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: P821336

Luminaire Tested: **TT-D1-750-24VDC-CQ-HSS**

Issue Date: 12/2/2020

Report Generated By 670245763

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Scaled Data Report

**Test Information**

| | |
|---|---|
| Test Method: | LM-79-08 |
| Report Number: | P821336 |
| | TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2010-017-3) |
| Test Lab: | INNOVATION CENTER |
| Issue Date: | 12/2/2020 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS (FORMERLY EATON) |
| Product Line: | McGRAW-EDISON |
| Catalog Number: | TT-D1-750-24VDC-CQ-HSS |
| Description: | TOPTIER LED PARKING GARAGE LUMINAIRE |
| | 5000K, 70 CRI LEDS AND CONCENTRATED DISTRIBUTION WITH HOUSE SIDE SHIELD |
| Light Source: | - |
| Ballast/Driver: | ELECTRONIC DRIVER |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 3239.9 lumens |
| Efficiency: | N/A |
| Efficacy: | 115.7 lumens/watt |
| Luminous Opening: | Circular (Dia: 1.12' x H: 0') |
| IES Classification: | Type IV - Short |
| BUG Rating: | B1 - U1 - G1 |

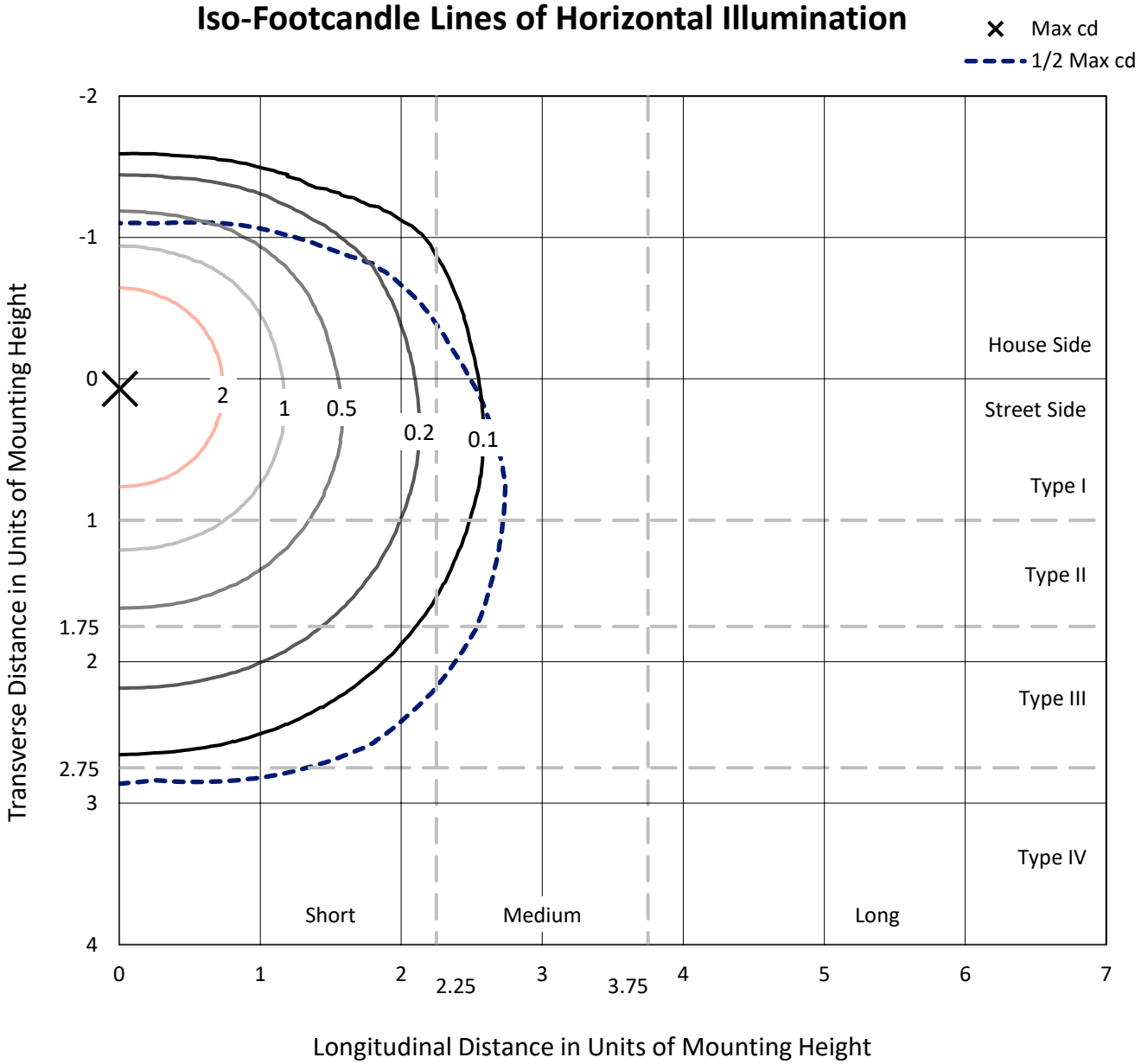
| | |
|---|---|
| Input Watts (W): | 28 |
| Input Voltage (V): | NR |
| Input Current (Ain): | NR |
| Voltage Rise (V): | NR |
| Power Factor: | NR |
| Total Harmonic Distortion (THDi): | NR |
| Frequency (hertz): | 60 |
| Stabilization Time: | NR |
| Operation Time: | NR |
| Ambient Temperature (°C): | NR |
| Test Distance: | 25 FT |

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## Iso-Footcandle Lines of Horizontal Illumination



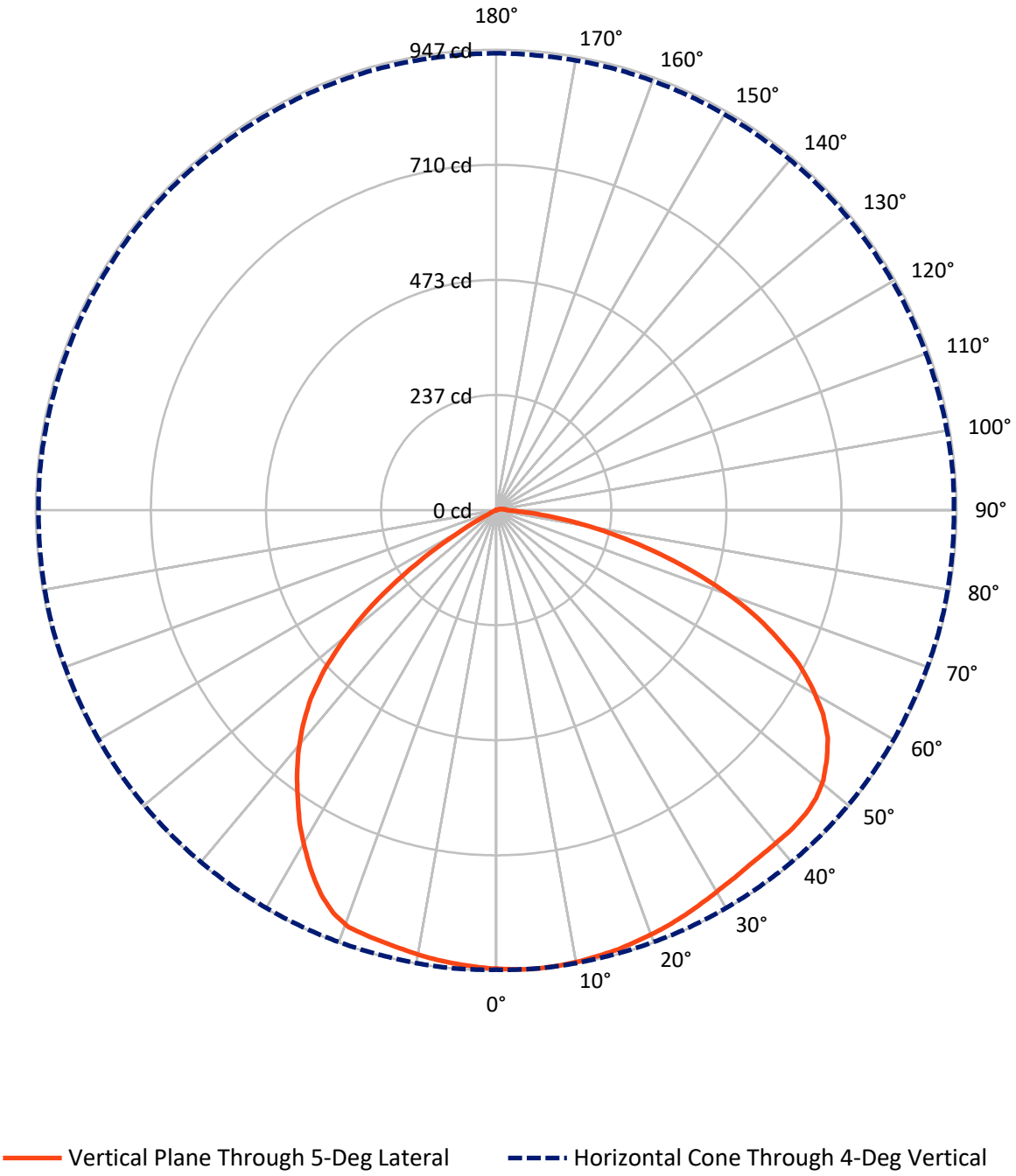

Based on 15 foot mounting height. Maximum calculated value = 4.2 fc
Type IV - Short - N/A

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## Luminous Intensity Polar Plot



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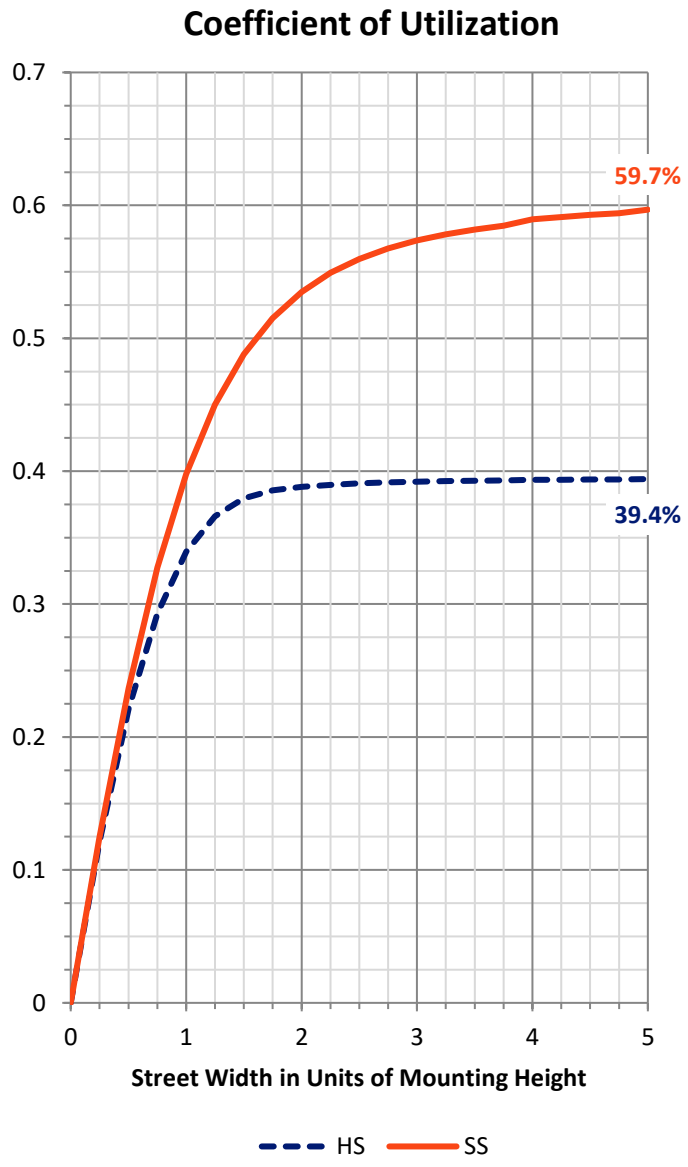
REPORT NUMBER: P821336
CATALOG NUMBER: TT-D1-750-24VDC-CQ-HSS

**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 1284.0 | 1.6 | 1285.6 |
| | % Fixture | 39.6 | 0.1 | 39.7 |
| **Street Side** | Lumens | 1945.3 | 9.0 | 1954.3 |
| | % Fixture | 60.0 | 0.3 | 60.3 |
| **Total** | Lumens | 3229.3 | 10.6 | 3239.9 |
| | % Fixture | 99.7 | 0.3 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 89.7 | 2.8 |
| 10°-20° | 262.6 | 8.1 |
| 20°-30° | 413.8 | 12.8 |
| 30°-40° | 526.7 | 16.3 |
| 40°-50° | 608.3 | 18.8 |
| 50°-60° | 595.6 | 18.4 |
| 60°-70° | 443.6 | 13.7 |
| 70°-80° | 240.3 | 7.4 |
| 80°-90° | 48.7 | 1.5 |
| 90°-100° | 6.2 | 0.2 |
| 100°-110° | 2.4 | 0.1 |
| 110°-120° | 0.7 | 0.0 |
| 120°-130° | 0.5 | 0.0 |
| 130°-140° | 0.4 | 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° | 3229.3 | 99.7 |
| 0°-180° | 3239.9 | 100.0 |



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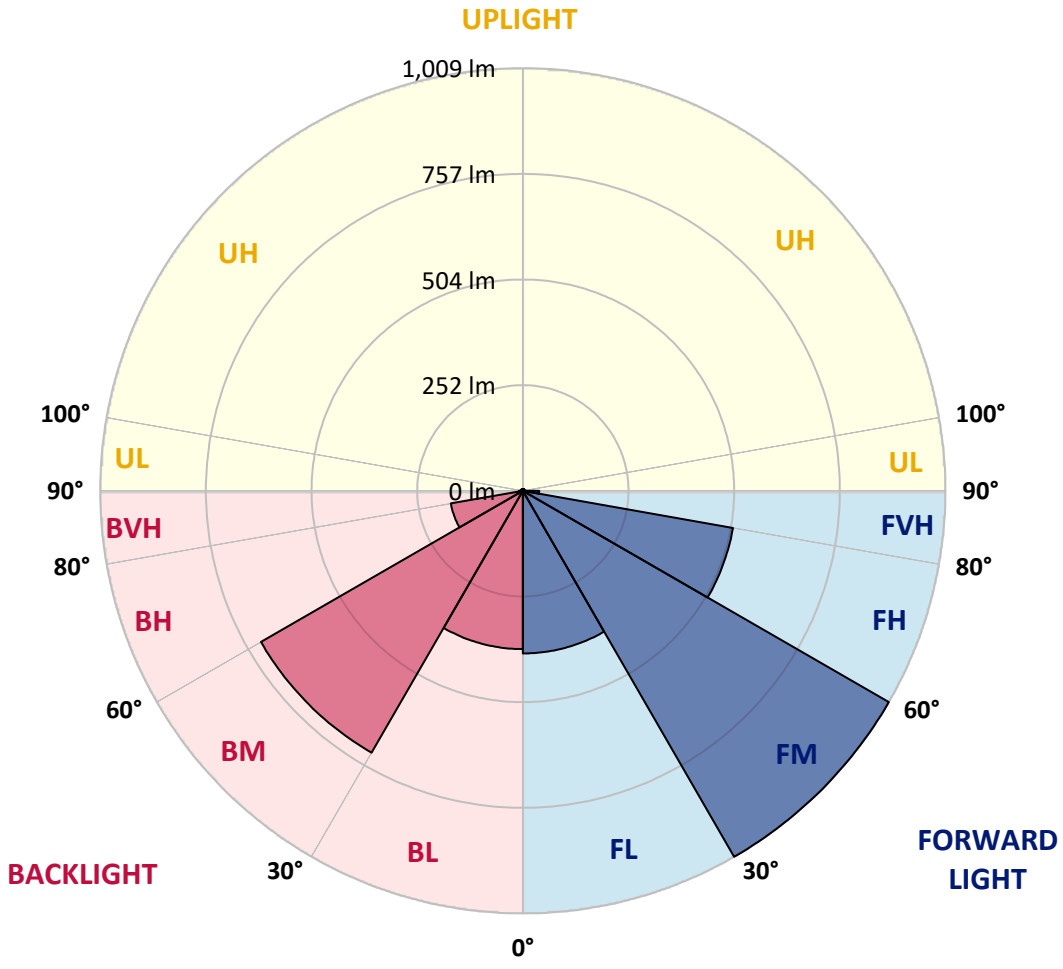
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## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 388.2 | 12.0 | | | |
| FM | (30°-60°) | 1008.8 | 31.1 | | | |
| FH | (60°-80°) | 509.4 | 15.7 | | | G0/660 |
| FVH | (80°-90°) | 38.9 | 1.2 | | | G1/100 |
| BL | (0°-30°) | 377.9 | 11.7 | B1/500 | | |
| BM | (30°-60°) | 721.8 | 22.3 | B1/1000 | | |
| BH | (60°-80°) | 174.5 | 5.4 | B1/500 | | G1/500 |
| BVH | (80°-90°) | 9.8 | 0.3 | | | G0/10 |
| UL | (90°-100°) | 6.2 | 0.2 | | U1/10 | |
| UH | (100°-180°) | 4.5 | 0.1 | | U1/10 | |

**BUG Rating: B1-U1-G1**
Type IV Short



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**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 65° | 75° | 85° | 90° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 943.7 | 943.7 | 943.7 | 943.7 | 943.7 | 943.7 | 943.7 | 943.7 | 943.7 | 943.7 | 943.7 |
| 2.5° | 944.9 | 946.1 | 945.5 | 945.5 | 944.3 | 944.9 | 944.3 | 944.3 | 943.7 | 943.1 | 943.1 |
| 4° | 945.5 | 946.7 | 945.5 | 945.5 | 944.9 | 944.9 | 944.3 | 943.1 | 943.7 | 941.8 | 941.2 |
| 5° | 946.1 | 946.7 | 946.1 | 946.1 | 944.9 | 944.3 | 943.1 | 943.1 | 942.5 | 941.2 | 941.2 |
| 7.5° | 944.9 | 945.5 | 945.5 | 944.9 | 943.7 | 942.5 | 941.8 | 941.2 | 940.6 | 938.8 | 938.8 |
| 10° | 942.5 | 943.7 | 942.5 | 942.5 | 941.8 | 940.6 | 938.8 | 938.2 | 936.4 | 935.1 | 934.5 |
| 12.5° | 940.0 | 940.6 | 940.0 | 940.0 | 938.8 | 937.0 | 936.4 | 935.1 | 932.7 | 930.9 | 930.9 |
| 15° | 936.4 | 937.6 | 937.0 | 936.4 | 935.8 | 933.9 | 932.1 | 930.3 | 928.4 | 926.6 | 926.6 |
| 17.5° | 932.1 | 932.7 | 933.3 | 932.7 | 931.5 | 930.3 | 928.4 | 926.0 | 924.2 | 922.4 | 921.7 |
| 20° | 927.2 | 928.4 | 928.4 | 928.4 | 927.2 | 926.0 | 923.6 | 921.1 | 919.9 | 917.5 | 916.9 |
| 22.5° | 922.4 | 923.6 | 923.0 | 923.6 | 923.0 | 921.1 | 918.7 | 916.3 | 913.8 | 912.0 | 910.8 |
| 25° | 917.5 | 917.5 | 917.5 | 917.5 | 917.5 | 915.0 | 912.6 | 909.6 | 907.1 | 904.1 | 904.1 |
| 27.5° | 911.4 | 911.4 | 912.0 | 912.0 | 911.4 | 909.6 | 906.5 | 902.9 | 899.2 | 896.2 | 894.9 |
| 30° | 905.9 | 905.3 | 906.5 | 907.7 | 907.1 | 905.3 | 901.6 | 897.4 | 891.9 | 887.6 | 884.0 |
| 32.5° | 899.2 | 901.0 | 902.2 | 904.7 | 905.3 | 902.9 | 898.6 | 893.1 | 887.6 | 879.7 | 873.0 |
| 35° | 896.8 | 896.8 | 899.8 | 903.5 | 904.7 | 903.5 | 897.4 | 891.3 | 883.4 | 871.8 | 863.9 |
| 37.5° | 894.3 | 894.9 | 899.8 | 905.3 | 907.1 | 907.1 | 900.4 | 892.5 | 881.5 | 865.1 | 855.3 |
| 40° | 893.1 | 894.3 | 900.4 | 908.3 | 913.2 | 912.6 | 904.7 | 894.9 | 881.5 | 860.2 | 848.0 |
| 42.5° | 891.9 | 894.3 | 901.0 | 912.0 | 919.3 | 918.7 | 910.2 | 897.4 | 880.3 | 854.1 | 840.1 |
| 45° | 890.1 | 891.9 | 901.0 | 915.0 | 924.8 | 926.6 | 916.9 | 900.4 | 880.3 | 848.6 | 830.4 |
| 47.5° | 884.6 | 885.2 | 897.4 | 913.8 | 928.4 | 930.9 | 921.1 | 901.6 | 877.9 | 839.5 | 818.2 |
| 50° | 870.0 | 871.8 | 885.8 | 907.7 | 924.8 | 928.4 | 919.9 | 898.6 | 871.8 | 824.3 | 798.7 |
| 52.5° | 851.1 | 851.1 | 868.1 | 892.5 | 913.2 | 919.3 | 911.4 | 887.6 | 856.6 | 801.7 | 772.5 |
| 55° | 823.0 | 827.3 | 845.0 | 870.6 | 893.1 | 901.6 | 890.7 | 867.5 | 831.6 | 773.1 | 740.8 |
| 57.5° | 791.4 | 792.6 | 810.9 | 841.3 | 864.5 | 870.0 | 860.8 | 833.4 | 798.7 | 739.0 | 700.6 |
| 60° | 745.7 | 748.1 | 771.3 | 798.1 | 823.0 | 830.4 | 818.8 | 791.4 | 754.8 | 695.1 | 656.1 |
| 62.5° | 695.1 | 698.8 | 719.5 | 746.9 | 770.7 | 782.2 | 768.2 | 739.6 | 703.6 | 642.7 | 608.6 |
| 65° | 634.2 | 635.4 | 658.0 | 689.0 | 712.8 | 717.0 | 704.9 | 676.8 | 640.9 | 582.4 | 551.9 |
| 67.5° | 564.1 | 570.2 | 592.2 | 615.3 | 636.0 | 640.9 | 632.4 | 600.1 | 571.4 | 519.7 | 489.8 |
| 70° | 496.5 | 493.5 | 511.7 | 534.9 | 553.8 | 558.0 | 548.3 | 518.4 | 491.6 | 442.9 | 419.7 |
| 72.5° | 414.9 | 412.4 | 431.9 | 449.6 | 467.9 | 465.4 | 455.7 | 431.9 | 408.8 | 367.4 | 346.0 |
| 75° | 332.6 | 330.2 | 345.4 | 360.7 | 369.8 | 371.0 | 364.3 | 346.6 | 321.7 | 289.4 | 272.9 |
| 77.5° | 252.2 | 254.7 | 261.4 | 274.1 | 282.7 | 286.3 | 274.8 | 257.1 | 241.2 | 216.3 | 204.1 |
| 80° | 179.7 | 180.3 | 182.8 | 191.9 | 198.0 | 198.0 | 192.5 | 178.5 | 160.8 | 143.2 | 137.1 |
| 82.5° | 113.3 | 115.8 | 115.8 | 124.9 | 124.9 | 120.0 | 117.6 | 108.4 | 99.3 | 85.3 | 76.8 |
| 85° | 62.1 | 60.9 | 64.6 | 65.2 | 64.6 | 60.9 | 57.3 | 51.8 | 45.7 | 35.9 | 32.3 |
| 87.5° | 27.4 | 26.8 | 26.8 | 26.8 | 26.2 | 23.8 | 20.1 | 15.8 | 11.0 | 6.7 | 4.9 |
| 90° | 21.3 | 21.3 | 20.7 | 19.5 | 17.7 | 15.8 | 12.8 | 9.7 | 6.1 | 2.4 | 1.2 |
| 92.5° | 19.5 | 19.5 | 18.9 | 18.3 | 16.4 | 14.6 | 11.6 | 8.5 | 5.5 | 2.4 | 1.2 |
| 95° | 17.1 | 16.4 | 16.4 | 15.2 | 14.0 | 12.2 | 10.4 | 7.3 | 4.9 | 1.8 | 1.2 |
| 97.5° | 14.0 | 13.4 | 13.4 | 12.8 | 11.6 | 9.7 | 8.5 | 6.1 | 4.3 | 1.8 | 1.2 |
| 100° | 10.4 | 11.0 | 10.4 | 9.7 | 9.1 | 7.9 | 6.7 | 4.9 | 3.0 | 1.2 | 1.2 |
| 102.5° | 7.9 | 7.9 | 7.3 | 7.3 | 6.7 | 6.1 | 4.9 | 3.7 | 2.4 | 1.2 | 0.6 |
| 105° | 5.5 | 5.5 | 5.5 | 4.9 | 4.9 | 4.3 | 3.7 | 2.4 | 1.8 | 1.2 | 0.6 |
| 107.5° | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 2.4 | 1.8 | 1.2 | 0.6 | 0.6 |

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**CANDELA DISTRIBUTION (continued):**

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 65° | 75° | 85° | 90° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 110° | 1.8 | *1.8* | 1.8 | 1.8 | 1.8 | 1.8 | 1.2 | 1.2 | 0.6 | 0.6 | 0.6 |
| 112.5° | 0.6 | *0.6* | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 0.6 | 0.6 | 0.6 | 0.6 |
| 115° | 0.6 | *0.6* | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 117.5° | 0.0 | *0.0* | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 120° | 0.0 | *0.0* | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 122.5° | 0.0 | *0.0* | 0.0 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 125° | 0.0 | *0.0* | 0.0 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 127.5° | 0.0 | *0.0* | 0.0 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 130° | 0.0 | *0.0* | 0.0 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 132.5° | 0.0 | *0.0* | 0.0 | 0.0 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 135° | 0.0 | *0.0* | 0.0 | 0.0 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 137.5° | 0.0 | *0.0* | 0.0 | 0.0 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 140° | 0.0 | *0.0* | 0.0 | 0.0 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 142.5° | 0.0 | *0.0* | 0.0 | 0.0 | 0.0 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 145° | 0.6 | *0.6* | 0.0 | 0.0 | 0.0 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 147.5° | 0.6 | *0.6* | 0.0 | 0.0 | 0.0 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 150° | 0.6 | *0.0* | 0.0 | 0.0 | 0.0 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 152.5° | 0.0 | *0.0* | 0.0 | 0.0 | 0.0 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 155° | 0.0 | *0.0* | 0.0 | 0.0 | 0.0 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 157.5° | 0.0 | *0.0* | 0.0 | 0.0 | 0.0 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 160° | 0.0 | *0.0* | 0.0 | 0.0 | 0.0 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 162.5° | 0.0 | *0.0* | 0.0 | 0.0 | 0.0 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 165° | 0.0 | *0.0* | 0.0 | 0.0 | 0.0 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 167.5° | 0.0 | *0.0* | 0.0 | 0.0 | 0.0 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 170° | 0.0 | *0.0* | 0.0 | 0.0 | 0.0 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 172.5° | 0.0 | *0.0* | 0.0 | 0.0 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 175° | 0.0 | *0.0* | 0.0 | 0.0 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 177.5° | 0.0 | *0.0* | 0.0 | 0.0 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 180° | 0.6 | *0.6* | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |

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**CANDELA DISTRIBUTION (continued):**

| | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 943.7 | 943.7 | 943.7 | 943.7 | 943.7 | 943.7 | 943.7 | 943.7 | 943.7 | 943.7 |
| 2.5° | 942.5 | 940.6 | 941.8 | 941.2 | 941.8 | 940.6 | 940.6 | 940.6 | 941.2 | 940.0 |
| 4° | *941.8* | *940.6* | *940.6* | *940.6* | *940.6* | *939.4* | *939.4* | *939.4* | *938.8* | *939.4* |
| 5° | 940.6 | 940.0 | 939.4 | 938.8 | 939.4 | 938.2 | 937.6 | 937.6 | 937.6 | 938.2 |
| 7.5° | 938.2 | 936.4 | 936.4 | 934.5 | 935.1 | 934.5 | 933.9 | 934.5 | 933.9 | 933.9 |
| 10° | 933.9 | 932.7 | 932.1 | 930.9 | 930.9 | 929.7 | 929.1 | 929.1 | 929.1 | 928.4 |
| 12.5° | 929.7 | 928.4 | 927.8 | 926.6 | 926.0 | 924.8 | 924.2 | 924.8 | 923.6 | 923.6 |
| 15° | 924.8 | 923.6 | 923.0 | 923.0 | 921.7 | 920.5 | 919.9 | 918.7 | 918.7 | 918.7 |
| 17.5° | 920.5 | 919.3 | 919.9 | 918.7 | 918.1 | 916.9 | 916.9 | 914.4 | 914.4 | 913.8 |
| 20° | 916.3 | 915.0 | 915.0 | 914.4 | 914.4 | 913.2 | 911.4 | 910.2 | 909.6 | 909.6 |
| 22.5° | 910.8 | 908.9 | 905.9 | 901.6 | 899.2 | 897.4 | 896.8 | 894.9 | 894.3 | 893.1 |
| 25° | 902.2 | 897.4 | 890.7 | 883.4 | 876.1 | 872.4 | 871.2 | 868.7 | 868.7 | 868.7 |
| 27.5° | 891.9 | 882.8 | 873.6 | 862.6 | 851.7 | 844.4 | 839.5 | 837.1 | 835.8 | 835.8 |
| 30° | 878.5 | 866.9 | 854.1 | 840.1 | 827.9 | 814.5 | 806.0 | 801.1 | 798.7 | 799.3 |
| 32.5° | 866.3 | 851.7 | 837.1 | 819.4 | 802.9 | 787.1 | 772.5 | 765.2 | 762.1 | 760.9 |
| 35° | 854.1 | 837.7 | 820.0 | 801.1 | 779.8 | 756.6 | 737.1 | 726.2 | 720.1 | 720.7 |
| 37.5° | 845.0 | 825.5 | 806.0 | 782.8 | 758.5 | 730.4 | 705.5 | 687.8 | 680.5 | 681.7 |
| 40° | 835.2 | 813.3 | 792.0 | 765.2 | 736.5 | 703.0 | 670.7 | 647.0 | 638.5 | 636.6 |
| 42.5° | 826.1 | 800.5 | 776.1 | 747.5 | 711.6 | 673.8 | 634.2 | 606.2 | 593.4 | 591.5 |
| 45° | 814.5 | 785.9 | 759.7 | 726.8 | 687.2 | 640.3 | 594.0 | 557.4 | 544.0 | 538.5 |
| 47.5° | 799.3 | 767.6 | 738.4 | 700.6 | 657.3 | 604.3 | 546.5 | 501.4 | 484.3 | 480.1 |
| 50° | 776.7 | 740.2 | 710.3 | 667.7 | 615.3 | 556.8 | 492.2 | 436.8 | 414.3 | 411.2 |
| 52.5° | 746.9 | 709.7 | 676.2 | 627.5 | 563.5 | 494.7 | 421.6 | 364.3 | 338.1 | 336.3 |
| 55° | 711.0 | 670.7 | 634.2 | 579.4 | 504.4 | 424.6 | 348.5 | 276.0 | 250.4 | 247.3 |
| 57.5° | 668.9 | 627.5 | 587.9 | 520.3 | 433.8 | 344.8 | 256.5 | 187.0 | 162.7 | 156.6 |
| 60° | 622.6 | 580.0 | 535.5 | 453.3 | 338.7 | 244.3 | 155.3 | 99.3 | 81.0 | 74.9 |
| 62.5° | 577.5 | 531.2 | 484.3 | 373.4 | 232.1 | 139.5 | 70.7 | 28.6 | 18.3 | 17.7 |
| 65° | 524.5 | 480.7 | 432.5 | 301.0 | 146.8 | 62.7 | 20.7 | 0.6 | 0.0 | 0.0 |
| 67.5° | 463.0 | 425.8 | 383.2 | 269.3 | 129.8 | 54.8 | 17.7 | 0.6 | 0.0 | 0.0 |
| 70° | 397.2 | 368.0 | 330.2 | 231.5 | 111.5 | 46.3 | 15.2 | 0.0 | 0.0 | 0.0 |
| 72.5° | 327.8 | 302.8 | 274.8 | 192.5 | 92.6 | 38.4 | 12.2 | 0.0 | 0.0 | 0.0 |
| 75° | 257.1 | 241.2 | 216.3 | 152.3 | 71.9 | 29.2 | 9.1 | 0.0 | 0.0 | 0.0 |
| 77.5° | 190.7 | 177.9 | 159.6 | 112.1 | 54.2 | 21.3 | 6.7 | 0.0 | 0.0 | 0.0 |
| 80° | 128.5 | 118.8 | 108.4 | 76.2 | 36.6 | 14.0 | 4.3 | 0.0 | 0.0 | 0.0 |
| 82.5° | 74.9 | 67.6 | 60.9 | 43.3 | 20.1 | 7.9 | 1.8 | 0.0 | 0.0 | 0.0 |
| 85° | 30.5 | 28.0 | 26.8 | 18.3 | 7.9 | 2.4 | 0.6 | 0.0 | 0.0 | 0.0 |
| 87.5° | 3.7 | 3.0 | 3.0 | 1.8 | 0.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 90° | 0.6 | 0.6 | 0.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 92.5° | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 95° | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.0 | 0.0 | 0.0 | 0.0 |
| 97.5° | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.0 |
| 100° | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 102.5° | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 105° | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 107.5° | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |

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

Scaled Data Report

REPORT NUMBER: P821336
CATALOG NUMBER: TT-D1-750-24VDC-CQ-HSS

**CANDELA DISTRIBUTION (continued):**

| | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|
| 110° | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 112.5° | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 115° | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 117.5° | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 120° | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 122.5° | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 125° | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 127.5° | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 130° | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 132.5° | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 135° | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 137.5° | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.0 | 0.0 |
| 140° | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.0 | 0.0 |
| 142.5° | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.0 | 0.0 | 0.0 |
| 145° | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.0 | 0.0 | 0.0 | 0.0 |
| 147.5° | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.0 | 0.0 | 0.0 | 0.6 |
| 150° | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 152.5° | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 155° | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 157.5° | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 160° | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 162.5° | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 165° | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 167.5° | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 170° | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 172.5° | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 175° | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 177.5° | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 180° | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |

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: SP1-2407-176-6

Test Date: 09/26/2024

Luminaire Tested: MEM2-HTN-VA-30-750-U-WQ

Data in this report applies to families of products including MEM2-HTN-VA-30-750-U-WQ

Report Generated By FNC07603 / LDUCLS01DT446
Version: v7.04

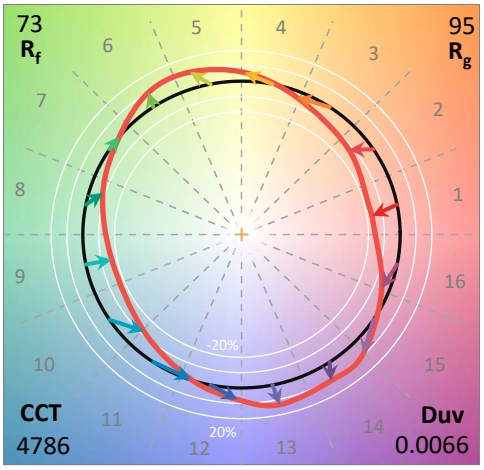
## Test Information

| | |
|---|---|
| Test Method: | LM-79-2019 |
| Report Number: | SP1-2407-176-6 |
| 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-30-750-U-WQ** |
| Description: | EPIC MODERN VISUAL COMFORT 30W WAVESTREAM WIDE |

## Spectral Parameters

| | |
|---|---|
| CCT (K): | 4786 |
| CIE u': | 0.2093 |
| CIE v': | 0.4953 |
| Duv: | 0.0066 |
| CIE x: | 0.3533 |
| CIE y: | 0.3716 |
| CIE z: | 0.2751 |
| Peak Wavelength (nm): | 449 |
| Dominant Wavelength (nm): | 570 |
| Purity: | 17.53512 |
| Rf: | 73 |
| Rg: | 94.6 |

| | | | | | |
|---|---|---|---|---|---|
| CRI (Ra): | 70.9 | | | | |
| R1: | 67.8 | R9: | -29.8 | | |
| R2: | 75.1 | R10: | 40.9 | | |
| R3: | 80.6 | R11: | 67.4 | | |
| R4: | 71.6 | R12: | 35.3 | | |
| R5: | 67.8 | R13: | 68.5 | | |
| R6: | 65.4 | R14: | 89.0 | | |
| R7: | 82.0 | R15: | 60.9 | | |
| R8: | 57.0 | | | | |




## Test Conditions

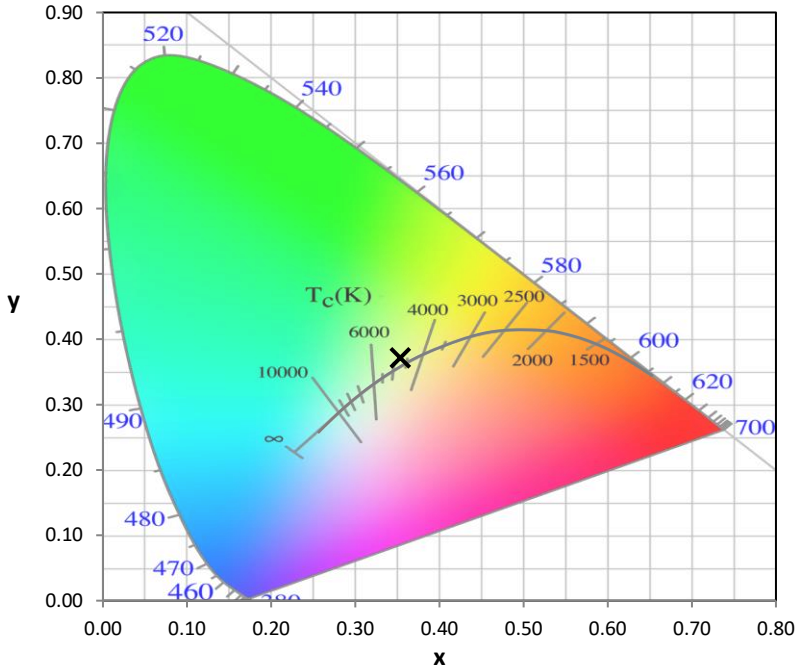
| | |
|---|---|
| Stabilization Time: | 45M |
| Operation Time: | 1H 45M |
| Sphere Temperature (°C): | 25.2 |

REPORT NUMBER: SP1-2407-176-6

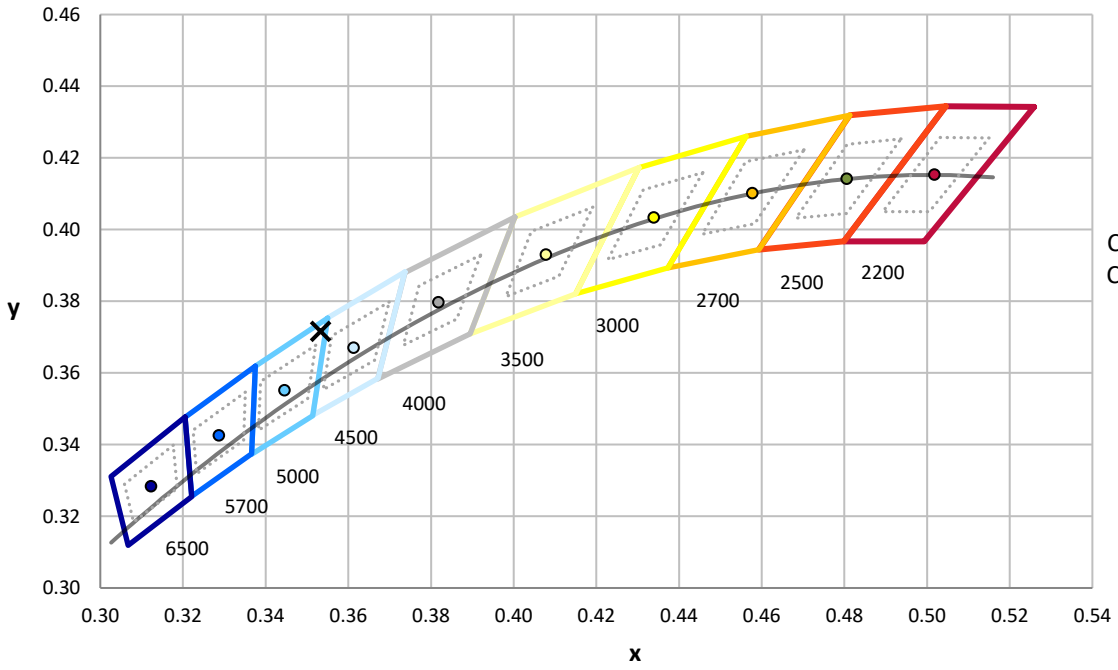
| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 6/18/2024 | 12/18/2024 |
| Power Meter | INXT2011004 | 2/8/2024 | 2/8/2025 |
| AC Power Source | IN0063 | 10/24/2023 | 10/24/2024 |
| DC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

## CIE 1931 Chromaticity Diagram




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

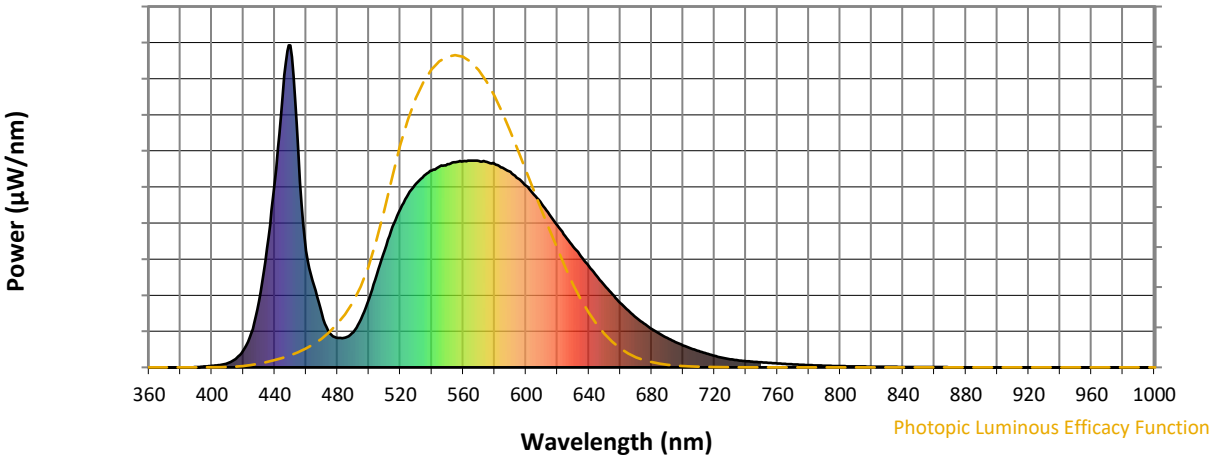



CCT = 4786K
CIE x = 0.3533
CIE y = 0.3716
Duv = 0.0066

Point lies inside the ANSI 5000K 7-step quadrangle

REPORT NUMBER: SP1-2407-176-6

## Photopic Flux vs. Wavelength

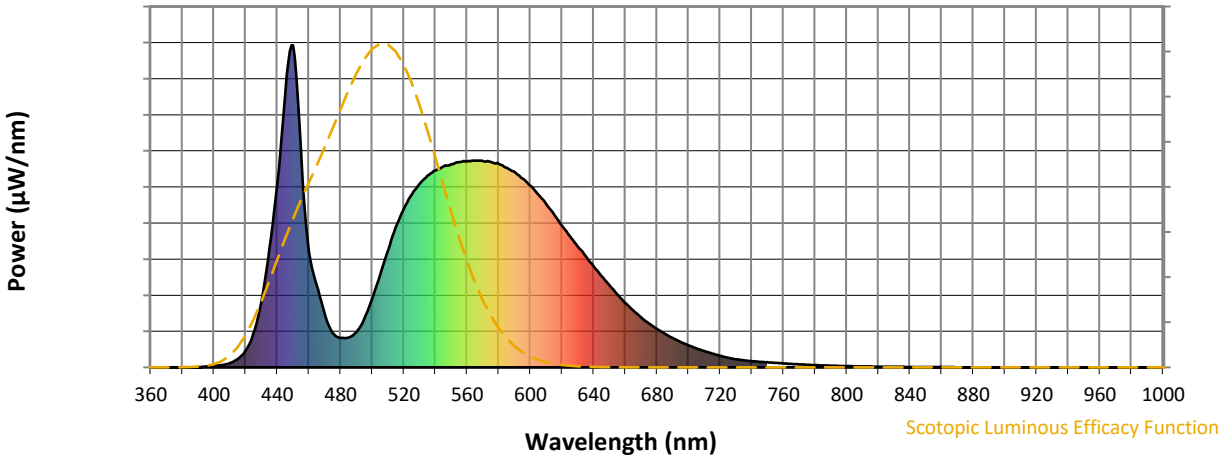



## Photopic Lumens: NR

| 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 | 440 | NR | 750 | 16 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 150 | NR | 625 | 407 | NR | 755 | 14 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 213 | NR | 630 | 375 | NR | 760 | 12 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 288 | NR | 635 | 345 | NR | 765 | 11 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 364 | NR | 640 | 314 | NR | 770 | 9 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 436 | NR | 645 | 283 | NR | 775 | 8 | NR | 905 | 0 | NR |
| 390 | 1 | NR | 520 | 492 | NR | 650 | 254 | NR | 780 | 7 | NR | 910 | 0 | NR |
| 395 | 3 | NR | 525 | 537 | NR | 655 | 227 | NR | 785 | 6 | NR | 915 | 0 | NR |
| 400 | 5 | NR | 530 | 570 | NR | 660 | 200 | NR | 790 | 5 | NR | 920 | 0 | NR |
| 405 | 7 | NR | 535 | 595 | NR | 665 | 177 | NR | 795 | 4 | NR | 925 | 0 | NR |
| 410 | 13 | NR | 540 | 611 | NR | 670 | 155 | NR | 800 | 4 | NR | 930 | 0 | NR |
| 415 | 25 | NR | 545 | 624 | NR | 675 | 136 | NR | 805 | 3 | NR | 935 | 0 | NR |
| 420 | 52 | NR | 550 | 631 | NR | 680 | 119 | NR | 810 | 3 | NR | 940 | 0 | NR |
| 425 | 106 | NR | 555 | 637 | NR | 685 | 104 | NR | 815 | 3 | NR | 945 | 0 | NR |
| 430 | 204 | NR | 560 | 640 | NR | 690 | 91 | NR | 820 | 2 | NR | 950 | 0 | NR |
| 435 | 369 | NR | 565 | 642 | NR | 695 | 79 | NR | 825 | 2 | NR | 955 | 0 | NR |
| 440 | 573 | NR | 570 | 641 | NR | 700 | 68 | NR | 830 | 2 | NR | 960 | 0 | NR |
| 445 | 844 | NR | 575 | 638 | NR | 705 | 59 | NR | 835 | 2 | NR | 965 | 0 | NR |
| 450 | 999 | NR | 580 | 632 | NR | 710 | 50 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 668 | NR | 585 | 620 | NR | 715 | 43 | NR | 845 | 1 | NR | 975 | 0 | NR |
| 460 | 361 | NR | 590 | 607 | NR | 720 | 36 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 255 | NR | 595 | 586 | NR | 725 | 30 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 165 | NR | 600 | 564 | NR | 730 | 25 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 106 | NR | 605 | 537 | NR | 735 | 22 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 91 | NR | 610 | 507 | NR | 740 | 19 | NR | 870 | 0 | NR | 1000 | 0 | NR |
| 485 | 93 | NR | 615 | 474 | NR | 745 | 17 | NR | 875 | 0 | NR | | | |

REPORT NUMBER: SP1-2407-176-6

## Scotopic Flux vs. Wavelength

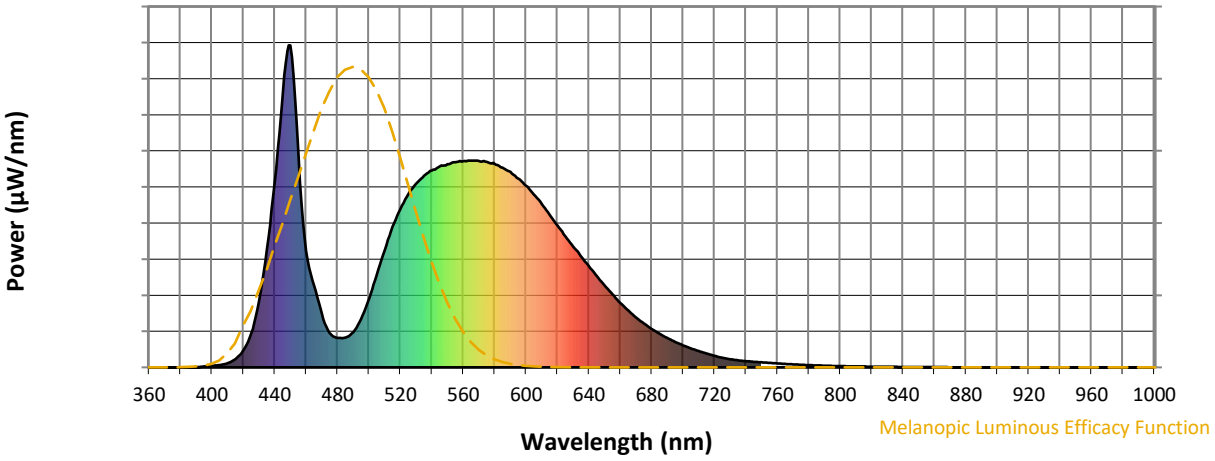



**Scotopic Lumens: NR** **S/P: 1.69**

| 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 | 440 | NR | 750 | 16 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 150 | NR | 625 | 407 | NR | 755 | 14 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 213 | NR | 630 | 375 | NR | 760 | 12 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 288 | NR | 635 | 345 | NR | 765 | 11 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 364 | NR | 640 | 314 | NR | 770 | 9 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 436 | NR | 645 | 283 | NR | 775 | 8 | NR | 905 | 0 | NR |
| 390 | 1 | NR | 520 | 492 | NR | 650 | 254 | NR | 780 | 7 | NR | 910 | 0 | NR |
| 395 | 3 | NR | 525 | 537 | NR | 655 | 227 | NR | 785 | 6 | NR | 915 | 0 | NR |
| 400 | 5 | NR | 530 | 570 | NR | 660 | 200 | NR | 790 | 5 | NR | 920 | 0 | NR |
| 405 | 7 | NR | 535 | 595 | NR | 665 | 177 | NR | 795 | 4 | NR | 925 | 0 | NR |
| 410 | 13 | NR | 540 | 611 | NR | 670 | 155 | NR | 800 | 4 | NR | 930 | 0 | NR |
| 415 | 25 | NR | 545 | 624 | NR | 675 | 136 | NR | 805 | 3 | NR | 935 | 0 | NR |
| 420 | 52 | NR | 550 | 631 | NR | 680 | 119 | NR | 810 | 3 | NR | 940 | 0 | NR |
| 425 | 106 | NR | 555 | 637 | NR | 685 | 104 | NR | 815 | 3 | NR | 945 | 0 | NR |
| 430 | 204 | NR | 560 | 640 | NR | 690 | 91 | NR | 820 | 2 | NR | 950 | 0 | NR |
| 435 | 369 | NR | 565 | 642 | NR | 695 | 79 | NR | 825 | 2 | NR | 955 | 0 | NR |
| 440 | 573 | NR | 570 | 641 | NR | 700 | 68 | NR | 830 | 2 | NR | 960 | 0 | NR |
| 445 | 844 | NR | 575 | 638 | NR | 705 | 59 | NR | 835 | 2 | NR | 965 | 0 | NR |
| 450 | 999 | NR | 580 | 632 | NR | 710 | 50 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 668 | NR | 585 | 620 | NR | 715 | 43 | NR | 845 | 1 | NR | 975 | 0 | NR |
| 460 | 361 | NR | 590 | 607 | NR | 720 | 36 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 255 | NR | 595 | 586 | NR | 725 | 30 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 165 | NR | 600 | 564 | NR | 730 | 25 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 106 | NR | 605 | 537 | NR | 735 | 22 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 91 | NR | 610 | 507 | NR | 740 | 19 | NR | 870 | 0 | NR | 1000 | 0 | NR |
| 485 | 93 | NR | 615 | 474 | NR | 745 | 17 | NR | 875 | 0 | NR | | | |

REPORT NUMBER: SP1-2407-176-6

## Melanopic Flux vs. Wavelength




**Melanopic Lumens: NR** **M/P: 3.36**

| 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 | 440 | NR | 750 | 16 | NR | 880 | 0 | NR |
| 365 | 0 | NR | 495 | 150 | NR | 625 | 407 | NR | 755 | 14 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 213 | NR | 630 | 375 | NR | 760 | 12 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 288 | NR | 635 | 345 | NR | 765 | 11 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 364 | NR | 640 | 314 | NR | 770 | 9 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 436 | NR | 645 | 283 | NR | 775 | 8 | NR | 905 | 0 | NR |
| 390 | 1 | NR | 520 | 492 | NR | 650 | 254 | NR | 780 | 7 | NR | 910 | 0 | NR |
| 395 | 3 | NR | 525 | 537 | NR | 655 | 227 | NR | 785 | 6 | NR | 915 | 0 | NR |
| 400 | 5 | NR | 530 | 570 | NR | 660 | 200 | NR | 790 | 5 | NR | 920 | 0 | NR |
| 405 | 7 | NR | 535 | 595 | NR | 665 | 177 | NR | 795 | 4 | NR | 925 | 0 | NR |
| 410 | 13 | NR | 540 | 611 | NR | 670 | 155 | NR | 800 | 4 | NR | 930 | 0 | NR |
| 415 | 25 | NR | 545 | 624 | NR | 675 | 136 | NR | 805 | 3 | NR | 935 | 0 | NR |
| 420 | 52 | NR | 550 | 631 | NR | 680 | 119 | NR | 810 | 3 | NR | 940 | 0 | NR |
| 425 | 106 | NR | 555 | 637 | NR | 685 | 104 | NR | 815 | 3 | NR | 945 | 0 | NR |
| 430 | 204 | NR | 560 | 640 | NR | 690 | 91 | NR | 820 | 2 | NR | 950 | 0 | NR |
| 435 | 369 | NR | 565 | 642 | NR | 695 | 79 | NR | 825 | 2 | NR | 955 | 0 | NR |
| 440 | 573 | NR | 570 | 641 | NR | 700 | 68 | NR | 830 | 2 | NR | 960 | 0 | NR |
| 445 | 844 | NR | 575 | 638 | NR | 705 | 59 | NR | 835 | 2 | NR | 965 | 0 | NR |
| 450 | 999 | NR | 580 | 632 | NR | 710 | 50 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 668 | NR | 585 | 620 | NR | 715 | 43 | NR | 845 | 1 | NR | 975 | 0 | NR |
| 460 | 361 | NR | 590 | 607 | NR | 720 | 36 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 255 | NR | 595 | 586 | NR | 725 | 30 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 165 | NR | 600 | 564 | NR | 730 | 25 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 106 | NR | 605 | 537 | NR | 735 | 22 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 91 | NR | 610 | 507 | NR | 740 | 19 | NR | 870 | 0 | NR | 1000 | 0 | NR |
| 485 | 93 | NR | 615 | 474 | NR | 745 | 17 | NR | 875 | 0 | NR | | | |

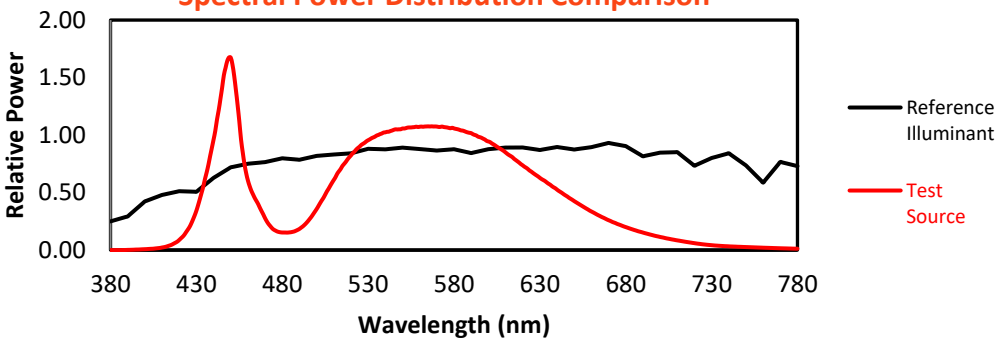
REPORT NUMBER: SP1-2407-176-6

# TM-30-18

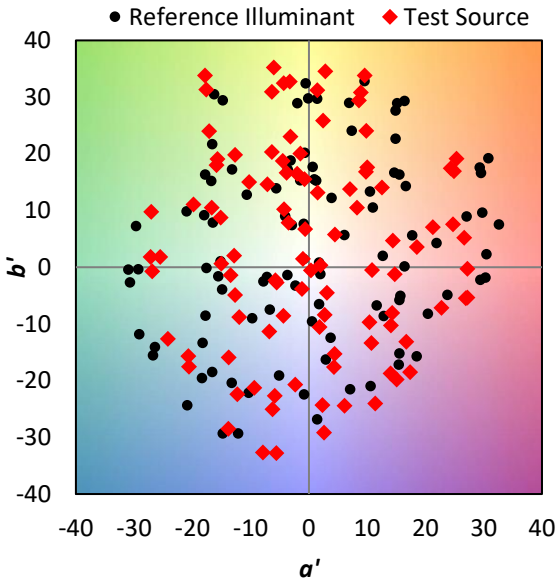
## Summary

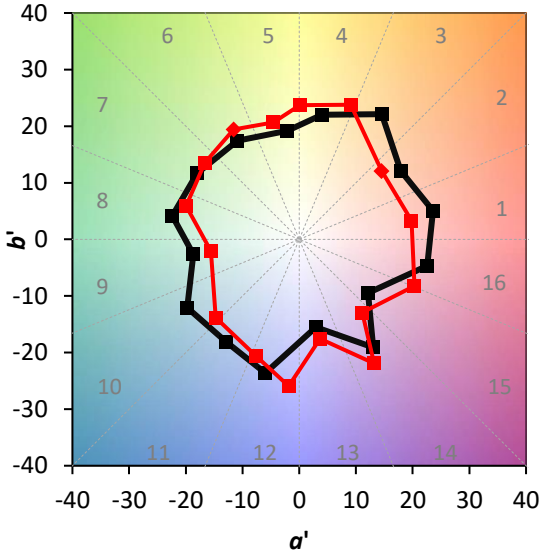
$R_f$ = 73
$R_g$ = 94.6
CIE $R_a$ = 70.9
$R_9$ = -29.8

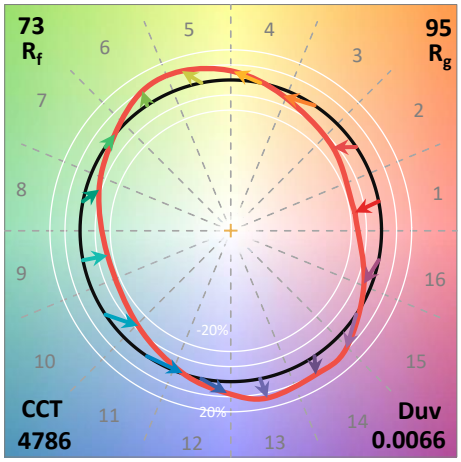
## Spectral Power Distribution Comparison

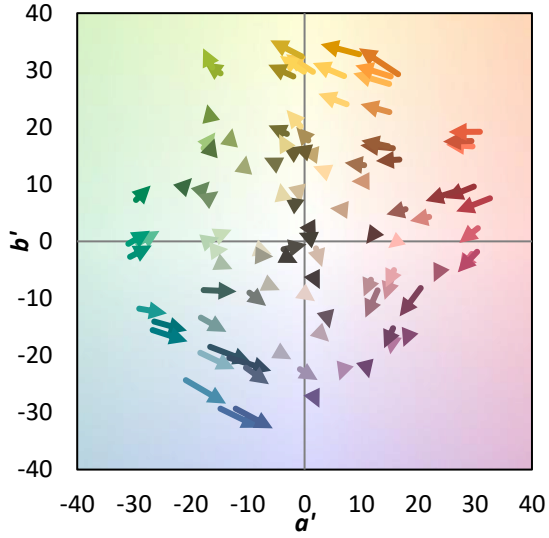



## Color Vector Graphics



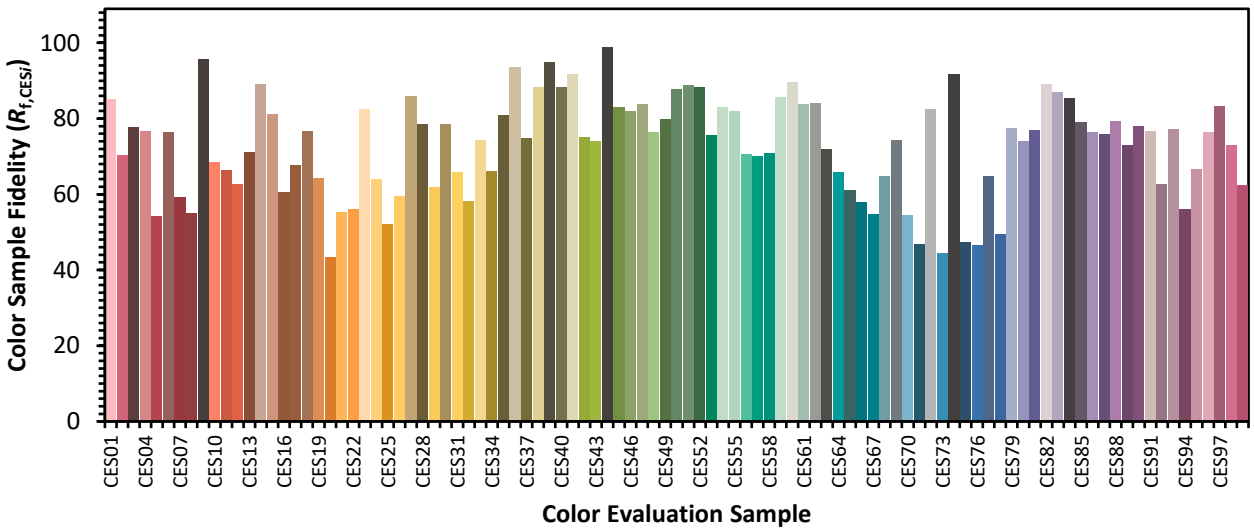



REPORT NUMBER: SP1-2407-176-6

# TM-30-18

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

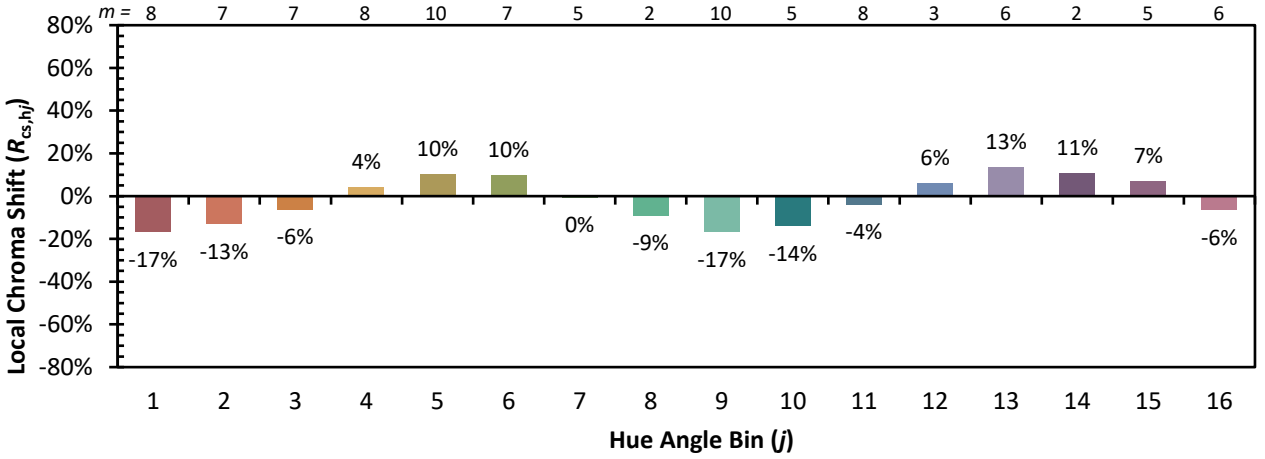
| | | | |
|---|---|---|---|
| CES01 = 85 | CES26 = 60 | CES51 = 89 | CES76 = 46 |
| CES02 = 59 | CES27 = 86 | CES52 = 88 | CES77 = 65 |
| CES03 = 30 | CES28 = 78 | CES53 = 76 | CES78 = 49 |
| CES04 = 69 | CES29 = 62 | CES54 = 83 | CES79 = 78 |
| CES05 = 46 | CES30 = 79 | CES55 = 82 | CES80 = 74 |
| CES06 = 50 | CES31 = 66 | CES56 = 71 | CES81 = 77 |
| CES07 = 39 | CES32 = 58 | CES57 = 70 | CES82 = 89 |
| CES08 = 38 | CES33 = 74 | CES58 = 71 | CES83 = 87 |
| CES09 = 29 | CES34 = 66 | CES59 = 86 | CES84 = 86 |
| CES10 = 72 | CES35 = 81 | CES60 = 90 | CES85 = 79 |
| CES11 = 56 | CES36 = 94 | CES61 = 84 | CES86 = 76 |
| CES12 = 61 | CES37 = 75 | CES62 = 84 | CES87 = 76 |
| CES13 = 41 | CES38 = 88 | CES63 = 72 | CES88 = 79 |
| CES14 = 74 | CES39 = 95 | CES64 = 66 | CES89 = 73 |
| CES15 = 70 | CES40 = 88 | CES65 = 61 | CES90 = 78 |
| CES16 = 46 | CES41 = 92 | CES66 = 58 | CES91 = 77 |
| CES17 = 49 | CES42 = 75 | CES67 = 55 | CES92 = 63 |
| CES18 = 55 | CES43 = 74 | CES68 = 65 | CES93 = 77 |
| CES19 = 71 | CES44 = 99 | CES69 = 74 | CES94 = 56 |
| CES20 = 64 | CES45 = 83 | CES70 = 55 | CES95 = 67 |
| CES21 = 85 | CES46 = 82 | CES71 = 47 | CES96 = 76 |
| CES22 = 77 | CES47 = 84 | CES72 = 82 | CES97 = 83 |
| CES23 = 91 | CES48 = 76 | CES73 = 44 | CES98 = 73 |
| CES24 = 90 | CES49 = 80 | CES74 = 92 | CES99 = 62 |
| CES25 = 71 | CES50 = 88 | CES75 = 47 | |

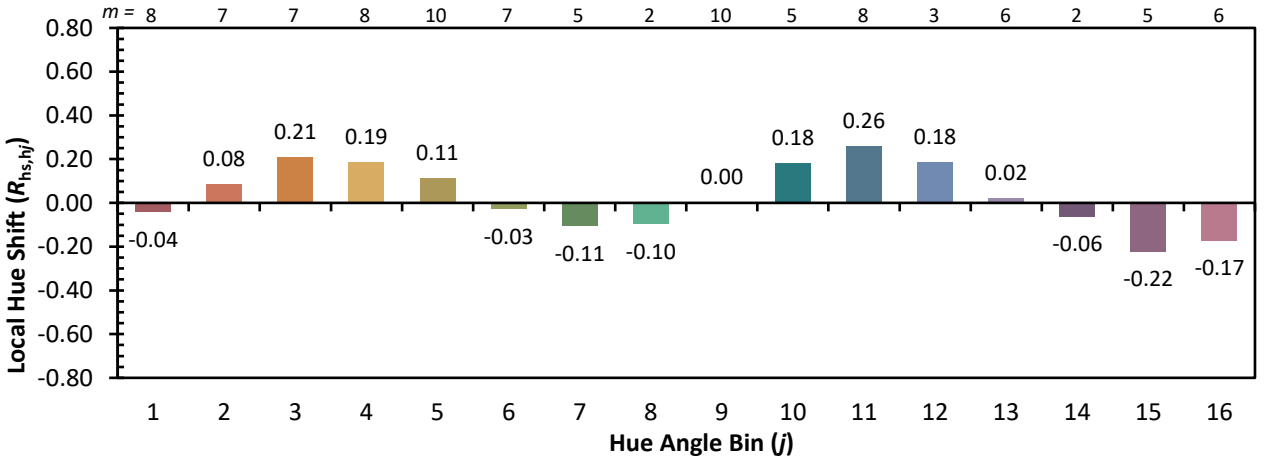


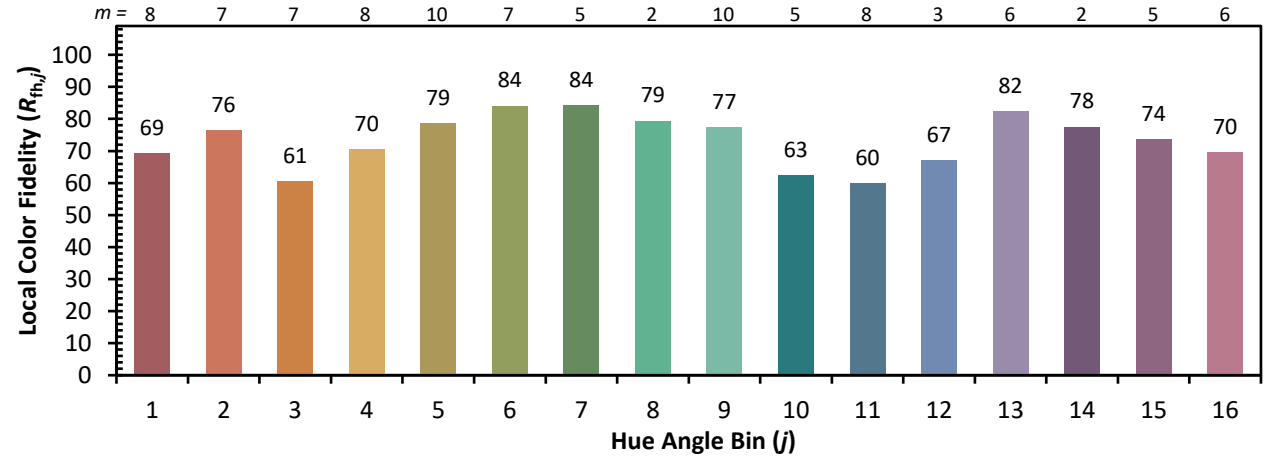
REPORT NUMBER: SP1-2407-176-6

**TM-30-18**

## Color Rendition by Hue-Angle Bin



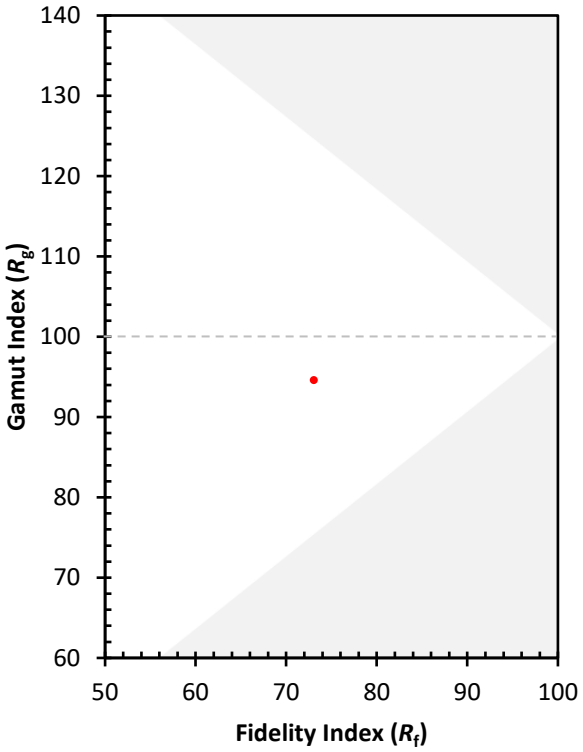



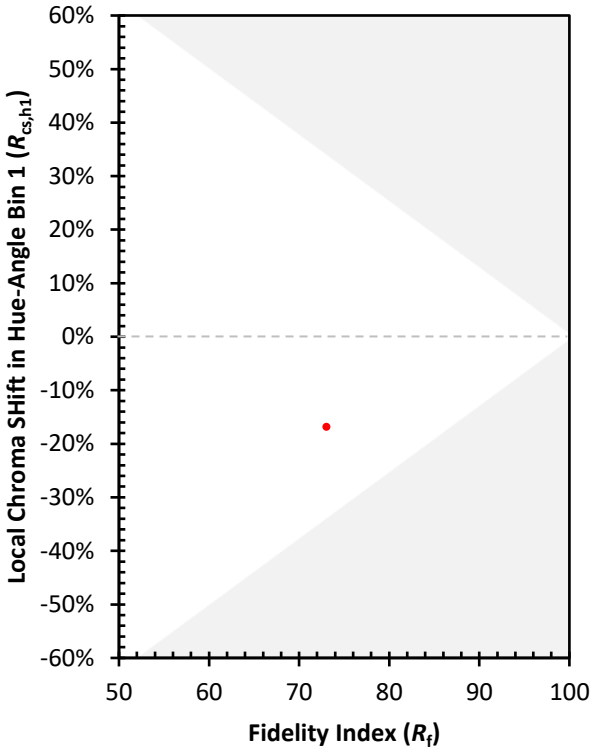



REPORT NUMBER: SP1-2407-176-6

# TM-30-18

## Measure Comparisons




(END OF REPORT)