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: P821236

Luminaire Tested: **TT-D4-735-24VDC-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: | P821236 |
| | 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-D4-735-24VDC-DL-HSS |
| Description: | TOPTIER LED PARKING GARAGE LUMINAIRE |
| | 3500K, 70 CRI LEDS AND DRIVE LANE DISTRIBUTION WITH HOUSE SIDE SHIELD |
| Light Source: | - |
| Ballast/Driver: | ELECTRONIC DRIVER |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 5261.9 lumens |
| Efficiency: | N/A |
| Efficacy: | 92.3 lumens/watt |
| Luminous Opening: | Circular (Dia: 1.12' x H: 0') |
| IES Classification: | Type IV - Short |
| BUG Rating: | B1 - U1 - G3 |

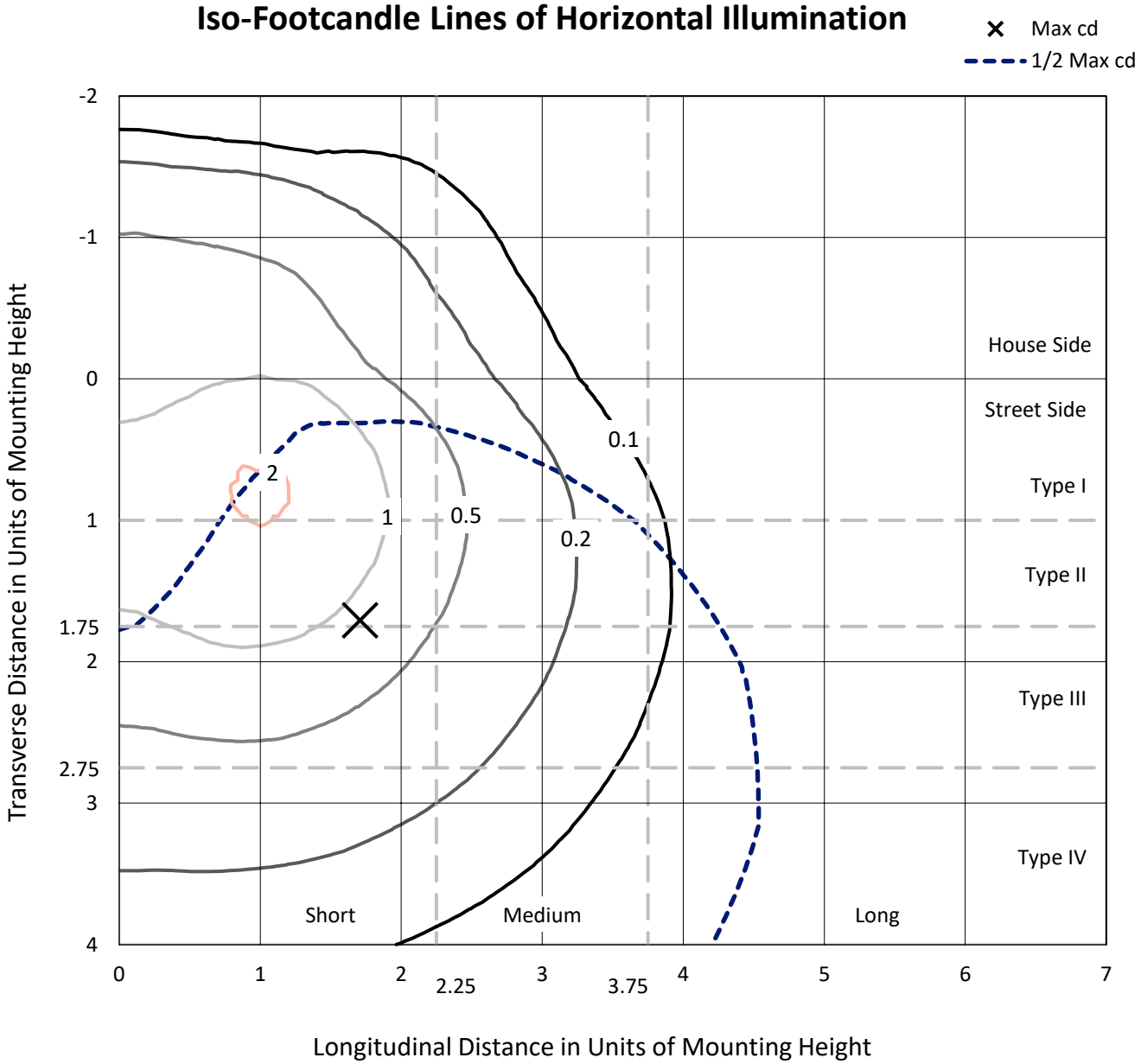
| | |
|---|---|
| Input Watts (W): | 57 |
| Input Voltage (V): | NR |
| Input Current (Ain): | NR |
| Voltage Rise (V): | NR |
| Power Factor: | NR |
| Total Harmonic Distortion (THDi): | NR |
| Frequency (hertz): | 60 |
| Stabilization Time: | NR |
| Operation Time: | NR |
| Ambient Temperature (°C):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

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## Iso-Footcandle Lines of Horizontal Illumination



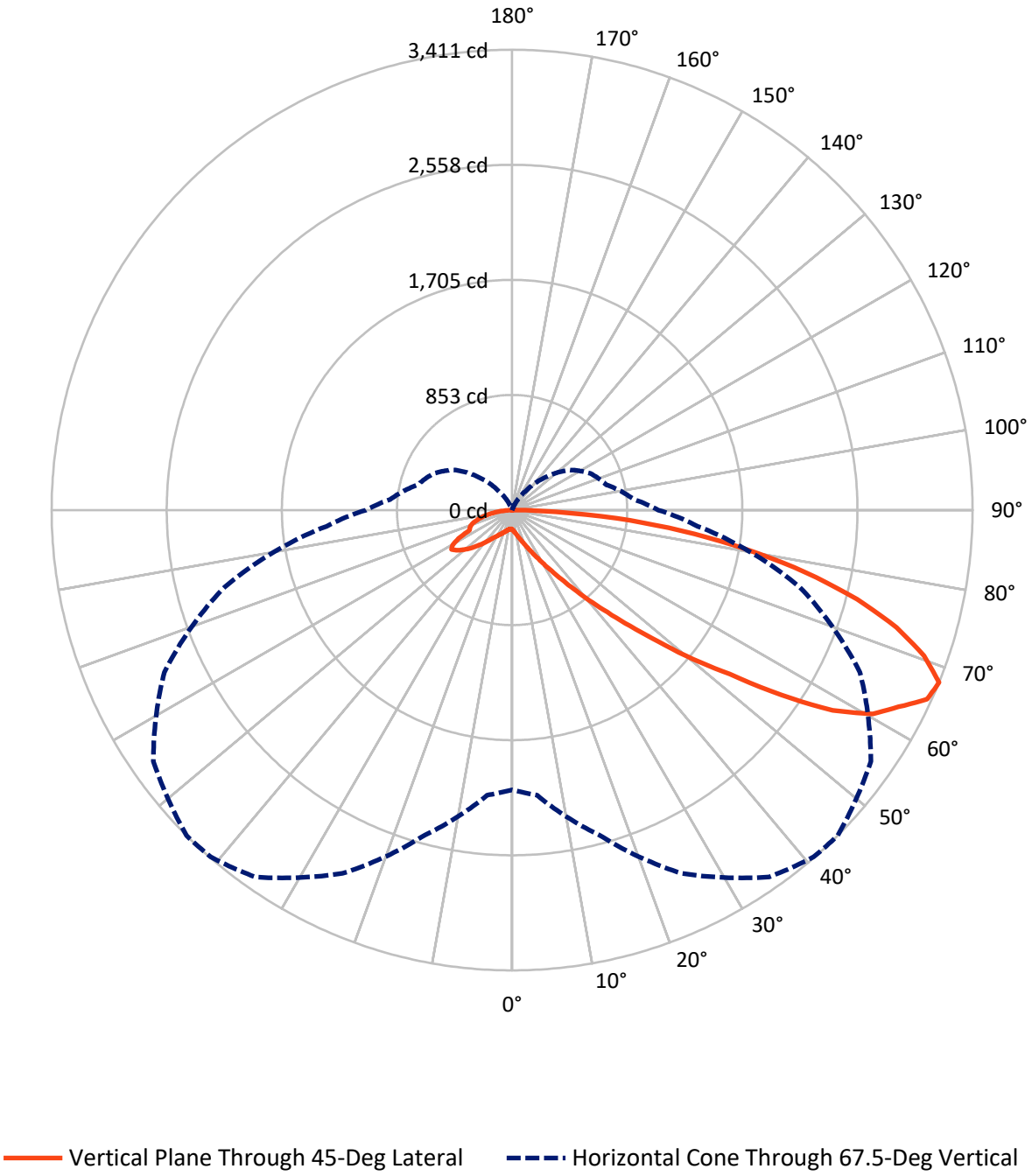

Based on 15 foot mounting height. Maximum calculated value = 2.1 fc
Type IV - Short - N/A

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## Luminous Intensity Polar Plot



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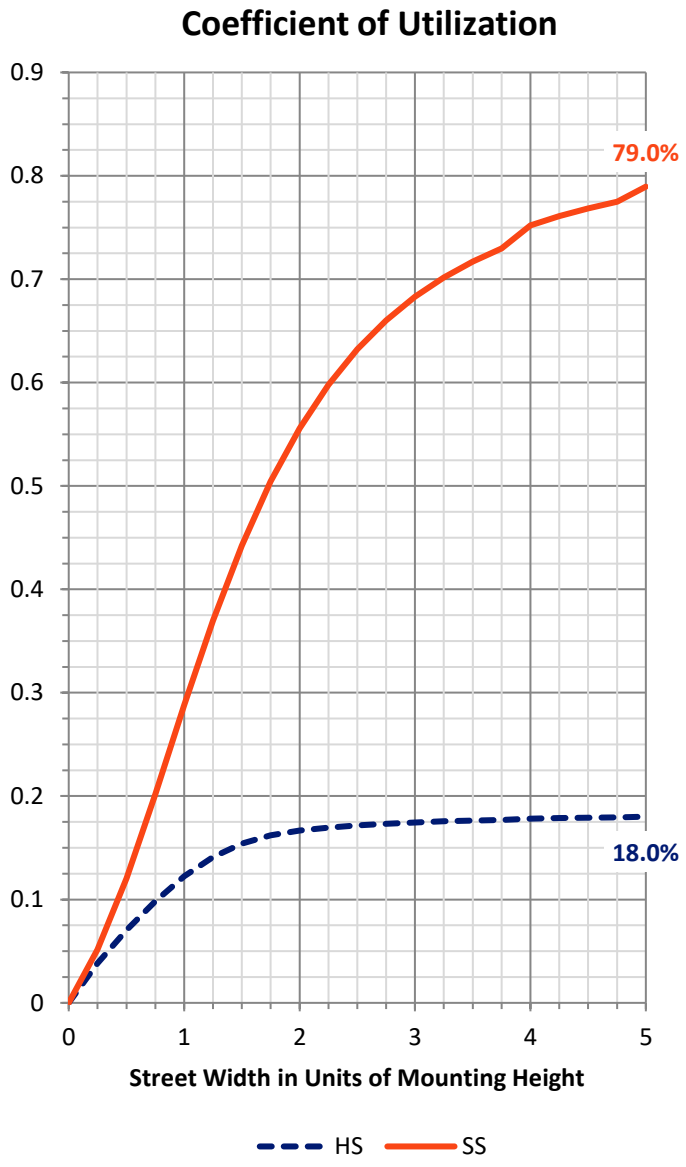
REPORT NUMBER: P821236
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**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 956.0 | 1.1 | 957.1 |
| | % Fixture | 18.2 | 0.0 | 18.2 |
| **Street Side** | Lumens | 4293.2 | 11.7 | 4304.8 |
| | % Fixture | 81.6 | 0.2 | 81.8 |
| **Total** | Lumens | 5249.2 | 12.8 | 5261.9 |
| | % Fixture | 99.8 | 0.2 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 14.9 | 0.3 |
| 10°-20° | 55.3 | 1.1 |
| 20°-30° | 127.7 | 2.4 |
| 30°-40° | 272.3 | 5.2 |
| 40°-50° | 569.8 | 10.8 |
| 50°-60° | 1081.0 | 20.5 |
| 60°-70° | 1471.2 | 28.0 |
| 70°-80° | 1264.9 | 24.0 |
| 80°-90° | 392.2 | 7.5 |
| 90°-100° | 8.3 | 0.2 |
| 100°-110° | 2.4 | 0.0 |
| 110°-120° | 0.7 | 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° | 5249.2 | 99.8 |
| 0°-180° | 5261.9 | 100.0 |



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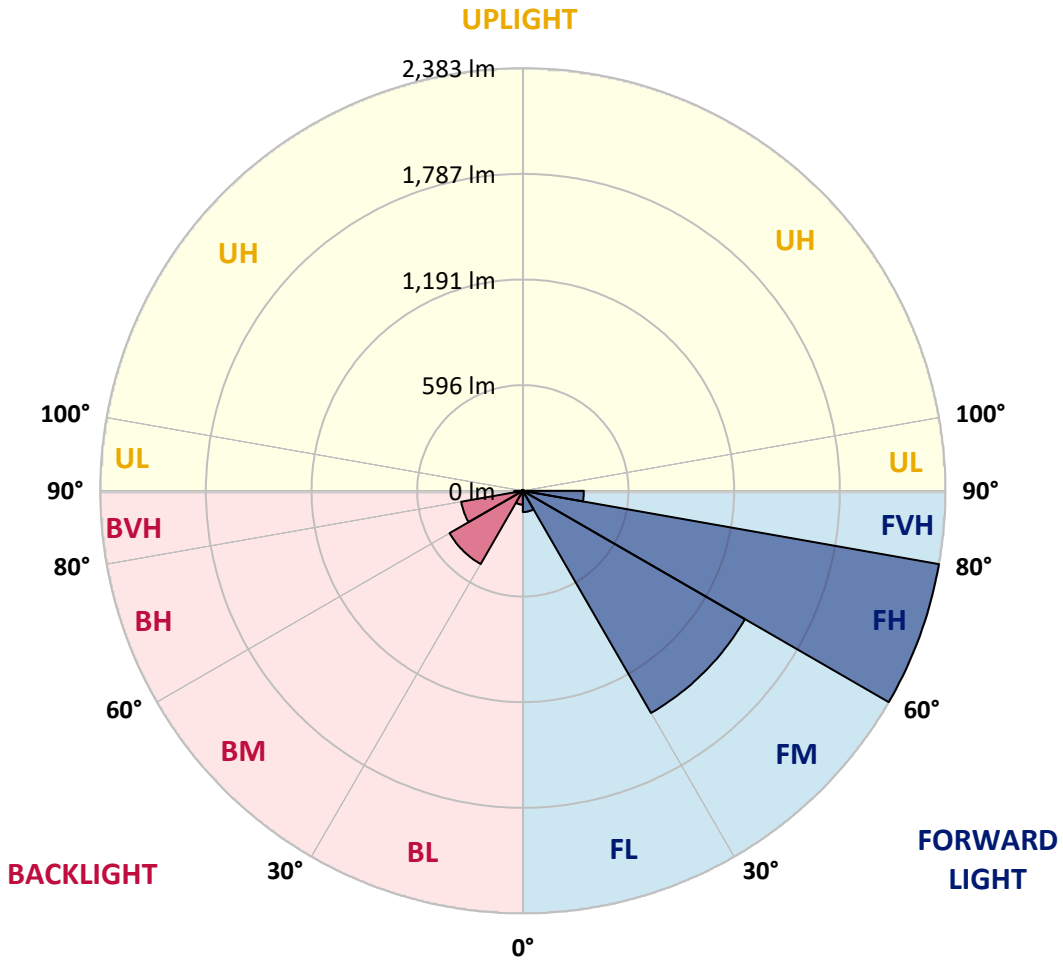
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## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 119.9 | 2.3 | | | |
| FM | (30°-60°) | 1446.2 | 27.5 | | | |
| FH | (60°-80°) | 2382.9 | 45.3 | | | G2/5000 |
| FVH | (80°-90°) | 344.2 | 6.5 | | | G3/500 |
| BL | (0°-30°) | 77.9 | 1.5 | B0/110 | | |
| BM | (30°-60°) | 476.9 | 9.1 | B1/1000 | | |
| BH | (60°-80°) | 353.1 | 6.7 | B1/500 | | G1/500 |
| BVH | (80°-90°) | 48.1 | 0.9 | | | G1/100 |
| UL | (90°-100°) | 8.3 | 0.2 | | U1/10 | |
| UH | (100°-180°) | 4.5 | 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° | 144.0 | 144.0 | 144.0 | 144.0 | 144.0 | 144.0 | 144.0 | 144.0 | 144.0 | 144.0 | 144.0 |
| 2.5° | 156.3 | 155.1 | 155.1 | 154.0 | 154.0 | 151.8 | 151.8 | 150.7 | 149.6 | 148.4 | 146.2 |
| 5° | 167.4 | 166.3 | 166.3 | 165.2 | 164.1 | 161.8 | 160.7 | 158.5 | 156.3 | 154.0 | 151.8 |
| 7.5° | 180.8 | 179.7 | 179.7 | 178.6 | 176.3 | 173.0 | 171.9 | 168.5 | 165.2 | 161.8 | 158.5 |
| 10° | 197.6 | 196.4 | 196.4 | 194.2 | 192.0 | 188.6 | 186.4 | 181.9 | 178.6 | 173.0 | 167.4 |
| 12.5° | 215.4 | 214.3 | 214.3 | 212.1 | 207.6 | 205.4 | 203.1 | 197.6 | 192.0 | 185.3 | 178.6 |
| 15° | 235.5 | 235.5 | 235.5 | 234.4 | 229.9 | 225.5 | 223.2 | 216.5 | 209.8 | 199.8 | 190.9 |
| 17.5° | 261.2 | 260.1 | 260.1 | 257.8 | 252.2 | 250.0 | 246.7 | 238.9 | 228.8 | 217.6 | 206.5 |
| 20° | 292.4 | 291.3 | 289.1 | 288.0 | 282.4 | 280.1 | 275.7 | 266.8 | 253.4 | 238.9 | 223.2 |
| 22.5° | 323.7 | 323.7 | 322.6 | 323.7 | 319.2 | 317.0 | 311.4 | 299.1 | 283.5 | 262.3 | 243.3 |
| 25° | 359.4 | 360.5 | 362.7 | 366.1 | 360.5 | 358.3 | 353.8 | 338.2 | 319.2 | 292.4 | 265.6 |
| 27.5° | 404.0 | 404.0 | 409.6 | 415.2 | 410.7 | 409.6 | 402.9 | 386.2 | 359.4 | 327.0 | 295.8 |
| 30° | 452.0 | 453.1 | 462.1 | 472.1 | 469.9 | 469.9 | 464.3 | 445.3 | 413.0 | 375.0 | 331.5 |
| 32.5° | 507.8 | 512.3 | 521.2 | 532.4 | 540.2 | 540.2 | 538.0 | 517.9 | 479.9 | 428.6 | 375.0 |
| 35° | 581.5 | 573.7 | 590.4 | 607.2 | 623.9 | 627.3 | 628.4 | 609.4 | 565.9 | 501.1 | 428.6 |
| 37.5° | 645.1 | 644.0 | 669.7 | 698.7 | 726.6 | 737.8 | 741.1 | 723.2 | 667.4 | 582.6 | 486.6 |
| 40° | 718.8 | 725.5 | 760.1 | 803.6 | 850.5 | 869.5 | 878.4 | 858.3 | 789.1 | 679.7 | 553.6 |
| 42.5° | 795.8 | 815.9 | 859.4 | 925.3 | 996.7 | 1024.6 | 1034.6 | 1015.7 | 934.2 | 801.4 | 638.4 |
| 45° | 886.2 | 914.1 | 972.1 | 1065.9 | 1159.7 | 1200.9 | 1223.3 | 1216.6 | 1132.9 | 967.7 | 747.8 |
| 47.5° | 997.8 | 1017.9 | 1097.1 | 1223.3 | 1356.1 | 1424.2 | 1455.4 | 1474.4 | 1355.0 | 1139.6 | 843.8 |
| 50° | 1123.9 | 1127.3 | 1236.7 | 1396.3 | 1590.5 | 1680.9 | 1735.6 | 1726.6 | 1584.9 | 1337.1 | 965.4 |
| 52.5° | 1251.2 | 1247.8 | 1390.7 | 1607.2 | 1861.7 | 1980.0 | 2016.8 | 2053.7 | 1914.2 | 1638.5 | 1160.8 |
| 55° | 1396.3 | 1389.6 | 1569.3 | 1843.8 | 2159.7 | 2316.0 | 2419.8 | 2471.1 | 2251.2 | 1837.1 | 1245.6 |
| 57.5° | 1516.8 | 1538.0 | 1763.5 | 2093.8 | 2534.7 | 2731.2 | 2799.2 | 2771.3 | 2436.5 | 1937.6 | 1286.9 |
| 60° | 1669.7 | 1701.0 | 1957.7 | 2420.9 | 2859.5 | 3005.7 | 3068.2 | 2941.0 | 2554.8 | 2013.5 | 1315.9 |
| 62.5° | 1813.7 | 1853.9 | 2170.9 | 2686.5 | 3062.6 | 3196.6 | 3212.2 | 3073.8 | 2721.1 | 2163.0 | 1400.7 |
| 65° | 1948.8 | 1994.5 | 2382.9 | 2843.9 | 3240.1 | 3351.7 | 3378.5 | 3269.1 | 2897.5 | 2251.2 | 1434.2 |
| 67.5° | 2072.6 | 2120.6 | 2492.3 | 2970.0 | 3319.3 | 3405.3 | 3410.9 | 3244.6 | 2842.8 | 2205.5 | 1380.6 |
| 70° | 2167.5 | 2188.7 | 2544.8 | 2966.7 | 3225.6 | 3259.1 | 3236.8 | 3069.3 | 2714.4 | 2111.7 | 1303.6 |
| 72.5° | 2186.5 | 2202.1 | 2472.2 | 2801.5 | 2965.5 | 2996.8 | 2978.9 | 2831.6 | 2512.4 | 1944.3 | 1178.6 |
| 75° | 2090.5 | 2093.8 | 2276.9 | 2504.6 | 2624.0 | 2662.0 | 2638.5 | 2502.3 | 2208.8 | 1707.7 | 1014.6 |
| 77.5° | 1839.4 | 1846.1 | 1956.6 | 2109.5 | 2209.9 | 2242.3 | 2224.4 | 2099.4 | 1850.5 | 1434.2 | 839.3 |
| 80° | 1457.7 | 1471.0 | 1550.3 | 1656.3 | 1747.8 | 1781.3 | 1760.1 | 1659.7 | 1456.5 | 1127.3 | 655.2 |
| 82.5° | 993.3 | 1010.1 | 1082.6 | 1170.8 | 1251.2 | 1283.5 | 1265.7 | 1202.1 | 1050.3 | 812.5 | 467.7 |
| 85° | 502.3 | 520.1 | 594.9 | 677.5 | 747.8 | 782.4 | 776.8 | 750.0 | 646.2 | 501.1 | 282.4 |
| 87.5° | 79.2 | 87.1 | 118.3 | 157.4 | 200.9 | 233.3 | 213.2 | 210.9 | 167.4 | 133.9 | 68.1 |
| 90° | 32.4 | 32.4 | 31.3 | 30.1 | 26.8 | 24.6 | 23.4 | 19.0 | 14.5 | 8.9 | 3.3 |
| 92.5° | 29.0 | 29.0 | 27.9 | 25.7 | 23.4 | 22.3 | 20.1 | 16.7 | 12.3 | 7.8 | 3.3 |
| 95° | 23.4 | 23.4 | 22.3 | 21.2 | 19.0 | 17.9 | 15.6 | 13.4 | 10.0 | 6.7 | 3.3 |
| 97.5° | 17.9 | 17.9 | 16.7 | 15.6 | 14.5 | 12.3 | 12.3 | 10.0 | 6.7 | 4.5 | 2.2 |
| 100° | 13.4 | 13.4 | 12.3 | 11.2 | 10.0 | 8.9 | 8.9 | 6.7 | 4.5 | 3.3 | 2.2 |
| 102.5° | 8.9 | 8.9 | 8.9 | 7.8 | 6.7 | 6.7 | 5.6 | 4.5 | 3.3 | 2.2 | 2.2 |
| 105° | 5.6 | 5.6 | 5.6 | 5.6 | 4.5 | 3.3 | 3.3 | 2.2 | 2.2 | 2.2 | 2.2 |
| 107.5° | 3.3 | 3.3 | 3.3 | 3.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 |
| 110° | 2.2 | 2.2 | 2.2 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 2.2 | 1.1 |

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REPORT NUMBER: P821236
CATALOG NUMBER: TT-D4-735-24VDC-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° | 144.0 | 144.0 | 144.0 | 144.0 | 144.0 | 144.0 | 144.0 | 144.0 | 144.0 | 144.0 | 144.0 |
| 2.5° | 146.2 | 145.1 | 142.9 | 141.7 | 139.5 | 139.5 | 138.4 | 137.3 | 137.3 | 137.3 | 137.3 |
| 5° | 149.6 | 148.4 | 146.2 | 144.0 | 141.7 | 139.5 | 138.4 | 137.3 | 137.3 | 137.3 | 136.2 |
| 7.5° | 156.3 | 154.0 | 150.7 | 147.3 | 144.0 | 141.7 | 140.6 | 139.5 | 138.4 | 138.4 | 138.4 |
| 10° | 164.1 | 161.8 | 156.3 | 152.9 | 148.4 | 145.1 | 144.0 | 142.9 | 141.7 | 141.7 | 141.7 |
| 12.5° | 174.1 | 170.8 | 164.1 | 158.5 | 154.0 | 150.7 | 148.4 | 147.3 | 147.3 | 146.2 | 147.3 |
| 15° | 186.4 | 181.9 | 173.0 | 166.3 | 160.7 | 157.4 | 155.1 | 154.0 | 154.0 | 154.0 | 152.9 |
| 17.5° | 199.8 | 194.2 | 183.0 | 175.2 | 168.5 | 165.2 | 163.0 | 161.8 | 161.8 | 161.8 | 161.8 |
| 20° | 215.4 | 207.6 | 195.3 | 185.3 | 178.6 | 174.1 | 171.9 | 171.9 | 170.8 | 171.9 | 171.9 |
| 22.5° | 232.2 | 223.2 | 207.6 | 196.4 | 187.5 | 183.0 | 180.8 | 180.8 | 180.8 | 181.9 | 183.0 |
| 25° | 252.2 | 241.1 | 222.1 | 207.6 | 197.6 | 193.1 | 190.9 | 192.0 | 192.0 | 193.1 | 193.1 |
| 27.5° | 279.0 | 262.3 | 238.9 | 221.0 | 209.8 | 204.3 | 202.0 | 203.1 | 204.3 | 204.3 | 204.3 |
| 30° | 309.2 | 289.1 | 256.7 | 237.7 | 224.3 | 217.6 | 215.4 | 216.5 | 217.6 | 219.9 | 218.8 |
| 32.5° | 346.0 | 321.4 | 283.5 | 256.7 | 242.2 | 234.4 | 232.2 | 231.0 | 233.3 | 235.5 | 235.5 |
| 35° | 390.6 | 359.4 | 314.7 | 283.5 | 262.3 | 252.2 | 250.0 | 248.9 | 250.0 | 252.2 | 254.5 |
| 37.5° | 438.6 | 400.7 | 346.0 | 313.6 | 290.2 | 279.0 | 273.5 | 269.0 | 270.1 | 271.2 | 274.6 |
| 40° | 493.3 | 446.4 | 381.7 | 342.6 | 321.4 | 308.0 | 300.2 | 293.5 | 295.8 | 295.8 | 296.9 |
| 42.5° | 562.5 | 503.4 | 426.4 | 377.2 | 354.9 | 340.4 | 328.1 | 320.3 | 315.9 | 317.0 | 312.5 |
| 45° | 652.9 | 579.3 | 482.2 | 426.4 | 395.1 | 372.8 | 358.3 | 342.6 | 331.5 | 333.7 | 327.0 |
| 47.5° | 727.7 | 639.5 | 534.6 | 473.2 | 439.8 | 411.8 | 381.7 | 359.4 | 343.8 | 341.5 | 337.1 |
| 50° | 819.2 | 713.2 | 594.9 | 524.6 | 488.9 | 446.4 | 410.7 | 372.8 | 347.1 | 340.4 | 341.5 |
| 52.5° | 973.3 | 842.7 | 680.8 | 593.8 | 531.3 | 481.0 | 426.4 | 373.9 | 339.3 | 329.3 | 332.6 |
| 55° | 1029.1 | 886.2 | 725.5 | 650.7 | 589.3 | 511.2 | 433.1 | 361.6 | 317.0 | 308.0 | 309.2 |
| 57.5° | 1041.3 | 886.2 | 728.8 | 668.6 | 617.2 | 535.7 | 429.7 | 333.7 | 274.6 | 266.8 | 265.6 |
| 60° | 1048.0 | 880.6 | 716.6 | 655.2 | 599.4 | 512.3 | 386.2 | 269.0 | 210.9 | 205.4 | 202.0 |
| 62.5° | 1110.5 | 927.5 | 728.8 | 645.1 | 565.9 | 449.8 | 293.5 | 171.9 | 117.2 | 116.1 | 113.8 |
| 65° | 1129.5 | 944.2 | 744.5 | 651.8 | 529.0 | 349.3 | 174.1 | 58.0 | 12.3 | 13.4 | 11.2 |
| 67.5° | *1082.6* | *906.3* | *722.1* | *641.8* | *517.9* | *340.4* | *167.4* | *49.1* | *0.0* | *0.0* | *0.0* |
| 70° | 1017.9 | 851.6 | 683.1 | 607.2 | 494.4 | 327.0 | 164.1 | 49.1 | 0.0 | 0.0 | 0.0 |
| 72.5° | 915.2 | 773.5 | 620.6 | 560.3 | 454.3 | 300.2 | 152.9 | 46.9 | 0.0 | 0.0 | 0.0 |
| 75° | 794.7 | 673.0 | 543.6 | 496.7 | 402.9 | 263.4 | 137.3 | 42.4 | 0.0 | 0.0 | 0.0 |
| 77.5° | 665.2 | 561.4 | 454.3 | 418.5 | 340.4 | 224.3 | 116.1 | 35.7 | 0.0 | 0.0 | 0.0 |
| 80° | 522.3 | 444.2 | 358.3 | 333.7 | 269.0 | 178.6 | 92.6 | 27.9 | 0.0 | 0.0 | 0.0 |
| 82.5° | 376.1 | 322.6 | 264.5 | 244.4 | 197.6 | 129.5 | 67.0 | 19.0 | 0.0 | 0.0 | 0.0 |
| 85° | 232.2 | 202.0 | 170.8 | 158.5 | 125.0 | 80.4 | 40.2 | 10.0 | 0.0 | 0.0 | 0.0 |
| 87.5° | 69.2 | 67.0 | 60.3 | 59.2 | 42.4 | 24.6 | 8.9 | 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: P821236
CATALOG NUMBER: TT-D4-735-24VDC-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: SP1-2407-176-4

Test Date: 09/24/2024

Luminaire Tested: MEM2-HTN-VA-30-735-U-WQ

Data in this report applies to families of products including MEM2-HTN-VA-30-735-U-WQ

Report Generated By FNC07603 / LDUCLS01DT446
Version: v7.04

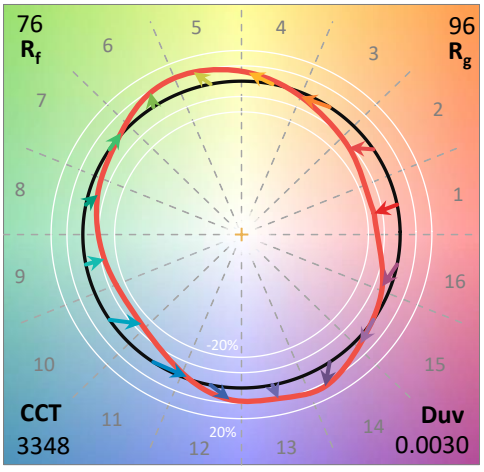
## Test Information

| | |
|---|---|
| Test Method: | LM-79-2019 |
| Report Number: | SP1-2407-176-4 |
| 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-30-735-U-WQ** |
| Description: | EPIC MODERN VISUAL COMFORT 30W WAVESTREAM WIDE |

## Spectral Parameters

| | | | | | |
|---|---|---|---|---|---|
| CCT (K): | 3348 | CRI (Ra): | 73.4 | | |
| CIE u': | 0.2384 | R1: | 70.8 | R9: | -19.2 |
| CIE v': | 0.5184 | R2: | 79.9 | R10: | 52.5 |
| Duv: | 0.0030 | R3: | 87.6 | R11: | 68.0 |
| CIE x: | 0.4177 | R4: | 72.6 | R12: | 42.6 |
| CIE y: | 0.4036 | R5: | 69.3 | R13: | 72.0 |
| CIE z: | 0.1787 | R6: | 71.3 | R14: | 92.6 |
| Peak Wavelength (nm): | 593 | R7: | 82.1 | R15: | 63.8 |
| Dominant Wavelength (nm): | 580 | R8: | 53.3 | | |
| Purity: | 46.5223 | | | | |

| | |
|---|---|
| Rf: | 75.8 |
| Rg: | 95.8 |




## Test Conditions

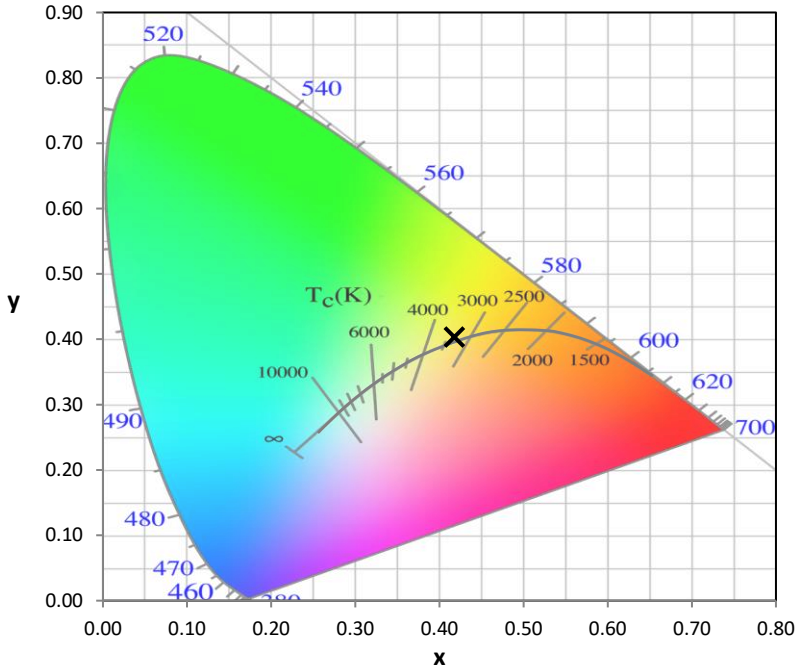
| | |
|---|---|
| Stabilization Time: | 30M |
| Operation Time: | 1H 30M |
| Sphere Temperature (°C): | 25.2 |

REPORT NUMBER: SP1-2407-176-4

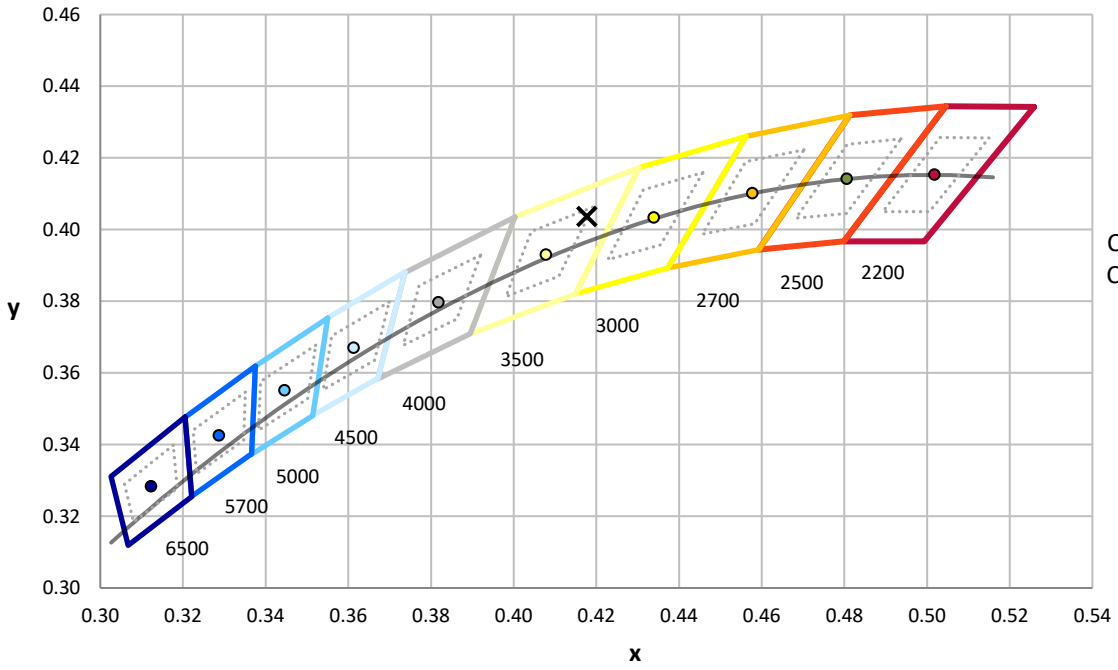
| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 6/18/2024 | 12/18/2024 |
| Power Meter | INXT2011004 | 2/8/2024 | 2/8/2025 |
| AC Power Source | IN0063 | 10/24/2023 | 10/24/2024 |
| DC 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: SP1-2407-176-4

## CIE 1931 Chromaticity Diagram




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

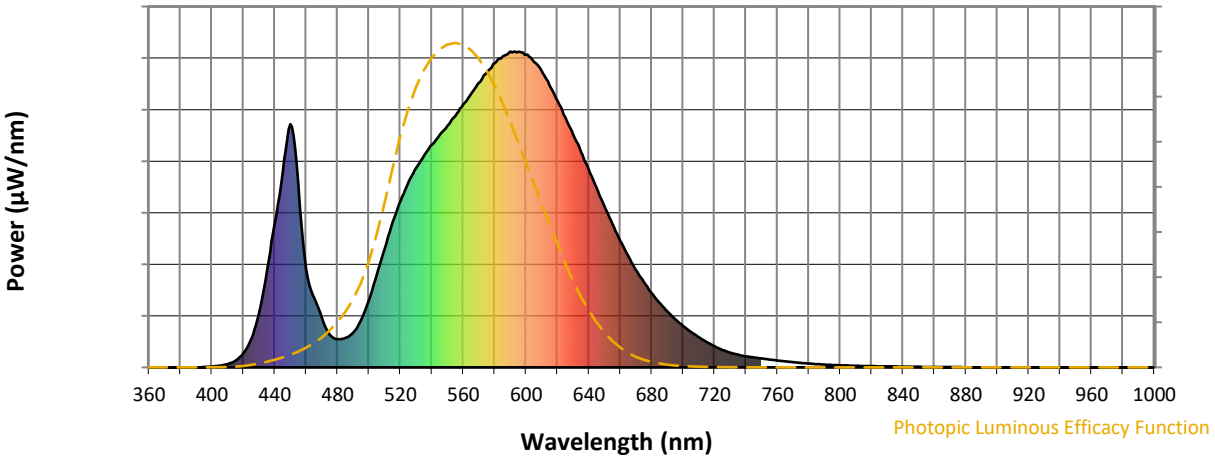



CCT = 3348K
CIE x = 0.4177
CIE y = 0.4036
Duv = 0.0030

Point lies inside the ANSI 3500K 4-step quadrangle

REPORT NUMBER: SP1-2407-176-4

## Photopic Flux vs. Wavelength

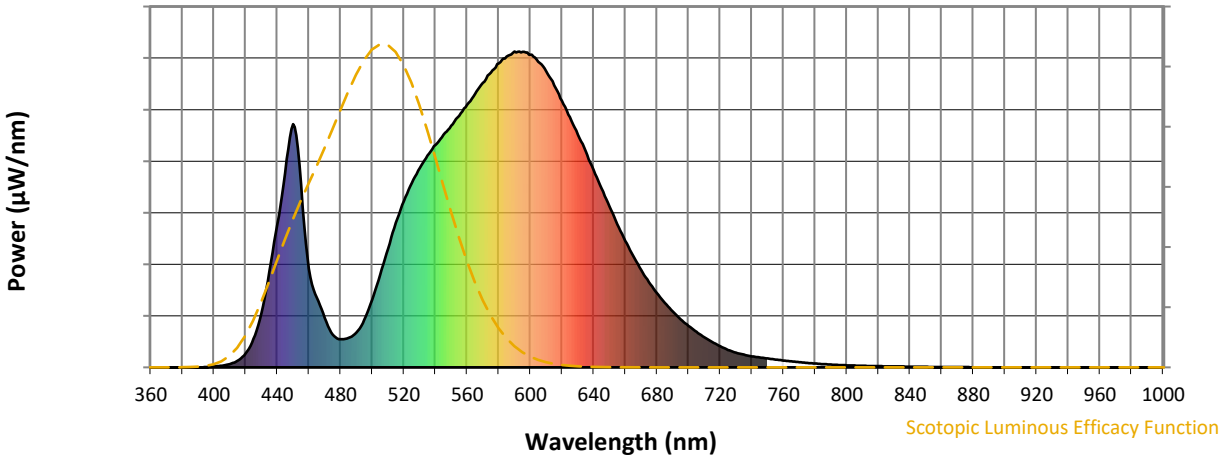



## Photopic Lumens: NR

| 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 | 110 | NR | 620 | 844 | NR | 750 | 28 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 150 | NR | 625 | 792 | NR | 755 | 25 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 214 | NR | 630 | 737 | NR | 760 | 22 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 293 | NR | 635 | 683 | NR | 765 | 19 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 376 | NR | 640 | 625 | NR | 770 | 16 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 458 | NR | 645 | 566 | NR | 775 | 14 | NR | 905 | 0 | NR |
| 390 | 0 | NR | 520 | 526 | NR | 650 | 509 | NR | 780 | 12 | NR | 910 | 0 | NR |
| 395 | 1 | NR | 525 | 584 | NR | 655 | 453 | NR | 785 | 10 | NR | 915 | 0 | NR |
| 400 | 3 | NR | 530 | 631 | NR | 660 | 401 | NR | 790 | 9 | NR | 920 | 0 | NR |
| 405 | 5 | NR | 535 | 671 | NR | 665 | 353 | NR | 795 | 8 | NR | 925 | 0 | NR |
| 410 | 10 | NR | 540 | 704 | NR | 670 | 308 | NR | 800 | 7 | NR | 930 | 0 | NR |
| 415 | 21 | NR | 545 | 737 | NR | 675 | 269 | NR | 805 | 6 | NR | 935 | 0 | NR |
| 420 | 44 | NR | 550 | 766 | NR | 680 | 235 | NR | 810 | 5 | NR | 940 | 0 | NR |
| 425 | 90 | NR | 555 | 797 | NR | 685 | 204 | NR | 815 | 4 | NR | 945 | 0 | NR |
| 430 | 171 | NR | 560 | 832 | NR | 690 | 177 | NR | 820 | 4 | NR | 950 | 0 | NR |
| 435 | 305 | NR | 565 | 866 | NR | 695 | 152 | NR | 825 | 3 | NR | 955 | 0 | NR |
| 440 | 455 | NR | 570 | 901 | NR | 700 | 131 | NR | 830 | 3 | NR | 960 | 0 | NR |
| 445 | 615 | NR | 575 | 933 | NR | 705 | 112 | NR | 835 | 3 | NR | 965 | 0 | NR |
| 450 | 771 | NR | 580 | 963 | NR | 710 | 96 | NR | 840 | 2 | NR | 970 | 0 | NR |
| 455 | 579 | NR | 585 | 984 | NR | 715 | 80 | NR | 845 | 2 | NR | 975 | 0 | NR |
| 460 | 313 | NR | 590 | 1000 | NR | 720 | 67 | NR | 850 | 2 | NR | 980 | 0 | NR |
| 465 | 221 | NR | 595 | 999 | NR | 725 | 55 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 156 | NR | 600 | 990 | NR | 730 | 46 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 103 | NR | 605 | 968 | NR | 735 | 40 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 89 | NR | 610 | 937 | NR | 740 | 35 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 93 | NR | 615 | 893 | NR | 745 | 31 | NR | 875 | 1 | NR | | | |

REPORT NUMBER: SP1-2407-176-4

## Scotopic Flux vs. Wavelength

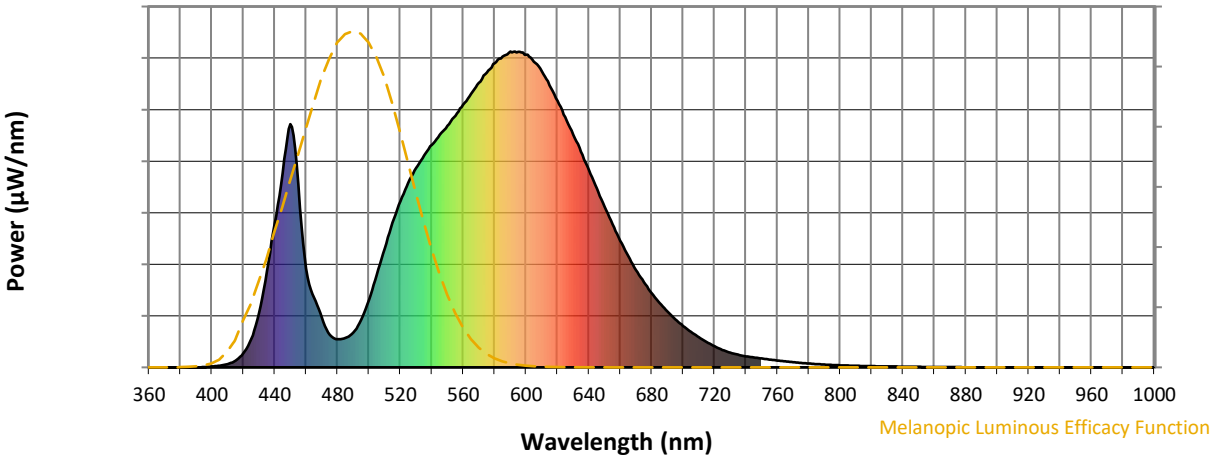



**Scotopic Lumens: NR** **S/P: 1.31**

| 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 | 110 | NR | 620 | 844 | NR | 750 | 28 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 150 | NR | 625 | 792 | NR | 755 | 25 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 214 | NR | 630 | 737 | NR | 760 | 22 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 293 | NR | 635 | 683 | NR | 765 | 19 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 376 | NR | 640 | 625 | NR | 770 | 16 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 458 | NR | 645 | 566 | NR | 775 | 14 | NR | 905 | 0 | NR |
| 390 | 0 | NR | 520 | 526 | NR | 650 | 509 | NR | 780 | 12 | NR | 910 | 0 | NR |
| 395 | 1 | NR | 525 | 584 | NR | 655 | 453 | NR | 785 | 10 | NR | 915 | 0 | NR |
| 400 | 3 | NR | 530 | 631 | NR | 660 | 401 | NR | 790 | 9 | NR | 920 | 0 | NR |
| 405 | 5 | NR | 535 | 671 | NR | 665 | 353 | NR | 795 | 8 | NR | 925 | 0 | NR |
| 410 | 10 | NR | 540 | 704 | NR | 670 | 308 | NR | 800 | 7 | NR | 930 | 0 | NR |
| 415 | 21 | NR | 545 | 737 | NR | 675 | 269 | NR | 805 | 6 | NR | 935 | 0 | NR |
| 420 | 44 | NR | 550 | 766 | NR | 680 | 235 | NR | 810 | 5 | NR | 940 | 0 | NR |
| 425 | 90 | NR | 555 | 797 | NR | 685 | 204 | NR | 815 | 4 | NR | 945 | 0 | NR |
| 430 | 171 | NR | 560 | 832 | NR | 690 | 177 | NR | 820 | 4 | NR | 950 | 0 | NR |
| 435 | 305 | NR | 565 | 866 | NR | 695 | 152 | NR | 825 | 3 | NR | 955 | 0 | NR |
| 440 | 455 | NR | 570 | 901 | NR | 700 | 131 | NR | 830 | 3 | NR | 960 | 0 | NR |
| 445 | 615 | NR | 575 | 933 | NR | 705 | 112 | NR | 835 | 3 | NR | 965 | 0 | NR |
| 450 | 771 | NR | 580 | 963 | NR | 710 | 96 | NR | 840 | 2 | NR | 970 | 0 | NR |
| 455 | 579 | NR | 585 | 984 | NR | 715 | 80 | NR | 845 | 2 | NR | 975 | 0 | NR |
| 460 | 313 | NR | 590 | 1000 | NR | 720 | 67 | NR | 850 | 2 | NR | 980 | 0 | NR |
| 465 | 221 | NR | 595 | 999 | NR | 725 | 55 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 156 | NR | 600 | 990 | NR | 730 | 46 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 103 | NR | 605 | 968 | NR | 735 | 40 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 89 | NR | 610 | 937 | NR | 740 | 35 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 93 | NR | 615 | 893 | NR | 745 | 31 | NR | 875 | 1 | NR | | | |

REPORT NUMBER: SP1-2407-176-4

## Melanopic Flux vs. Wavelength




**Melanopic Lumens: NR** **M/P: 2.4**

| 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 | 110 | NR | 620 | 844 | NR | 750 | 28 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 150 | NR | 625 | 792 | NR | 755 | 25 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 214 | NR | 630 | 737 | NR | 760 | 22 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 293 | NR | 635 | 683 | NR | 765 | 19 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 376 | NR | 640 | 625 | NR | 770 | 16 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 458 | NR | 645 | 566 | NR | 775 | 14 | NR | 905 | 0 | NR |
| 390 | 0 | NR | 520 | 526 | NR | 650 | 509 | NR | 780 | 12 | NR | 910 | 0 | NR |
| 395 | 1 | NR | 525 | 584 | NR | 655 | 453 | NR | 785 | 10 | NR | 915 | 0 | NR |
| 400 | 3 | NR | 530 | 631 | NR | 660 | 401 | NR | 790 | 9 | NR | 920 | 0 | NR |
| 405 | 5 | NR | 535 | 671 | NR | 665 | 353 | NR | 795 | 8 | NR | 925 | 0 | NR |
| 410 | 10 | NR | 540 | 704 | NR | 670 | 308 | NR | 800 | 7 | NR | 930 | 0 | NR |
| 415 | 21 | NR | 545 | 737 | NR | 675 | 269 | NR | 805 | 6 | NR | 935 | 0 | NR |
| 420 | 44 | NR | 550 | 766 | NR | 680 | 235 | NR | 810 | 5 | NR | 940 | 0 | NR |
| 425 | 90 | NR | 555 | 797 | NR | 685 | 204 | NR | 815 | 4 | NR | 945 | 0 | NR |
| 430 | 171 | NR | 560 | 832 | NR | 690 | 177 | NR | 820 | 4 | NR | 950 | 0 | NR |
| 435 | 305 | NR | 565 | 866 | NR | 695 | 152 | NR | 825 | 3 | NR | 955 | 0 | NR |
| 440 | 455 | NR | 570 | 901 | NR | 700 | 131 | NR | 830 | 3 | NR | 960 | 0 | NR |
| 445 | 615 | NR | 575 | 933 | NR | 705 | 112 | NR | 835 | 3 | NR | 965 | 0 | NR |
| 450 | 771 | NR | 580 | 963 | NR | 710 | 96 | NR | 840 | 2 | NR | 970 | 0 | NR |
| 455 | 579 | NR | 585 | 984 | NR | 715 | 80 | NR | 845 | 2 | NR | 975 | 0 | NR |
| 460 | 313 | NR | 590 | 1000 | NR | 720 | 67 | NR | 850 | 2 | NR | 980 | 0 | NR |
| 465 | 221 | NR | 595 | 999 | NR | 725 | 55 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 156 | NR | 600 | 990 | NR | 730 | 46 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 103 | NR | 605 | 968 | NR | 735 | 40 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 89 | NR | 610 | 937 | NR | 740 | 35 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 93 | NR | 615 | 893 | NR | 745 | 31 | NR | 875 | 1 | NR | | | |

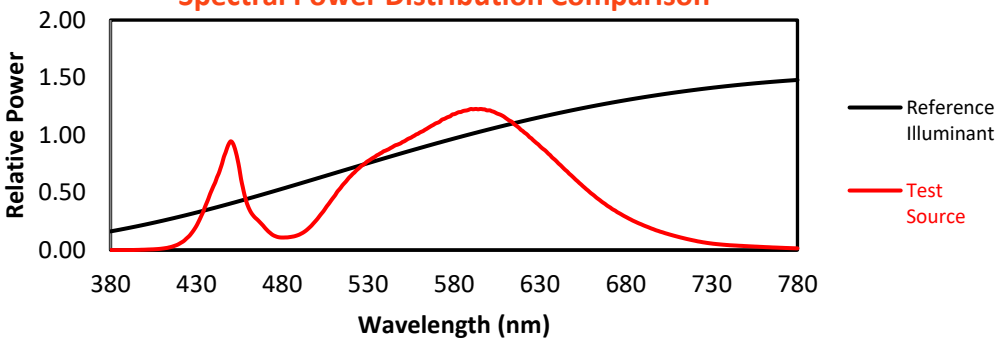
REPORT NUMBER: SP1-2407-176-4

# TM-30-18

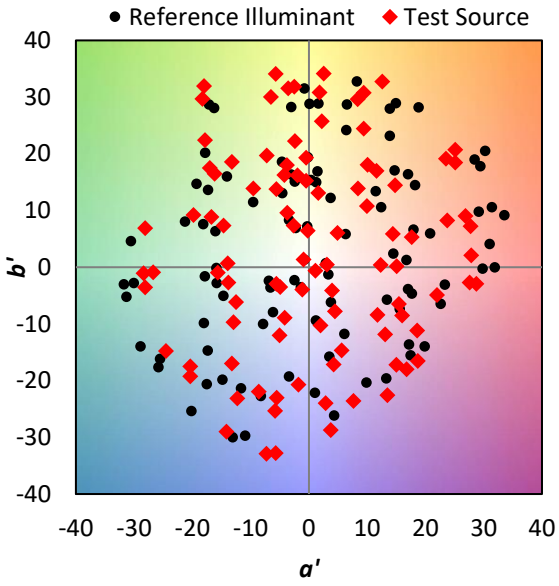
## Summary

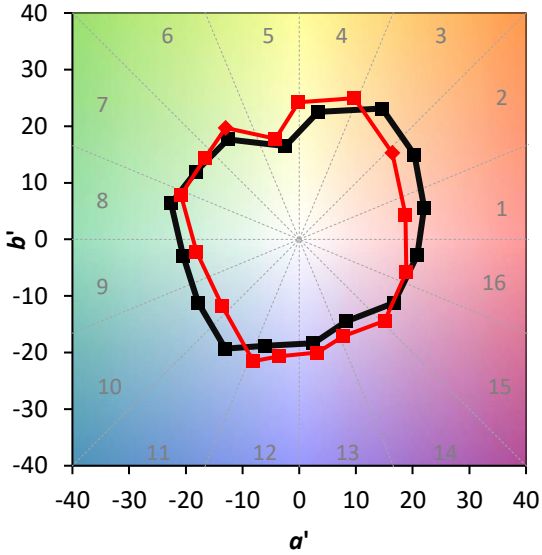
$R_f$ = 75.8
$R_g$ = 95.8
CIE $R_a$ = 73.4
$R_9$ = -19.2

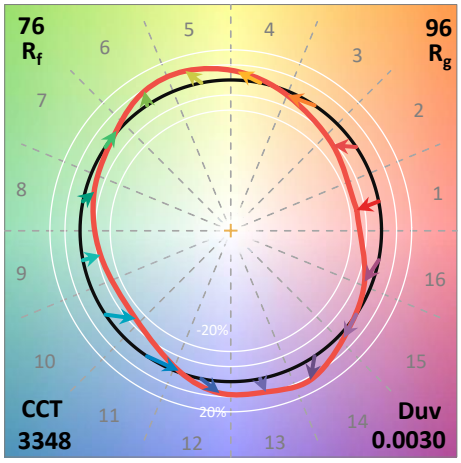
## Spectral Power Distribution Comparison

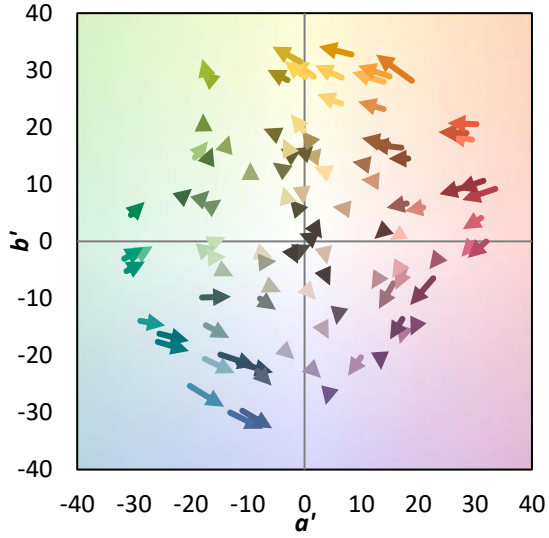



## Color Vector Graphics



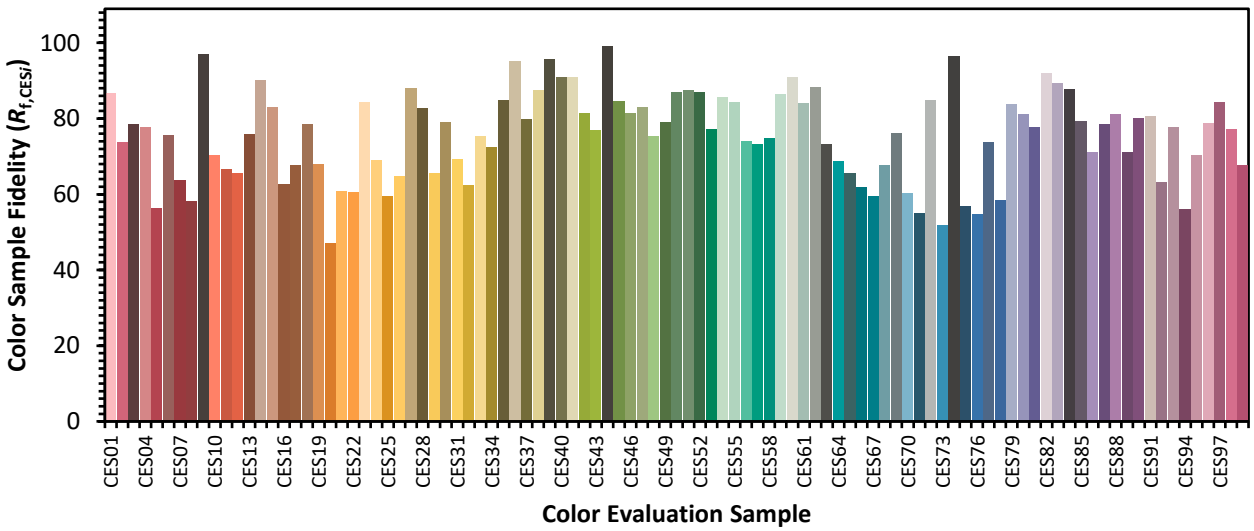



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## Individual Sample Fidelity Index ($R_{f,i}$)

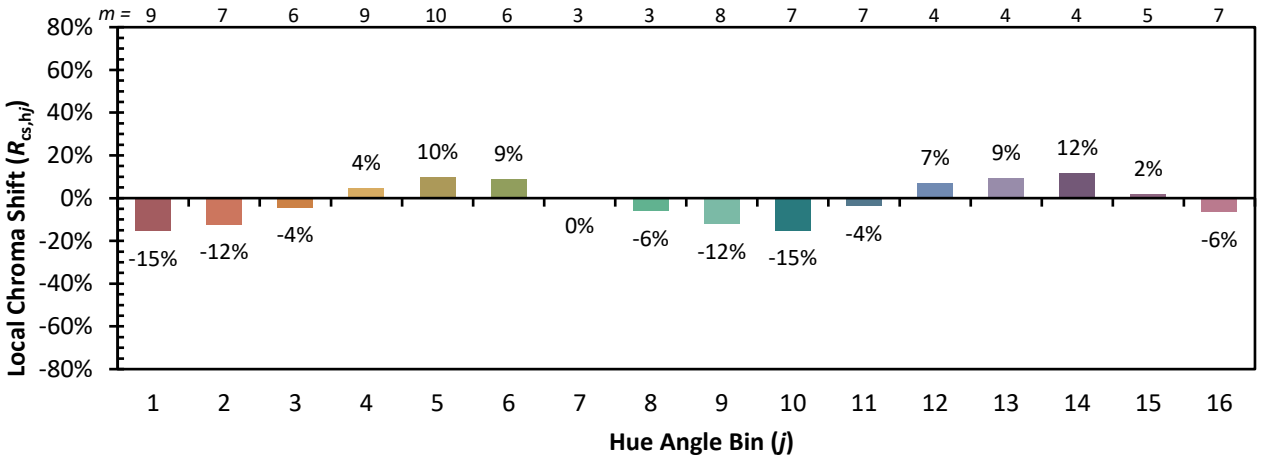
| | | | |
|---|---|---|---|
| CES01 = 86 | CES26 = 65 | CES51 = 88 | CES76 = 55 |
| CES02 = 62 | CES27 = 88 | CES52 = 87 | CES77 = 74 |
| CES03 = 31 | CES28 = 83 | CES53 = 77 | CES78 = 58 |
| CES04 = 70 | CES29 = 66 | CES54 = 86 | CES79 = 84 |
| CES05 = 48 | CES30 = 79 | CES55 = 84 | CES80 = 81 |
| CES06 = 51 | CES31 = 69 | CES56 = 74 | CES81 = 78 |
| CES07 = 41 | CES32 = 62 | CES57 = 73 | CES82 = 92 |
| CES08 = 40 | CES33 = 75 | CES58 = 75 | CES83 = 89 |
| CES09 = 29 | CES34 = 73 | CES59 = 87 | CES84 = 88 |
| CES10 = 75 | CES35 = 85 | CES60 = 91 | CES85 = 79 |
| CES11 = 58 | CES36 = 95 | CES61 = 84 | CES86 = 71 |
| CES12 = 64 | CES37 = 80 | CES62 = 88 | CES87 = 79 |
| CES13 = 43 | CES38 = 88 | CES63 = 73 | CES88 = 81 |
| CES14 = 74 | CES39 = 96 | CES64 = 69 | CES89 = 71 |
| CES15 = 71 | CES40 = 91 | CES65 = 66 | CES90 = 80 |
| CES16 = 47 | CES41 = 91 | CES66 = 62 | CES91 = 81 |
| CES17 = 50 | CES42 = 81 | CES67 = 60 | CES92 = 63 |
| CES18 = 56 | CES43 = 77 | CES68 = 68 | CES93 = 78 |
| CES19 = 72 | CES44 = 99 | CES69 = 76 | CES94 = 56 |
| CES20 = 65 | CES45 = 85 | CES70 = 60 | CES95 = 70 |
| CES21 = 87 | CES46 = 82 | CES71 = 55 | CES96 = 79 |
| CES22 = 79 | CES47 = 83 | CES72 = 85 | CES97 = 84 |
| CES23 = 92 | CES48 = 75 | CES73 = 52 | CES98 = 77 |
| CES24 = 91 | CES49 = 79 | CES74 = 96 | CES99 = 68 |
| CES25 = 72 | CES50 = 87 | CES75 = 57 | |

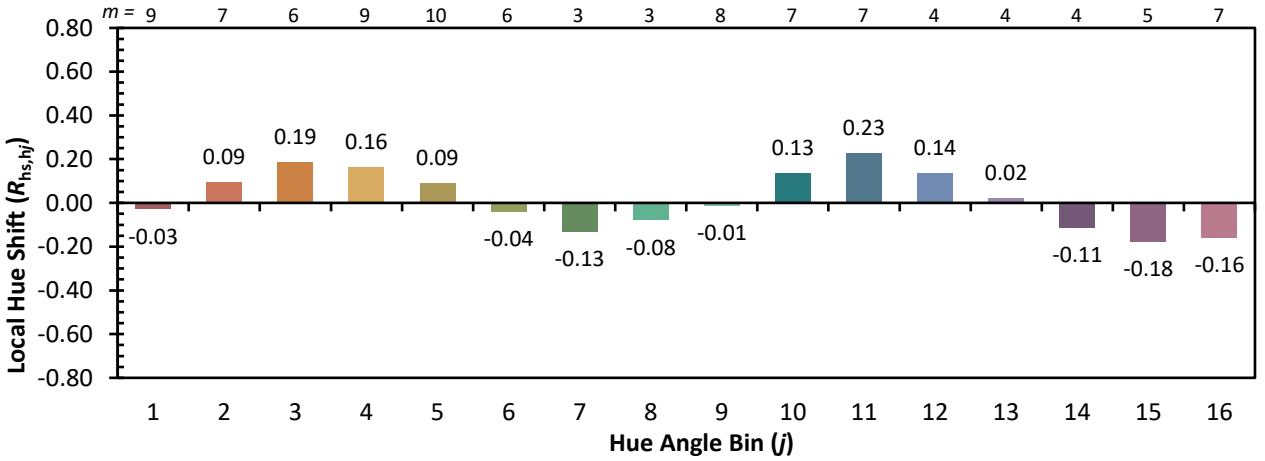


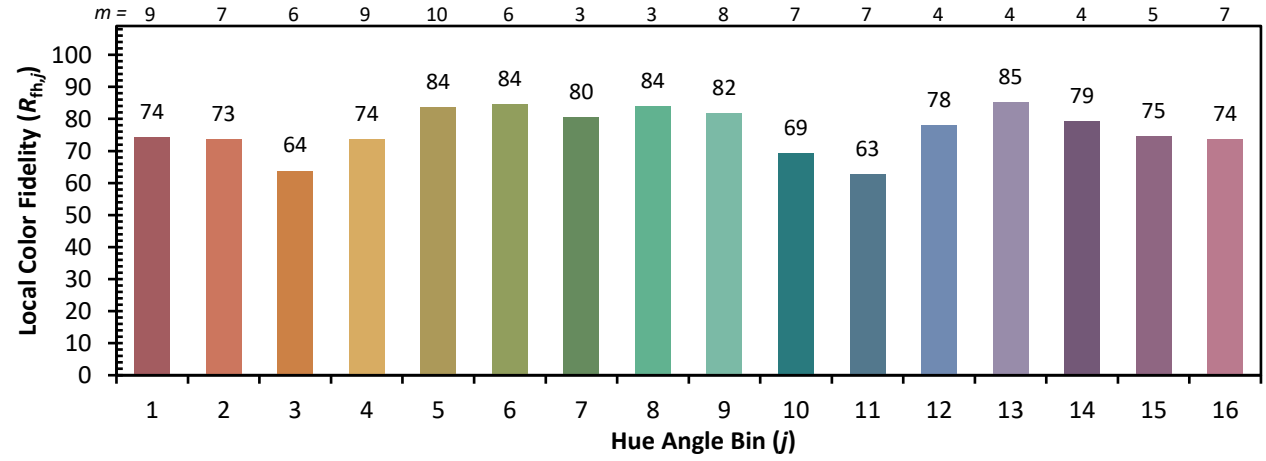
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## Color Rendition by Hue-Angle Bin



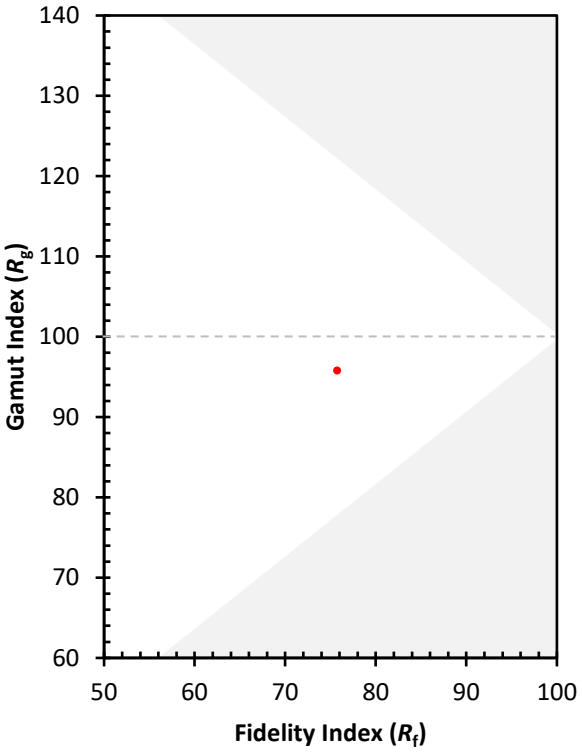



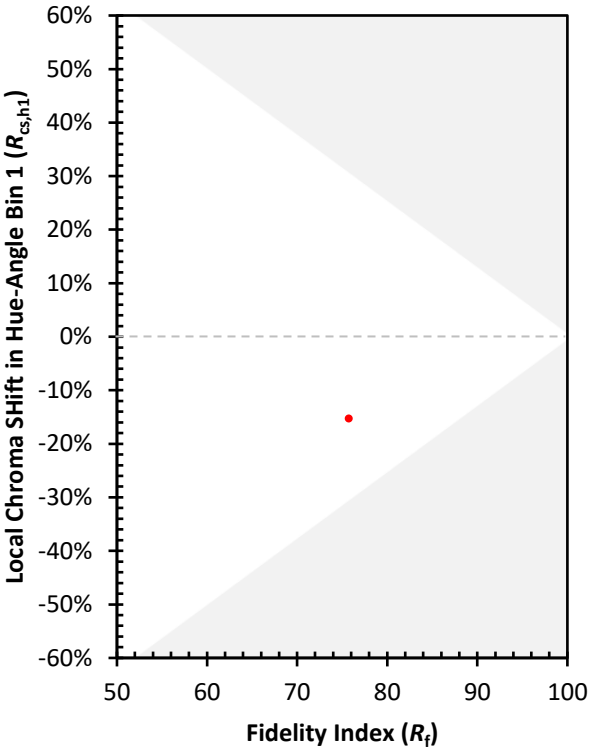



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## Measure Comparisons




(END OF REPORT)