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: P821162

Luminaire Tested: **TT-D4-830-24VDC-DL-HSS**

Issue Date: 12/2/2020

Report Generated By 670245763

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Peachtree City, GA 30269

Scaled Data Report

**Test Information**

| | |
|---|---|
| Test Method: | LM-79-08 |
| Report Number: | P821162 |
| | TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2010-017-4) |
| Test Lab: | INNOVATION CENTER |
| Issue Date: | 12/2/2020 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS (FORMERLY EATON) |
| Product Line: | McGRAW-EDISON |
| Catalog Number: | TT-D4-830-24VDC-DL-HSS |
| Description: | TOPTIER LED PARKING GARAGE LUMINAIRE |
| | 3000K, 80 CRI LEDS AND DRIVE LANE DISTRIBUTION WITH HOUSE SIDE SHIELD |
| Light Source: | - |
| Ballast/Driver: | ELECTRONIC DRIVER |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 4957.1 lumens |
| Efficiency: | N/A |
| Efficacy: | 87.0 lumens/watt |
| Luminous Opening: | Circular (Dia: 1.12' x H: 0') |
| IES Classification: | Type IV - Short |
| BUG Rating: | B1 - U1 - G3 |

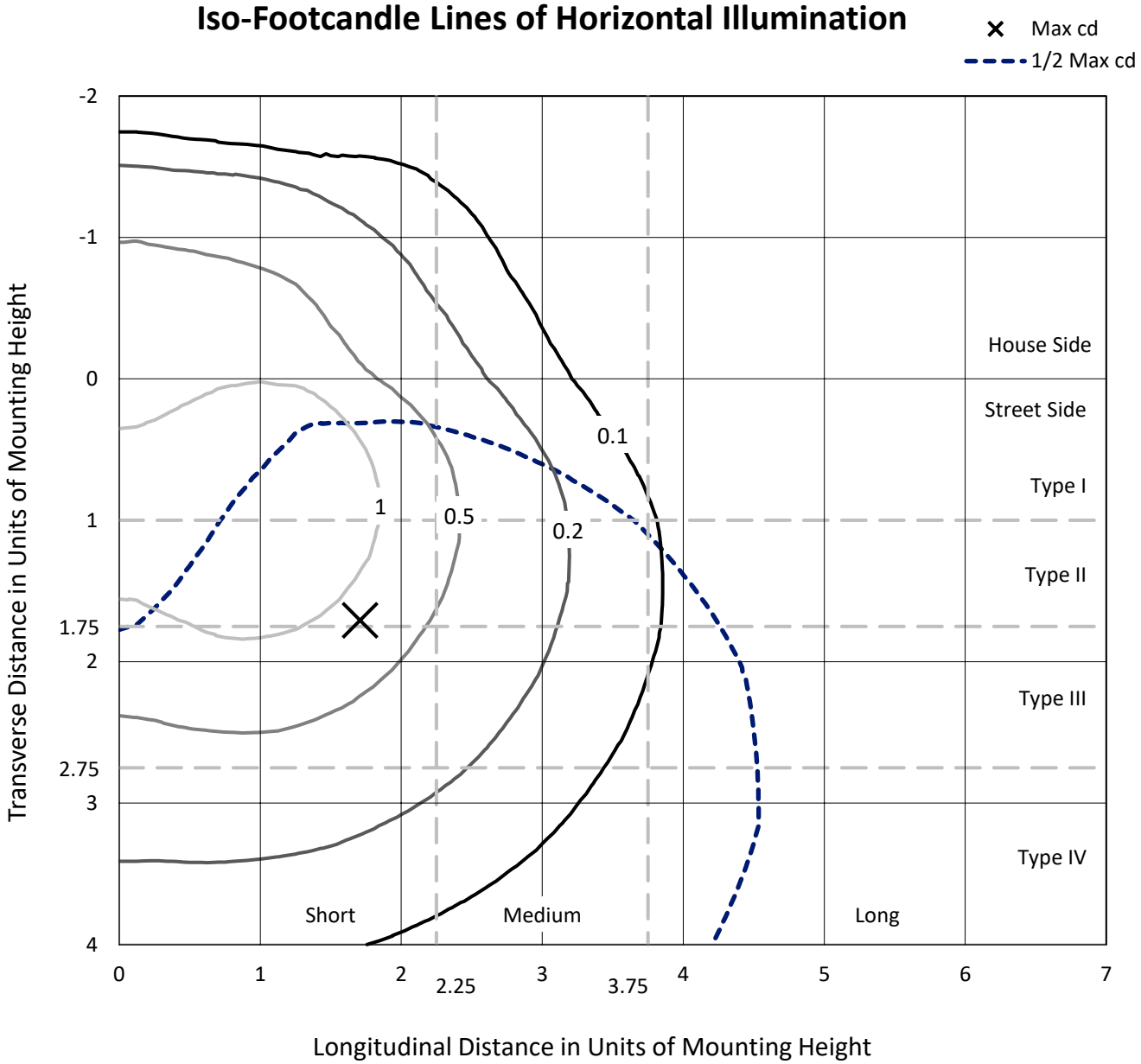
| | |
|---|---|
| Input Watts (W): | 57 |
| Input Voltage (V): | NR |
| Input Current (Ain): | NR |
| Voltage Rise (V): | NR |
| Power Factor: | NR |
| Total Harmonic Distortion (THDi): | NR |
| Frequency (hertz): | 60 |
| Stabilization Time: | NR |
| Operation Time: | NR |
| Ambient Temperature (°C): | NR |
| Test Distance: | 25 FT |

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## Iso-Footcandle Lines of Horizontal Illumination



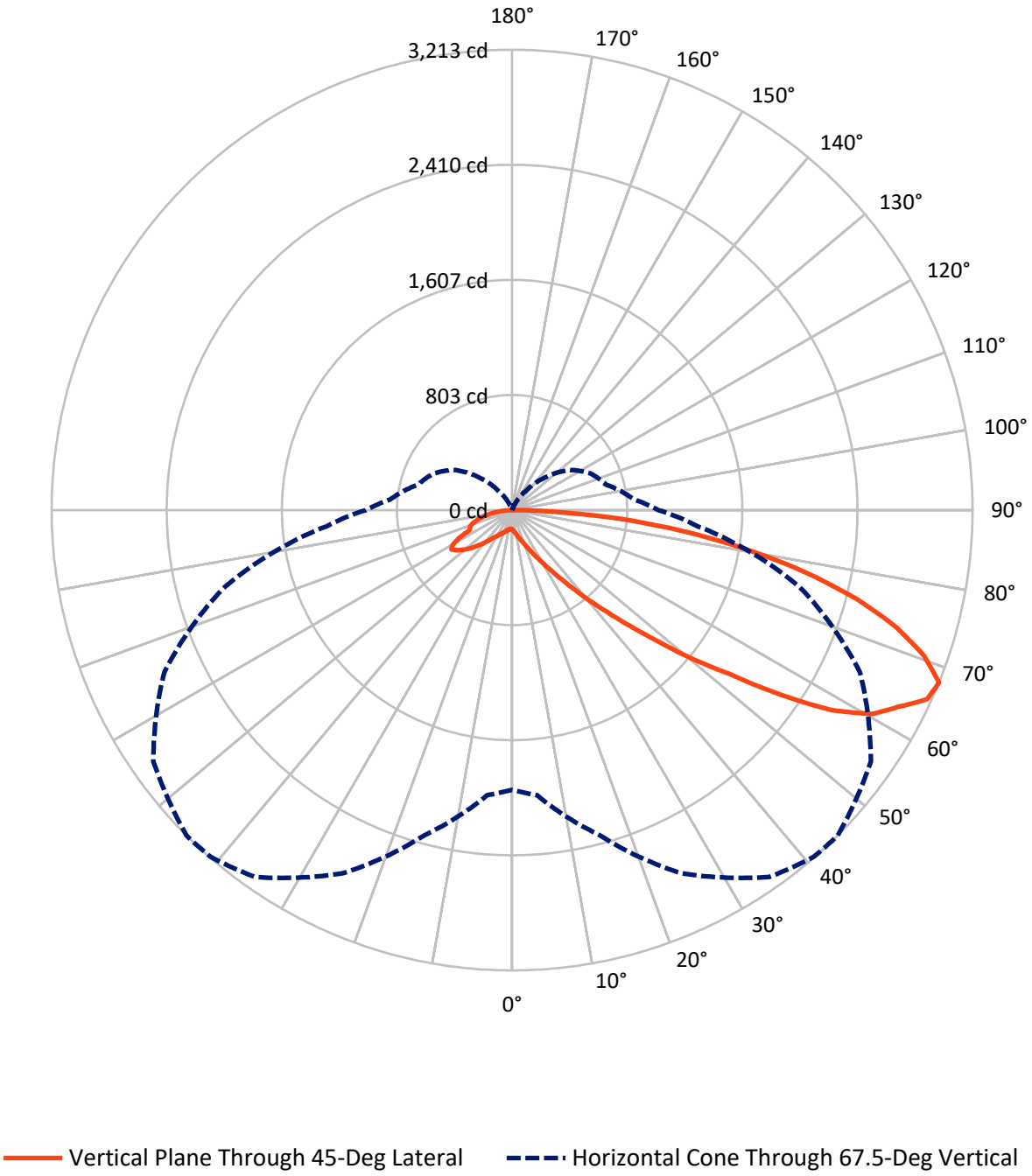

Based on 15 foot mounting height. Maximum calculated value = 1.9 fc
Type IV - Short - N/A

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## Luminous Intensity Polar Plot



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Scaled Data Report

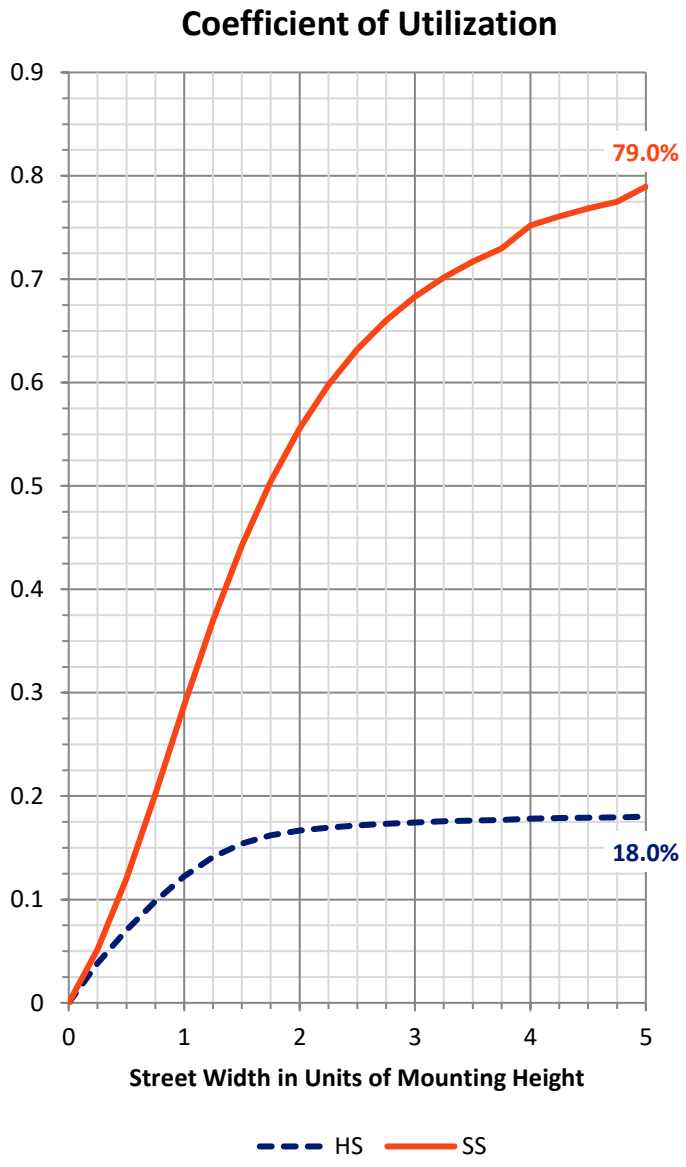
REPORT NUMBER: P821162
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**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 900.6 | 1.1 | 901.7 |
| | % Fixture | 18.2 | 0.0 | 18.2 |
| **Street Side** | Lumens | 4044.3 | 11.1 | 4055.4 |
| | % Fixture | 81.6 | 0.2 | 81.8 |
| **Total** | Lumens | 4944.9 | 12.2 | 4957.1 |
| | % Fixture | 99.8 | 0.2 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 14.0 | 0.3 |
| 10°-20° | 52.1 | 1.1 |
| 20°-30° | 120.3 | 2.4 |
| 30°-40° | 256.5 | 5.2 |
| 40°-50° | 536.8 | 10.8 |
| 50°-60° | 1018.3 | 20.5 |
| 60°-70° | 1385.9 | 28.0 |
| 70°-80° | 1191.5 | 24.0 |
| 80°-90° | 369.5 | 7.5 |
| 90°-100° | 7.8 | 0.2 |
| 100°-110° | 2.3 | 0.0 |
| 110°-120° | 0.6 | 0.0 |
| 120°-130° | 0.5 | 0.0 |
| 130°-140° | 0.3 | 0.0 |
| 140°-150° | 0.3 | 0.0 |
| 150°-160° | 0.2 | 0.0 |
| 160°-170° | 0.1 | 0.0 |
| 170°-180° | 0.0 | 0.0 |
| 0°-90° | 4944.9 | 99.8 |
| 0°-180° | 4957.1 | 100.0 |



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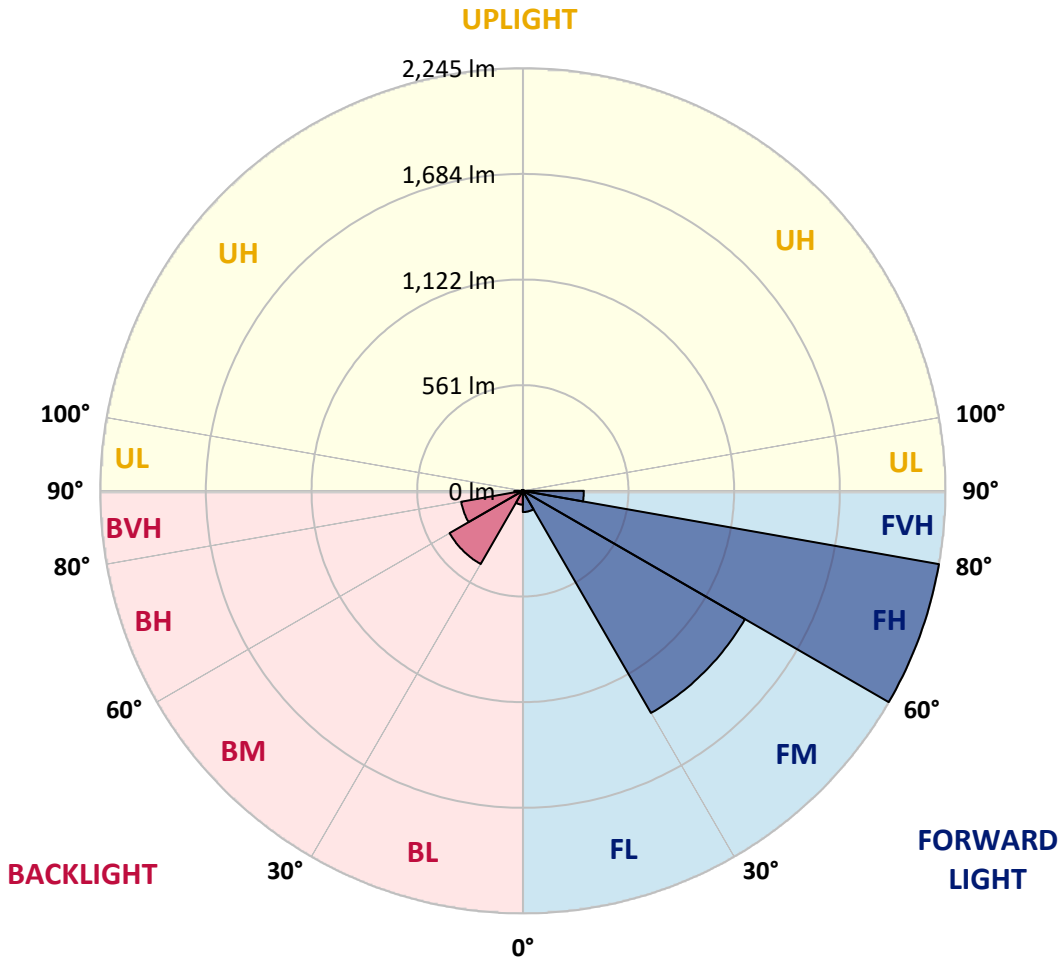
Scaled Data Report

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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°) | 113.0 | 2.3 | | | |
| FM | (30°-60°) | 1362.3 | 27.5 | | | |
| FH | (60°-80°) | 2244.8 | 45.3 | | | G2/5000 |
| FVH | (80°-90°) | 324.2 | 6.5 | | | G3/500 |
| BL | (0°-30°) | 73.4 | 1.5 | B0/110 | | |
| BM | (30°-60°) | 449.3 | 9.1 | B1/1000 | | |
| BH | (60°-80°) | 332.7 | 6.7 | B1/500 | | G1/500 |
| BVH | (80°-90°) | 45.3 | 0.9 | | | G1/100 |
| UL | (90°-100°) | 7.8 | 0.2 | | U1/10 | |
| UH | (100°-180°) | 4.4 | 0.1 | | U1/10 | |

**BUG Rating: B1-U1-G3**
Type IV Short



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**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 41° | 45° | 55° | 65° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 135.6 | 135.6 | 135.6 | 135.6 | 135.6 | 135.6 | 135.6 | 135.6 | 135.6 | 135.6 | 135.6 |
| 2.5° | 147.2 | 146.1 | 146.1 | 145.1 | 145.1 | 143.0 | 143.0 | 141.9 | 140.9 | 139.8 | 137.7 |
| 5° | 157.7 | 156.7 | 156.7 | 155.6 | 154.6 | 152.5 | 151.4 | 149.3 | 147.2 | 145.1 | 143.0 |
| 7.5° | 170.3 | 169.3 | 169.3 | 168.2 | 166.1 | 163.0 | 161.9 | 158.8 | 155.6 | 152.5 | 149.3 |
| 10° | 186.1 | 185.1 | 185.1 | 182.9 | 180.8 | 177.7 | 175.6 | 171.4 | 168.2 | 163.0 | 157.7 |
| 12.5° | 202.9 | 201.9 | 201.9 | 199.8 | 195.6 | 193.5 | 191.4 | 186.1 | 180.8 | 174.5 | 168.2 |
| 15° | 221.9 | 221.9 | 221.9 | 220.8 | 216.6 | 212.4 | 210.3 | 204.0 | 197.7 | 188.2 | 179.8 |
| 17.5° | 246.0 | 245.0 | 245.0 | 242.9 | 237.6 | 235.5 | 232.4 | 225.0 | 215.5 | 205.0 | 194.5 |
| 20° | 275.5 | 274.4 | 272.3 | 271.3 | 266.0 | 263.9 | 259.7 | 251.3 | 238.7 | 225.0 | 210.3 |
| 22.5° | 304.9 | 304.9 | 303.9 | 304.9 | 300.7 | 298.6 | 293.3 | 281.8 | 267.1 | 247.1 | 229.2 |
| 25° | 338.6 | 339.6 | 341.7 | 344.9 | 339.6 | 337.5 | 333.3 | 318.6 | 300.7 | 275.5 | 250.2 |
| 27.5° | 380.6 | 380.6 | 385.9 | 391.1 | 386.9 | 385.9 | 379.6 | 363.8 | 338.6 | 308.1 | 278.6 |
| 30° | 425.8 | 426.9 | 435.3 | 444.8 | 442.7 | 442.7 | 437.4 | 419.5 | 389.0 | 353.3 | 312.3 |
| 32.5° | 478.4 | 482.6 | 491.0 | 501.5 | 508.9 | 508.9 | 506.8 | 487.9 | 452.1 | 403.7 | 353.3 |
| 35° | 547.8 | 540.4 | 556.2 | 572.0 | 587.7 | 590.9 | 592.0 | 574.1 | 533.1 | 472.1 | 403.7 |
| 37.5° | 607.7 | 606.7 | 630.9 | 658.2 | 684.5 | 695.0 | 698.1 | 681.3 | 628.8 | 548.8 | 458.4 |
| 40° | 677.1 | 683.4 | 716.0 | 757.0 | 801.2 | 819.1 | 827.5 | 808.5 | 743.4 | 640.3 | 521.5 |
| 42.5° | 749.7 | 768.6 | 809.6 | 871.6 | 938.9 | 965.2 | 974.7 | 956.8 | 880.0 | 754.9 | 601.4 |
| 45° | 834.8 | 861.1 | 915.8 | 1004.1 | 1092.4 | 1131.3 | 1152.4 | 1146.1 | 1067.2 | 911.6 | 704.5 |
| 47.5° | 940.0 | 958.9 | 1033.6 | 1152.4 | 1277.5 | 1341.6 | 1371.1 | 1388.9 | 1276.4 | 1073.5 | 794.9 |
| 50° | 1058.8 | 1061.9 | 1165.0 | 1315.3 | 1498.3 | 1583.5 | 1635.0 | 1626.6 | 1493.0 | 1259.6 | 909.5 |
| 52.5° | 1178.7 | 1175.5 | 1310.1 | 1514.1 | 1753.8 | 1865.2 | 1899.9 | 1934.6 | 1803.2 | 1543.5 | 1093.5 |
| 55° | 1315.3 | 1309.0 | 1478.3 | 1737.0 | 2034.5 | 2181.7 | 2279.5 | 2327.9 | 2120.7 | 1730.7 | 1173.4 |
| 57.5° | 1428.9 | 1448.9 | 1661.3 | 1972.5 | 2387.8 | 2572.8 | 2637.0 | 2610.7 | 2295.3 | 1825.3 | 1212.3 |
| 60° | 1572.9 | 1602.4 | 1844.2 | 2280.5 | 2693.8 | 2831.5 | 2890.4 | 2770.5 | 2406.7 | 1896.8 | 1239.6 |
| 62.5° | 1708.6 | 1746.4 | 2045.0 | 2530.8 | 2885.1 | 3011.3 | 3026.0 | 2895.6 | 2563.4 | 2037.7 | 1319.5 |
| 65° | 1835.8 | 1878.9 | 2244.8 | 2679.0 | 3052.3 | 3157.4 | 3182.7 | 3079.6 | 2729.5 | 2120.7 | 1351.1 |
| 67.5° | 1952.5 | 1997.7 | 2347.8 | 2797.9 | 3127.0 | 3207.9 | 3213.2 | 3056.5 | 2678.0 | 2077.6 | 1300.6 |
| 70° | 2041.9 | 2061.9 | 2397.3 | 2794.7 | 3038.6 | 3070.2 | 3049.1 | 2891.4 | 2557.1 | 1989.3 | 1228.1 |
| 72.5° | 2059.7 | 2074.5 | 2328.9 | 2639.1 | 2793.6 | 2823.1 | 2806.3 | 2667.5 | 2366.8 | 1831.6 | 1110.3 |
| 75° | 1969.3 | 1972.5 | 2144.9 | 2359.4 | 2471.9 | 2507.7 | 2485.6 | 2357.3 | 2080.8 | 1608.7 | 955.7 |
| 77.5° | 1732.8 | 1739.1 | 1843.2 | 1987.2 | 2081.8 | 2112.3 | 2095.5 | 1977.7 | 1743.3 | 1351.1 | 790.7 |
| 80° | 1373.2 | 1385.8 | 1460.4 | 1560.3 | 1646.5 | 1678.1 | 1658.1 | 1563.5 | 1372.1 | 1061.9 | 617.2 |
| 82.5° | 935.8 | 951.5 | 1019.9 | 1102.9 | 1178.7 | 1209.1 | 1192.3 | 1132.4 | 989.4 | 765.4 | 440.5 |
| 85° | 473.1 | 490.0 | 560.4 | 638.2 | 704.5 | 737.1 | 731.8 | 706.6 | 608.8 | 472.1 | 266.0 |
| 87.5° | 74.7 | 82.0 | 111.5 | 148.3 | 189.3 | 219.7 | 200.8 | 198.7 | 157.7 | 126.2 | 64.1 |
| 90° | 30.5 | 30.5 | 29.4 | 28.4 | 25.2 | 23.1 | 22.1 | 17.9 | 13.7 | 8.4 | 3.2 |
| 92.5° | 27.3 | 27.3 | 26.3 | 24.2 | 22.1 | 21.0 | 18.9 | 15.8 | 11.6 | 7.4 | 3.2 |
| 95° | 22.1 | 22.1 | 21.0 | 20.0 | 17.9 | 16.8 | 14.7 | 12.6 | 9.5 | 6.3 | 3.2 |
| 97.5° | 16.8 | 16.8 | 15.8 | 14.7 | 13.7 | 11.6 | 11.6 | 9.5 | 6.3 | 4.2 | 2.1 |
| 100° | 12.6 | 12.6 | 11.6 | 10.5 | 9.5 | 8.4 | 8.4 | 6.3 | 4.2 | 3.2 | 2.1 |
| 102.5° | 8.4 | 8.4 | 8.4 | 7.4 | 6.3 | 6.3 | 5.3 | 4.2 | 3.2 | 2.1 | 2.1 |
| 105° | 5.3 | 5.3 | 5.3 | 5.3 | 4.2 | 3.2 | 3.2 | 2.1 | 2.1 | 2.1 | 2.1 |
| 107.5° | 3.2 | 3.2 | 3.2 | 3.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 |
| 110° | 2.1 | 2.1 | 2.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 2.1 | 1.1 |

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REPORT NUMBER: P821162
CATALOG NUMBER: TT-D4-830-24VDC-DL-HSS

**CANDELA DISTRIBUTION (continued):**

| | 0° | 5° | 15° | 25° | 35° | 41° | 45° | 55° | 65° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 112.5° | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | *1.1* | 1.1 | 1.1 | 1.1 | 1.1 |
| 115° | 0.0 | 0.0 | 1.1 | 1.1 | 1.1 | 1.1 | *1.1* | 1.1 | 1.1 | 1.1 | 1.1 |
| 117.5° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.1 | *1.1* | 1.1 | 1.1 | 1.1 | 1.1 |
| 120° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.1 | *1.1* | 1.1 | 1.1 | 1.1 | 1.1 |
| 122.5° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.1 | *1.1* | 1.1 | 1.1 | 1.1 | 1.1 |
| 125° | 0.0 | 0.0 | 0.0 | 1.1 | 0.0 | 1.1 | *1.1* | 1.1 | 1.1 | 1.1 | 1.1 |
| 127.5° | 0.0 | 0.0 | 0.0 | 1.1 | 0.0 | 0.0 | *1.1* | 1.1 | 1.1 | 1.1 | 1.1 |
| 130° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | *1.1* | 1.1 | 1.1 | 1.1 | 1.1 |
| 132.5° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | *1.1* | 1.1 | 1.1 | 1.1 | 1.1 |
| 135° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | *1.1* | 1.1 | 1.1 | 1.1 | 1.1 |
| 137.5° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | *1.1* | 1.1 | 1.1 | 1.1 | 1.1 |
| 140° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | *0.0* | 1.1 | 1.1 | 1.1 | 1.1 |
| 142.5° | 1.1 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | *1.1* | 1.1 | 1.1 | 1.1 | 1.1 |
| 145° | 1.1 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | *1.1* | 1.1 | 1.1 | 1.1 | 1.1 |
| 147.5° | 1.1 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | *1.1* | 1.1 | 1.1 | 1.1 | 1.1 |
| 150° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | *1.1* | 1.1 | 1.1 | 1.1 | 1.1 |
| 152.5° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | *0.0* | 1.1 | 1.1 | 1.1 | 1.1 |
| 155° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | *1.1* | 1.1 | 1.1 | 1.1 | 1.1 |
| 157.5° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | *1.1* | 1.1 | 1.1 | 1.1 | 1.1 |
| 160° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | *0.0* | 1.1 | 1.1 | 1.1 | 1.1 |
| 162.5° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | *1.1* | 1.1 | 1.1 | 1.1 | 1.1 |
| 165° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | *1.1* | 1.1 | 1.1 | 1.1 | 1.1 |
| 167.5° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | *1.1* | 1.1 | 1.1 | 1.1 | 1.1 |
| 170° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | *1.1* | 1.1 | 1.1 | 1.1 | 1.1 |
| 172.5° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | *1.1* | 1.1 | 1.1 | 1.1 | 1.1 |
| 175° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.1 | *1.1* | 1.1 | 1.1 | 1.1 | 1.1 |
| 177.5° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | *1.1* | 1.1 | 1.1 | 1.1 | 1.1 |
| 180° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | *0.0* | 0.0 | 0.0 | 0.0 | 0.0 |

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**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 135.6 | 135.6 | 135.6 | 135.6 | 135.6 | 135.6 | 135.6 | 135.6 | 135.6 | 135.6 | 135.6 |
| 2.5° | 137.7 | 136.7 | 134.6 | 133.5 | 131.4 | 131.4 | 130.4 | 129.3 | 129.3 | 129.3 | 129.3 |
| 5° | 140.9 | 139.8 | 137.7 | 135.6 | 133.5 | 131.4 | 130.4 | 129.3 | 129.3 | 129.3 | 128.3 |
| 7.5° | 147.2 | 145.1 | 141.9 | 138.8 | 135.6 | 133.5 | 132.5 | 131.4 | 130.4 | 130.4 | 130.4 |
| 10° | 154.6 | 152.5 | 147.2 | 144.0 | 139.8 | 136.7 | 135.6 | 134.6 | 133.5 | 133.5 | 133.5 |
| 12.5° | 164.0 | 160.9 | 154.6 | 149.3 | 145.1 | 141.9 | 139.8 | 138.8 | 138.8 | 137.7 | 138.8 |
| 15° | 175.6 | 171.4 | 163.0 | 156.7 | 151.4 | 148.3 | 146.1 | 145.1 | 145.1 | 145.1 | 144.0 |
| 17.5° | 188.2 | 182.9 | 172.4 | 165.1 | 158.8 | 155.6 | 153.5 | 152.5 | 152.5 | 152.5 | 152.5 |
| 20° | 202.9 | 195.6 | 184.0 | 174.5 | 168.2 | 164.0 | 161.9 | 161.9 | 160.9 | 161.9 | 161.9 |
| 22.5° | 218.7 | 210.3 | 195.6 | 185.1 | 176.6 | 172.4 | 170.3 | 170.3 | 170.3 | 171.4 | 172.4 |
| 25° | 237.6 | 227.1 | 209.2 | 195.6 | 186.1 | 181.9 | 179.8 | 180.8 | 180.8 | 181.9 | 181.9 |
| 27.5° | 262.9 | 247.1 | 225.0 | 208.2 | 197.7 | 192.4 | 190.3 | 191.4 | 192.4 | 192.4 | 192.4 |
| 30° | 291.2 | 272.3 | 241.8 | 224.0 | 211.3 | 205.0 | 202.9 | 204.0 | 205.0 | 207.1 | 206.1 |
| 32.5° | 325.9 | 302.8 | 267.1 | 241.8 | 228.2 | 220.8 | 218.7 | 217.6 | 219.7 | 221.9 | 221.9 |
| 35° | 368.0 | 338.6 | 296.5 | 267.1 | 247.1 | 237.6 | 235.5 | 234.5 | 235.5 | 237.6 | 239.7 |
| 37.5° | 413.2 | 377.5 | 325.9 | 295.5 | 273.4 | 262.9 | 257.6 | 253.4 | 254.4 | 255.5 | 258.7 |
| 40° | 464.7 | 420.6 | 359.6 | 322.8 | 302.8 | 290.2 | 282.8 | 276.5 | 278.6 | 278.6 | 279.7 |
| 42.5° | 529.9 | 474.2 | 401.6 | 355.4 | 334.4 | 320.7 | 309.1 | 301.8 | 297.6 | 298.6 | 294.4 |
| 45° | 615.1 | 545.7 | 454.2 | 401.6 | 372.2 | 351.2 | 337.5 | 322.8 | 312.3 | 314.4 | 308.1 |
| 47.5° | 685.5 | 602.5 | 503.6 | 445.8 | 414.3 | 388.0 | 359.6 | 338.6 | 323.8 | 321.7 | 317.5 |
| 50° | 771.7 | 671.9 | 560.4 | 494.2 | 460.5 | 420.6 | 386.9 | 351.2 | 327.0 | 320.7 | 321.7 |
| 52.5° | 916.8 | 793.8 | 641.4 | 559.4 | 500.5 | 453.2 | 401.6 | 352.2 | 319.6 | 310.2 | 313.3 |
| 55° | 969.4 | 834.8 | 683.4 | 613.0 | 555.2 | 481.6 | 408.0 | 340.7 | 298.6 | 290.2 | 291.2 |
| 57.5° | 981.0 | 834.8 | 686.6 | 629.8 | 581.4 | 504.7 | 404.8 | 314.4 | 258.7 | 251.3 | 250.2 |
| 60° | 987.3 | 829.6 | 675.0 | 617.2 | 564.6 | 482.6 | 363.8 | 253.4 | 198.7 | 193.5 | 190.3 |
| 62.5° | 1046.2 | 873.7 | 686.6 | 607.7 | 533.1 | 423.7 | 276.5 | 161.9 | 110.4 | 109.3 | 107.2 |
| 65° | 1064.0 | 889.5 | 701.3 | 614.0 | 498.4 | 329.1 | 164.0 | 54.7 | 11.6 | 12.6 | 10.5 |
| 67.5° | *1019.9* | *853.8* | *680.3* | *604.6* | *487.9* | *320.7* | *157.7* | *46.3* | *0.0* | *0.0* | *0.0* |
| 70° | 958.9 | 802.2 | 643.5 | 572.0 | 465.8 | 308.1 | 154.6 | 46.3 | 0.0 | 0.0 | 0.0 |
| 72.5° | 862.2 | 728.6 | 584.6 | 527.8 | 427.9 | 282.8 | 144.0 | 44.2 | 0.0 | 0.0 | 0.0 |
| 75° | 748.6 | 634.0 | 512.0 | 467.9 | 379.6 | 248.1 | 129.3 | 40.0 | 0.0 | 0.0 | 0.0 |
| 77.5° | 626.7 | 528.9 | 427.9 | 394.3 | 320.7 | 211.3 | 109.3 | 33.6 | 0.0 | 0.0 | 0.0 |
| 80° | 492.1 | 418.5 | 337.5 | 314.4 | 253.4 | 168.2 | 87.3 | 26.3 | 0.0 | 0.0 | 0.0 |
| 82.5° | 354.3 | 303.9 | 249.2 | 230.3 | 186.1 | 122.0 | 63.1 | 17.9 | 0.0 | 0.0 | 0.0 |
| 85° | 218.7 | 190.3 | 160.9 | 149.3 | 117.8 | 75.7 | 37.9 | 9.5 | 0.0 | 0.0 | 0.0 |
| 87.5° | 65.2 | 63.1 | 56.8 | 55.7 | 40.0 | 23.1 | 8.4 | 1.1 | 0.0 | 0.0 | 0.0 |
| 90° | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 92.5° | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 95° | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 97.5° | 1.1 | 1.1 | 1.1 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 100° | 1.1 | 1.1 | 1.1 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 102.5° | 1.1 | 1.1 | 1.1 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 105° | 1.1 | 1.1 | 1.1 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 107.5° | 1.1 | 1.1 | 1.1 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 110° | 1.1 | 1.1 | 1.1 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

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

Scaled Data Report

REPORT NUMBER: P821162
CATALOG NUMBER: TT-D4-830-24VDC-DL-HSS

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 112.5° | 1.1 | 1.1 | 1.1 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 115° | 1.1 | 1.1 | 1.1 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 117.5° | 1.1 | 1.1 | 1.1 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 120° | 1.1 | 1.1 | 1.1 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 122.5° | 1.1 | 1.1 | 1.1 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 125° | 1.1 | 1.1 | 1.1 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 127.5° | 1.1 | 1.1 | 1.1 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 130° | 1.1 | 1.1 | 1.1 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 132.5° | 1.1 | 1.1 | 1.1 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 135° | 1.1 | 1.1 | 1.1 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 137.5° | 1.1 | 1.1 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 140° | 1.1 | 1.1 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 142.5° | 1.1 | 1.1 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 145° | 1.1 | 1.1 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 147.5° | 1.1 | 1.1 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 150° | 1.1 | 1.1 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 152.5° | 1.1 | 1.1 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 155° | 1.1 | 1.1 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 157.5° | 1.1 | 1.1 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 160° | 1.1 | 1.1 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 162.5° | 1.1 | 1.1 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 165° | 1.1 | 1.1 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 167.5° | 1.1 | 1.1 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 170° | 1.1 | 1.1 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 172.5° | 1.1 | 1.1 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 175° | 1.1 | 1.1 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 177.5° | 1.1 | 1.1 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 180° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

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

# LM-79-2019: Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Report Prepared for

Cooper Lighting Solutions

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

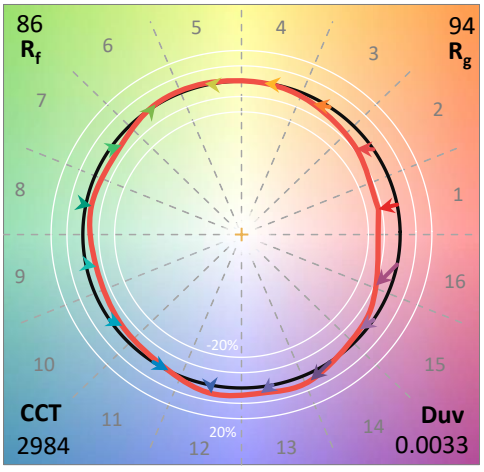
## Test Information

| | |
|---|---|
| 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

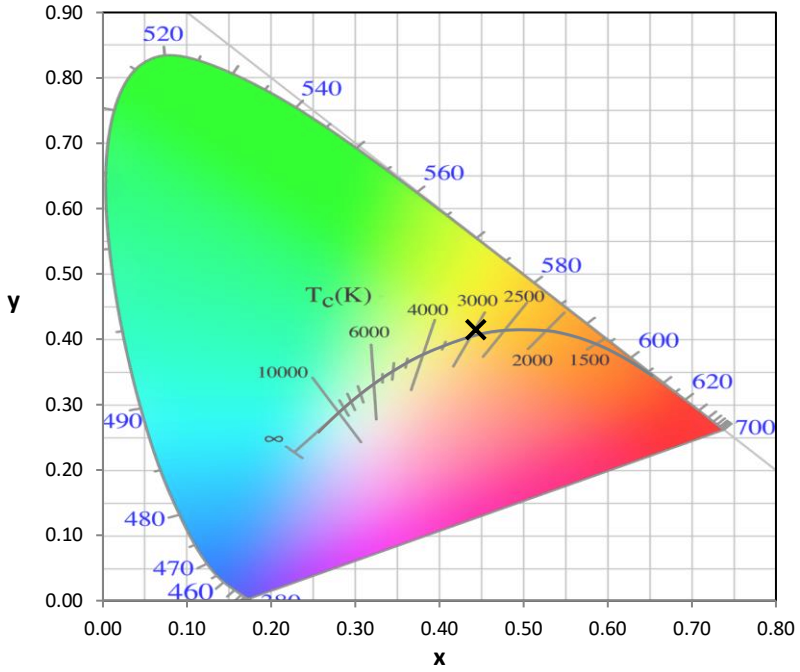
| | |
|---|---|
| Stabilization Time: | 29M |
| Operation Time: | 1H 29M |
| Sphere Temperature (°C): | 25.2 |

REPORT NUMBER: SP1-2407-176-7

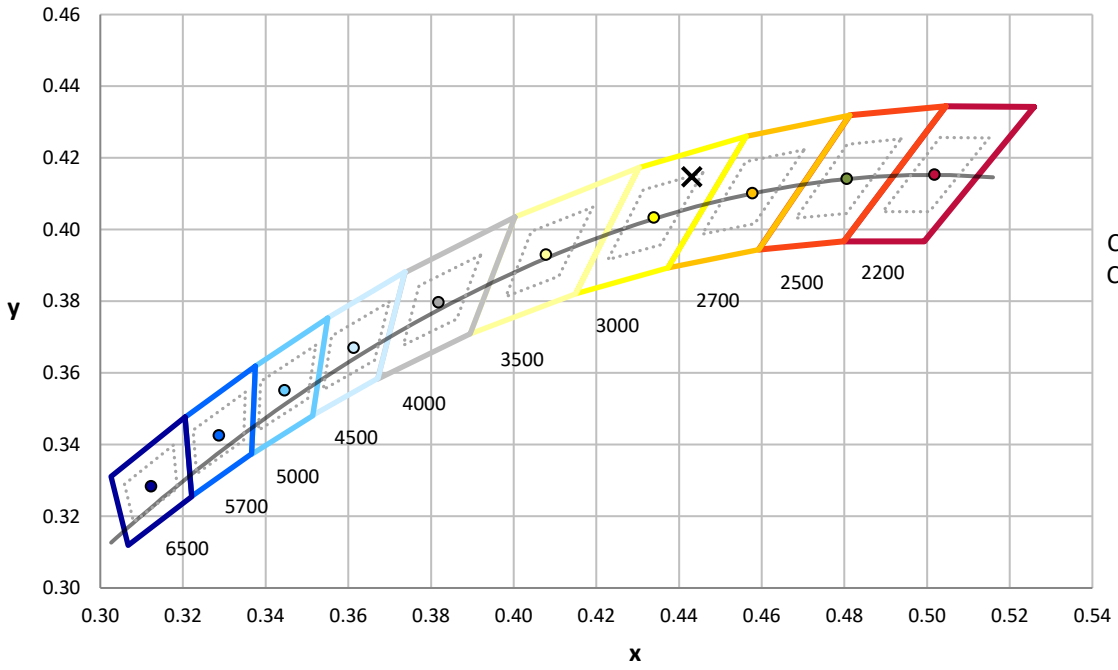
| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 6/18/2024 | 12/18/2024 |
| Power Meter | INXT2011004 | 2/8/2024 | 2/8/2025 |
| AC Power Source | IN0063 | 10/24/2023 | 10/24/2024 |
| DC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

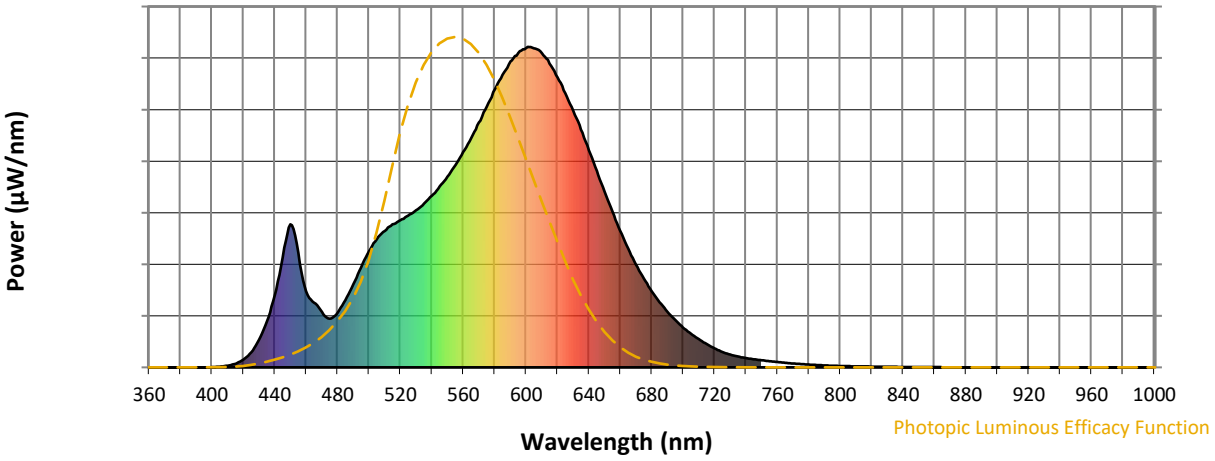



CCT = 2984K
CIE x = 0.4431
CIE y = 0.4147
Duv = 0.0033

Point lies inside the ANSI 3000K 4-step quadrangle

REPORT NUMBER: SP1-2407-176-7

## Photopic Flux vs. Wavelength

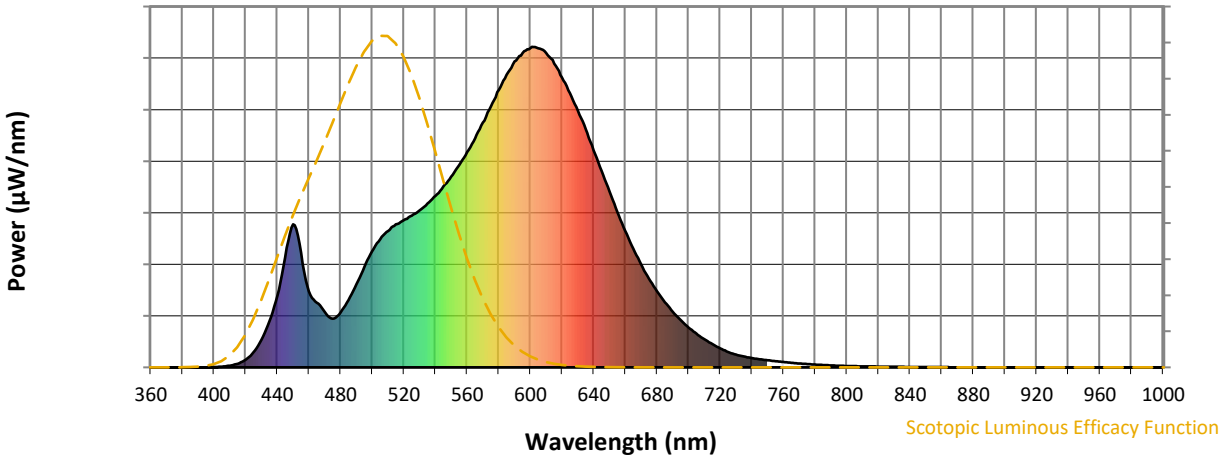



## Photopic Lumens: NR

| 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

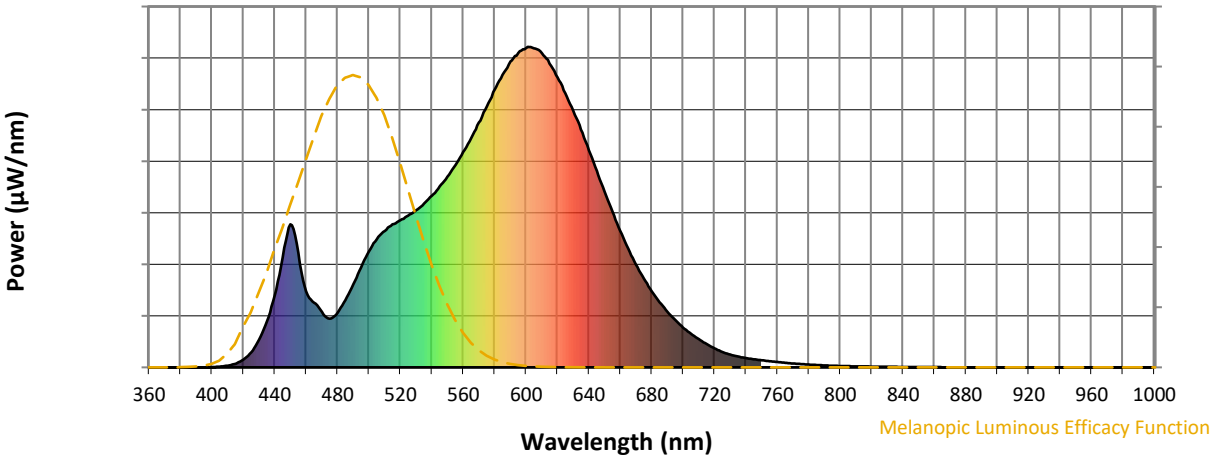



**Scotopic Lumens: NR** **S/P: 1.32**

| 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 | | | |

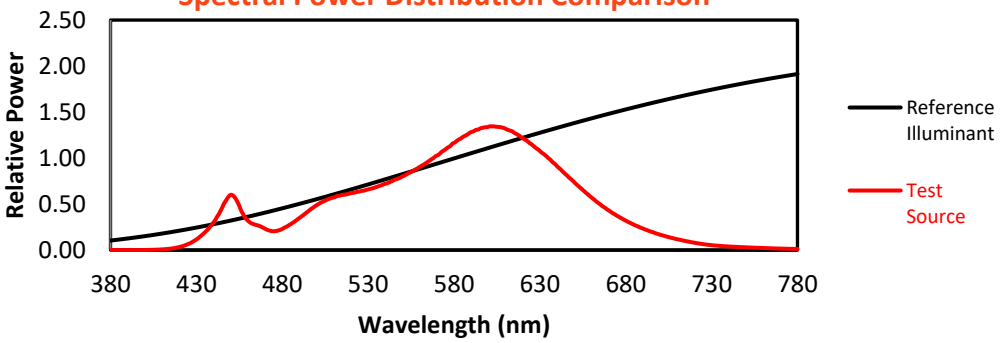
REPORT NUMBER: SP1-2407-176-7

# TM-30-18

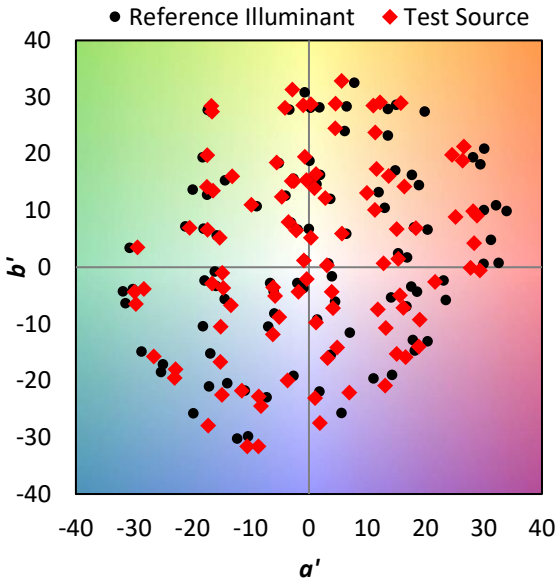
## Summary

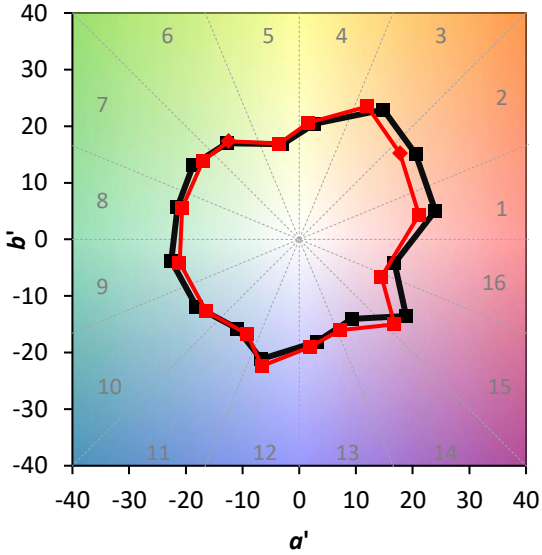
$R_f$ = 85.8
$R_g$ = 94.1
CIE $R_a$ = 81.8
$R_9$ = -1.1

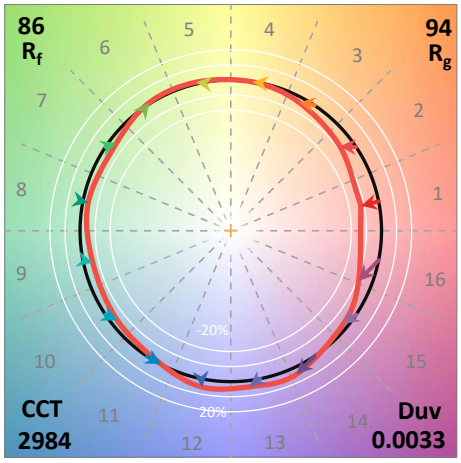
## Spectral Power Distribution Comparison

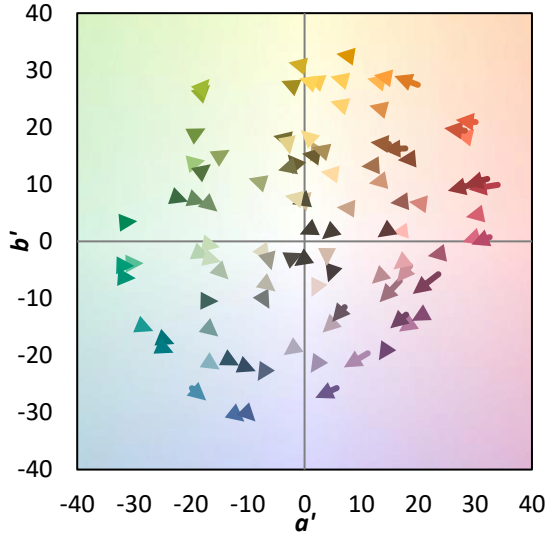



## Color Vector Graphics



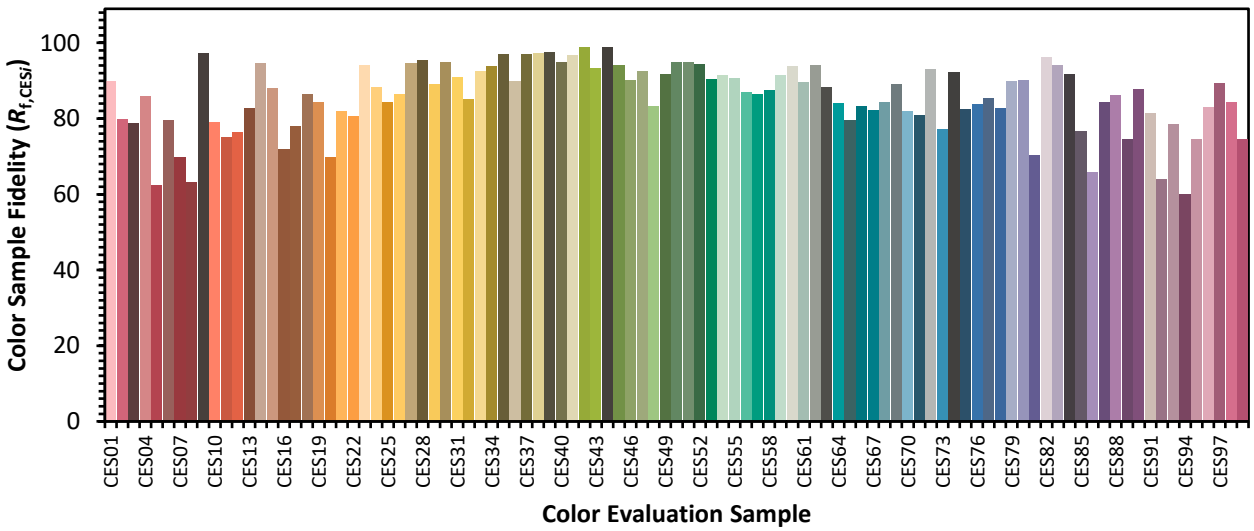



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**Individual Sample Fidelity Index ($R_{f,i}$)**

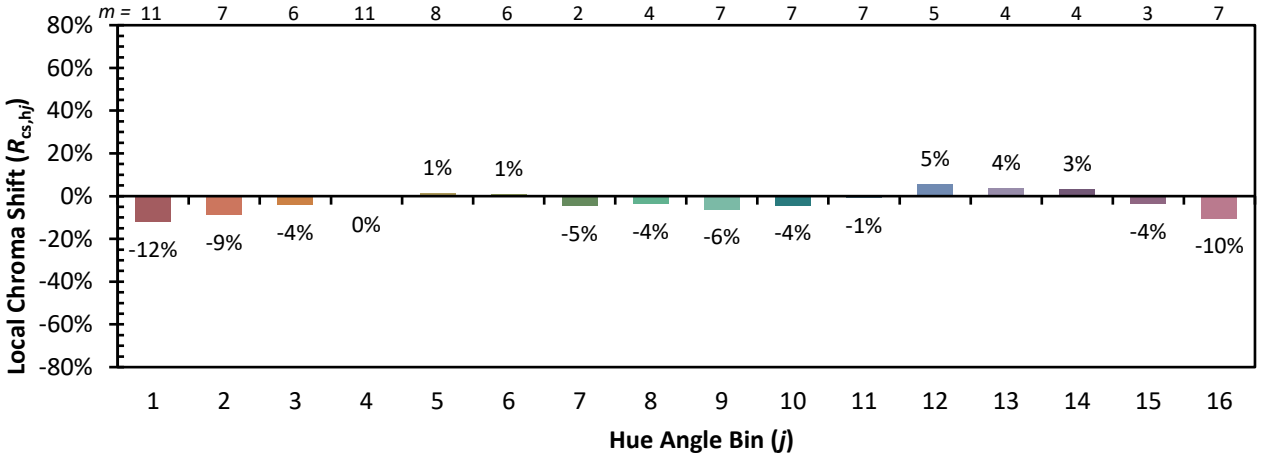
| | | | |
|---|---|---|---|
| CES01 = 86 | CES26 = 86 | CES51 = 95 | CES76 = 84 |
| CES02 = 63 | CES27 = 95 | CES52 = 94 | CES77 = 86 |
| CES03 = 31 | CES28 = 95 | CES53 = 90 | CES78 = 83 |
| CES04 = 70 | CES29 = 89 | CES54 = 91 | CES79 = 90 |
| CES05 = 50 | CES30 = 95 | CES55 = 91 | CES80 = 90 |
| CES06 = 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 | |

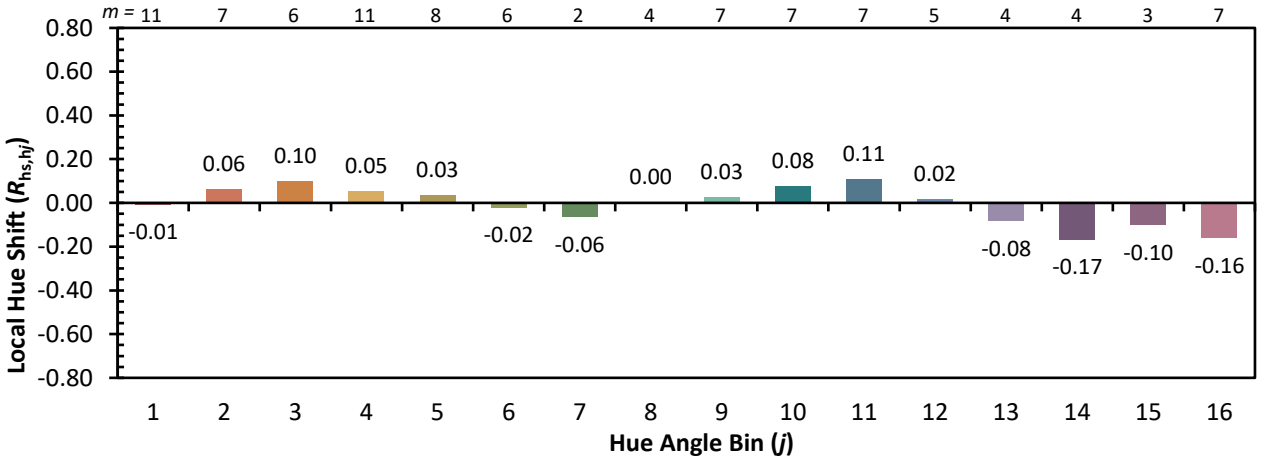


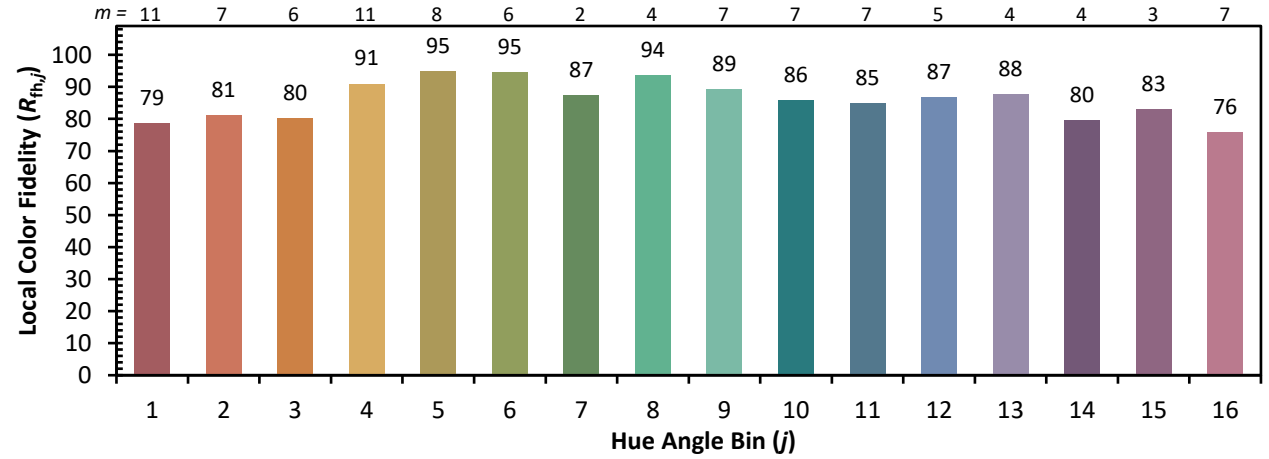
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## Color Rendition by Hue-Angle Bin



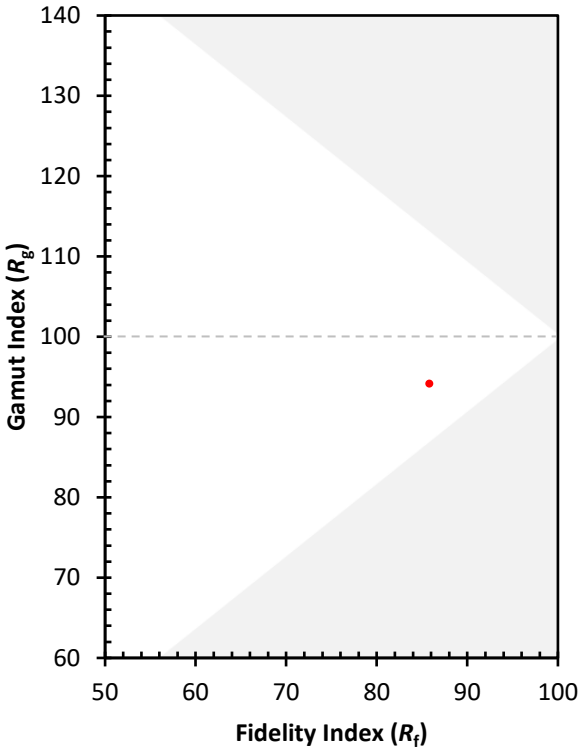



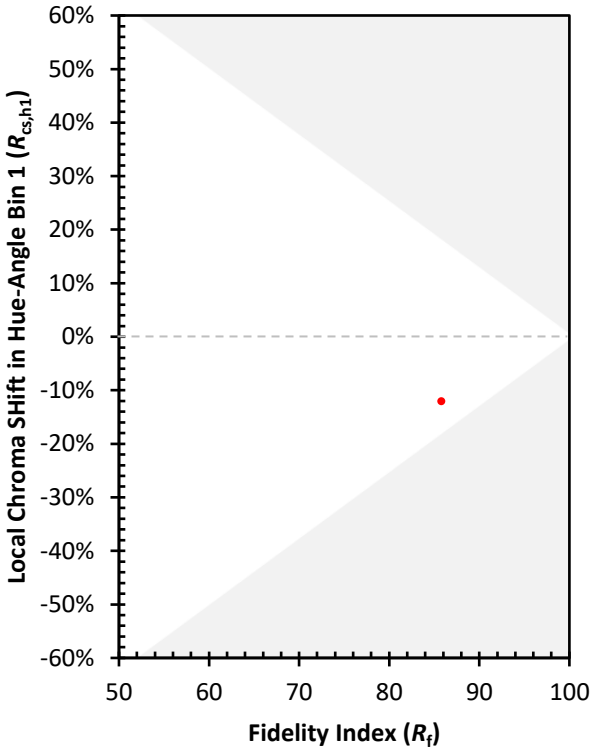



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## Measure Comparisons




(END OF REPORT)