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: P821445

Luminaire Tested: **TT-D2-830-12VDC-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: | P821445 |
| | REPORT IS FROM IESNA LM-79-08 TEST DATA - UPLIGHT (G2-2002-677-2) AND |
| Test Lab: | INNOVATION CENTER |
| Issue Date: | 7/23/2020 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS (FORMERLY EATON) |
| Product Line: | McGRAW-EDISON |
| Catalog Number: | TT-D2-830-12VDC-DL-UPL |
| Description: | TOPTIER LED PARKING GARAGE LUMINAIRE WITH UPLIGHT |
| | 3000K, 80 CRI LEDS AND DRIVE LANE DISTRIBUTION |
| Light Source: | - |
| Ballast/Driver: | ELECTRONIC DRIVER |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 4820.7 lumens |
| Efficiency: | N/A |
| Efficacy: | 126.9 lumens/watt |
| Luminous Opening: | Vertical Cylinder (Dia: 1.12' x H: 0.1') |
| IES Classification: | Type IV - Short |
| BUG Rating: | B2 - U4 - G3 |

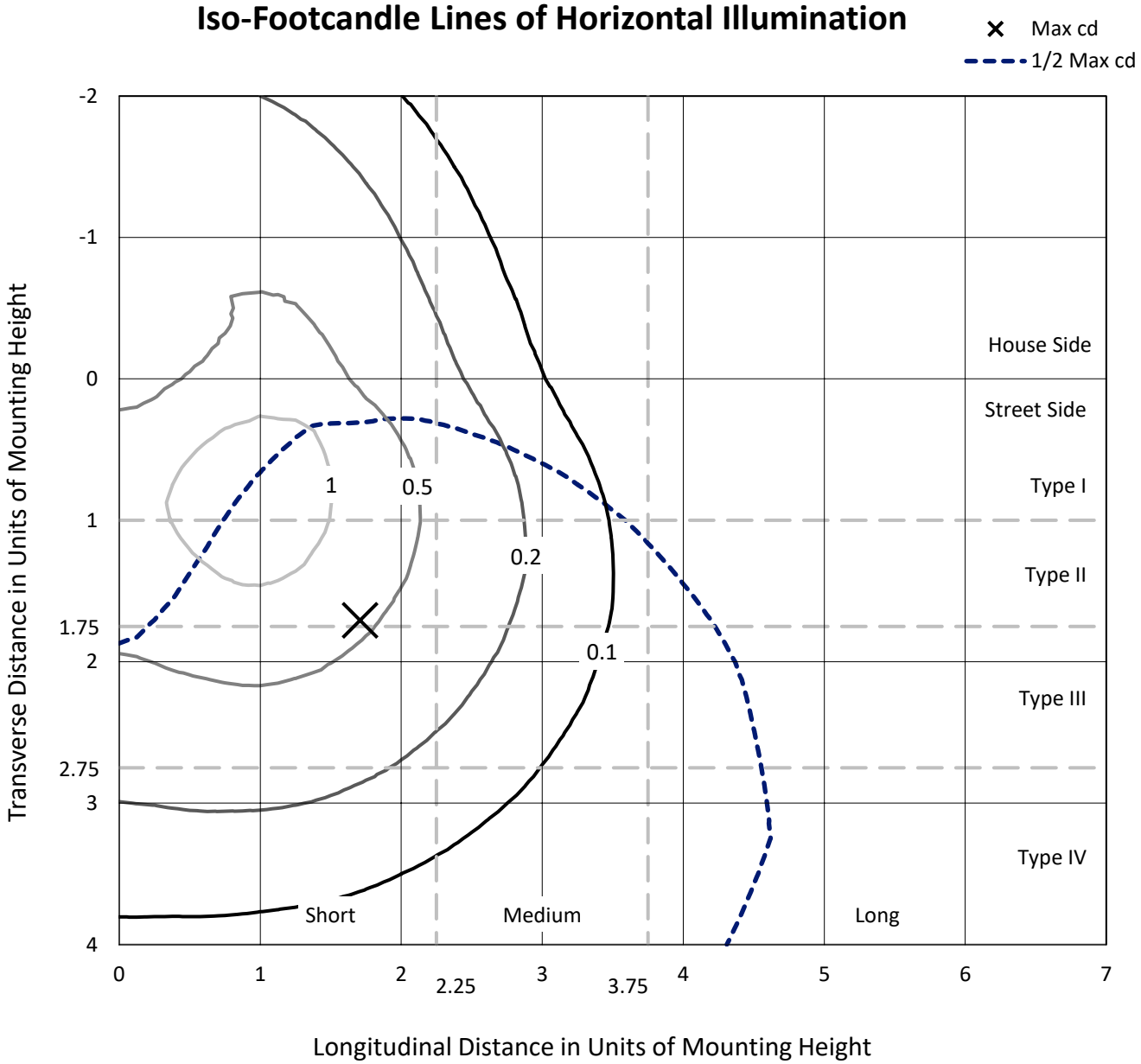
| | |
|---|---|
| Input Watts (W): | 38 |
| Input Voltage (V): | NR |
| Input Current (Ain): | NR |
| Voltage Rise (V): | NR |
| Power Factor: | NR |
| Total Harmonic Distortion (THDi): | NR |
| Frequency (hertz): | 60 |
| Stabilization Time: | NR |
| Operation Time: | NR |
| Ambient Temperature (°C):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

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## Iso-Footcandle Lines of Horizontal Illumination



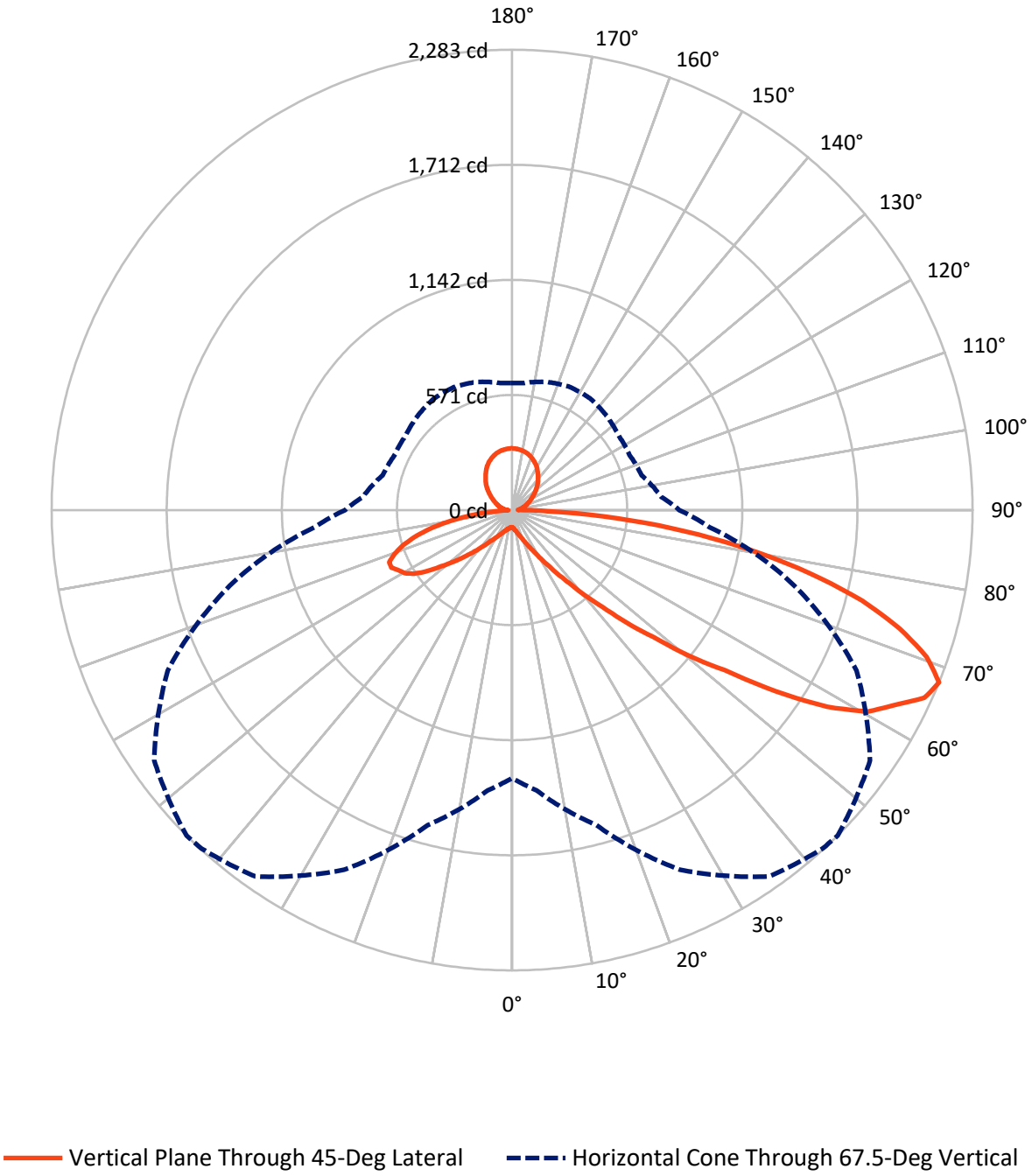

Based on 15 foot mounting height. Maximum calculated value = 1.4 fc
Type IV - Short - N/A

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## Luminous Intensity Polar Plot



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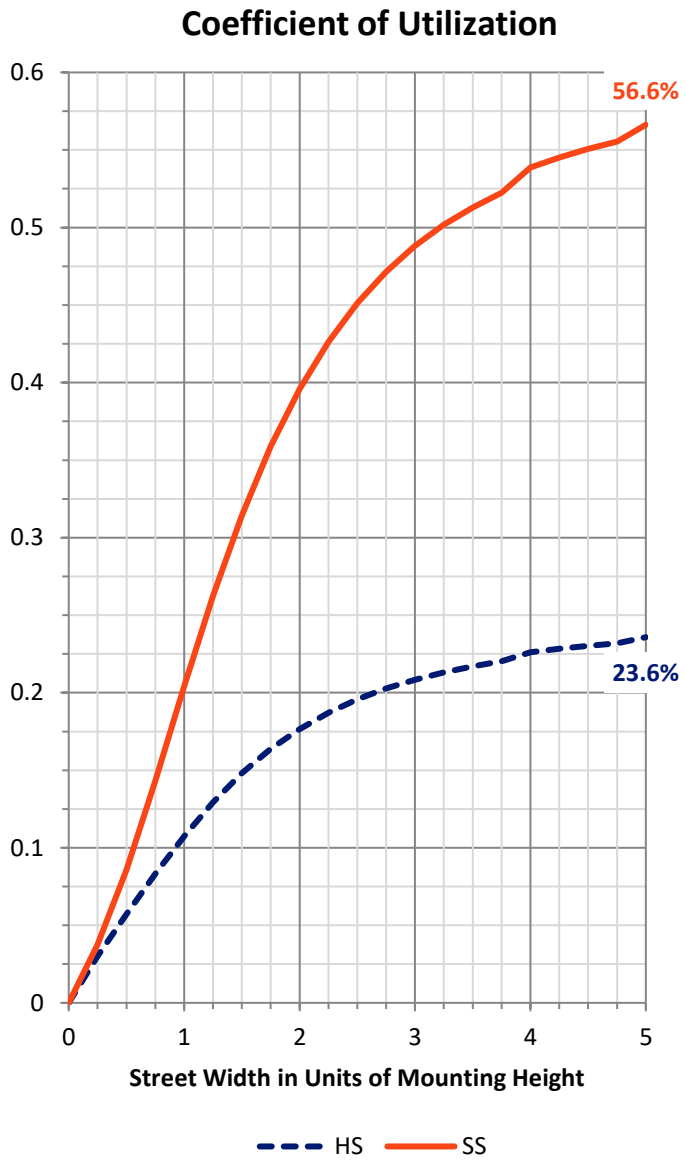
REPORT NUMBER: P821445
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**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 1163.2 | 415.9 | 1579.1 |
| | % Fixture | 24.1 | 8.6 | 32.8 |
| **Street Side** | Lumens | 2825.8 | 415.9 | 3241.6 |
| | % Fixture | 58.6 | 8.6 | 67.2 |
| **Total** | Lumens | 3989.0 | 831.7 | 4820.7 |
| | % Fixture | 82.7 | 17.3 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 8.9 | 0.2 |
| 10°-20° | 33.1 | 0.7 |
| 20°-30° | 78.2 | 1.6 |
| 30°-40° | 176.9 | 3.7 |
| 40°-50° | 394.4 | 8.2 |
| 50°-60° | 793.0 | 16.4 |
| 60°-70° | 1164.6 | 24.2 |
| 70°-80° | 1024.1 | 21.2 |
| 80°-90° | 315.8 | 6.6 |
| 90°-100° | 42.6 | 0.9 |
| 100°-110° | 66.0 | 1.4 |
| 110°-120° | 91.9 | 1.9 |
| 120°-130° | 119.0 | 2.5 |
| 130°-140° | 138.7 | 2.9 |
| 140°-150° | 140.5 | 2.9 |
| 150°-160° | 121.9 | 2.5 |
| 160°-170° | 82.2 | 1.7 |
| 170°-180° | 28.9 | 0.6 |
| 0°-90° | 3989.0 | 82.7 |
| 0°-180° | 4820.7 | 100.0 |



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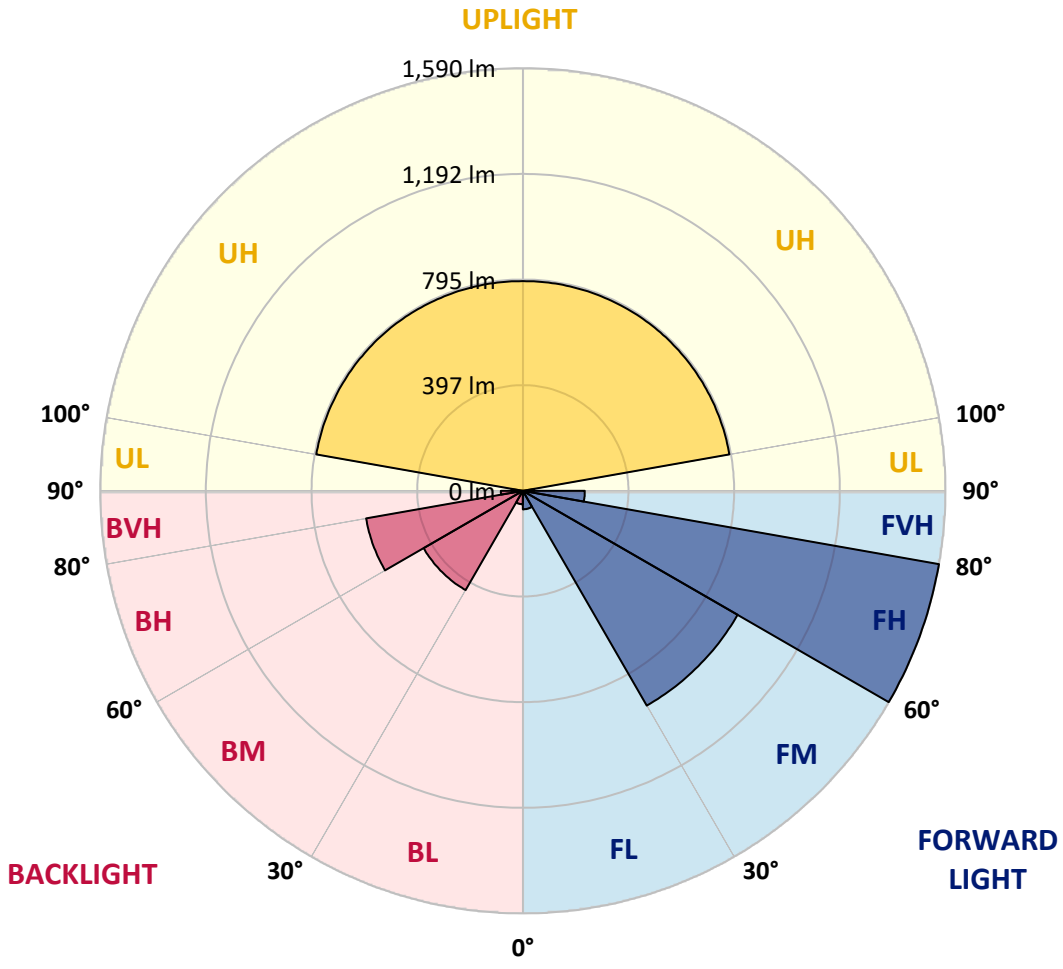
Scaled Data Report

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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°) | 69.6 | 1.4 | | | |
| FM | (30°-60°) | 933.2 | 19.4 | | | |
| FH | (60°-80°) | 1589.9 | 33.0 | | | G1/1800 |
| FVH | (80°-90°) | 233.0 | 4.8 | | | G3/500 |
| BL | (0°-30°) | 50.5 | 1.0 | B0/110 | | |
| BM | (30°-60°) | 431.1 | 8.9 | B1/1000 | | |
| BH | (60°-80°) | 598.8 | 12.4 | B2/1000 | | G2/1000 |
| BVH | (80°-90°) | 82.8 | 1.7 | | | G1/100 |
| UL | (90°-100°) | 42.6 | 0.9 | | U2/50 | |
| UH | (100°-180°) | 789.1 | 16.4 | | 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° | 86.4 | 86.4 | 86.4 | 86.4 | 86.4 | 86.4 | 86.4 | 86.4 | 86.4 | 86.4 | 86.4 |
| 2.5° | 90.2 | 89.4 | 89.4 | 89.4 | 88.7 | 88.7 | 88.7 | 88.7 | 87.9 | 87.9 | 87.9 |
| 5° | 95.4 | 94.6 | 95.4 | 93.9 | 93.1 | 93.1 | 92.4 | 92.4 | 91.7 | 90.9 | 90.2 |
| 7.5° | 102.8 | 102.1 | 102.1 | 100.6 | 99.9 | 99.1 | 99.1 | 97.6 | 96.9 | 95.4 | 93.9 |
| 10° | 111.0 | 111.0 | 110.3 | 109.5 | 108.0 | 106.6 | 106.6 | 104.3 | 103.6 | 101.3 | 99.1 |
| 12.5° | 120.7 | 120.7 | 120.7 | 119.2 | 117.7 | 117.0 | 115.5 | 114.0 | 111.8 | 108.0 | 105.8 |
| 15° | 132.6 | 132.6 | 132.6 | 131.1 | 129.7 | 128.2 | 127.4 | 124.4 | 120.7 | 117.0 | 112.5 |
| 17.5° | 147.5 | 146.1 | 146.1 | 144.6 | 143.1 | 142.3 | 140.8 | 137.9 | 132.6 | 128.2 | 122.2 |
| 20° | 163.9 | 163.2 | 162.4 | 162.4 | 161.0 | 159.5 | 158.7 | 154.2 | 148.3 | 140.1 | 132.6 |
| 22.5° | 182.6 | 181.8 | 181.8 | 183.3 | 182.6 | 180.3 | 180.3 | 173.6 | 165.4 | 155.7 | 144.6 |
| 25° | 205.7 | 204.9 | 206.4 | 209.4 | 209.4 | 207.9 | 205.7 | 199.0 | 187.0 | 173.6 | 160.2 |
| 27.5° | 231.0 | 230.3 | 233.2 | 238.5 | 239.9 | 237.7 | 236.2 | 228.8 | 215.4 | 197.5 | 178.1 |
| 30° | 261.6 | 262.3 | 270.5 | 276.5 | 280.2 | 278.7 | 277.9 | 269.7 | 248.1 | 227.3 | 201.9 |
| 32.5° | 298.8 | 296.6 | 307.0 | 316.7 | 323.4 | 327.1 | 324.9 | 315.2 | 296.6 | 263.8 | 231.7 |
| 35° | 338.3 | 339.0 | 351.7 | 365.9 | 381.5 | 383.0 | 387.5 | 377.8 | 352.5 | 313.7 | 269.0 |
| 37.5° | 389.7 | 383.8 | 400.1 | 427.0 | 445.6 | 462.0 | 459.0 | 453.1 | 423.2 | 371.8 | 310.7 |
| 40° | 435.9 | 434.4 | 457.5 | 494.8 | 529.1 | 552.9 | 555.9 | 548.4 | 508.9 | 435.9 | 355.4 |
| 42.5° | 488.8 | 493.3 | 525.3 | 576.8 | 628.9 | 663.2 | 655.0 | 651.3 | 605.1 | 511.9 | 416.5 |
| 45° | 542.5 | 557.4 | 598.4 | 672.9 | 734.0 | 783.2 | 797.3 | 784.7 | 728.0 | 631.9 | 494.0 |
| 47.5° | 607.3 | 627.4 | 678.1 | 778.7 | 878.5 | 935.9 | 938.9 | 976.9 | 891.2 | 747.4 | 574.5 |
| 50° | 693.0 | 701.9 | 772.7 | 895.7 | 1032.8 | 1113.3 | 1136.4 | 1137.1 | 1051.4 | 863.6 | 665.4 |
| 52.5° | 777.2 | 783.9 | 877.1 | 1035.8 | 1222.1 | 1313.7 | 1318.9 | 1348.0 | 1231.0 | 1051.4 | 795.8 |
| 55° | 878.5 | 875.6 | 1003.7 | 1194.5 | 1414.3 | 1547.7 | 1586.4 | 1625.9 | 1476.9 | 1199.7 | 870.3 |
| 57.5° | 976.9 | 972.4 | 1126.7 | 1377.1 | 1677.4 | 1810.0 | 1842.0 | 1813.7 | 1592.4 | 1261.6 | 906.9 |
| 60° | 1067.8 | 1083.5 | 1271.2 | 1579.0 | 1880.8 | 2007.5 | 2029.1 | 1952.3 | 1666.9 | 1309.2 | 930.0 |
| 62.5° | 1162.4 | 1193.7 | 1421.0 | 1747.4 | 2036.5 | 2127.4 | 2128.9 | 2038.8 | 1791.4 | 1401.6 | 1005.2 |
| 65° | 1251.1 | 1301.0 | 1537.3 | 1891.2 | 2145.3 | 2236.2 | 2246.7 | 2165.4 | 1913.6 | 1482.1 | 1017.9 |
| 67.5° | 1329.4 | 1395.7 | 1617.7 | 1968.7 | 2219.1 | 2277.9 | 2283.2 | 2166.2 | 1884.5 | 1449.3 | 982.9 |
| 70° | 1392.7 | 1446.4 | 1667.7 | 1970.2 | 2167.7 | 2184.1 | 2180.3 | 2055.9 | 1804.0 | 1384.5 | 924.0 |
| 72.5° | 1417.3 | 1461.3 | 1643.8 | 1877.8 | 2016.4 | 2012.7 | 2009.7 | 1894.9 | 1671.4 | 1276.5 | 839.0 |
| 75° | 1382.3 | 1394.9 | 1513.4 | 1680.3 | 1768.3 | 1789.1 | 1792.1 | 1688.5 | 1466.5 | 1116.2 | 719.8 |
| 77.5° | 1237.7 | 1231.0 | 1321.9 | 1432.2 | 1498.5 | 1513.4 | 1510.4 | 1424.0 | 1229.5 | 927.7 | 603.6 |
| 80° | 981.4 | 995.5 | 1052.2 | 1125.2 | 1191.5 | 1207.9 | 1197.5 | 1131.9 | 956.8 | 723.5 | 463.5 |
| 82.5° | 686.3 | 703.4 | 751.1 | 806.3 | 856.2 | 856.2 | 865.9 | 802.5 | 678.1 | 519.4 | 324.1 |
| 85° | 370.3 | 360.7 | 412.8 | 475.4 | 511.2 | 517.9 | 521.6 | 500.7 | 419.5 | 313.7 | 192.3 |
| 87.5° | 61.1 | 65.6 | 81.2 | 124.4 | 141.6 | 163.9 | 174.4 | 136.4 | 82.7 | 52.9 | 38.7 |
| 90° | 30.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 |
| 92.5° | 34.8 | 34.2 | 34.2 | 33.8 | 33.8 | 33.8 | 33.8 | 33.8 | 33.8 | 33.8 | 33.8 |
| 95° | 39.4 | 39.4 | 39.4 | 38.5 | 38.5 | 38.5 | 38.5 | 38.5 | 38.5 | 38.5 | 38.5 |
| 97.5° | 44.6 | 44.6 | 44.6 | 44.2 | 44.2 | 44.2 | 44.2 | 44.2 | 44.2 | 44.2 | 44.2 |
| 100° | 49.8 | 49.8 | 49.8 | 49.8 | 49.8 | 49.8 | 49.8 | 49.8 | 49.8 | 49.8 | 49.8 |
| 102.5° | 55.9 | 55.9 | 55.9 | 55.9 | 55.9 | 55.9 | 55.9 | 55.9 | 56.4 | 55.9 | 55.9 |
| 105° | 62.0 | 62.0 | 62.0 | 62.0 | 62.0 | 62.0 | 62.0 | 62.0 | 62.9 | 62.0 | 62.0 |
| 107.5° | 68.6 | 68.6 | 69.0 | 69.0 | 69.0 | 69.0 | 69.0 | 69.0 | 69.5 | 69.0 | 69.0 |
| 110° | 75.1 | 75.1 | 76.1 | 76.1 | 76.1 | 76.1 | 76.1 | 76.1 | 76.1 | 76.1 | 76.1 |

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CATALOG NUMBER: TT-D2-830-12VDC-DL-UPL

**CANDELA DISTRIBUTION (continued):**

| | 0° | 5° | 15° | 25° | 35° | 42.5° | 45° | 55° | 65° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 112.5° | 83.1 | 83.1 | 84.0 | 84.0 | 84.0 | 84.0 | *84.0* | 84.6 | 84.6 | 84.0 | 84.0 |
| 115° | 91.1 | 91.1 | 92.0 | 92.0 | 92.0 | 92.0 | *92.0* | 93.0 | 93.0 | 92.0 | 92.0 |
| 117.5° | 100.5 | 100.5 | 101.0 | 101.4 | 101.4 | 101.4 | *101.4* | 102.4 | 102.4 | 101.4 | 101.4 |
| 120° | 109.9 | 109.9 | 109.9 | 110.8 | 110.8 | 110.8 | *110.8* | 111.8 | 111.8 | 110.8 | 110.8 |
| 122.5° | 120.7 | 120.7 | 121.2 | 121.6 | 121.6 | 121.6 | *121.6* | 122.6 | 122.6 | 122.1 | 122.1 |
| 125° | 131.5 | 131.5 | 132.4 | 132.4 | 132.4 | 132.4 | *132.4* | 133.4 | 133.4 | 133.4 | 133.4 |
| 127.5° | 143.2 | 143.2 | 144.2 | 144.2 | 144.2 | 144.2 | *144.2* | 145.1 | 145.1 | 145.1 | 145.1 |
| 130° | 155.0 | 155.0 | 155.9 | 155.9 | 155.9 | 155.9 | *155.9* | 156.8 | 156.8 | 156.8 | 156.8 |
| 132.5° | 167.2 | 167.2 | 167.6 | 167.6 | 167.6 | 168.0 | *168.1* | 168.6 | 168.6 | 168.6 | 168.6 |
| 135° | 179.4 | 179.4 | 179.4 | 179.4 | 179.4 | 180.1 | *180.3* | 180.3 | 180.3 | 180.3 | 180.3 |
| 137.5° | 191.2 | 190.6 | 191.2 | 190.6 | 191.2 | 191.5 | *191.6* | 191.6 | 191.6 | 191.6 | 191.6 |
| 140° | 202.9 | 201.9 | 202.9 | 201.9 | 202.9 | 202.9 | *202.9* | 202.9 | 202.9 | 202.9 | 202.9 |
| 142.5° | 213.7 | 213.2 | 213.7 | 212.7 | 213.7 | 213.7 | *213.7* | 213.7 | 213.7 | 213.7 | 213.7 |
| 145° | 224.5 | 224.5 | 224.5 | 223.5 | 224.5 | 224.5 | *224.5* | 224.5 | 224.5 | 224.5 | 224.5 |
| 147.5° | 235.8 | 235.3 | 235.8 | 234.8 | 235.8 | 235.8 | *235.8* | 235.8 | 235.8 | 235.8 | 235.8 |
| 150° | 247.0 | 246.1 | 247.0 | 246.1 | 247.0 | 247.0 | *247.0* | 247.0 | 247.0 | 247.0 | 247.0 |
| 152.5° | 256.0 | 255.5 | 256.4 | 255.5 | 256.0 | 256.0 | *256.0* | 256.4 | 256.0 | 256.0 | 256.0 |
| 155° | 264.9 | 264.9 | 265.8 | 264.9 | 264.9 | 264.9 | *264.9* | 265.8 | 264.9 | 264.9 | 264.9 |
| 157.5° | 272.4 | 272.4 | 273.3 | 272.4 | 272.4 | 272.4 | *272.4* | 273.3 | 272.4 | 272.4 | 272.4 |
| 160° | 279.9 | 279.9 | 280.8 | 279.9 | 279.9 | 279.9 | *279.9* | 280.8 | 279.9 | 279.9 | 279.9 |
| 162.5° | 286.0 | 286.0 | 286.9 | 286.0 | 286.0 | 286.0 | *286.0* | 286.9 | 286.0 | 286.0 | 286.0 |
| 165° | 292.1 | 292.1 | 293.0 | 292.1 | 292.1 | 292.1 | *292.1* | 293.0 | 292.1 | 292.1 | 292.1 |
| 167.5° | 295.8 | 295.8 | 296.8 | 295.8 | 295.8 | 295.8 | *295.8* | 296.8 | 295.8 | 295.8 | 295.8 |
| 170° | 299.6 | 299.6 | 300.5 | 299.6 | 299.6 | 299.6 | *299.6* | 300.5 | 299.6 | 299.6 | 299.6 |
| 172.5° | 302.0 | 302.0 | 302.8 | 302.0 | 302.4 | 302.1 | *302.0* | 302.8 | 302.0 | 302.0 | 302.0 |
| 175° | 304.3 | 304.3 | 305.2 | 304.3 | 305.2 | 304.6 | *304.3* | 305.2 | 304.3 | 304.3 | 304.3 |
| 177.5° | 305.2 | 305.2 | 305.7 | 305.2 | 305.7 | 305.4 | *305.2* | 305.7 | 305.2 | 305.2 | 305.2 |
| 180° | 306.2 | 306.2 | 306.2 | 306.2 | 306.2 | 306.2 | *306.2* | 306.2 | 306.2 | 306.2 | 306.2 |

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**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 86.4 | 86.4 | 86.4 | 86.4 | 86.4 | 86.4 | 86.4 | 86.4 | 86.4 | 86.4 | 86.4 |
| 2.5° | 87.9 | 87.2 | 86.4 | 85.7 | 85.7 | 84.9 | 84.9 | 84.9 | 85.7 | 85.7 | 85.7 |
| 5° | 90.2 | 89.4 | 88.7 | 87.9 | 86.4 | 86.4 | 86.4 | 86.4 | 86.4 | 86.4 | 86.4 |
| 7.5° | 93.9 | 92.4 | 91.7 | 90.2 | 88.7 | 88.7 | 87.9 | 87.9 | 87.9 | 88.7 | 87.9 |
| 10° | 98.4 | 96.9 | 95.4 | 93.1 | 92.4 | 91.7 | 90.9 | 90.9 | 91.7 | 91.7 | 90.9 |
| 12.5° | 103.6 | 102.8 | 99.9 | 97.6 | 96.1 | 95.4 | 94.6 | 95.4 | 94.6 | 95.4 | 95.4 |
| 15° | 111.0 | 108.8 | 105.1 | 102.8 | 100.6 | 99.9 | 99.1 | 99.9 | 99.9 | 100.6 | 99.9 |
| 17.5° | 119.2 | 116.2 | 112.5 | 108.8 | 105.8 | 105.1 | 105.1 | 105.1 | 105.8 | 106.6 | 105.8 |
| 20° | 128.9 | 125.2 | 120.0 | 115.5 | 112.5 | 111.8 | 111.8 | 112.5 | 113.3 | 114.0 | 114.0 |
| 22.5° | 138.6 | 135.6 | 128.2 | 122.2 | 120.7 | 120.0 | 119.2 | 120.7 | 122.2 | 123.0 | 123.7 |
| 25° | 153.5 | 147.5 | 138.6 | 131.9 | 128.9 | 128.9 | 129.7 | 131.1 | 131.9 | 133.4 | 132.6 |
| 27.5° | 169.2 | 162.4 | 151.3 | 142.3 | 140.1 | 139.3 | 140.8 | 142.3 | 145.3 | 145.3 | 144.6 |
| 30° | 190.8 | 179.6 | 165.4 | 157.2 | 151.3 | 152.0 | 154.2 | 156.5 | 159.5 | 161.0 | 161.0 |
| 32.5° | 215.4 | 203.4 | 184.1 | 171.4 | 168.4 | 169.2 | 169.9 | 173.6 | 176.6 | 179.6 | 177.3 |
| 35° | 247.4 | 232.5 | 208.6 | 194.5 | 187.0 | 186.3 | 189.3 | 193.7 | 196.7 | 198.2 | 198.2 |
| 37.5° | 282.4 | 263.0 | 233.2 | 221.3 | 212.4 | 211.6 | 212.4 | 216.1 | 219.8 | 221.3 | 224.3 |
| 40° | 324.9 | 301.0 | 266.0 | 246.6 | 239.9 | 238.5 | 241.4 | 246.6 | 246.6 | 248.9 | 249.6 |
| 42.5° | 377.0 | 346.5 | 307.8 | 282.4 | 274.2 | 274.2 | 273.5 | 277.9 | 277.9 | 277.9 | 276.5 |
| 45° | 443.4 | 409.1 | 358.4 | 332.3 | 318.2 | 310.7 | 313.0 | 310.0 | 309.2 | 311.5 | 304.8 |
| 47.5° | 507.5 | 464.2 | 404.6 | 376.3 | 362.1 | 357.7 | 349.5 | 347.2 | 343.5 | 343.5 | 333.8 |
| 50° | 582.0 | 528.3 | 470.9 | 430.7 | 417.3 | 404.6 | 397.9 | 387.5 | 376.3 | 374.1 | 370.3 |
| 52.5° | 706.4 | 639.3 | 549.2 | 506.0 | 471.7 | 459.0 | 443.4 | 430.0 | 416.5 | 406.1 | 412.1 |
| 55° | 757.1 | 688.5 | 602.8 | 561.1 | 537.3 | 525.3 | 496.3 | 478.4 | 458.3 | 443.4 | 451.6 |
| 57.5° | 782.4 | 707.9 | 628.2 | 596.9 | 590.2 | 579.0 | 557.4 | 526.8 | 503.7 | 485.1 | 486.6 |
| 60° | 796.6 | 718.3 | 641.6 | 613.3 | 609.5 | 617.0 | 605.8 | 584.9 | 549.2 | 530.6 | 528.3 |
| 62.5° | 851.0 | 769.0 | 679.6 | 639.3 | 631.1 | 636.4 | 639.3 | 626.7 | 596.9 | 572.3 | 565.6 |
| 65° | 862.1 | 775.0 | 687.0 | 661.0 | 661.7 | 663.2 | 665.4 | 652.0 | 637.1 | 606.6 | 600.6 |
| 67.5° | *828.6* | *742.9* | *664.7* | *643.1* | *644.6* | *661.7* | *675.1* | *674.4* | *658.0* | *631.9* | *629.7* |
| 70° | 777.9 | 694.5 | 622.2 | 602.8 | 606.6 | 622.2 | 651.3 | 666.2 | 663.2 | 646.1 | 649.8 |
| 72.5° | 699.0 | 624.4 | 561.1 | 546.2 | 555.1 | 570.0 | 597.6 | 624.4 | 640.1 | 643.8 | 652.0 |
| 75° | 606.6 | 546.9 | 487.3 | 478.4 | 485.1 | 502.2 | 527.6 | 558.9 | 593.1 | 611.8 | 617.0 |
| 77.5° | 500.7 | 446.3 | 402.4 | 396.4 | 406.1 | 421.8 | 447.1 | 471.7 | 510.4 | 543.2 | 550.7 |
| 80° | 392.0 | 345.0 | 313.7 | 308.5 | 314.5 | 327.9 | 347.2 | 367.4 | 404.6 | 430.0 | 433.7 |
| 82.5° | 272.0 | 243.7 | 223.5 | 220.6 | 224.3 | 229.5 | 245.2 | 263.8 | 284.7 | 304.8 | 307.0 |
| 85° | 158.0 | 140.1 | 134.9 | 130.4 | 138.6 | 138.6 | 142.3 | 152.8 | 163.2 | 164.7 | 169.2 |
| 87.5° | 29.1 | 27.6 | 28.3 | 20.9 | 26.1 | 18.6 | 18.6 | 23.8 | 17.9 | 20.9 | 17.1 |
| 90° | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 29.1 | 30.1 |
| 92.5° | 33.8 | 33.8 | 33.8 | 33.8 | 33.8 | 33.8 | 33.8 | 33.8 | 34.2 | 34.2 | 34.8 |
| 95° | 38.5 | 38.5 | 38.5 | 38.5 | 38.5 | 38.5 | 38.5 | 38.5 | 39.4 | 39.4 | 39.4 |
| 97.5° | 44.2 | 44.2 | 44.2 | 44.2 | 44.2 | 44.2 | 44.2 | 44.2 | 44.6 | 44.6 | 44.6 |
| 100° | 49.8 | 49.8 | 49.8 | 49.8 | 49.8 | 49.8 | 49.8 | 49.8 | 49.8 | 49.8 | 49.8 |
| 102.5° | 55.9 | 55.9 | 55.9 | 56.4 | 55.9 | 55.9 | 55.9 | 55.9 | 55.9 | 55.9 | 55.9 |
| 105° | 62.0 | 62.0 | 62.0 | 62.9 | 62.0 | 62.0 | 62.0 | 62.0 | 62.0 | 62.0 | 62.0 |
| 107.5° | 69.0 | 69.0 | 69.0 | 69.5 | 69.0 | 69.0 | 69.0 | 69.0 | 69.0 | 68.6 | 68.6 |
| 110° | 76.1 | 76.1 | 76.1 | 76.1 | 76.1 | 76.1 | 76.1 | 76.1 | 76.1 | 75.1 | 75.1 |

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

Scaled Data Report

REPORT NUMBER: P821445
CATALOG NUMBER: TT-D2-830-12VDC-DL-UPL

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 112.5° | 84.0 | 84.0 | 84.0 | 84.6 | 84.6 | 84.0 | 84.0 | 84.0 | 84.0 | 83.1 | 83.1 |
| 115° | 92.0 | 92.0 | 92.0 | 93.0 | 93.0 | 92.0 | 92.0 | 92.0 | 92.0 | 91.1 | 91.1 |
| 117.5° | 101.4 | 101.4 | 101.4 | 102.4 | 102.4 | 101.4 | 101.4 | 101.4 | 101.0 | 100.5 | 100.5 |
| 120° | 110.8 | 110.8 | 110.8 | 111.8 | 111.8 | 110.8 | 110.8 | 110.8 | 109.9 | 109.9 | 109.9 |
| 122.5° | 121.6 | 122.1 | 122.1 | 122.6 | 122.6 | 121.6 | 121.6 | 121.6 | 121.2 | 120.7 | 120.7 |
| 125° | 132.4 | 133.4 | 133.4 | 133.4 | 133.4 | 132.4 | 132.4 | 132.4 | 132.4 | 131.5 | 131.5 |
| 127.5° | 144.2 | 145.1 | 145.1 | 145.1 | 145.1 | 144.2 | 144.2 | 144.2 | 144.2 | 143.2 | 143.2 |
| 130° | 155.9 | 156.8 | 156.8 | 156.8 | 156.8 | 155.9 | 155.9 | 155.9 | 155.9 | 155.0 | 155.0 |
| 132.5° | 168.1 | 168.6 | 168.6 | 168.6 | 168.6 | 168.1 | 167.6 | 167.6 | 167.6 | 167.2 | 167.2 |
| 135° | 180.3 | 180.3 | 180.3 | 180.3 | 180.3 | 180.3 | 179.4 | 179.4 | 179.4 | 179.4 | 179.4 |
| 137.5° | 191.6 | 191.6 | 191.6 | 191.6 | 191.6 | 191.6 | 191.2 | 190.6 | 191.2 | 190.6 | 191.2 |
| 140° | 202.9 | 202.9 | 202.9 | 202.9 | 202.9 | 202.9 | 202.9 | 201.9 | 202.9 | 201.9 | 202.9 |
| 142.5° | 213.7 | 213.7 | 213.7 | 213.7 | 213.7 | 213.7 | 213.7 | 212.7 | 213.7 | 213.2 | 213.7 |
| 145° | 224.5 | 224.5 | 224.5 | 224.5 | 224.5 | 224.5 | 224.5 | 223.5 | 224.5 | 224.5 | 224.5 |
| 147.5° | 235.8 | 235.8 | 235.8 | 235.8 | 235.8 | 235.8 | 235.8 | 234.8 | 235.8 | 235.3 | 235.8 |
| 150° | 247.0 | 247.0 | 247.0 | 247.0 | 247.0 | 247.0 | 247.0 | 246.1 | 247.0 | 246.1 | 247.0 |
| 152.5° | 256.0 | 256.0 | 256.0 | 256.0 | 256.4 | 256.0 | 256.0 | 255.5 | 256.4 | 255.5 | 256.0 |
| 155° | 264.9 | 264.9 | 264.9 | 264.9 | 265.8 | 264.9 | 264.9 | 264.9 | 265.8 | 264.9 | 264.9 |
| 157.5° | 272.4 | 272.4 | 272.4 | 272.4 | 273.3 | 272.4 | 272.4 | 272.4 | 273.3 | 272.4 | 272.4 |
| 160° | 279.9 | 279.9 | 279.9 | 279.9 | 280.8 | 279.9 | 279.9 | 279.9 | 280.8 | 279.9 | 279.9 |
| 162.5° | 286.0 | 286.0 | 286.0 | 286.0 | 286.9 | 286.0 | 286.0 | 286.0 | 286.9 | 286.0 | 286.0 |
| 165° | 292.1 | 292.1 | 292.1 | 292.1 | 293.0 | 292.1 | 292.1 | 292.1 | 293.0 | 292.1 | 292.1 |
| 167.5° | 295.8 | 295.8 | 295.8 | 295.8 | 296.8 | 295.8 | 295.8 | 295.8 | 296.8 | 295.8 | 295.8 |
| 170° | 299.6 | 299.6 | 299.6 | 299.6 | 300.5 | 299.6 | 299.6 | 299.6 | 300.5 | 299.6 | 299.6 |
| 172.5° | 302.0 | 302.0 | 302.0 | 302.0 | 302.8 | 302.0 | 302.4 | 302.0 | 302.8 | 302.0 | 302.0 |
| 175° | 304.3 | 304.3 | 304.3 | 304.3 | 305.2 | 304.3 | 305.2 | 304.3 | 305.2 | 304.3 | 304.3 |
| 177.5° | 305.2 | 305.2 | 305.2 | 305.2 | 305.7 | 305.2 | 305.7 | 305.2 | 305.7 | 305.2 | 305.2 |
| 180° | 306.2 | 306.2 | 306.2 | 306.2 | 306.2 | 306.2 | 306.2 | 306.2 | 306.2 | 306.2 | 306.2 |

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: SP1-2407-176-7

Test Date: 09/27/2024

Luminaire Tested: MEM2-HTN-VA-30-830-U-WQ

Data in this report applies to families of products including MEM2-HTN-VA-30-830-U-WQ

Report Generated By FNC07603 / LDUCLS01DT446
Version: v7.04

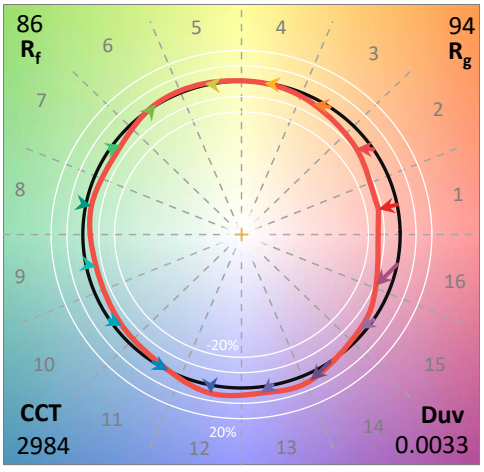
## Test Information

| | |
|---|---|
| Test Method: | LM-79-2019 |
| Report Number: | SP1-2407-176-7 |
| 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-30-830-U-WQ** |
| Description: | EPIC MODERN VISUAL COMFORT 30W WAVESTREAM WIDE |

## Spectral Parameters

| | | | | | |
|---|---|---|---|---|---|
| CCT (K): | 2984 | CRI (Ra): | 81.8 | | |
| CIE u': | 0.2500 | R1: | 79.4 | R9: | -1.1 |
| CIE v': | 0.5264 | R2: | 89.9 | R10: | 78.4 |
| Duv: | 0.0033 | R3: | 96.6 | R11: | 80.8 |
| CIE x: | 0.4431 | R4: | 80.6 | R12: | 72.8 |
| CIE y: | 0.4147 | R5: | 80.1 | R13: | 81.7 |
| CIE z: | 0.1422 | R6: | 88.9 | R14: | 98.5 |
| Peak Wavelength (nm): | 601 | R7: | 82.6 | R15: | 70.2 |
| Dominant Wavelength (nm): | 581 | R8: | 56.0 | | |
| Purity: | 57.4798 | | | | |

| | |
|---|---|
| Rf: | 85.8 |
| Rg: | 94.1 |




## Test Conditions

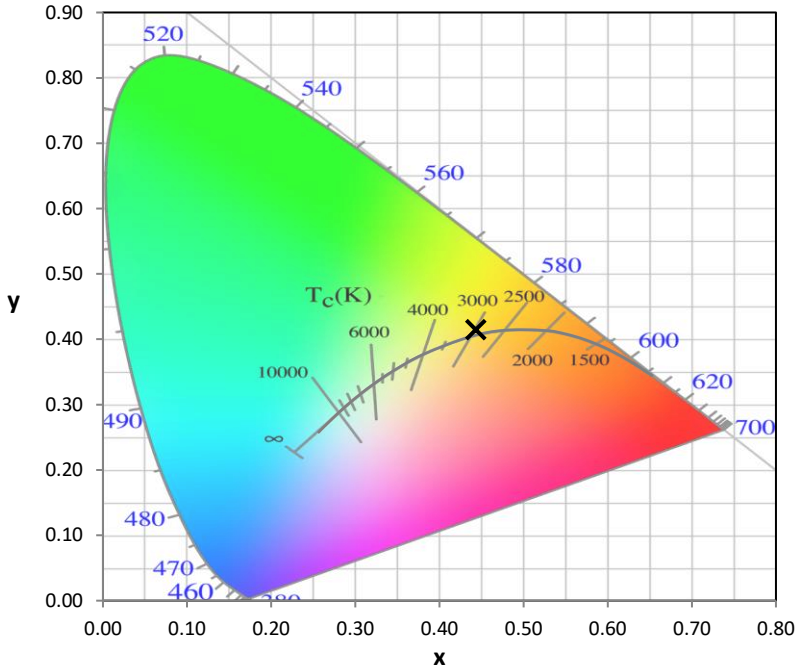
| | |
|---|---|
| Stabilization Time: | 29M |
| Operation Time: | 1H 29M |
| Sphere Temperature (°C): | 25.2 |

REPORT NUMBER: SP1-2407-176-7

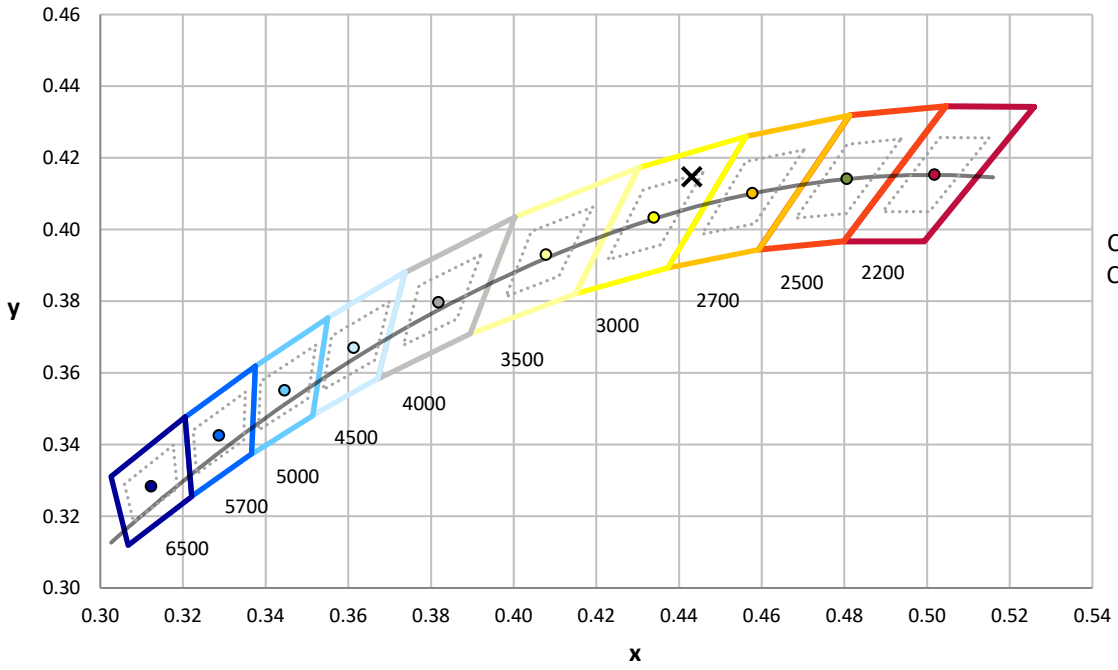
| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 6/18/2024 | 12/18/2024 |
| Power Meter | INXT2011004 | 2/8/2024 | 2/8/2025 |
| AC Power Source | IN0063 | 10/24/2023 | 10/24/2024 |
| DC 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: SP1-2407-176-7

## CIE 1931 Chromaticity Diagram




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

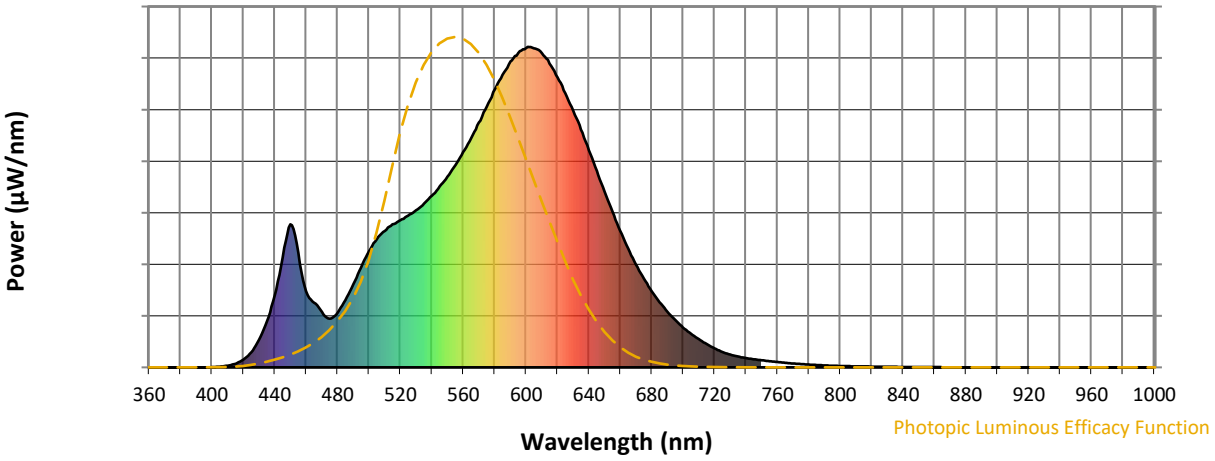



CCT = 2984K
CIE x = 0.4431
CIE y = 0.4147
Duv = 0.0033

Point lies inside the ANSI 3000K 4-step quadrangle

REPORT NUMBER: SP1-2407-176-7

## Photopic Flux vs. Wavelength

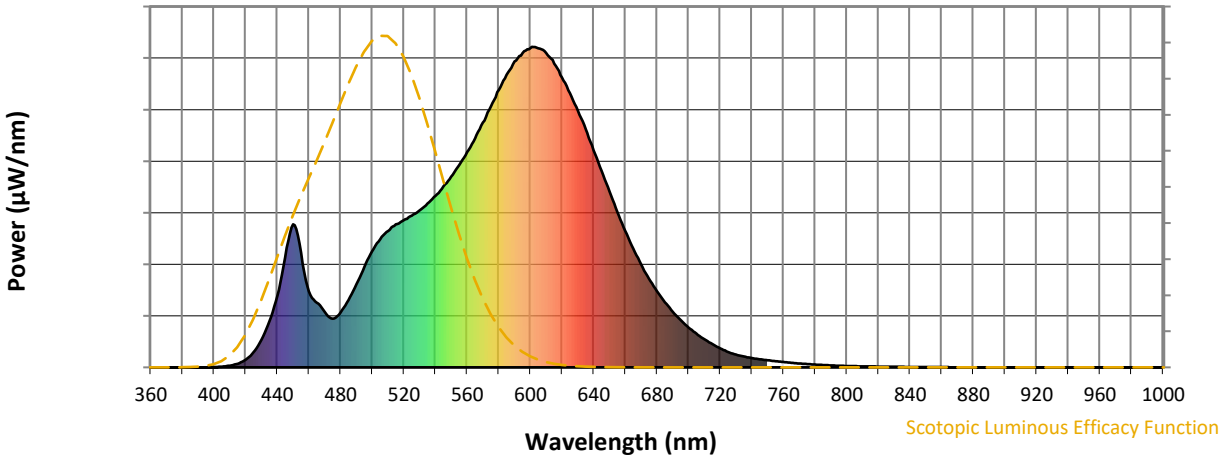



## Photopic Lumens: NR

| 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 | 260 | NR | 620 | 905 | NR | 750 | 22 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 312 | NR | 625 | 856 | NR | 755 | 19 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 362 | NR | 630 | 801 | NR | 760 | 17 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 399 | NR | 635 | 742 | NR | 765 | 14 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 425 | NR | 640 | 677 | NR | 770 | 12 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 446 | NR | 645 | 613 | NR | 775 | 10 | NR | 905 | 0 | NR |
| 390 | 0 | NR | 520 | 459 | NR | 650 | 549 | NR | 780 | 9 | NR | 910 | 0 | NR |
| 395 | 0 | NR | 525 | 473 | NR | 655 | 485 | NR | 785 | 7 | NR | 915 | 0 | NR |
| 400 | 1 | NR | 530 | 490 | NR | 660 | 425 | NR | 790 | 6 | NR | 920 | 0 | NR |
| 405 | 2 | NR | 535 | 511 | NR | 665 | 371 | NR | 795 | 5 | NR | 925 | 0 | NR |
| 410 | 5 | NR | 540 | 535 | NR | 670 | 321 | NR | 800 | 4 | NR | 930 | 0 | NR |
| 415 | 11 | NR | 545 | 565 | NR | 675 | 276 | NR | 805 | 4 | NR | 935 | 0 | NR |
| 420 | 24 | NR | 550 | 595 | NR | 680 | 238 | NR | 810 | 3 | NR | 940 | 0 | NR |
| 425 | 47 | NR | 555 | 631 | NR | 685 | 203 | NR | 815 | 3 | NR | 945 | 0 | NR |
| 430 | 86 | NR | 560 | 672 | NR | 690 | 174 | NR | 820 | 2 | NR | 950 | 0 | NR |
| 435 | 144 | NR | 565 | 715 | NR | 695 | 148 | NR | 825 | 2 | NR | 955 | 0 | NR |
| 440 | 224 | NR | 570 | 763 | NR | 700 | 124 | NR | 830 | 2 | NR | 960 | 0 | NR |
| 445 | 342 | NR | 575 | 814 | NR | 705 | 105 | NR | 835 | 2 | NR | 965 | 0 | NR |
| 450 | 446 | NR | 580 | 866 | NR | 710 | 88 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 357 | NR | 585 | 912 | NR | 715 | 73 | NR | 845 | 1 | NR | 975 | 0 | NR |
| 460 | 237 | NR | 590 | 954 | NR | 720 | 59 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 202 | NR | 595 | 981 | NR | 725 | 48 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 172 | NR | 600 | 996 | NR | 730 | 40 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 152 | NR | 605 | 996 | NR | 735 | 34 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 171 | NR | 610 | 980 | NR | 740 | 29 | NR | 870 | 0 | NR | 1000 | 0 | NR |
| 485 | 210 | NR | 615 | 947 | NR | 745 | 25 | NR | 875 | 0 | NR | | | |

REPORT NUMBER: SP1-2407-176-7

## Scotopic Flux vs. Wavelength

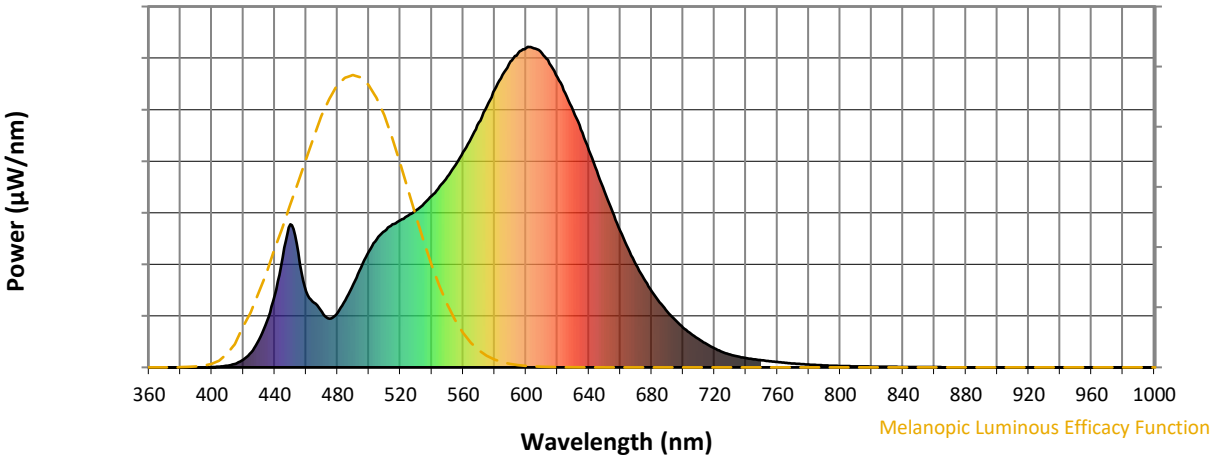



**Scotopic Lumens: NR** **S/P: 1.32**

| 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 | 260 | NR | 620 | 905 | NR | 750 | 22 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 312 | NR | 625 | 856 | NR | 755 | 19 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 362 | NR | 630 | 801 | NR | 760 | 17 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 399 | NR | 635 | 742 | NR | 765 | 14 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 425 | NR | 640 | 677 | NR | 770 | 12 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 446 | NR | 645 | 613 | NR | 775 | 10 | NR | 905 | 0 | NR |
| 390 | 0 | NR | 520 | 459 | NR | 650 | 549 | NR | 780 | 9 | NR | 910 | 0 | NR |
| 395 | 0 | NR | 525 | 473 | NR | 655 | 485 | NR | 785 | 7 | NR | 915 | 0 | NR |
| 400 | 1 | NR | 530 | 490 | NR | 660 | 425 | NR | 790 | 6 | NR | 920 | 0 | NR |
| 405 | 2 | NR | 535 | 511 | NR | 665 | 371 | NR | 795 | 5 | NR | 925 | 0 | NR |
| 410 | 5 | NR | 540 | 535 | NR | 670 | 321 | NR | 800 | 4 | NR | 930 | 0 | NR |
| 415 | 11 | NR | 545 | 565 | NR | 675 | 276 | NR | 805 | 4 | NR | 935 | 0 | NR |
| 420 | 24 | NR | 550 | 595 | NR | 680 | 238 | NR | 810 | 3 | NR | 940 | 0 | NR |
| 425 | 47 | NR | 555 | 631 | NR | 685 | 203 | NR | 815 | 3 | NR | 945 | 0 | NR |
| 430 | 86 | NR | 560 | 672 | NR | 690 | 174 | NR | 820 | 2 | NR | 950 | 0 | NR |
| 435 | 144 | NR | 565 | 715 | NR | 695 | 148 | NR | 825 | 2 | NR | 955 | 0 | NR |
| 440 | 224 | NR | 570 | 763 | NR | 700 | 124 | NR | 830 | 2 | NR | 960 | 0 | NR |
| 445 | 342 | NR | 575 | 814 | NR | 705 | 105 | NR | 835 | 2 | NR | 965 | 0 | NR |
| 450 | 446 | NR | 580 | 866 | NR | 710 | 88 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 357 | NR | 585 | 912 | NR | 715 | 73 | NR | 845 | 1 | NR | 975 | 0 | NR |
| 460 | 237 | NR | 590 | 954 | NR | 720 | 59 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 202 | NR | 595 | 981 | NR | 725 | 48 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 172 | NR | 600 | 996 | NR | 730 | 40 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 152 | NR | 605 | 996 | NR | 735 | 34 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 171 | NR | 610 | 980 | NR | 740 | 29 | NR | 870 | 0 | NR | 1000 | 0 | NR |
| 485 | 210 | NR | 615 | 947 | NR | 745 | 25 | NR | 875 | 0 | NR | | | |

REPORT NUMBER: SP1-2407-176-7

## Melanopic Flux vs. Wavelength




**Melanopic Lumens: NR** **M/P: 2.51**

| 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 | 260 | NR | 620 | 905 | NR | 750 | 22 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 312 | NR | 625 | 856 | NR | 755 | 19 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 362 | NR | 630 | 801 | NR | 760 | 17 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 399 | NR | 635 | 742 | NR | 765 | 14 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 425 | NR | 640 | 677 | NR | 770 | 12 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 446 | NR | 645 | 613 | NR | 775 | 10 | NR | 905 | 0 | NR |
| 390 | 0 | NR | 520 | 459 | NR | 650 | 549 | NR | 780 | 9 | NR | 910 | 0 | NR |
| 395 | 0 | NR | 525 | 473 | NR | 655 | 485 | NR | 785 | 7 | NR | 915 | 0 | NR |
| 400 | 1 | NR | 530 | 490 | NR | 660 | 425 | NR | 790 | 6 | NR | 920 | 0 | NR |
| 405 | 2 | NR | 535 | 511 | NR | 665 | 371 | NR | 795 | 5 | NR | 925 | 0 | NR |
| 410 | 5 | NR | 540 | 535 | NR | 670 | 321 | NR | 800 | 4 | NR | 930 | 0 | NR |
| 415 | 11 | NR | 545 | 565 | NR | 675 | 276 | NR | 805 | 4 | NR | 935 | 0 | NR |
| 420 | 24 | NR | 550 | 595 | NR | 680 | 238 | NR | 810 | 3 | NR | 940 | 0 | NR |
| 425 | 47 | NR | 555 | 631 | NR | 685 | 203 | NR | 815 | 3 | NR | 945 | 0 | NR |
| 430 | 86 | NR | 560 | 672 | NR | 690 | 174 | NR | 820 | 2 | NR | 950 | 0 | NR |
| 435 | 144 | NR | 565 | 715 | NR | 695 | 148 | NR | 825 | 2 | NR | 955 | 0 | NR |
| 440 | 224 | NR | 570 | 763 | NR | 700 | 124 | NR | 830 | 2 | NR | 960 | 0 | NR |
| 445 | 342 | NR | 575 | 814 | NR | 705 | 105 | NR | 835 | 2 | NR | 965 | 0 | NR |
| 450 | 446 | NR | 580 | 866 | NR | 710 | 88 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 357 | NR | 585 | 912 | NR | 715 | 73 | NR | 845 | 1 | NR | 975 | 0 | NR |
| 460 | 237 | NR | 590 | 954 | NR | 720 | 59 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 202 | NR | 595 | 981 | NR | 725 | 48 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 172 | NR | 600 | 996 | NR | 730 | 40 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 152 | NR | 605 | 996 | NR | 735 | 34 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 171 | NR | 610 | 980 | NR | 740 | 29 | NR | 870 | 0 | NR | 1000 | 0 | NR |
| 485 | 210 | NR | 615 | 947 | NR | 745 | 25 | NR | 875 | 0 | NR | | | |

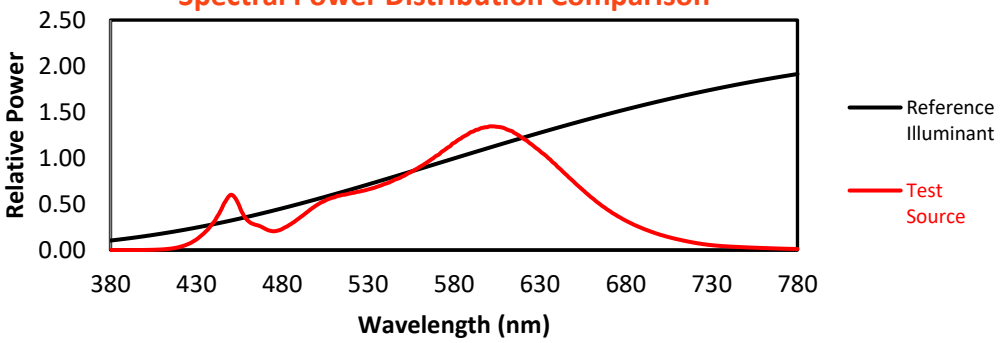
REPORT NUMBER: SP1-2407-176-7

# TM-30-18

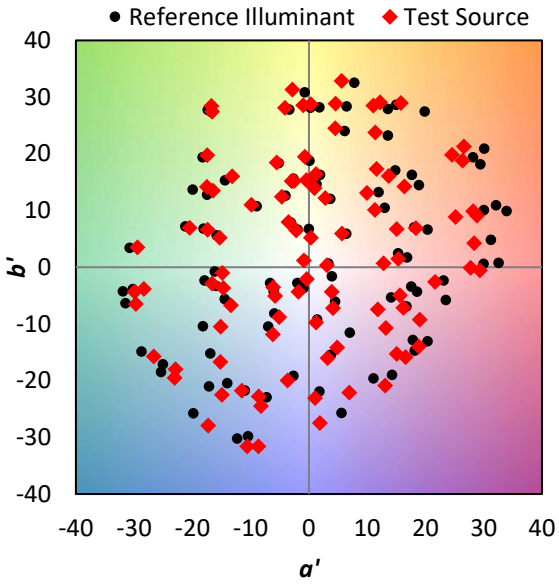
## Summary

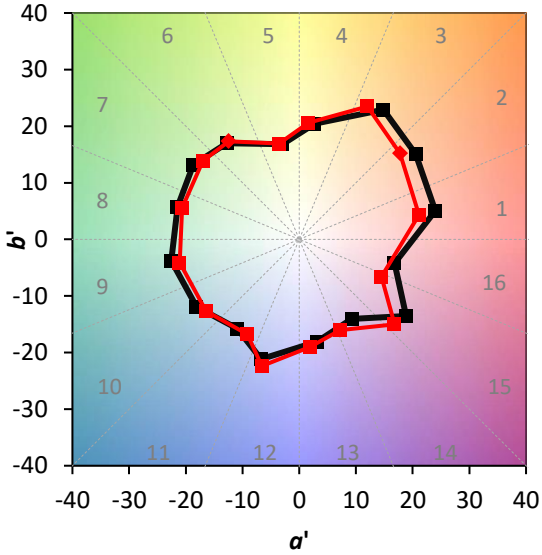
$R_f$ = 85.8
$R_g$ = 94.1
CIE $R_a$ = 81.8
$R_9$ = -1.1

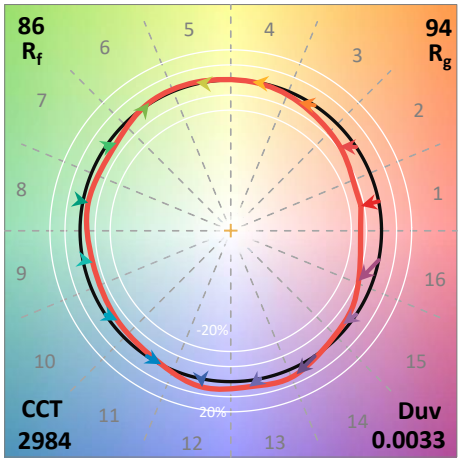
## Spectral Power Distribution Comparison

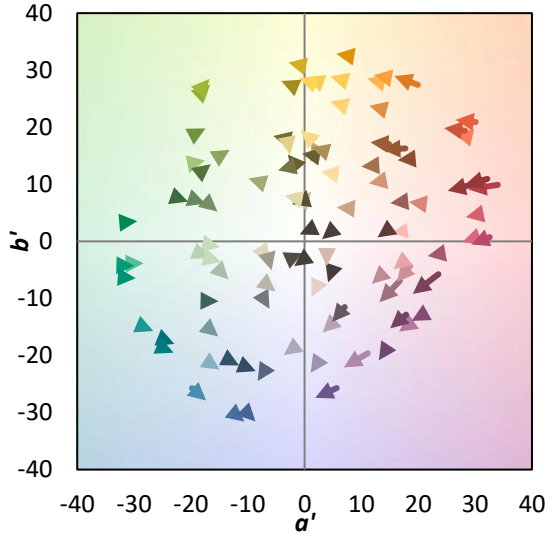



## Color Vector Graphics



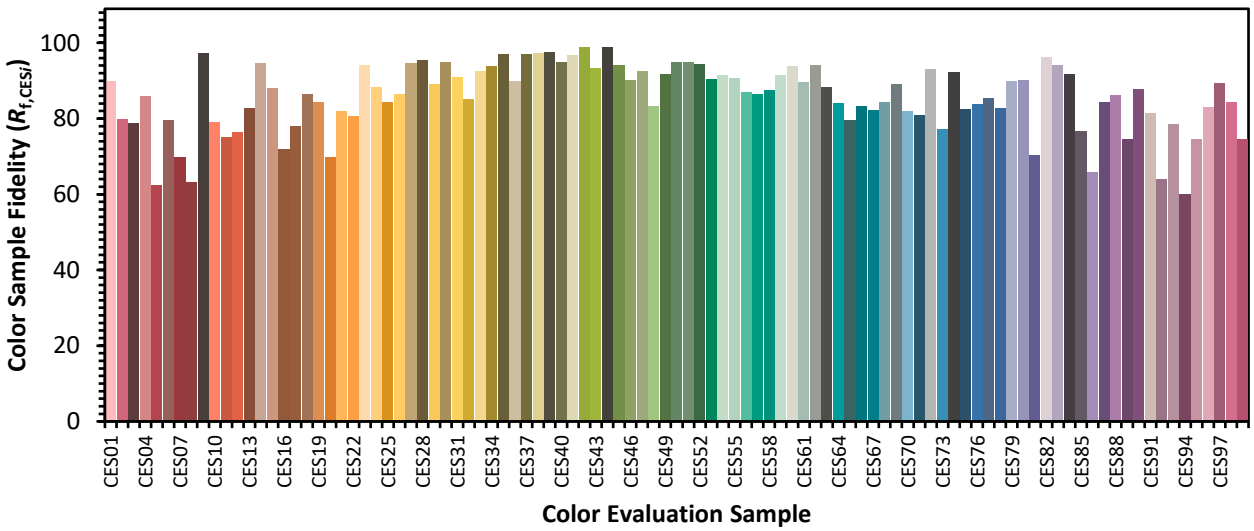



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**Individual Sample Fidelity Index ($R_{f,i}$)**

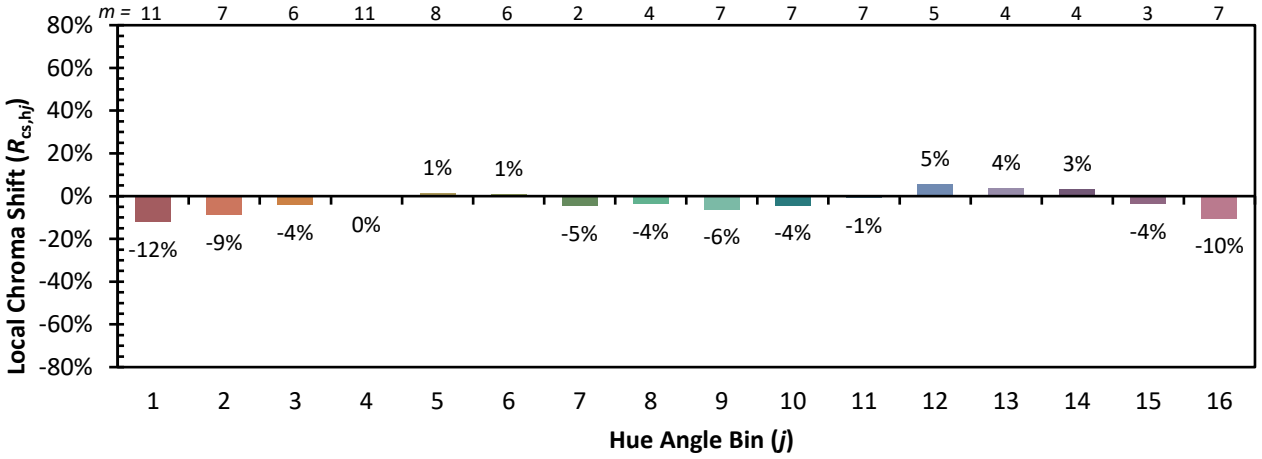
| | | | |
|---|---|---|---|
| CES01 = 86 | CES26 = 86 | CES51 = 95 | CES76 = 84 |
| CES02 = 63 | CES27 = 95 | CES52 = 94 | CES77 = 86 |
| CES03 = 31 | CES28 = 95 | CES53 = 90 | CES78 = 83 |
| CES04 = 70 | CES29 = 89 | CES54 = 91 | CES79 = 90 |
| CES05 = 50 | CES30 = 95 | CES55 = 91 | CES80 = 90 |
| CES06 = 51 | CES31 = 91 | CES56 = 87 | CES81 = 70 |
| CES07 = 42 | CES32 = 85 | CES57 = 86 | CES82 = 96 |
| CES08 = 41 | CES33 = 93 | CES58 = 87 | CES83 = 94 |
| CES09 = 29 | CES34 = 94 | CES59 = 92 | CES84 = 92 |
| CES10 = 76 | CES35 = 97 | CES60 = 94 | CES85 = 77 |
| CES11 = 59 | CES36 = 90 | CES61 = 90 | CES86 = 66 |
| CES12 = 65 | CES37 = 97 | CES62 = 94 | CES87 = 84 |
| CES13 = 43 | CES38 = 97 | CES63 = 88 | CES88 = 86 |
| CES14 = 74 | CES39 = 98 | CES64 = 84 | CES89 = 75 |
| CES15 = 72 | CES40 = 95 | CES65 = 80 | CES90 = 88 |
| CES16 = 47 | CES41 = 97 | CES66 = 83 | CES91 = 81 |
| CES17 = 50 | CES42 = 99 | CES67 = 82 | CES92 = 64 |
| CES18 = 56 | CES43 = 93 | CES68 = 84 | CES93 = 79 |
| CES19 = 72 | CES44 = 99 | CES69 = 89 | CES94 = 60 |
| CES20 = 67 | CES45 = 94 | CES70 = 82 | CES95 = 74 |
| CES21 = 87 | CES46 = 90 | CES71 = 81 | CES96 = 83 |
| CES22 = 79 | CES47 = 93 | CES72 = 93 | CES97 = 89 |
| CES23 = 92 | CES48 = 83 | CES73 = 77 | CES98 = 84 |
| CES24 = 91 | CES49 = 92 | CES74 = 92 | CES99 = 75 |
| CES25 = 72 | CES50 = 95 | CES75 = 83 | |

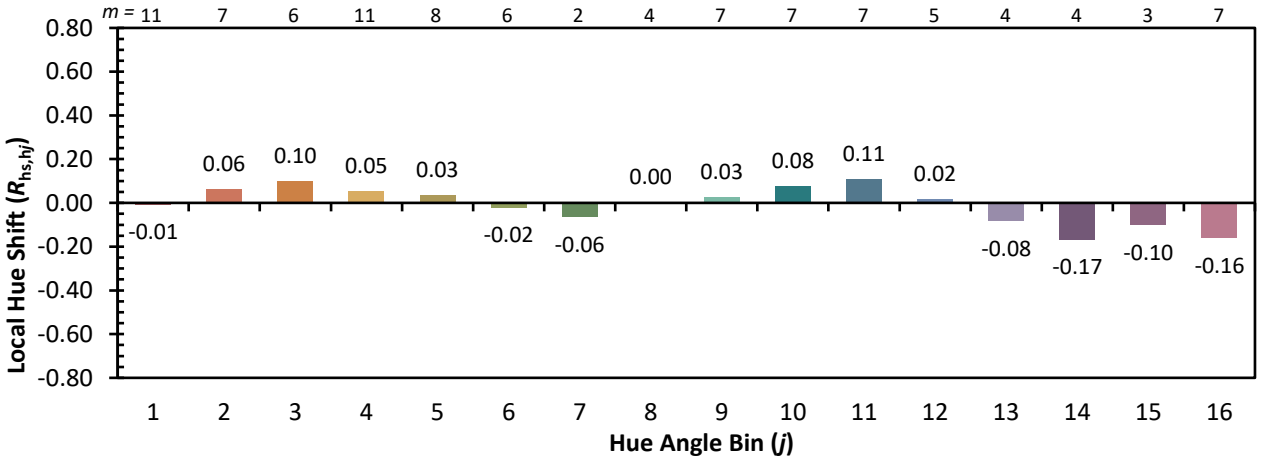


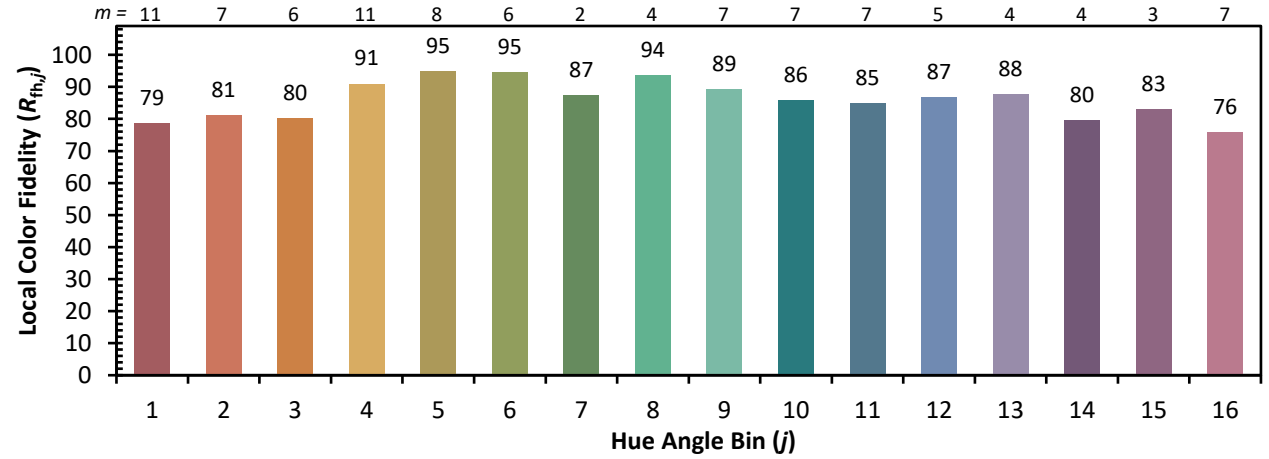
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## Color Rendition by Hue-Angle Bin



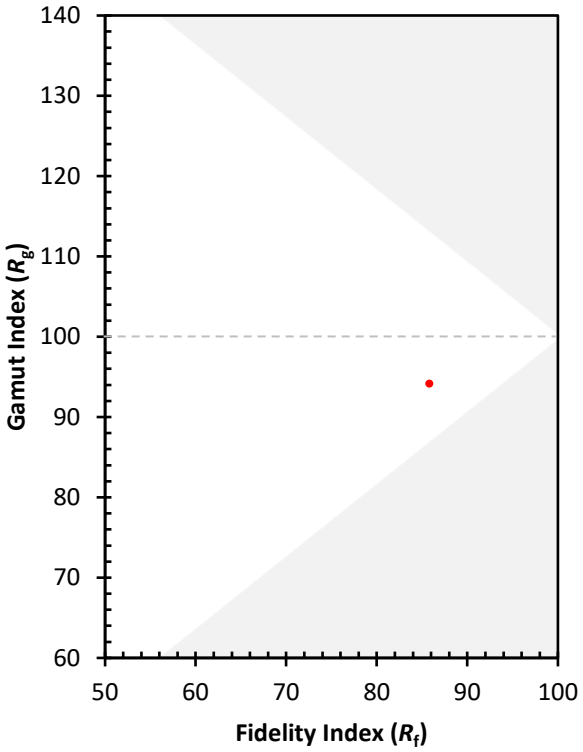



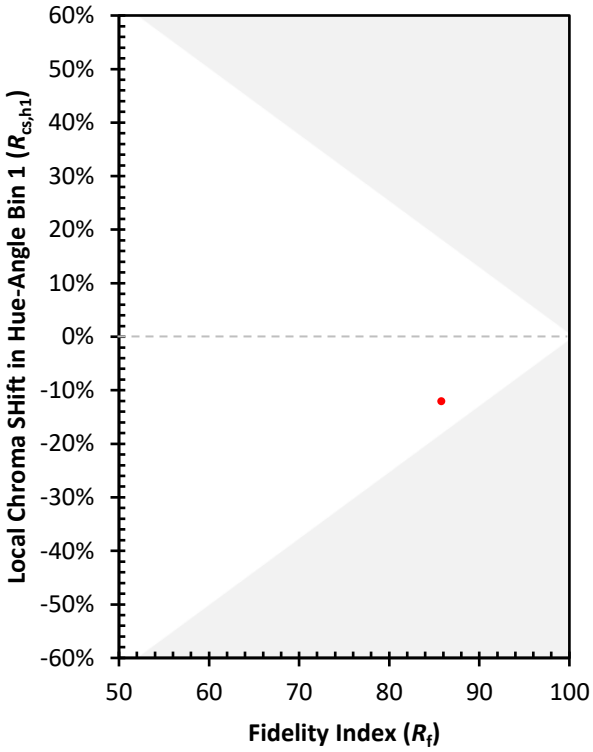



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## Measure Comparisons




(END OF REPORT)