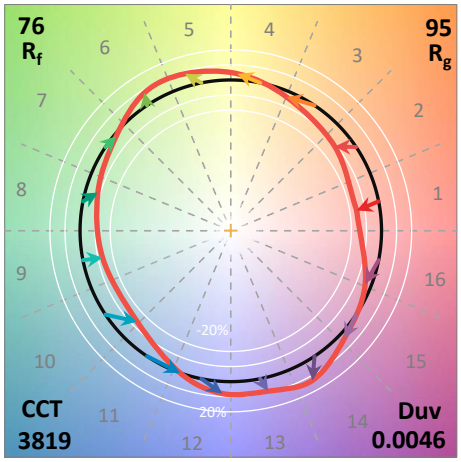
## Spectral Power Distribution Comparison

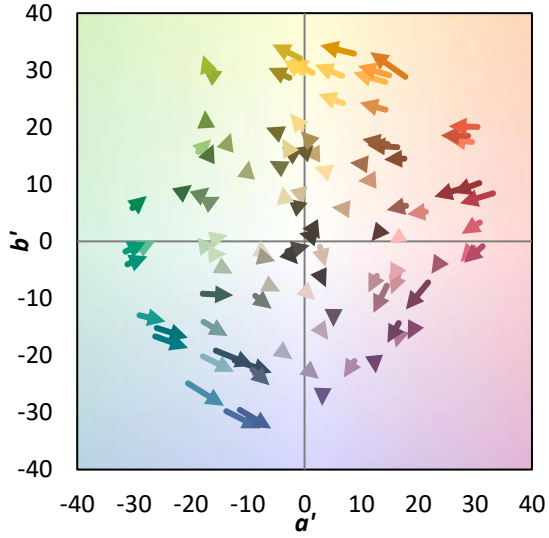



## Color Vector Graphics



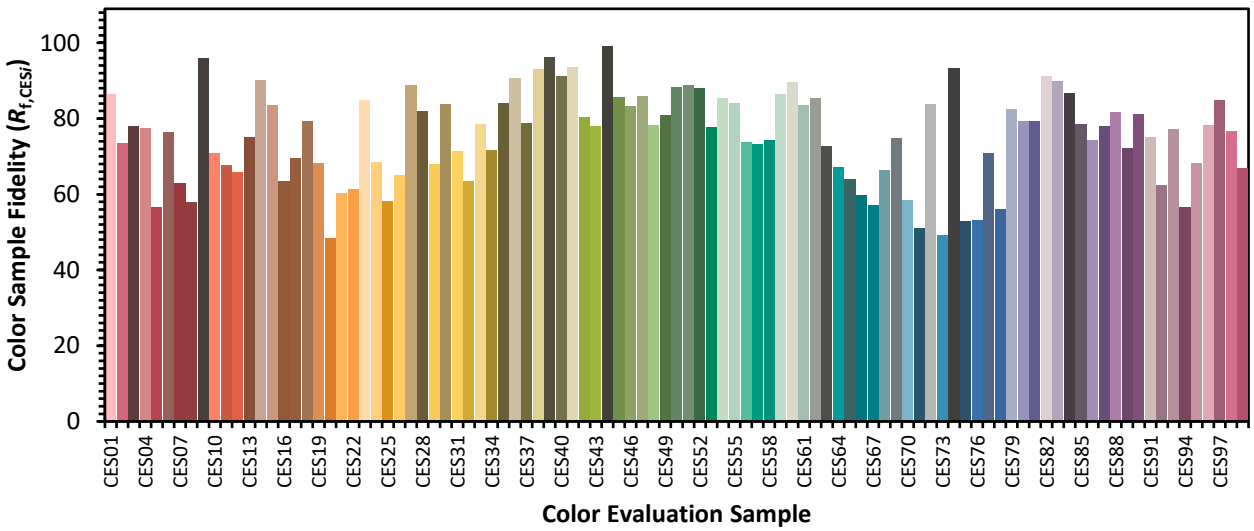



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**Individual Sample Fidelity Index ($R_{f,i}$)**

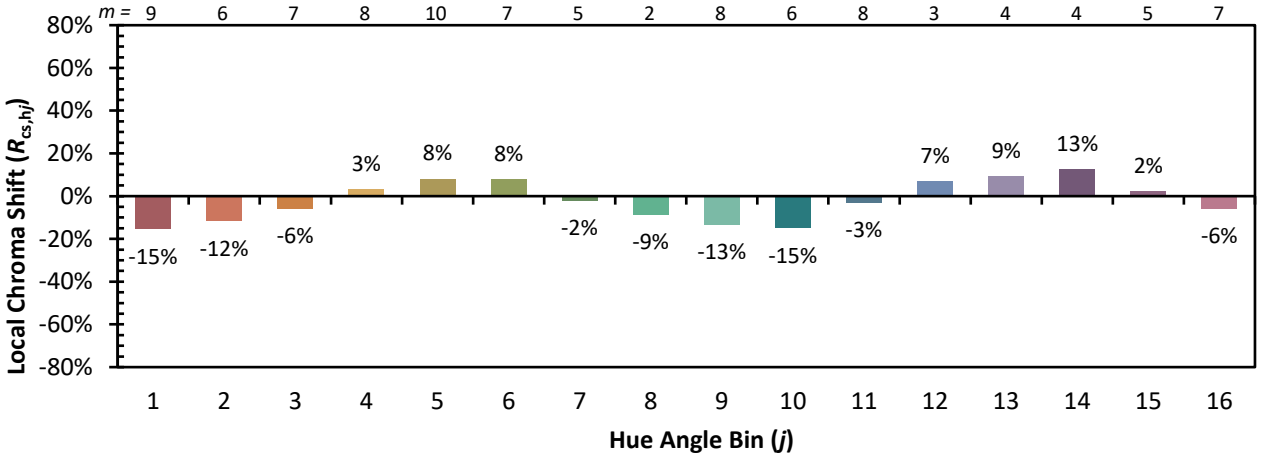
| | | | |
|---|---|---|---|
| CES01 = 85 | CES26 = 65 | CES51 = 89 | CES76 = 53 |
| CES02 = 61 | CES27 = 89 | CES52 = 88 | CES77 = 71 |
| CES03 = 30 | CES28 = 82 | CES53 = 78 | CES78 = 56 |
| CES04 = 70 | CES29 = 68 | CES54 = 85 | CES79 = 83 |
| CES05 = 48 | CES30 = 84 | CES55 = 84 | CES80 = 79 |
| CES06 = 50 | CES31 = 71 | CES56 = 74 | CES81 = 79 |
| CES07 = 40 | CES32 = 63 | CES57 = 73 | CES82 = 91 |
| CES08 = 39 | CES33 = 79 | CES58 = 74 | CES83 = 90 |
| CES09 = 29 | CES34 = 72 | CES59 = 86 | CES84 = 87 |
| CES10 = 74 | CES35 = 84 | CES60 = 90 | CES85 = 78 |
| CES11 = 57 | CES36 = 91 | CES61 = 84 | CES86 = 74 |
| CES12 = 63 | CES37 = 79 | CES62 = 85 | CES87 = 78 |
| CES13 = 42 | CES38 = 93 | CES63 = 73 | CES88 = 82 |
| CES14 = 74 | CES39 = 96 | CES64 = 67 | CES89 = 72 |
| CES15 = 71 | CES40 = 91 | CES65 = 64 | CES90 = 81 |
| CES16 = 47 | CES41 = 93 | CES66 = 60 | CES91 = 75 |
| CES17 = 49 | CES42 = 80 | CES67 = 57 | CES92 = 62 |
| CES18 = 56 | CES43 = 78 | CES68 = 66 | CES93 = 77 |
| CES19 = 72 | CES44 = 99 | CES69 = 75 | CES94 = 57 |
| CES20 = 65 | CES45 = 86 | CES70 = 58 | CES95 = 68 |
| CES21 = 86 | CES46 = 83 | CES71 = 51 | CES96 = 78 |
| CES22 = 78 | CES47 = 86 | CES72 = 84 | CES97 = 85 |
| CES23 = 92 | CES48 = 78 | CES73 = 49 | CES98 = 77 |
| CES24 = 91 | CES49 = 81 | CES74 = 93 | CES99 = 67 |
| CES25 = 72 | CES50 = 88 | CES75 = 53 | |

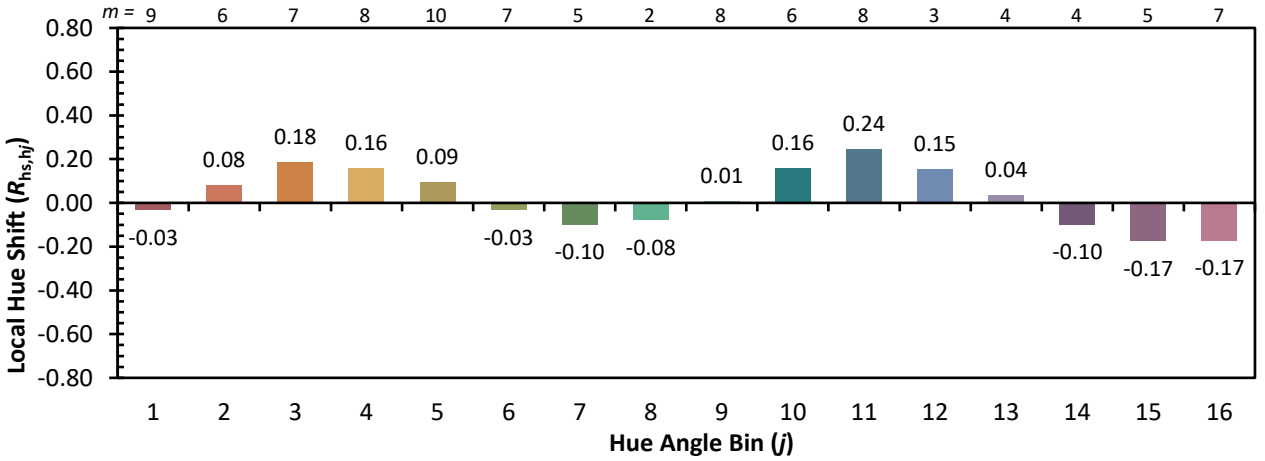


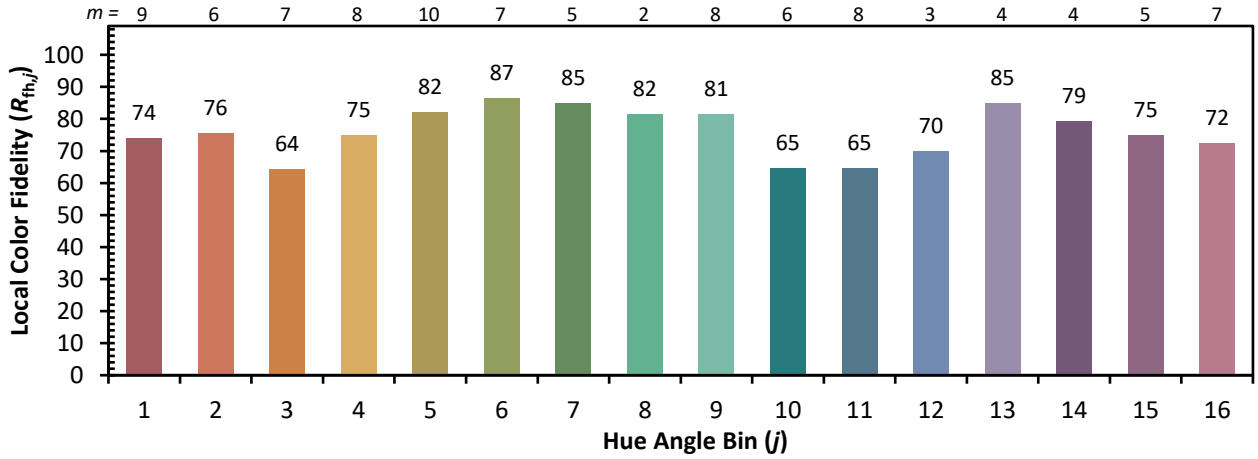
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## Color Rendition by Hue-Angle Bin



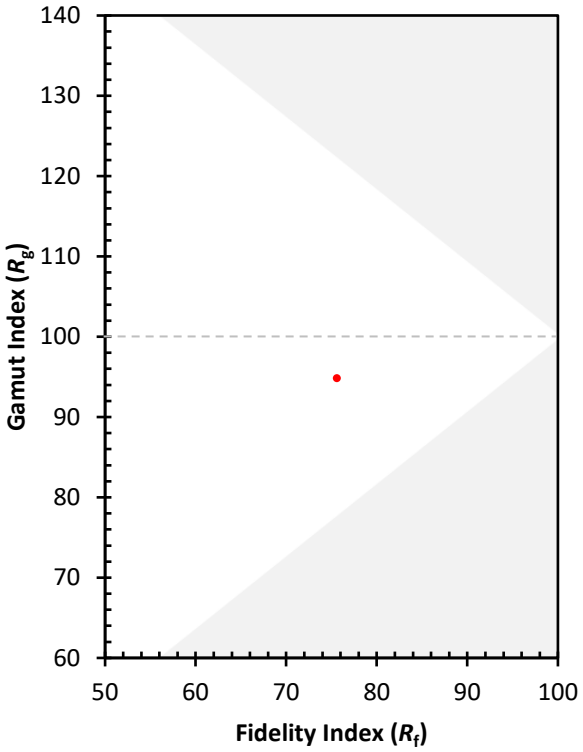



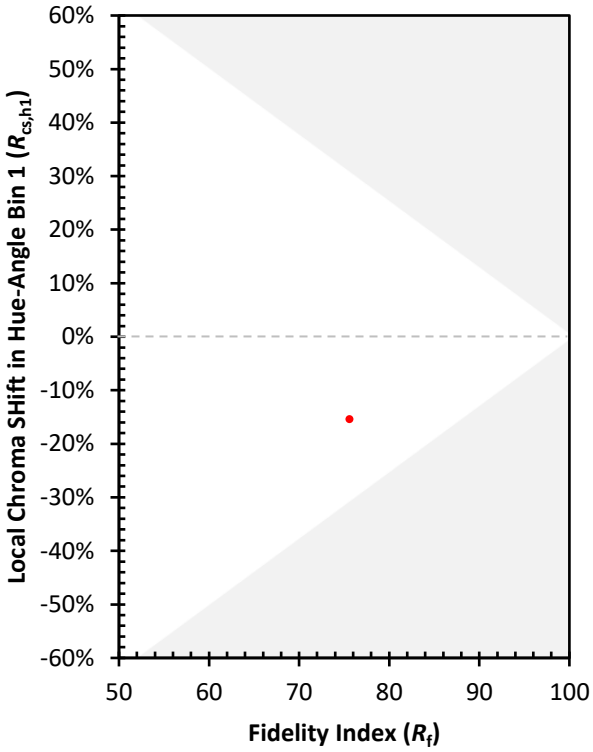



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## Measure Comparisons




(END OF REPORT)