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: P821470

Luminaire Tested: **TT-D1-735-12VDC-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: | P821470 |
| | 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-D1-735-12VDC-CQ-HSS |
| Description: | TOPTIER LED PARKING GARAGE LUMINAIRE |
| | 3500K, 70 CRI LEDS AND CONCENTRATED DISTRIBUTION WITH HOUSE SIDE SHIELD |
| Light Source: | - |
| Ballast/Driver: | ELECTRONIC DRIVER |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 3062.1 lumens |
| Efficiency: | N/A |
| Efficacy: | 109.4 lumens/watt |
| Luminous Opening: | Circular (Dia: 1.12' x H: 0') |
| IES Classification: | Type IV - Short |
| BUG Rating: | B1 - U1 - G1 |

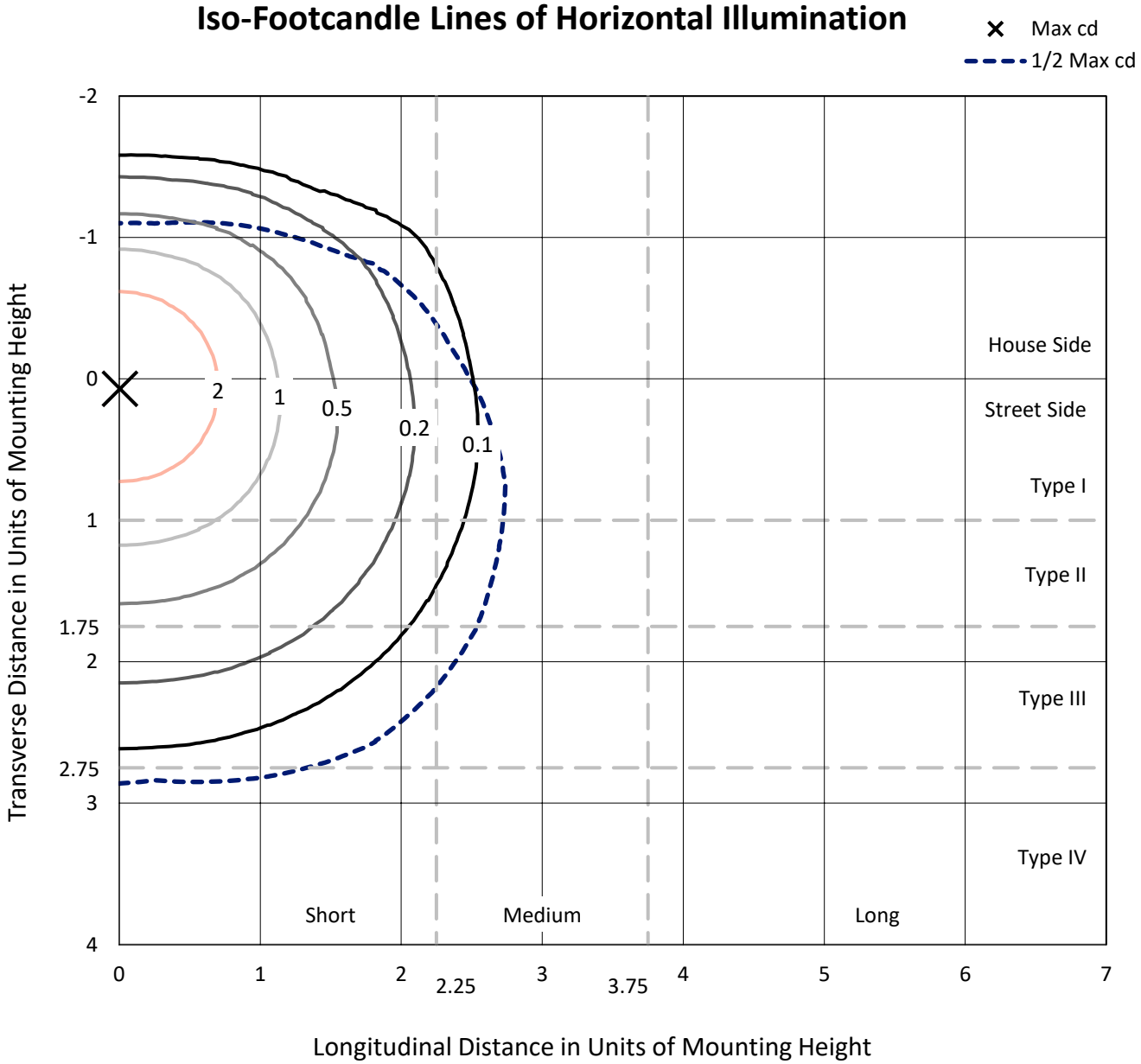
| | |
|---|---|
| Input Watts (W): | 28 |
| Input Voltage (V): | NR |
| Input Current (Ain): | NR |
| Voltage Rise (V): | NR |
| Power Factor: | NR |
| Total Harmonic Distortion (THDi): | NR |
| Frequency (hertz): | 60 |
| Stabilization Time: | NR |
| Operation Time: | NR |
| Ambient Temperature (°C):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

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## Iso-Footcandle Lines of Horizontal Illumination



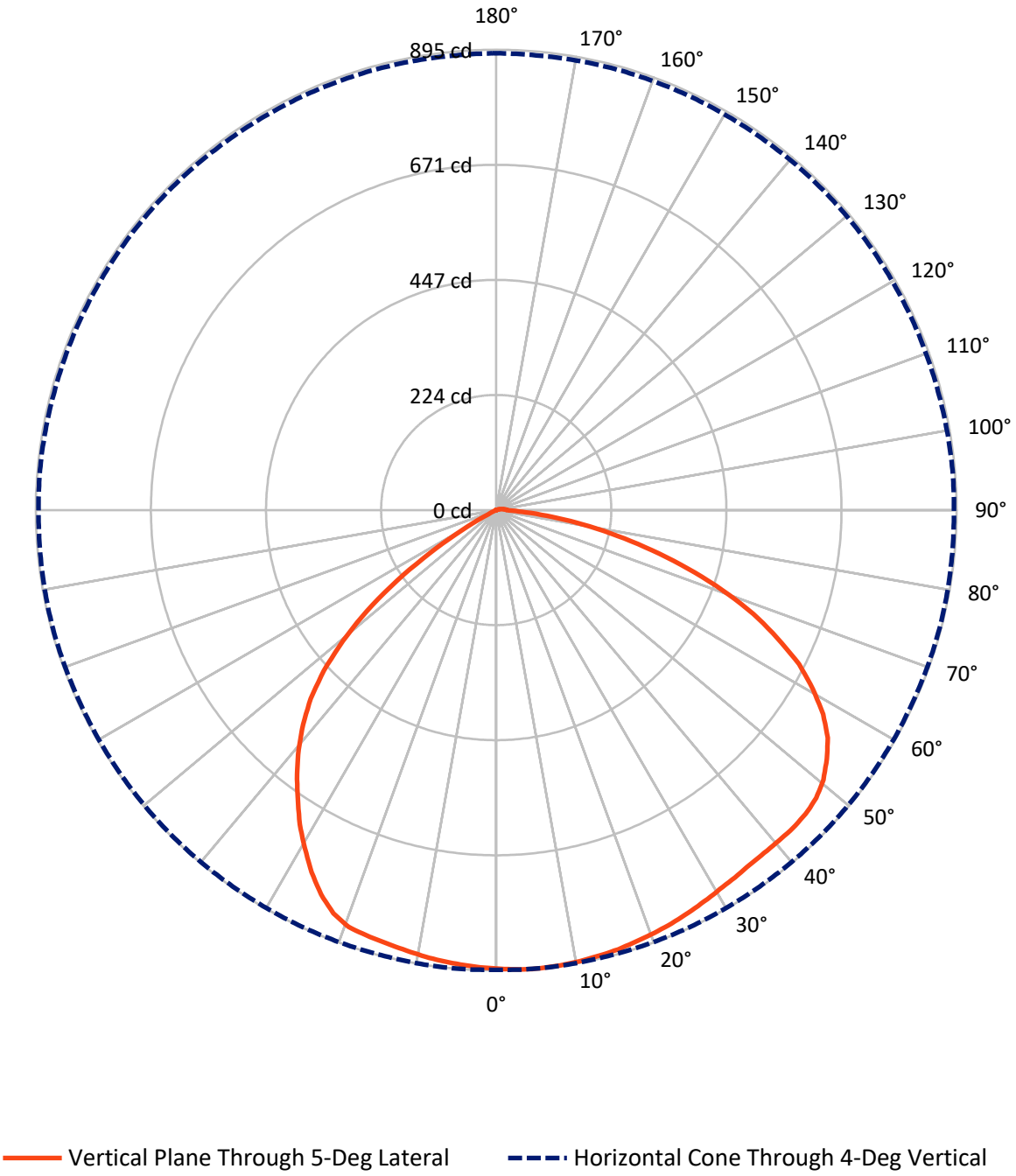

Based on 15 foot mounting height. Maximum calculated value = 4 fc
Type IV - Short - N/A

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## Luminous Intensity Polar Plot



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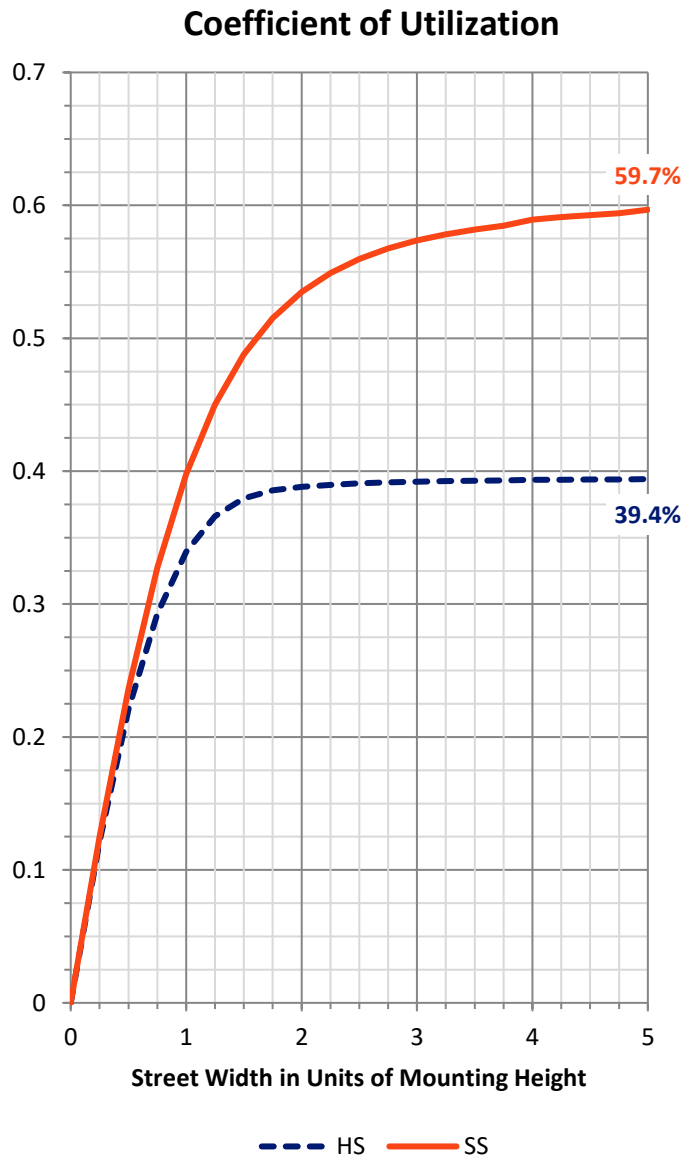
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CATALOG NUMBER: TT-D1-735-12VDC-CQ-HSS

**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 1213.4 | 1.6 | 1215.1 |
| | % Fixture | 39.6 | 0.1 | 39.7 |
| **Street Side** | Lumens | 1838.5 | 8.6 | 1847.0 |
| | % Fixture | 60.0 | 0.3 | 60.3 |
| **Total** | Lumens | 3051.9 | 10.2 | 3062.1 |
| | % Fixture | 99.7 | 0.3 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 84.8 | 2.8 |
| 10°-20° | 248.2 | 8.1 |
| 20°-30° | 391.1 | 12.8 |
| 30°-40° | 497.7 | 16.3 |
| 40°-50° | 574.9 | 18.8 |
| 50°-60° | 562.9 | 18.4 |
| 60°-70° | 419.2 | 13.7 |
| 70°-80° | 227.1 | 7.4 |
| 80°-90° | 46.0 | 1.5 |
| 90°-100° | 5.8 | 0.2 |
| 100°-110° | 2.3 | 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° | 3051.9 | 99.7 |
| 0°-180° | 3062.1 | 100.0 |



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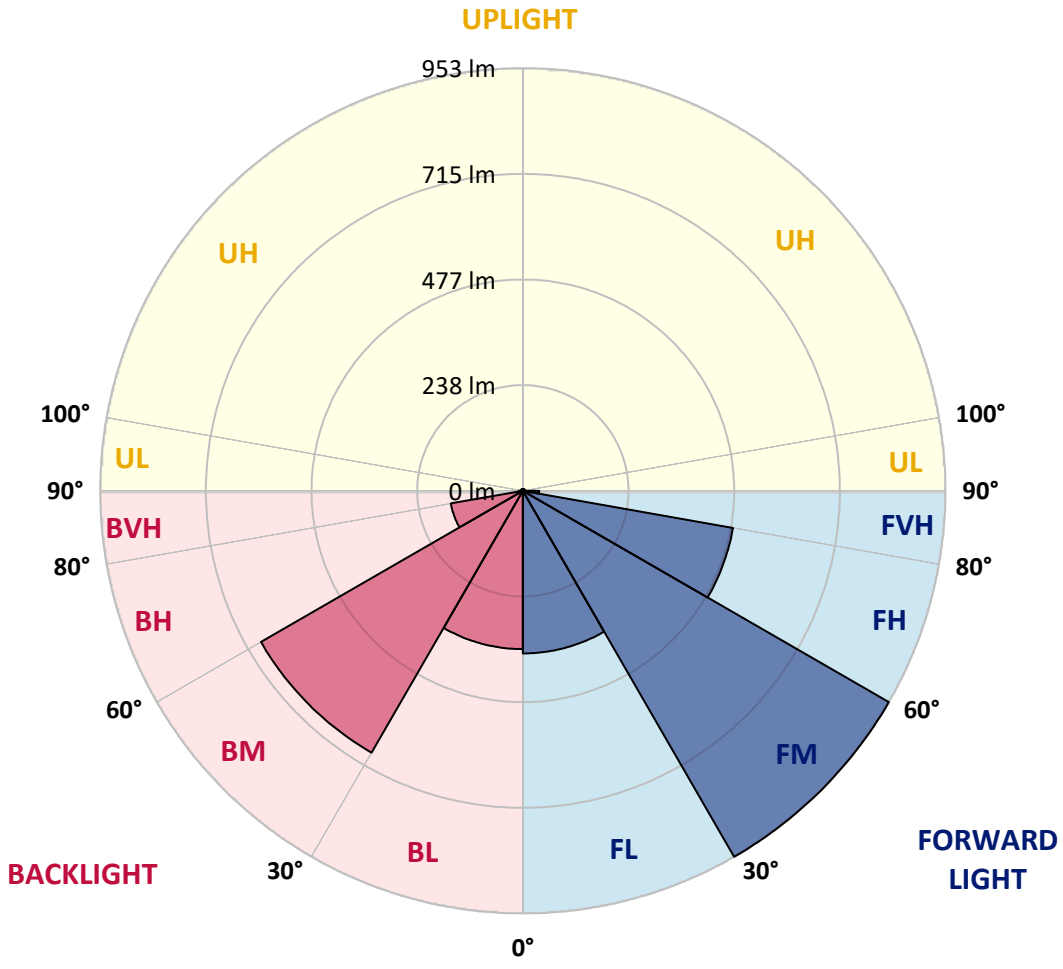
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## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 366.9 | 12.0 | | | |
| FM | (30°-60°) | 953.4 | 31.1 | | | |
| FH | (60°-80°) | 481.4 | 15.7 | | | G0/660 |
| FVH | (80°-90°) | 36.8 | 1.2 | | | G1/100 |
| BL | (0°-30°) | 357.1 | 11.7 | B1/500 | | |
| BM | (30°-60°) | 682.1 | 22.3 | B1/1000 | | |
| BH | (60°-80°) | 164.9 | 5.4 | B1/500 | | G1/500 |
| BVH | (80°-90°) | 9.3 | 0.3 | | | G0/10 |
| UL | (90°-100°) | 5.8 | 0.2 | | U1/10 | |
| UH | (100°-180°) | 4.4 | 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° | 891.8 | *891.8* | 891.8 | 891.8 | 891.8 | 891.8 | 891.8 | 891.8 | 891.8 | 891.8 | 891.8 |
| 2.5° | 893.0 | *894.1* | 893.6 | 893.6 | 892.4 | 893.0 | 892.4 | 892.4 | 891.8 | 891.3 | 891.3 |
| 4° | *893.6* | *894.7* | *893.6* | *893.6* | *893.0* | *893.0* | *892.4* | *891.3* | *891.8* | *890.1* | *889.5* |
| 5° | 894.1 | *894.7* | 894.1 | 894.1 | 893.0 | 892.4 | 891.3 | 891.3 | 890.7 | 889.5 | 889.5 |
| 7.5° | 893.0 | *893.6* | 893.6 | 893.0 | 891.8 | 890.7 | 890.1 | 889.5 | 889.0 | 887.2 | 887.2 |
| 10° | 890.7 | *891.8* | 890.7 | 890.7 | 890.1 | 889.0 | 887.2 | 886.6 | 884.9 | 883.8 | 883.2 |
| 12.5° | 888.4 | *889.0* | 888.4 | 888.4 | 887.2 | 885.5 | 884.9 | 883.8 | 881.5 | 879.7 | 879.7 |
| 15° | 884.9 | *886.1* | 885.5 | 884.9 | 884.3 | 882.6 | 880.9 | 879.2 | 877.4 | 875.7 | 875.7 |
| 17.5° | 880.9 | *881.5* | 882.0 | 881.5 | 880.3 | 879.2 | 877.4 | 875.1 | 873.4 | 871.7 | 871.1 |
| 20° | 876.3 | *877.4* | 877.4 | 877.4 | 876.3 | 875.1 | 872.8 | 870.5 | 869.4 | 867.1 | 866.5 |
| 22.5° | 871.7 | *872.8* | 872.3 | 872.8 | 872.3 | 870.5 | 868.2 | 865.9 | 863.6 | 861.9 | 860.7 |
| 25° | 867.1 | *867.1* | 867.1 | 867.1 | 867.1 | 864.8 | 862.5 | 859.6 | 857.3 | 854.4 | 854.4 |
| 27.5° | 861.3 | *861.3* | 861.9 | 861.9 | 861.3 | 859.6 | 856.7 | 853.3 | 849.8 | 846.9 | 845.8 |
| 30° | 856.1 | *855.6* | 856.7 | 857.9 | 857.3 | 855.6 | 852.1 | 848.1 | 842.9 | 838.9 | 835.4 |
| 32.5° | 849.8 | *851.5* | 852.7 | 855.0 | 855.6 | 853.3 | 849.2 | 844.0 | 838.9 | 831.4 | 825.0 |
| 35° | 847.5 | *847.5* | 850.4 | 853.8 | 855.0 | 853.8 | 848.1 | 842.3 | 834.8 | 823.9 | 816.4 |
| 37.5° | 845.2 | *845.8* | 850.4 | 855.6 | 857.3 | 857.3 | 851.0 | 843.5 | 833.1 | 817.6 | 808.3 |
| 40° | 844.0 | *845.2* | 851.0 | 858.4 | 863.0 | 862.5 | 855.0 | 845.8 | 833.1 | 813.0 | 801.4 |
| 42.5° | 842.9 | *845.2* | 851.5 | 861.9 | 868.8 | 868.2 | 860.2 | 848.1 | 832.0 | 807.2 | 794.0 |
| 45° | 841.2 | *842.9* | 851.5 | 864.8 | 874.0 | 875.7 | 866.5 | 851.0 | 832.0 | 802.0 | 784.7 |
| 47.5° | 836.0 | *836.6* | 848.1 | 863.6 | 877.4 | 879.7 | 870.5 | 852.1 | 829.6 | 793.4 | 773.2 |
| 50° | 822.2 | *823.9* | 837.1 | 857.9 | 874.0 | 877.4 | 869.4 | 849.2 | 823.9 | 779.0 | 754.8 |
| 52.5° | 804.3 | *804.3* | 820.4 | 843.5 | 863.0 | 868.8 | 861.3 | 838.9 | 809.5 | 757.7 | 730.0 |
| 55° | 777.8 | *781.9* | 798.6 | 822.7 | 844.0 | 852.1 | 841.7 | 819.9 | 785.9 | 730.6 | 700.1 |
| 57.5° | 747.9 | *749.0* | 766.3 | 795.1 | 817.0 | 822.2 | 813.5 | 787.6 | 754.8 | 698.4 | 662.1 |
| 60° | 704.7 | *707.0* | 728.9 | 754.2 | 777.8 | 784.7 | 773.8 | 747.9 | 713.3 | 656.9 | 620.1 |
| 62.5° | 656.9 | *660.4* | 680.0 | 705.9 | 728.3 | 739.3 | 726.0 | 699.0 | 665.0 | 607.4 | 575.2 |
| 65° | 599.4 | *600.5* | 621.8 | 651.2 | 673.6 | 677.7 | 666.1 | 639.7 | 605.7 | 550.4 | 521.6 |
| 67.5° | 533.1 | *538.9* | 559.6 | 581.5 | 601.1 | 605.7 | 597.6 | 567.1 | 540.0 | 491.1 | 462.9 |
| 70° | 469.2 | *466.4* | 483.6 | 505.5 | 523.4 | 527.4 | 518.2 | 490.0 | 464.6 | 418.6 | 396.7 |
| 72.5° | 392.1 | *389.8* | 408.2 | 424.9 | 442.2 | 439.9 | 430.7 | 408.2 | 386.3 | 347.2 | 327.0 |
| 75° | 314.4 | *312.1* | 326.4 | 340.8 | 349.5 | 350.6 | 344.3 | 327.6 | 304.0 | 273.5 | 257.9 |
| 77.5° | 238.4 | *240.7* | 247.0 | 259.1 | 267.1 | 270.6 | 259.7 | 243.0 | 228.0 | 204.4 | 192.9 |
| 80° | 169.8 | *170.4* | 172.7 | 181.4 | 187.1 | 187.1 | 181.9 | 168.7 | 152.0 | 135.3 | 129.5 |
| 82.5° | 107.1 | *109.4* | 109.4 | 118.0 | 118.0 | 113.4 | 111.1 | 102.5 | 93.8 | 80.6 | 72.5 |
| 85° | 58.7 | *57.6* | 61.0 | 61.6 | 61.0 | 57.6 | 54.1 | 48.9 | 43.2 | 34.0 | 30.5 |
| 87.5° | 25.9 | *25.3* | 25.3 | 25.3 | 24.8 | 22.5 | 19.0 | 15.0 | 10.4 | 6.3 | 4.6 |
| 90° | 20.2 | *20.2* | 19.6 | 18.4 | 16.7 | 15.0 | 12.1 | 9.2 | 5.8 | 2.3 | 1.2 |
| 92.5° | 18.4 | *18.4* | 17.8 | 17.3 | 15.5 | 13.8 | 10.9 | 8.1 | 5.2 | 2.3 | 1.2 |
| 95° | 16.1 | *15.5* | 15.5 | 14.4 | 13.2 | 11.5 | 9.8 | 6.9 | 4.6 | 1.7 | 1.2 |
| 97.5° | 13.2 | *12.7* | 12.7 | 12.1 | 10.9 | 9.2 | 8.1 | 5.8 | 4.0 | 1.7 | 1.2 |
| 100° | 9.8 | *10.4* | 9.8 | 9.2 | 8.6 | 7.5 | 6.3 | 4.6 | 2.9 | 1.2 | 1.2 |
| 102.5° | 7.5 | *7.5* | 6.9 | 6.9 | 6.3 | 5.8 | 4.6 | 3.5 | 2.3 | 1.2 | 0.6 |
| 105° | 5.2 | *5.2* | 5.2 | 4.6 | 4.6 | 4.0 | 3.5 | 2.3 | 1.7 | 1.2 | 0.6 |
| 107.5° | 2.9 | *2.9* | 2.9 | 2.9 | 2.9 | 2.9 | 2.3 | 1.7 | 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° | 1.7 | *1.7* | 1.7 | 1.7 | 1.7 | 1.7 | 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° | 891.8 | 891.8 | 891.8 | 891.8 | 891.8 | 891.8 | 891.8 | 891.8 | 891.8 | 891.8 |
| 2.5° | 890.7 | 889.0 | 890.1 | 889.5 | 890.1 | 889.0 | 889.0 | 889.0 | 889.5 | 888.4 |
| 4° | *890.1* | *889.0* | *889.0* | *889.0* | *889.0* | *887.8* | *887.8* | *887.8* | *887.2* | *887.8* |
| 5° | 889.0 | 888.4 | 887.8 | 887.2 | 887.8 | 886.6 | 886.1 | 886.1 | 886.1 | 886.6 |
| 7.5° | 886.6 | 884.9 | 884.9 | 883.2 | 883.8 | 883.2 | 882.6 | 883.2 | 882.6 | 882.6 |
| 10° | 882.6 | 881.5 | 880.9 | 879.7 | 879.7 | 878.6 | 878.0 | 878.0 | 878.0 | 877.4 |
| 12.5° | 878.6 | 877.4 | 876.9 | 875.7 | 875.1 | 874.0 | 873.4 | 874.0 | 872.8 | 872.8 |
| 15° | 874.0 | 872.8 | 872.3 | 872.3 | 871.1 | 870.0 | 869.4 | 868.2 | 868.2 | 868.2 |
| 17.5° | 870.0 | 868.8 | 869.4 | 868.2 | 867.6 | 866.5 | 866.5 | 864.2 | 864.2 | 863.6 |
| 20° | 865.9 | 864.8 | 864.8 | 864.2 | 864.2 | 863.0 | 861.3 | 860.2 | 859.6 | 859.6 |
| 22.5° | 860.7 | 859.0 | 856.1 | 852.1 | 849.8 | 848.1 | 847.5 | 845.8 | 845.2 | 844.0 |
| 25° | 852.7 | 848.1 | 841.7 | 834.8 | 827.9 | 824.5 | 823.3 | 821.0 | 821.0 | 821.0 |
| 27.5° | 842.9 | 834.3 | 825.6 | 815.3 | 804.9 | 798.0 | 793.4 | 791.1 | 789.9 | 789.9 |
| 30° | 830.2 | 819.3 | 807.2 | 794.0 | 782.4 | 769.8 | 761.7 | 757.1 | 754.8 | 755.4 |
| 32.5° | 818.7 | 804.9 | 791.1 | 774.4 | 758.8 | 743.9 | 730.0 | 723.1 | 720.3 | 719.1 |
| 35° | 807.2 | 791.6 | 775.0 | 757.1 | 737.0 | 715.1 | 696.7 | 686.3 | 680.5 | 681.1 |
| 37.5° | 798.6 | 780.1 | 761.7 | 739.8 | 716.8 | 690.3 | 666.7 | 650.0 | 643.1 | 644.3 |
| 40° | 789.3 | 768.6 | 748.5 | 723.1 | 696.1 | 664.4 | 633.9 | 611.4 | 603.4 | 601.7 |
| 42.5° | 780.7 | 756.5 | 733.5 | 706.4 | 672.5 | 636.8 | 599.4 | 572.9 | 560.8 | 559.0 |
| 45° | 769.8 | 742.7 | 718.0 | 686.9 | 649.4 | 605.1 | 561.4 | 526.8 | 514.1 | 509.0 |
| 47.5° | 755.4 | 725.4 | 697.8 | 662.1 | 621.2 | 571.1 | 516.4 | 473.8 | 457.7 | 453.7 |
| 50° | 734.1 | 699.5 | 671.3 | 631.0 | 581.5 | 526.2 | 465.2 | 412.8 | 391.5 | 388.6 |
| 52.5° | 705.9 | 670.7 | 639.1 | 593.0 | 532.6 | 467.5 | 398.4 | 344.3 | 319.5 | 317.8 |
| 55° | 671.9 | 633.9 | 599.4 | 547.5 | 476.7 | 401.3 | 329.3 | 260.8 | 236.6 | 233.8 |
| 57.5° | 632.2 | 593.0 | 555.6 | 491.7 | 409.9 | 325.9 | 242.4 | 176.8 | 153.7 | 148.0 |
| 60° | 588.4 | 548.1 | 506.1 | 428.4 | 320.1 | 230.9 | 146.8 | 93.8 | 76.6 | 70.8 |
| 62.5° | 545.8 | 502.0 | 457.7 | 352.9 | 219.4 | 131.8 | 66.8 | 27.1 | 17.3 | 16.7 |
| 65° | 495.7 | 454.3 | 408.8 | 284.4 | 138.8 | 59.3 | 19.6 | 0.6 | 0.0 | 0.0 |
| 67.5° | 437.6 | 402.4 | 362.1 | 254.5 | 122.6 | 51.8 | 16.7 | 0.6 | 0.0 | 0.0 |
| 70° | 375.4 | 347.8 | 312.1 | 218.8 | 105.4 | 43.8 | 14.4 | 0.0 | 0.0 | 0.0 |
| 72.5° | 309.8 | 286.1 | 259.7 | 181.9 | 87.5 | 36.3 | 11.5 | 0.0 | 0.0 | 0.0 |
| 75° | 243.0 | 228.0 | 204.4 | 143.9 | 67.9 | 27.6 | 8.6 | 0.0 | 0.0 | 0.0 |
| 77.5° | 180.2 | 168.1 | 150.8 | 105.9 | 51.2 | 20.2 | 6.3 | 0.0 | 0.0 | 0.0 |
| 80° | 121.5 | 112.3 | 102.5 | 72.0 | 34.5 | 13.2 | 4.0 | 0.0 | 0.0 | 0.0 |
| 82.5° | 70.8 | 63.9 | 57.6 | 40.9 | 19.0 | 7.5 | 1.7 | 0.0 | 0.0 | 0.0 |
| 85° | 28.8 | 26.5 | 25.3 | 17.3 | 7.5 | 2.3 | 0.6 | 0.0 | 0.0 | 0.0 |
| 87.5° | 3.5 | 2.9 | 2.9 | 1.7 | 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: P821470
CATALOG NUMBER: TT-D1-735-12VDC-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: SP1-2407-176-4

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

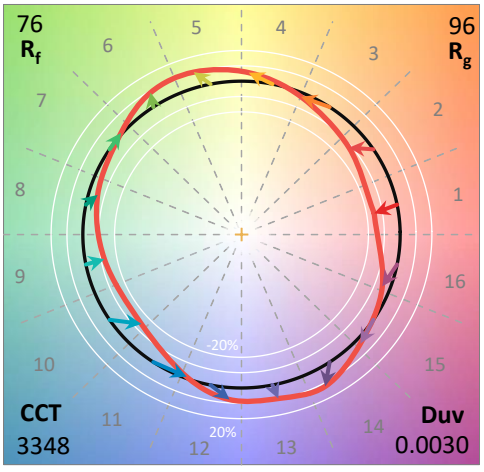
## Test Information

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

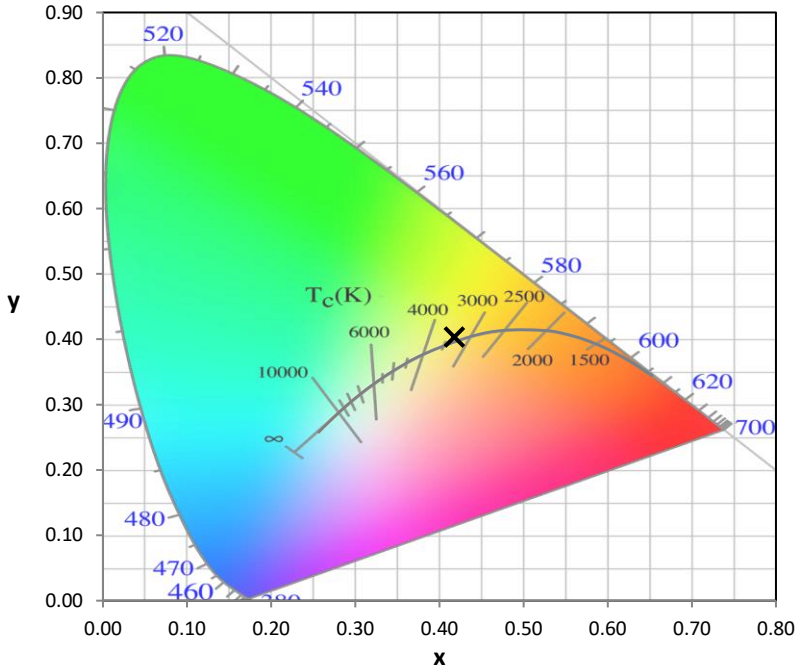
| | |
|---|---|
| Stabilization Time: | 30M |
| Operation Time: | 1H 30M |
| Sphere Temperature (°C): | 25.2 |

REPORT NUMBER: SP1-2407-176-4

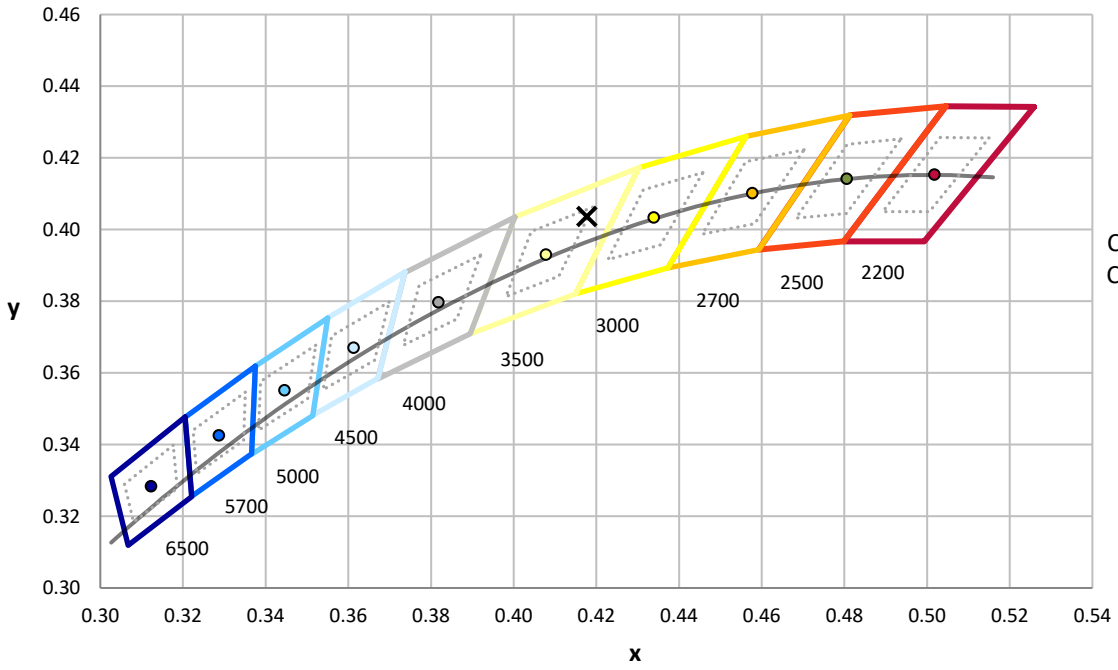
| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 6/18/2024 | 12/18/2024 |
| Power Meter | INXT2011004 | 2/8/2024 | 2/8/2025 |
| AC Power Source | IN0063 | 10/24/2023 | 10/24/2024 |
| DC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

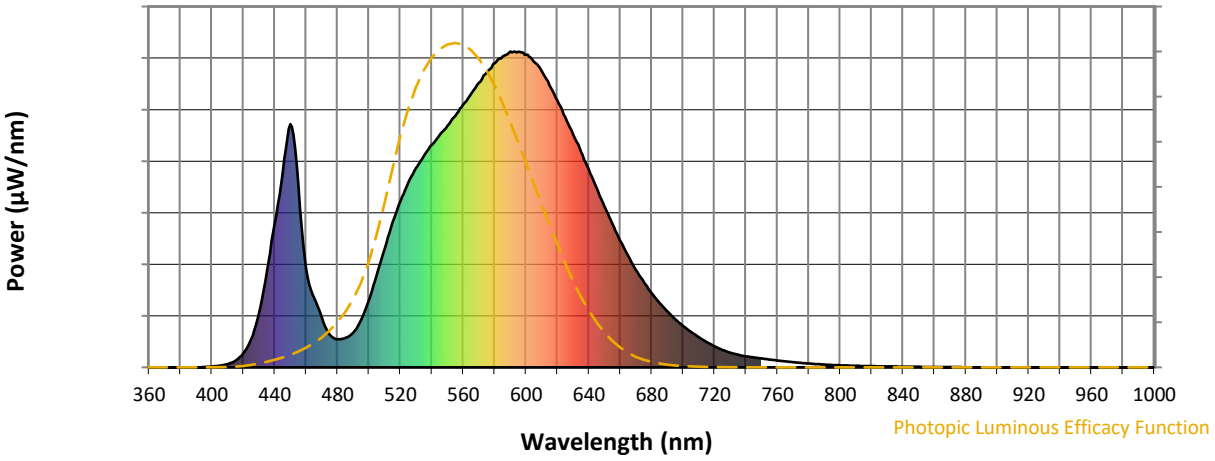



CCT = 3348K
CIE x = 0.4177
CIE y = 0.4036
Duv = 0.0030

Point lies inside the ANSI 3500K 4-step quadrangle

REPORT NUMBER: SP1-2407-176-4

## Photopic Flux vs. Wavelength

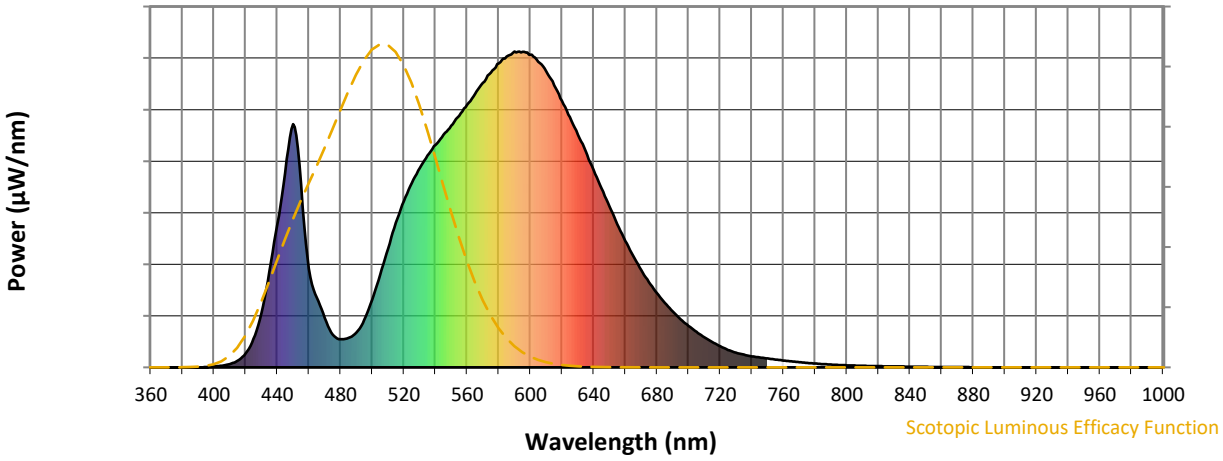



## Photopic Lumens: NR

| 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

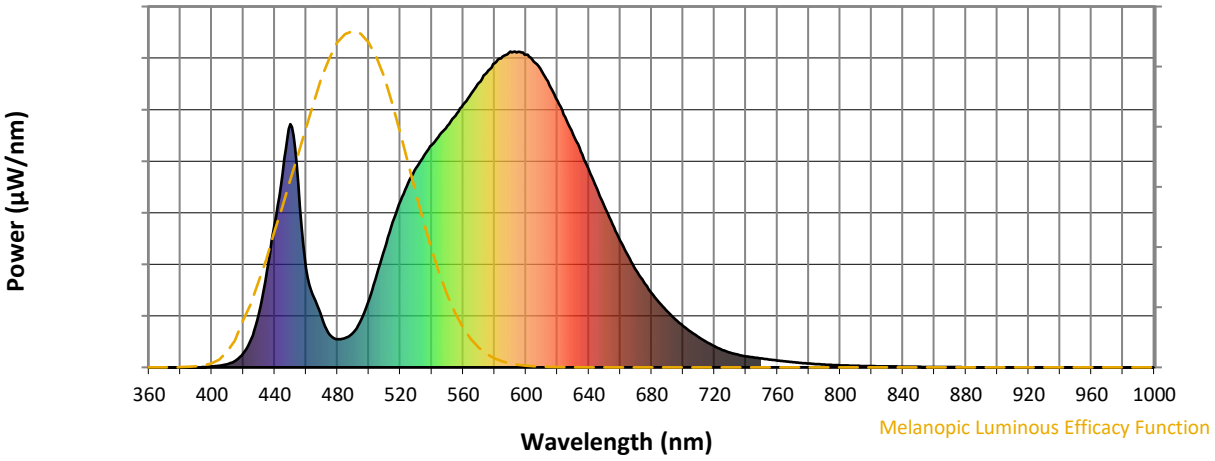



**Scotopic Lumens: NR** **S/P: 1.31**

| 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 | | | |

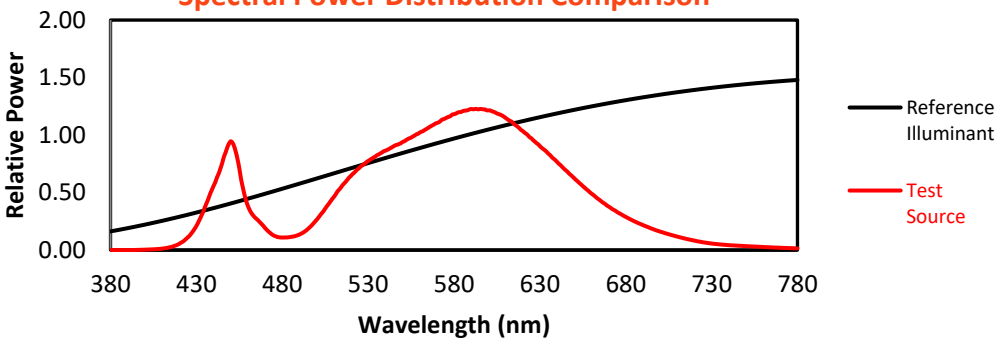
REPORT NUMBER: SP1-2407-176-4

# TM-30-18

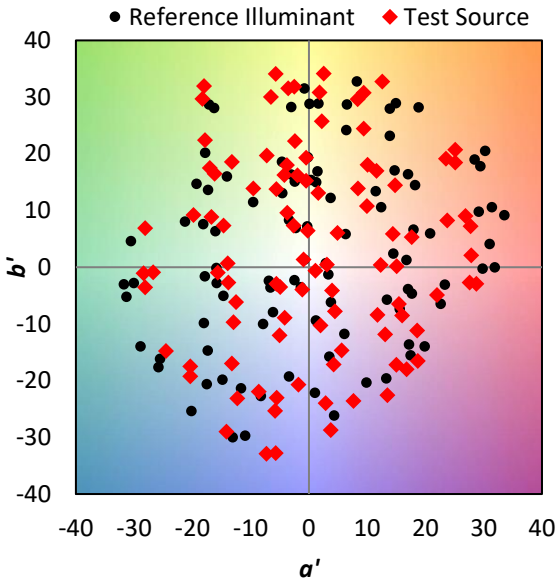
## Summary

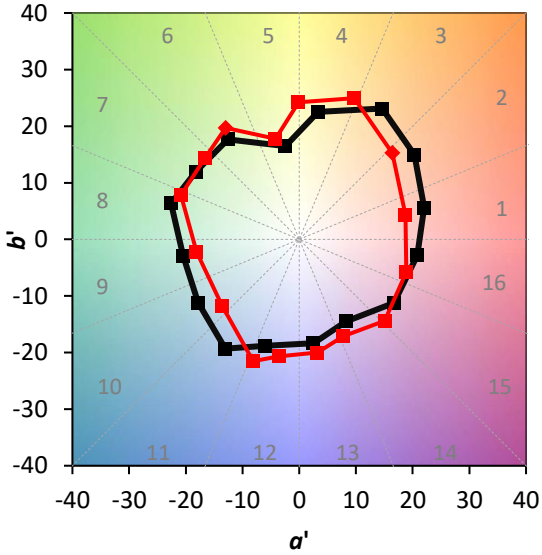
$R_f$ = 75.8
$R_g$ = 95.8
CIE $R_a$ = 73.4
$R_9$ = -19.2

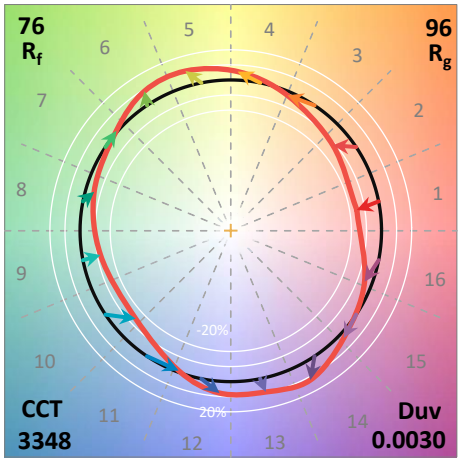
## Spectral Power Distribution Comparison

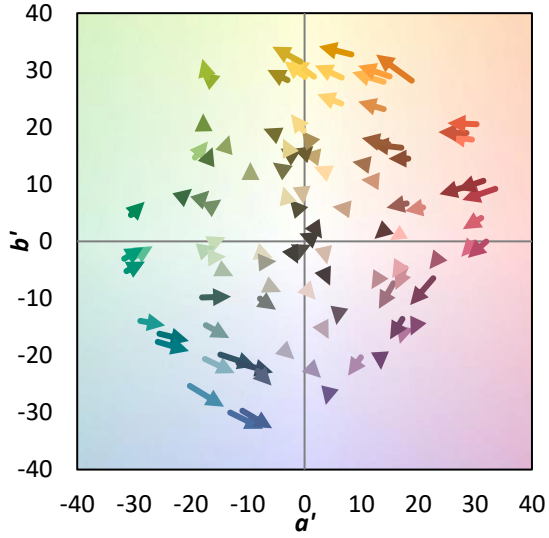



## Color Vector Graphics



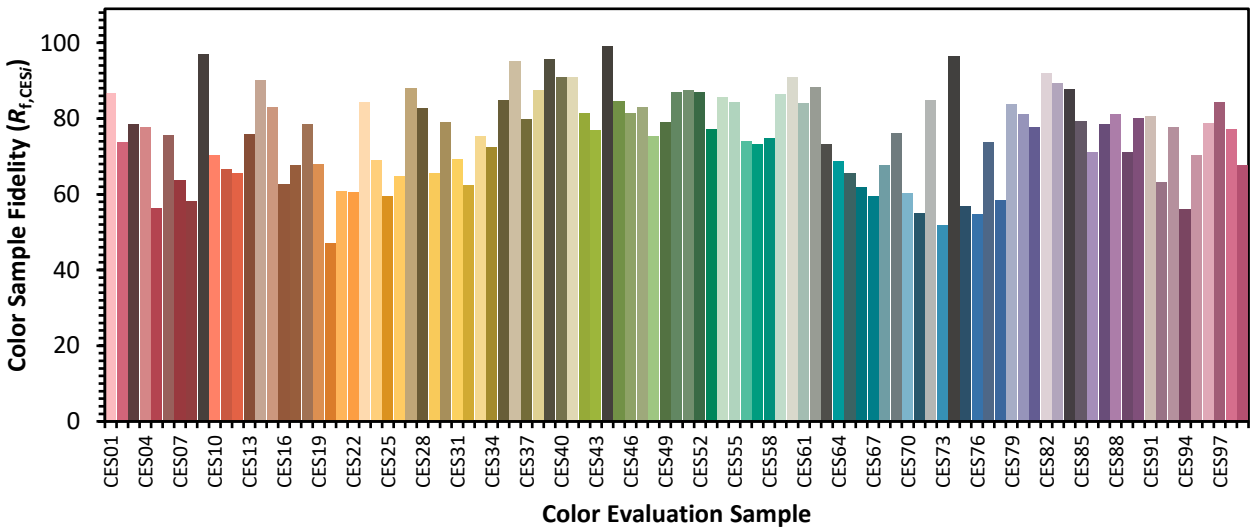



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## Individual Sample Fidelity Index ($R_{f,i}$)

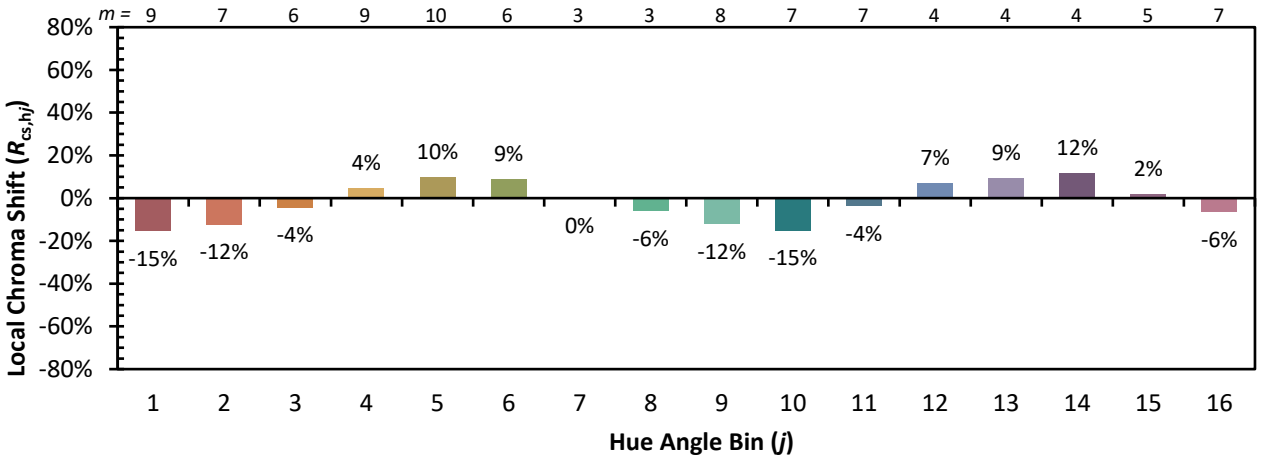
| | | | |
|---|---|---|---|
| CES01 = 86 | CES26 = 65 | CES51 = 88 | CES76 = 55 |
| CES02 = 62 | CES27 = 88 | CES52 = 87 | CES77 = 74 |
| CES03 = 31 | CES28 = 83 | CES53 = 77 | CES78 = 58 |
| CES04 = 70 | CES29 = 66 | CES54 = 86 | CES79 = 84 |
| CES05 = 48 | CES30 = 79 | CES55 = 84 | CES80 = 81 |
| CES06 = 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 | |

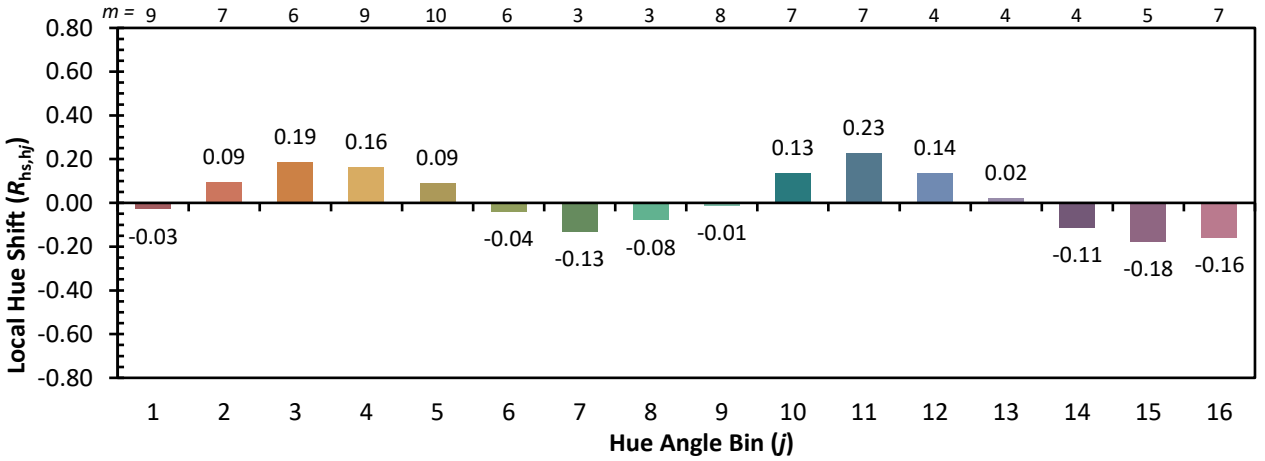


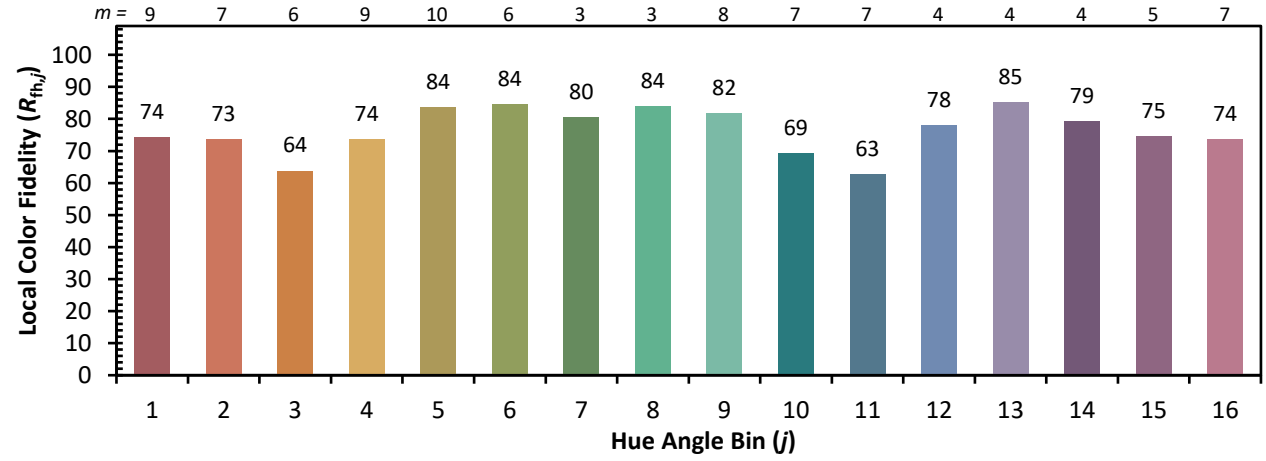
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## Color Rendition by Hue-Angle Bin



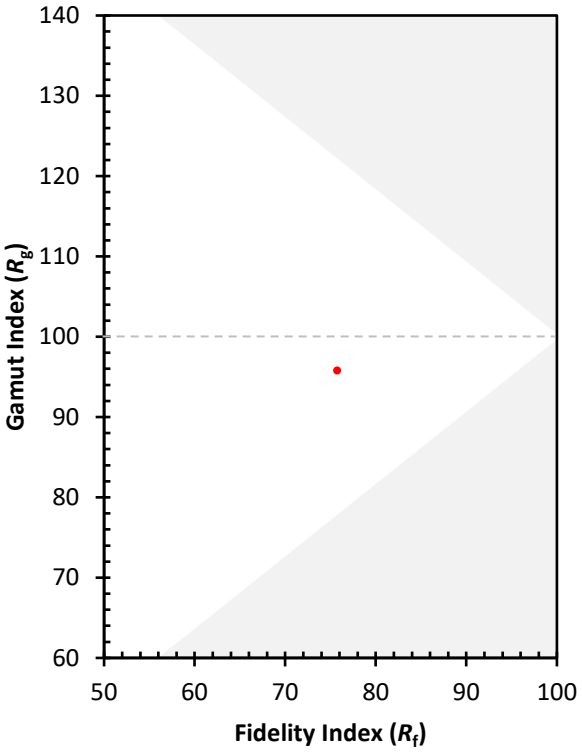



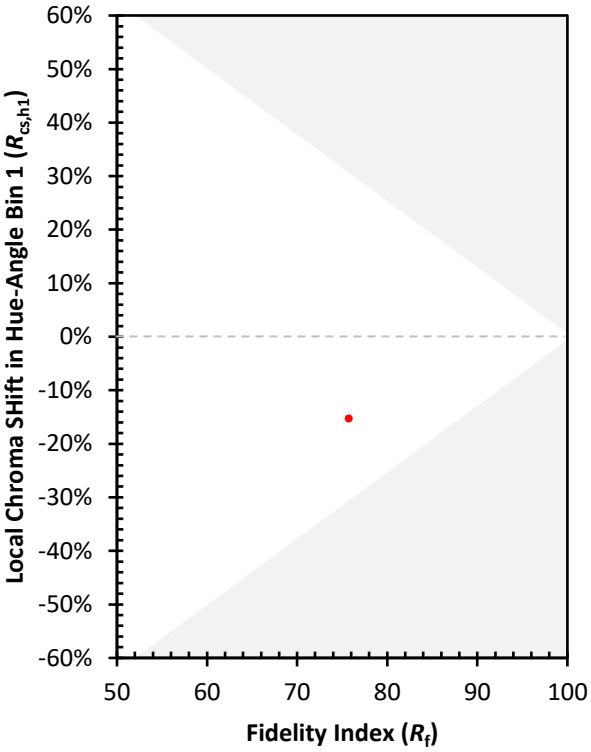



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## Measure Comparisons




(END OF REPORT)