

Signify Classified - Internal  
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: STREETWORKS

Report Number: P856329

Luminaire Tested: **FFX-CLB-70-722-U-VM8**

Issue Date: 07/16/2024



**Test Information**

Test Method: LM-79-08  
Report Number: P856329  
Test Lab: INNOVATION CENTER(G3)  
Issue Date: 07/16/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: STREETWORKS  
Catalog Number: FFX-CLB-70-722-U-VM8  
Description: FAIRFAX POST TOP FIXTURE w/ ULA ACORN 8 INCH NECK  
Light Source: (6) 2200K CCT, 70 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

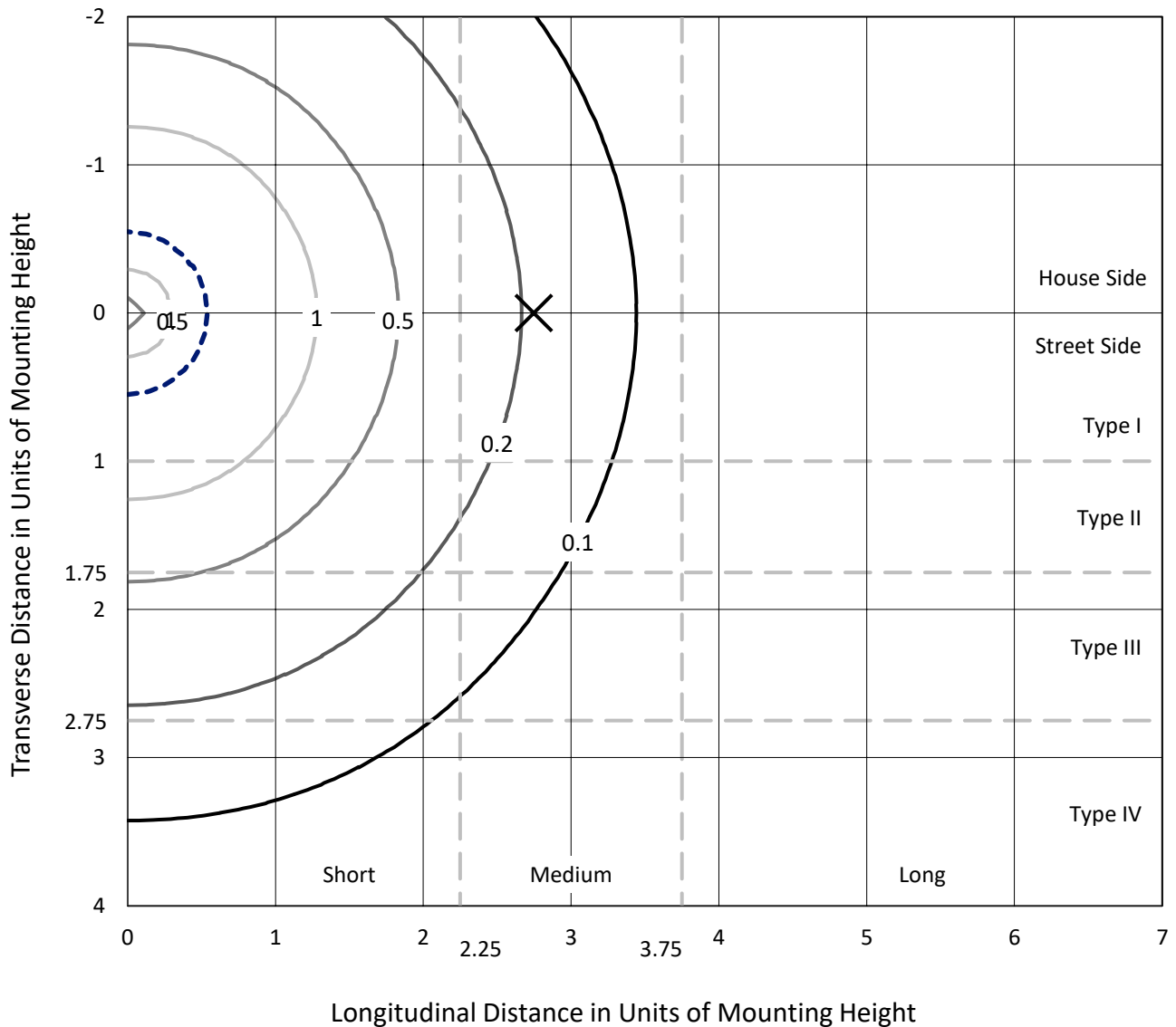
**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 9575.5 lumens  
Efficiency: N/A  
Efficacy: 136.2 lumens/watt  
Luminous Opening: Vertical Cylinder (Dia: 1.33' x H: 2.08')  
IES Classification: Type V - Short  
BUG Rating: B3 - U5 - G4  
  
Input Watts (W): 70.3  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.99  
Total Harmonic Distortion (THDi): 7.1%%  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT

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 CATALOG NUMBER: FFX-CLB-70-722-U-VM8

### Iso-Footcandle Lines of Horizontal Illumination

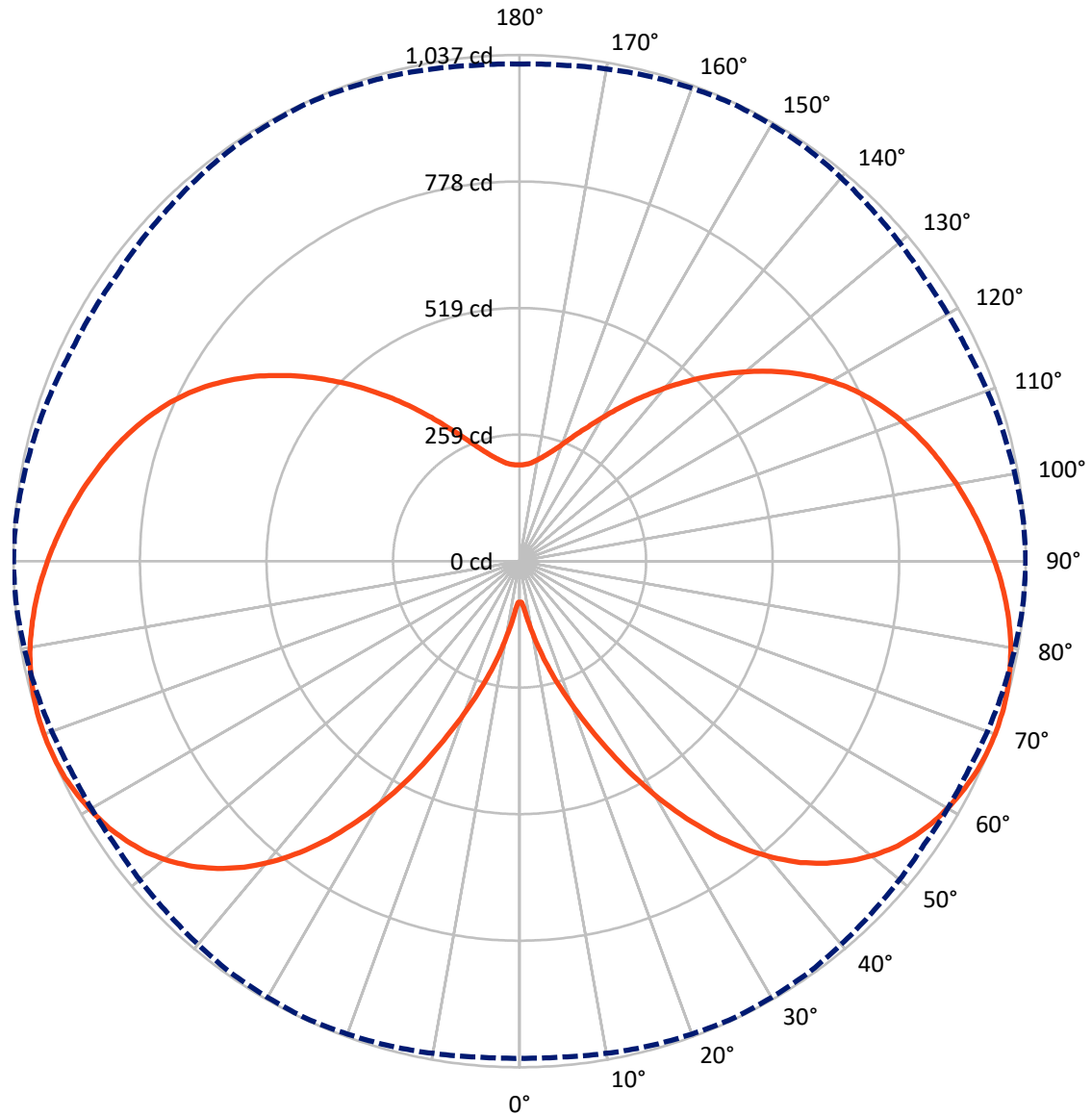
× Max cd  
 - - - 1/2 Max cd



Based on 15 foot mounting height. Maximum calculated value = 1.7 fc  
 Type V - Short - N/A

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### Luminous Intensity Polar Plot



— Vertical Plane Through 90-Deg Lateral    - - - Horizontal Cone Through 70-Deg Vertical

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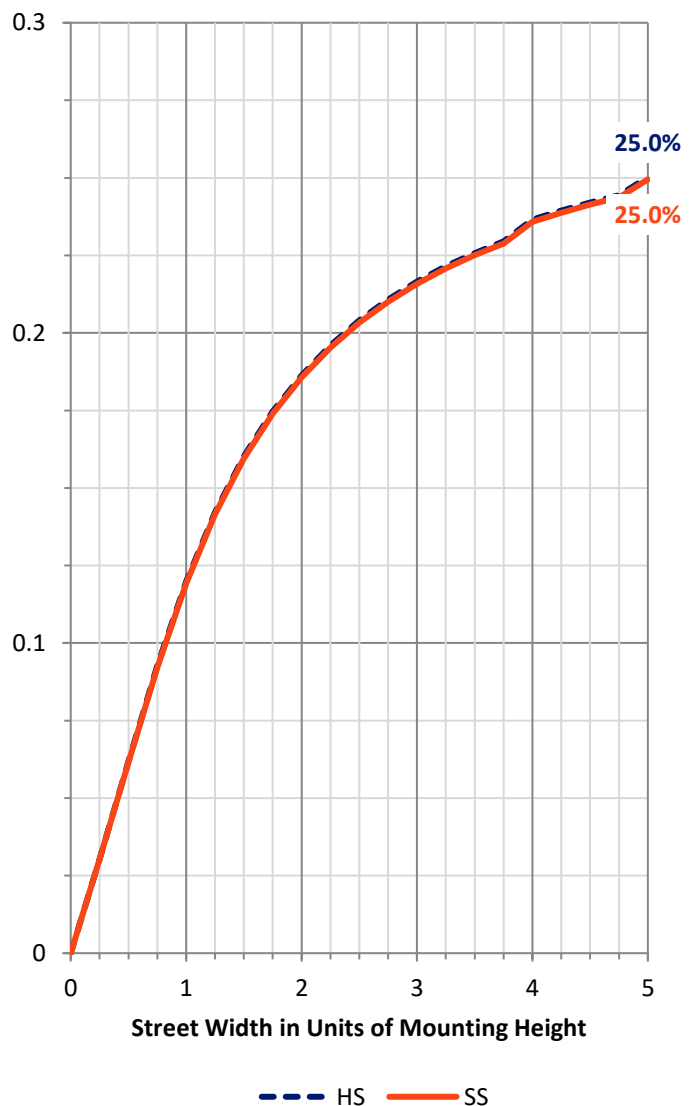
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 2711.7   | 2076.0 | 4787.7 |
|                    | % Fixture | 28.3     | 21.7   | 50.0   |
| <b>Street Side</b> | Lumens    | 2711.7   | 2076.0 | 4787.7 |
|                    | % Fixture | 28.3     | 21.7   | 50.0   |
| <b>Total</b>       | Lumens    | 5423.4   | 4152.1 | 9575.5 |
|                    | % Fixture | 56.6     | 43.4   | 100.0  |

**Coefficient of Utilization**

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 11.3   | 0.1       |
| 10°-20°   | 68.5   | 0.7       |
| 20°-30°   | 204.5  | 2.1       |
| 30°-40°   | 427.7  | 4.5       |
| 40°-50°   | 671.2  | 7.0       |
| 50°-60°   | 871.3  | 9.1       |
| 60°-70°   | 1008.6 | 10.5      |
| 70°-80°   | 1079.7 | 11.3      |
| 80°-90°   | 1080.6 | 11.3      |
| 90°-100°  | 1019.1 | 10.6      |
| 100°-110° | 911.8  | 9.5       |
| 110°-120° | 766.7  | 8.0       |
| 120°-130° | 588.1  | 6.1       |
| 130°-140° | 402.4  | 4.2       |
| 140°-150° | 245.5  | 2.6       |
| 150°-160° | 134.2  | 1.4       |
| 160°-170° | 65.1   | 0.7       |
| 170°-180° | 19.4   | 0.2       |
| 0°-90°    | 5423.4 | 56.6      |
| 0°-180°   | 9575.5 | 100.0     |

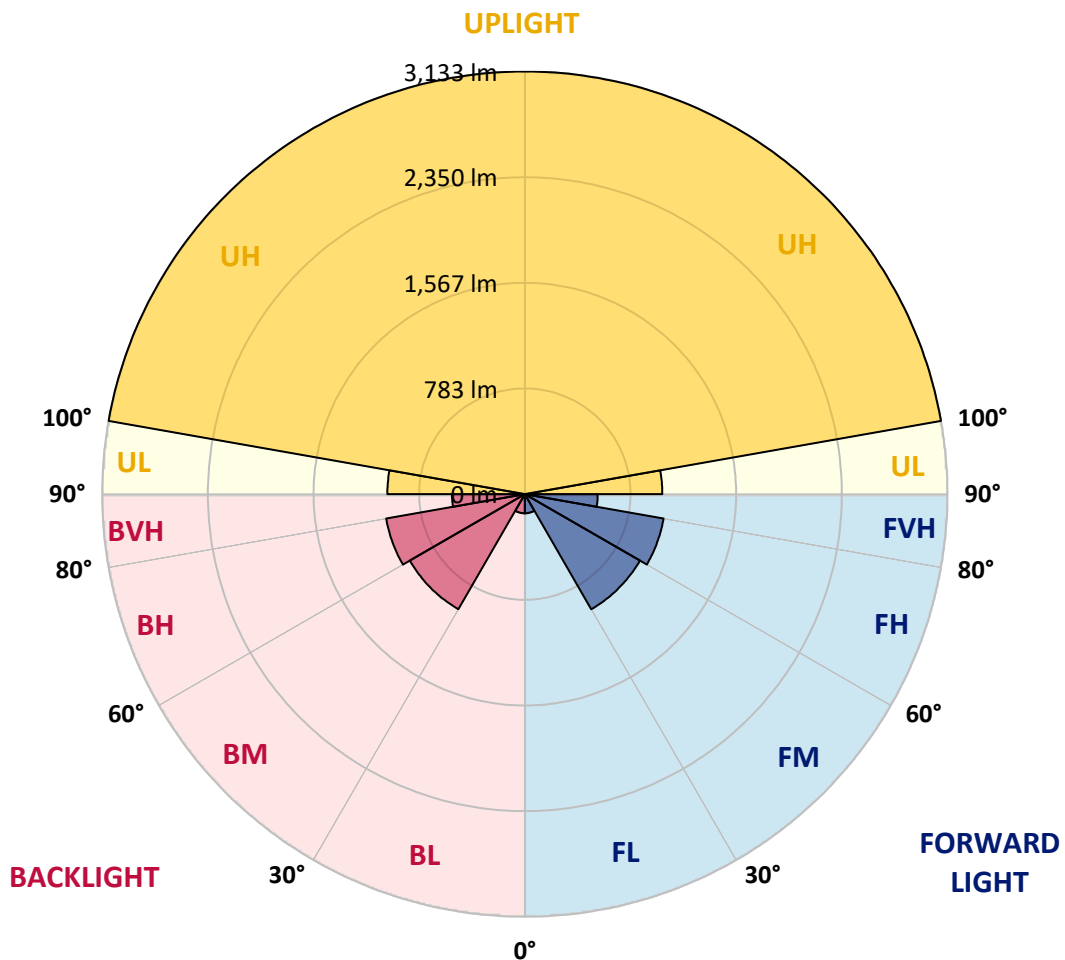


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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |    |         |
|----------------|--------|-----------|-------------------------|----|---------|
|                |        |           | B                       | U  | G       |
| FL (0°-30°)    | 142.2  | 1.5       |                         |    |         |
| FM (30°-60°)   | 985.1  | 10.3      |                         |    |         |
| FH (60°-80°)   | 1044.1 | 10.9      |                         |    | G1/1800 |
| FVH (80°-90°)  | 540.3  | 5.6       |                         |    | G4/750  |
| BL (0°-30°)    | 142.2  | 1.5       | B1/500                  |    |         |
| BM (30°-60°)   | 985.1  | 10.3      | B1/1000                 |    |         |
| BH (60°-80°)   | 1044.1 | 10.9      | B3/2500                 |    | G1/1800 |
| BVH (80°-90°)  | 540.3  | 5.6       |                         |    | G4/750  |
| UL (90°-100°)  | 1019.1 | 10.6      |                         | U5 |         |
| UH (100°-180°) | 3133.0 | 32.7      |                         | U5 |         |

**BUG Rating: B3-U5-G4**  
 Type V Short





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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 75°    | 85°    | 90°    |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°     | 84.1   | 84.1   | 84.1   | 84.1   | 84.1   | 84.1   | 84.1   | 84.1   | 84.1   | 84.1   | 84.1   |
| 2.5°   | 87.8   | 87.8   | 87.1   | 87.1   | 86.5   | 85.9   | 85.9   | 85.9   | 85.3   | 85.3   | 84.7   |
| 5°     | 100.0  | 99.4   | 99.4   | 98.8   | 99.4   | 98.8   | 98.8   | 98.8   | 98.8   | 97.6   | 97.6   |
| 7.5°   | 124.0  | 123.3  | 123.3  | 122.7  | 124.0  | 122.7  | 122.7  | 123.3  | 123.3  | 122.7  | 122.7  |
| 10°    | 155.3  | 154.6  | 154.6  | 153.4  | 154.6  | 154.0  | 154.0  | 152.8  | 153.4  | 152.8  | 153.4  |
| 12.5°  | 192.7  | 190.9  | 190.9  | 190.2  | 191.5  | 190.9  | 190.2  | 189.0  | 190.2  | 189.6  | 189.6  |
| 15°    | 231.4  | 232.0  | 231.4  | 230.7  | 232.0  | 232.0  | 231.4  | 230.1  | 231.4  | 230.1  | 230.7  |
| 17.5°  | 274.3  | 274.3  | 274.3  | 272.5  | 274.3  | 274.9  | 274.3  | 273.1  | 273.7  | 274.3  | 274.3  |
| 20°    | 321.0  | 321.0  | 321.6  | 320.3  | 323.4  | 321.6  | 321.0  | 320.3  | 321.0  | 321.6  | 322.2  |
| 22.5°  | 372.5  | 372.5  | 373.1  | 372.5  | 374.3  | 374.3  | 373.7  | 373.7  | 374.3  | 375.6  | 375.6  |
| 25°    | 429.6  | 430.2  | 430.2  | 428.3  | 432.6  | 433.9  | 432.6  | 432.6  | 433.9  | 435.7  | 435.7  |
| 27.5°  | 488.5  | 490.9  | 489.7  | 489.7  | 495.2  | 495.9  | 495.2  | 495.9  | 497.7  | 499.5  | 500.1  |
| 30°    | 549.2  | 551.1  | 553.5  | 551.7  | 557.8  | 558.4  | 559.1  | 559.7  | 562.1  | 565.2  | 565.2  |
| 32.5°  | 610.0  | 611.8  | 613.1  | 613.1  | 621.0  | 620.4  | 619.8  | 622.3  | 626.0  | 627.2  | 629.0  |
| 35°    | 670.8  | 670.8  | 672.0  | 672.6  | 680.6  | 680.0  | 681.2  | 683.0  | 686.7  | 689.2  | 690.4  |
| 37.5°  | 725.4  | 724.1  | 727.2  | 728.4  | 734.6  | 735.2  | 735.8  | 738.9  | 743.2  | 746.2  | 747.5  |
| 40°    | 775.1  | 773.8  | 777.5  | 779.4  | 784.9  | 784.9  | 786.1  | 789.8  | 794.7  | 797.8  | 798.4  |
| 42.5°  | 819.3  | 818.6  | 822.3  | 824.8  | 830.3  | 829.7  | 829.1  | 834.0  | 839.5  | 843.2  | 844.4  |
| 45°    | 857.3  | 856.7  | 861.6  | 864.7  | 869.0  | 867.7  | 867.7  | 872.0  | 878.2  | 882.5  | 883.1  |
| 47.5°  | 889.8  | 889.8  | 895.4  | 899.0  | 902.7  | 900.9  | 899.7  | 903.9  | 910.1  | 916.2  | 916.8  |
| 50°    | 918.7  | 918.1  | 924.2  | 928.5  | 931.6  | 929.1  | 927.3  | 931.6  | 938.3  | 944.5  | 945.7  |
| 52.5°  | 941.4  | 942.6  | 948.7  | 954.3  | 956.7  | 953.0  | 950.0  | 954.3  | 961.6  | 968.4  | 969.6  |
| 55°    | 961.0  | 961.6  | 968.4  | 975.1  | 976.4  | 971.5  | 967.8  | 971.5  | 979.4  | 986.8  | 988.0  |
| 57.5°  | 976.4  | 977.6  | 985.6  | 991.7  | 992.3  | 986.8  | 982.5  | 985.6  | 994.2  | 1001.5 | 1003.4 |
| 60°    | 989.9  | 991.1  | 998.5  | 1005.2 | 1005.8 | 999.1  | 993.5  | 996.0  | 1005.2 | 1013.8 | 1015.0 |
| 62.5°  | 1000.3 | 1002.1 | 1010.1 | 1016.3 | 1016.3 | 1008.3 | 1001.5 | 1004.0 | 1013.8 | 1023.0 | 1024.2 |
| 65°    | 1008.9 | 1010.7 | 1018.7 | 1024.8 | 1024.2 | 1015.0 | 1007.7 | 1010.1 | 1020.5 | 1029.8 | 1031.6 |
| 67.5°  | 1015.0 | 1016.3 | 1024.8 | 1031.0 | 1028.5 | 1018.7 | 1011.3 | 1013.2 | 1024.2 | 1033.4 | 1035.3 |
| 70°    | 1018.7 | 1019.9 | 1028.5 | 1034.0 | 1030.4 | 1019.9 | 1012.0 | 1014.4 | 1025.5 | 1035.3 | 1037.1 |
| 72.5°  | 1020.5 | 1022.4 | 1030.4 | 1035.3 | 1031.0 | 1019.3 | 1010.7 | 1013.8 | 1024.8 | 1035.3 | 1036.5 |
| 75°    | 1019.9 | 1021.2 | 1029.1 | 1033.4 | 1027.9 | 1016.9 | 1007.7 | 1010.7 | 1022.4 | 1031.6 | 1033.4 |
| 77.5°  | 1016.9 | 1018.1 | 1025.5 | 1029.1 | 1022.4 | 1011.3 | 1002.8 | 1005.8 | 1016.9 | 1026.1 | 1027.9 |
| 80°    | 1012.0 | 1013.2 | 1019.9 | 1022.4 | 1015.6 | 1004.6 | 996.6  | 999.7  | 1010.1 | 1018.7 | 1020.5 |
| 82.5°  | 1004.0 | 1005.8 | 1012.0 | 1013.2 | 1005.8 | 996.0  | 988.0  | 991.1  | 1000.9 | 1008.9 | 1010.1 |
| 85°    | 994.2  | 995.4  | 1000.9 | 1001.5 | 994.2  | 985.6  | 978.8  | 981.9  | 990.5  | 996.6  | 998.5  |
| 87.5°  | 983.1  | 983.1  | 988.6  | 988.6  | 980.7  | 972.7  | 967.8  | 970.2  | 978.2  | 983.1  | 985.0  |
| 90°    | 969.6  | 970.2  | 973.9  | 973.3  | 965.9  | 959.2  | 954.9  | 958.0  | 964.7  | 969.0  | 970.2  |
| 92.5°  | 954.9  | 955.5  | 958.6  | 957.3  | 950.0  | 944.5  | 940.8  | 944.5  | 950.6  | 953.7  | 954.9  |
| 95°    | 938.9  | 939.5  | 942.0  | 939.5  | 932.8  | 928.5  | 925.4  | 929.7  | 934.6  | 937.7  | 938.9  |
| 97.5°  | 922.4  | 923.0  | 924.8  | 922.4  | 915.0  | 911.3  | 910.1  | 913.8  | 918.7  | 921.1  | 922.4  |
| 100°   | 905.2  | 905.2  | 906.4  | 902.7  | 896.6  | 893.5  | 892.9  | 897.2  | 902.1  | 904.6  | 905.8  |
| 102.5° | 886.2  | 886.8  | 886.8  | 883.1  | 876.9  | 875.1  | 875.1  | 880.0  | 884.9  | 886.8  | 888.0  |
| 105°   | 866.5  | 866.5  | 866.5  | 863.4  | 856.7  | 855.5  | 856.1  | 861.0  | 866.5  | 869.0  | 870.2  |
| 107.5° | 845.0  | 845.6  | 844.4  | 841.4  | 835.8  | 834.6  | 835.8  | 842.6  | 847.5  | 849.9  | 851.2  |
| 110°   | 822.3  | 822.9  | 822.3  | 818.6  | 813.7  | 813.1  | 815.0  | 821.7  | 826.6  | 829.1  | 830.9  |



REPORT NUMBER: P856329  
 CATALOG NUMBER: FFX-CLB-70-722-U-VM8

**CANDELA DISTRIBUTION (continued):**

|        | 0°    | 5°    | 15°   | 25°   | 35°   | 45°   | 55°   | 65°   | 75°   | 85°   | 90°   |
|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 112.5° | 798.4 | 799.0 | 798.4 | 795.3 | 790.4 | 790.4 | 792.9 | 799.6 | 805.1 | 807.0 | 808.8 |
| 115°   | 773.2 | 773.8 | 772.6 | 770.2 | 765.3 | 766.5 | 768.9 | 775.7 | 781.2 | 783.1 | 785.5 |
| 117.5° | 746.2 | 746.8 | 746.2 | 743.2 | 738.9 | 740.1 | 743.8 | 750.5 | 755.4 | 757.3 | 759.7 |
| 120°   | 716.8 | 716.8 | 716.8 | 713.7 | 709.4 | 711.9 | 715.5 | 722.9 | 727.2 | 728.4 | 730.9 |
| 122.5° | 686.7 | 685.5 | 685.5 | 683.6 | 678.7 | 681.8 | 685.5 | 692.8 | 697.1 | 697.8 | 699.6 |
| 125°   | 653.6 | 654.2 | 652.3 | 651.1 | 646.8 | 650.5 | 653.6 | 660.9 | 664.6 | 665.2 | 667.1 |
| 127.5° | 618.0 | 619.8 | 618.0 | 616.1 | 613.1 | 616.7 | 620.4 | 627.2 | 630.2 | 630.9 | 632.1 |
| 130°   | 584.8 | 584.8 | 583.0 | 581.8 | 578.7 | 582.4 | 586.1 | 592.2 | 595.3 | 595.3 | 596.5 |
| 132.5° | 551.7 | 549.9 | 549.2 | 548.0 | 544.3 | 548.6 | 551.1 | 557.2 | 559.7 | 559.1 | 560.3 |
| 135°   | 515.5 | 515.5 | 513.6 | 513.0 | 510.0 | 514.3 | 516.7 | 522.2 | 524.1 | 523.5 | 524.7 |
| 137.5° | 481.7 | 481.7 | 480.5 | 479.3 | 477.4 | 481.1 | 483.6 | 487.9 | 489.7 | 487.9 | 489.7 |
| 140°   | 448.6 | 448.6 | 448.0 | 446.8 | 444.9 | 448.6 | 450.4 | 454.1 | 456.0 | 454.1 | 455.3 |
| 142.5° | 417.9 | 416.7 | 416.1 | 415.5 | 413.0 | 416.7 | 417.9 | 421.6 | 422.2 | 421.0 | 422.8 |
| 145°   | 385.4 | 386.0 | 385.4 | 384.8 | 382.9 | 386.0 | 387.2 | 390.3 | 390.9 | 389.7 | 391.5 |
| 147.5° | 358.4 | 356.5 | 357.2 | 356.5 | 354.7 | 357.8 | 358.4 | 360.2 | 361.5 | 360.2 | 361.5 |
| 150°   | 331.4 | 330.2 | 330.2 | 329.5 | 328.3 | 330.8 | 331.4 | 333.2 | 333.8 | 332.6 | 333.8 |
| 152.5° | 307.5 | 306.8 | 306.8 | 306.2 | 305.0 | 306.8 | 307.5 | 308.7 | 309.3 | 308.1 | 308.7 |
| 155°   | 286.0 | 285.4 | 285.4 | 284.7 | 283.5 | 285.4 | 285.4 | 286.6 | 287.2 | 286.6 | 287.2 |
| 157.5° | 267.0 | 266.3 | 266.3 | 266.3 | 265.1 | 266.3 | 266.3 | 267.6 | 267.6 | 267.0 | 267.6 |
| 160°   | 251.6 | 250.4 | 251.0 | 250.4 | 249.2 | 250.4 | 250.4 | 251.0 | 251.0 | 251.0 | 251.0 |
| 162.5° | 237.5 | 237.5 | 237.5 | 236.9 | 236.3 | 236.9 | 236.9 | 237.5 | 237.5 | 237.5 | 236.9 |
| 165°   | 226.4 | 226.4 | 226.4 | 225.8 | 225.2 | 225.8 | 225.8 | 225.8 | 225.8 | 225.8 | 225.8 |
| 167.5° | 217.2 | 216.6 | 217.2 | 216.6 | 216.0 | 216.6 | 216.6 | 216.6 | 216.6 | 216.6 | 216.6 |
| 170°   | 209.3 | 209.3 | 209.3 | 209.3 | 208.7 | 209.3 | 209.3 | 209.3 | 209.3 | 209.3 | 209.3 |
| 172.5° | 204.4 | 203.7 | 203.7 | 203.7 | 203.1 | 203.7 | 203.1 | 203.7 | 203.1 | 203.7 | 203.1 |
| 175°   | 200.1 | 200.1 | 200.1 | 200.1 | 199.4 | 199.4 | 199.4 | 199.4 | 199.4 | 199.4 | 199.4 |
| 177.5° | 197.6 | 197.6 | 197.6 | 197.6 | 197.6 | 197.6 | 197.6 | 197.6 | 197.6 | 197.6 | 197.6 |
| 180°   | 197.0 | 197.0 | 197.0 | 197.0 | 197.0 | 197.0 | 197.0 | 197.0 | 197.0 | 197.0 | 197.0 |



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: SP1-2406-133-2

Test Date: 07/11/2024

Luminaire Tested: FFX-CLB-100-722-U-FR-T5

Data in this report applies to families of products including FFX-CLB-100-722-U-FR-T5.

**Test Information**

Test Method: LM-79-2019  
 Report Number: SP1-2406-133-2  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry: 4π  
 Issue Date: 07/12/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: Streetworks  
 Catalog Number: **FFX-CLB-100-722-U-FR-T5**  
 Description: FAIRFAX ACORN W/ FAIRFAX REFRACTOR 100W T5

**Spectral Parameters**

CCT (K): 2211  
 CIE u': 0.2892  
 CIE v': 0.5376  
 Duv: 0.0011  
 CIE x: 0.5069  
 CIE y: 0.4188  
 CIE z: 0.0743  
 Peak Wavelength (nm): 606  
 Dominant Wavelength (nm): 586  
 Purity: 77.8805  
 Rf: 76.1  
 Rg: 94.3

|           |      |      |       |
|-----------|------|------|-------|
| CRI (Ra): | 71.4 |      |       |
| R1:       | 68.2 | R9:  | -29.2 |
| R2:       | 85.0 | R10: | 67.8  |
| R3:       | 94.0 | R11: | 60.7  |
| R4:       | 65.1 | R12: | 59.0  |
| R5:       | 66.6 | R13: | 71.3  |
| R6:       | 81.8 | R14: | 97.6  |
| R7:       | 73.4 | R15: | 58.9  |
| R8:       | 37.3 |      |       |



**Test Conditions**

Stabilization Time: 0.813563M  
 Operation Time: 1H  
 Sphere Temperature (°C): 24.7

REPORT NUMBER: SP1-2406-133-2

| 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           |

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CIE 1931 Chromaticity Diagram



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



Point lies inside the ANSI 2200K 4-step quadrangle

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**Photopic Flux vs. Wavelength**



**Photopic Lumens: NR**

| $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) |
|-------------------|-----------------------------|-------------------------|-------------------|-----------------------------|-------------------------|-------------------|-----------------------------|-------------------------|-------------------|-----------------------------|-------------------------|-------------------|-----------------------------|-------------------------|
| 360               | 0                           | NR                      | 490               | 58                          | NR                      | 620               | 925                         | NR                      | 750               | 30                          | NR                      | 880               | 1                           | NR                      |
| 365               | 0                           | NR                      | 495               | 75                          | NR                      | 625               | 877                         | NR                      | 755               | 26                          | NR                      | 885               | 1                           | NR                      |
| 370               | 0                           | NR                      | 500               | 101                         | NR                      | 630               | 821                         | NR                      | 760               | 22                          | NR                      | 890               | 1                           | NR                      |
| 375               | 0                           | NR                      | 505               | 135                         | NR                      | 635               | 756                         | NR                      | 765               | 19                          | NR                      | 895               | 0                           | NR                      |
| 380               | 0                           | NR                      | 510               | 171                         | NR                      | 640               | 692                         | NR                      | 770               | 16                          | NR                      | 900               | 0                           | NR                      |
| 385               | 0                           | NR                      | 515               | 206                         | NR                      | 645               | 626                         | NR                      | 775               | 14                          | NR                      | 905               | 0                           | NR                      |
| 390               | 0                           | NR                      | 520               | 238                         | NR                      | 650               | 564                         | NR                      | 780               | 12                          | NR                      | 910               | 0                           | NR                      |
| 395               | 0                           | NR                      | 525               | 265                         | NR                      | 655               | 502                         | NR                      | 785               | 10                          | NR                      | 915               | 0                           | NR                      |
| 400               | 0                           | NR                      | 530               | 291                         | NR                      | 660               | 444                         | NR                      | 790               | 9                           | NR                      | 920               | 0                           | NR                      |
| 405               | 1                           | NR                      | 535               | 314                         | NR                      | 665               | 390                         | NR                      | 795               | 8                           | NR                      | 925               | 0                           | NR                      |
| 410               | 3                           | NR                      | 540               | 339                         | NR                      | 670               | 341                         | NR                      | 800               | 7                           | NR                      | 930               | 0                           | NR                      |
| 415               | 7                           | NR                      | 545               | 368                         | NR                      | 675               | 298                         | NR                      | 805               | 6                           | NR                      | 935               | 0                           | NR                      |
| 420               | 14                          | NR                      | 550               | 401                         | NR                      | 680               | 259                         | NR                      | 810               | 5                           | NR                      | 940               | 0                           | NR                      |
| 425               | 25                          | NR                      | 555               | 444                         | NR                      | 685               | 224                         | NR                      | 815               | 4                           | NR                      | 945               | 0                           | NR                      |
| 430               | 40                          | NR                      | 560               | 495                         | NR                      | 690               | 194                         | NR                      | 820               | 4                           | NR                      | 950               | 0                           | NR                      |
| 435               | 60                          | NR                      | 565               | 553                         | NR                      | 695               | 166                         | NR                      | 825               | 3                           | NR                      | 955               | 0                           | NR                      |
| 440               | 85                          | NR                      | 570               | 623                         | NR                      | 700               | 142                         | NR                      | 830               | 3                           | NR                      | 960               | 0                           | NR                      |
| 445               | 121                         | NR                      | 575               | 699                         | NR                      | 705               | 122                         | NR                      | 835               | 2                           | NR                      | 965               | 0                           | NR                      |
| 450               | 177                         | NR                      | 580               | 777                         | NR                      | 710               | 105                         | NR                      | 840               | 2                           | NR                      | 970               | 0                           | NR                      |
| 455               | 186                         | NR                      | 585               | 850                         | NR                      | 715               | 90                          | NR                      | 845               | 2                           | NR                      | 975               | 0                           | NR                      |
| 460               | 126                         | NR                      | 590               | 912                         | NR                      | 720               | 77                          | NR                      | 850               | 2                           | NR                      | 980               | 0                           | NR                      |
| 465               | 92                          | NR                      | 595               | 960                         | NR                      | 725               | 65                          | NR                      | 855               | 1                           | NR                      | 985               | 0                           | NR                      |
| 470               | 76                          | NR                      | 600               | 990                         | NR                      | 730               | 56                          | NR                      | 860               | 1                           | NR                      | 990               | 0                           | NR                      |
| 475               | 57                          | NR                      | 605               | 998                         | NR                      | 735               | 48                          | NR                      | 865               | 1                           | NR                      | 995               | 0                           | NR                      |
| 480               | 48                          | NR                      | 610               | 991                         | NR                      | 740               | 40                          | NR                      | 870               | 1                           | NR                      | 1000              | 0                           | NR                      |
| 485               | 50                          | NR                      | 615               | 963                         | NR                      | 745               | 35                          | NR                      | 875               | 1                           | NR                      |                   |                             |                         |

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**Scotopic Flux vs. Wavelength**



**Scotopic Lumens: NR**

**S/P: 0.87**

| λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360    | 0                        | NR            | 490    | 58                       | NR            | 620    | 925                      | NR            | 750    | 30                       | NR            | 880    | 1                        | NR            |
| 365    | 0                        | NR            | 495    | 75                       | NR            | 625    | 877                      | NR            | 755    | 26                       | NR            | 885    | 1                        | NR            |
| 370    | 0                        | NR            | 500    | 101                      | NR            | 630    | 821                      | NR            | 760    | 22                       | NR            | 890    | 1                        | NR            |
| 375    | 0                        | NR            | 505    | 135                      | NR            | 635    | 756                      | NR            | 765    | 19                       | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 171                      | NR            | 640    | 692                      | NR            | 770    | 16                       | NR            | 900    | 0                        | NR            |
| 385    | 0                        | NR            | 515    | 206                      | NR            | 645    | 626                      | NR            | 775    | 14                       | NR            | 905    | 0                        | NR            |
| 390    | 0                        | NR            | 520    | 238                      | NR            | 650    | 564                      | NR            | 780    | 12                       | NR            | 910    | 0                        | NR            |
| 395    | 0                        | NR            | 525    | 265                      | NR            | 655    | 502                      | NR            | 785    | 10                       | NR            | 915    | 0                        | NR            |
| 400    | 0                        | NR            | 530    | 291                      | NR            | 660    | 444                      | NR            | 790    | 9                        | NR            | 920    | 0                        | NR            |
| 405    | 1                        | NR            | 535    | 314                      | NR            | 665    | 390                      | NR            | 795    | 8                        | NR            | 925    | 0                        | NR            |
| 410    | 3                        | NR            | 540    | 339                      | NR            | 670    | 341                      | NR            | 800    | 7                        | NR            | 930    | 0                        | NR            |
| 415    | 7                        | NR            | 545    | 368                      | NR            | 675    | 298                      | NR            | 805    | 6                        | NR            | 935    | 0                        | NR            |
| 420    | 14                       | NR            | 550    | 401                      | NR            | 680    | 259                      | NR            | 810    | 5                        | NR            | 940    | 0                        | NR            |
| 425    | 25                       | NR            | 555    | 444                      | NR            | 685    | 224                      | NR            | 815    | 4                        | NR            | 945    | 0                        | NR            |
| 430    | 40                       | NR            | 560    | 495                      | NR            | 690    | 194                      | NR            | 820    | 4                        | NR            | 950    | 0                        | NR            |
| 435    | 60                       | NR            | 565    | 553                      | NR            | 695    | 166                      | NR            | 825    | 3                        | NR            | 955    | 0                        | NR            |
| 440    | 85                       | NR            | 570    | 623                      | NR            | 700    | 142                      | NR            | 830    | 3                        | NR            | 960    | 0                        | NR            |
| 445    | 121                      | NR            | 575    | 699                      | NR            | 705    | 122                      | NR            | 835    | 2                        | NR            | 965    | 0                        | NR            |
| 450    | 177                      | NR            | 580    | 777                      | NR            | 710    | 105                      | NR            | 840    | 2                        | NR            | 970    | 0                        | NR            |
| 455    | 186                      | NR            | 585    | 850                      | NR            | 715    | 90                       | NR            | 845    | 2                        | NR            | 975    | 0                        | NR            |
| 460    | 126                      | NR            | 590    | 912                      | NR            | 720    | 77                       | NR            | 850    | 2                        | NR            | 980    | 0                        | NR            |
| 465    | 92                       | NR            | 595    | 960                      | NR            | 725    | 65                       | NR            | 855    | 1                        | NR            | 985    | 0                        | NR            |
| 470    | 76                       | NR            | 600    | 990                      | NR            | 730    | 56                       | NR            | 860    | 1                        | NR            | 990    | 0                        | NR            |
| 475    | 57                       | NR            | 605    | 998                      | NR            | 735    | 48                       | NR            | 865    | 1                        | NR            | 995    | 0                        | NR            |
| 480    | 48                       | NR            | 610    | 991                      | NR            | 740    | 40                       | NR            | 870    | 1                        | NR            | 1000   | 0                        | NR            |
| 485    | 50                       | NR            | 615    | 963                      | NR            | 745    | 35                       | NR            | 875    | 1                        | NR            |        |                          |               |

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Melanopic Flux vs. Wavelength



Melanopic Lumens: NR

M/P: 1.42

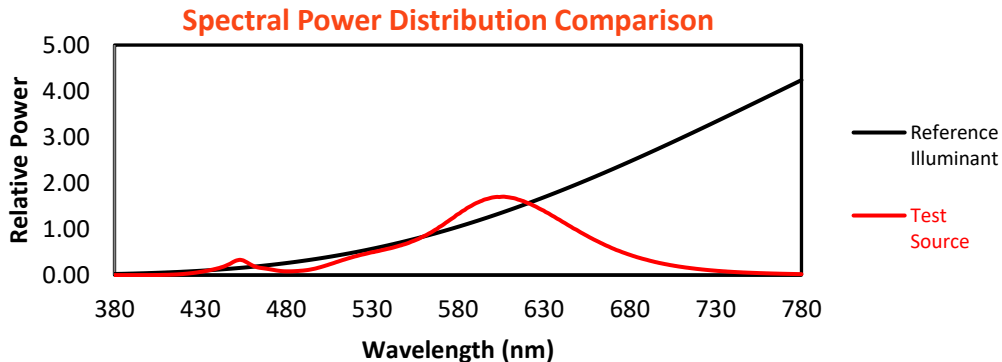
| λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360    | 0                        | NR            | 490    | 58                       | NR            | 620    | 925                      | NR            | 750    | 30                       | NR            | 880    | 1                        | NR            |
| 365    | 0                        | NR            | 495    | 75                       | NR            | 625    | 877                      | NR            | 755    | 26                       | NR            | 885    | 1                        | NR            |
| 370    | 0                        | NR            | 500    | 101                      | NR            | 630    | 821                      | NR            | 760    | 22                       | NR            | 890    | 1                        | NR            |
| 375    | 0                        | NR            | 505    | 135                      | NR            | 635    | 756                      | NR            | 765    | 19                       | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 171                      | NR            | 640    | 692                      | NR            | 770    | 16                       | NR            | 900    | 0                        | NR            |
| 385    | 0                        | NR            | 515    | 206                      | NR            | 645    | 626                      | NR            | 775    | 14                       | NR            | 905    | 0                        | NR            |
| 390    | 0                        | NR            | 520    | 238                      | NR            | 650    | 564                      | NR            | 780    | 12                       | NR            | 910    | 0                        | NR            |
| 395    | 0                        | NR            | 525    | 265                      | NR            | 655    | 502                      | NR            | 785    | 10                       | NR            | 915    | 0                        | NR            |
| 400    | 0                        | NR            | 530    | 291                      | NR            | 660    | 444                      | NR            | 790    | 9                        | NR            | 920    | 0                        | NR            |
| 405    | 1                        | NR            | 535    | 314                      | NR            | 665    | 390                      | NR            | 795    | 8                        | NR            | 925    | 0                        | NR            |
| 410    | 3                        | NR            | 540    | 339                      | NR            | 670    | 341                      | NR            | 800    | 7                        | NR            | 930    | 0                        | NR            |
| 415    | 7                        | NR            | 545    | 368                      | NR            | 675    | 298                      | NR            | 805    | 6                        | NR            | 935    | 0                        | NR            |
| 420    | 14                       | NR            | 550    | 401                      | NR            | 680    | 259                      | NR            | 810    | 5                        | NR            | 940    | 0                        | NR            |
| 425    | 25                       | NR            | 555    | 444                      | NR            | 685    | 224                      | NR            | 815    | 4                        | NR            | 945    | 0                        | NR            |
| 430    | 40                       | NR            | 560    | 495                      | NR            | 690    | 194                      | NR            | 820    | 4                        | NR            | 950    | 0                        | NR            |
| 435    | 60                       | NR            | 565    | 553                      | NR            | 695    | 166                      | NR            | 825    | 3                        | NR            | 955    | 0                        | NR            |
| 440    | 85                       | NR            | 570    | 623                      | NR            | 700    | 142                      | NR            | 830    | 3                        | NR            | 960    | 0                        | NR            |
| 445    | 121                      | NR            | 575    | 699                      | NR            | 705    | 122                      | NR            | 835    | 2                        | NR            | 965    | 0                        | NR            |
| 450    | 177                      | NR            | 580    | 777                      | NR            | 710    | 105                      | NR            | 840    | 2                        | NR            | 970    | 0                        | NR            |
| 455    | 186                      | NR            | 585    | 850                      | NR            | 715    | 90                       | NR            | 845    | 2                        | NR            | 975    | 0                        | NR            |
| 460    | 126                      | NR            | 590    | 912                      | NR            | 720    | 77                       | NR            | 850    | 2                        | NR            | 980    | 0                        | NR            |
| 465    | 92                       | NR            | 595    | 960                      | NR            | 725    | 65                       | NR            | 855    | 1                        | NR            | 985    | 0                        | NR            |
| 470    | 76                       | NR            | 600    | 990                      | NR            | 730    | 56                       | NR            | 860    | 1                        | NR            | 990    | 0                        | NR            |
| 475    | 57                       | NR            | 605    | 998                      | NR            | 735    | 48                       | NR            | 865    | 1                        | NR            | 995    | 0                        | NR            |
| 480    | 48                       | NR            | 610    | 991                      | NR            | 740    | 40                       | NR            | 870    | 1                        | NR            | 1000   | 0                        | NR            |
| 485    | 50                       | NR            | 615    | 963                      | NR            | 745    | 35                       | NR            | 875    | 1                        | NR            |        |                          |               |

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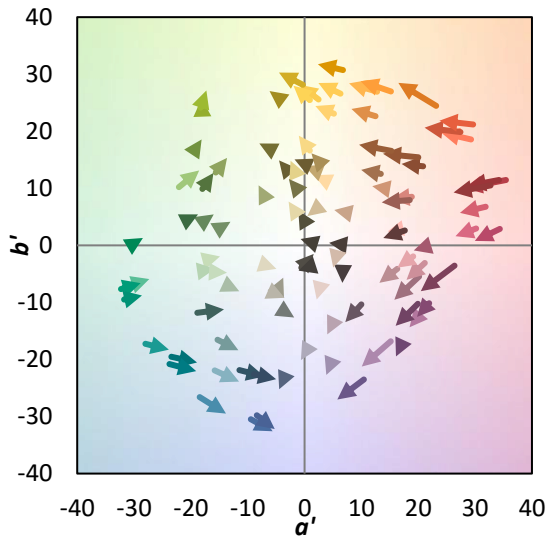
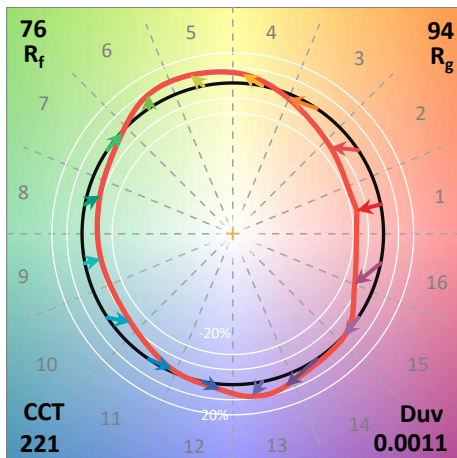
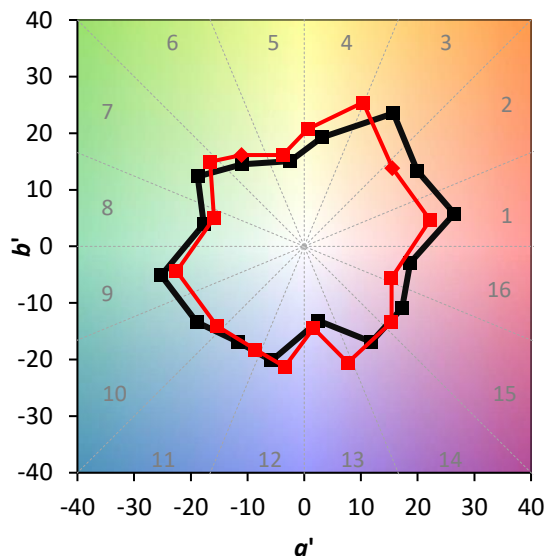
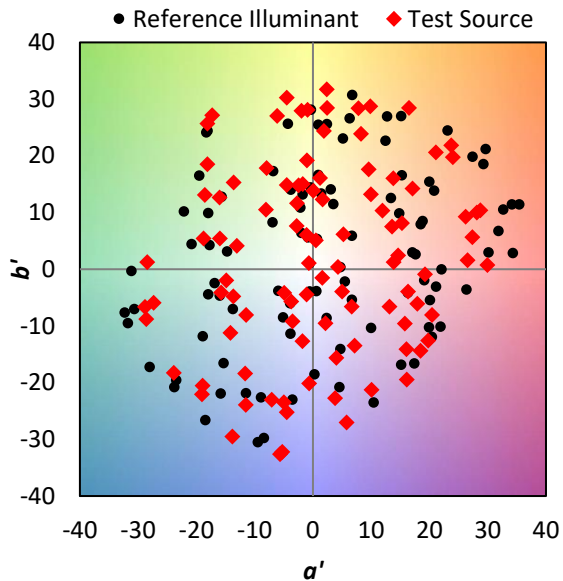
TM-30-18

**Summary**

$R_f = 76.1$   
 $R_g = 94.3$   
 CIE  $R_a = 71.4$   
 $R_9 = -29.2$



**Color Vector Graphics**



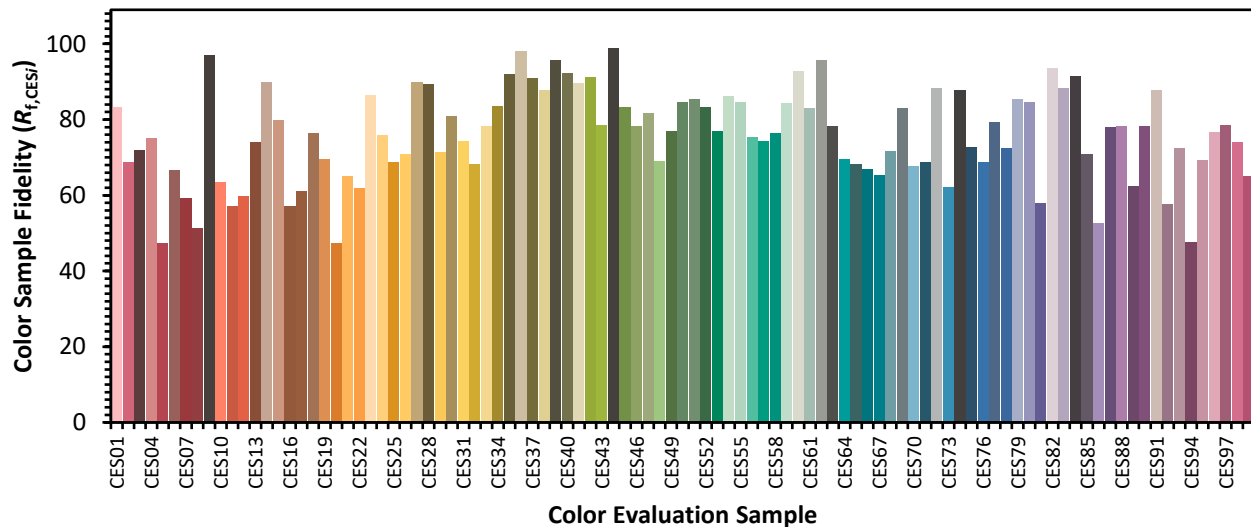


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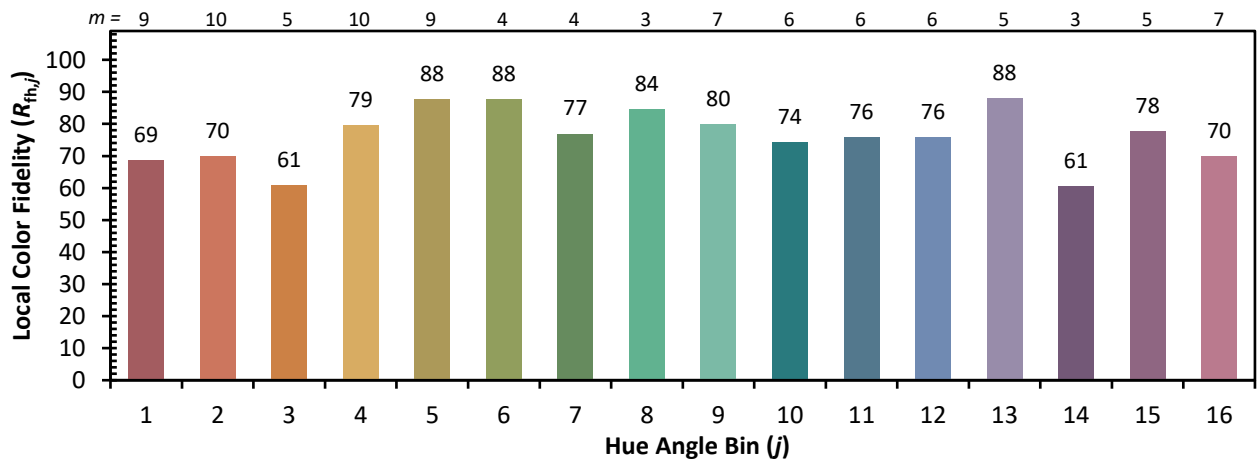
TM-30-18

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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 87 | CES26 = 71 | CES51 = 85 | CES76 = 69 |
| CES02 = 65 | CES27 = 90 | CES52 = 83 | CES77 = 79 |
| CES03 = 32 | CES28 = 89 | CES53 = 77 | CES78 = 72 |
| CES04 = 72 | CES29 = 71 | CES54 = 86 | CES79 = 86 |
| CES05 = 52 | CES30 = 81 | CES55 = 85 | CES80 = 85 |
| CES06 = 52 | CES31 = 74 | CES56 = 75 | CES81 = 58 |
| CES07 = 44 | CES32 = 68 | CES57 = 74 | CES82 = 93 |
| CES08 = 42 | CES33 = 78 | CES58 = 76 | CES83 = 88 |
| CES09 = 29 | CES34 = 84 | CES59 = 84 | CES84 = 92 |
| CES10 = 79 | CES35 = 92 | CES60 = 93 | CES85 = 71 |
| CES11 = 62 | CES36 = 98 | CES61 = 83 | CES86 = 53 |
| CES12 = 68 | CES37 = 91 | CES62 = 96 | CES87 = 78 |
| CES13 = 45 | CES38 = 88 | CES63 = 78 | CES88 = 78 |
| CES14 = 75 | CES39 = 96 | CES64 = 69 | CES89 = 63 |
| CES15 = 72 | CES40 = 92 | CES65 = 68 | CES90 = 78 |
| CES16 = 49 | CES41 = 90 | CES66 = 67 | CES91 = 88 |
| CES17 = 51 | CES42 = 91 | CES67 = 65 | CES92 = 58 |
| CES18 = 57 | CES43 = 79 | CES68 = 72 | CES93 = 72 |
| CES19 = 74 | CES44 = 99 | CES69 = 83 | CES94 = 48 |
| CES20 = 68 | CES45 = 83 | CES70 = 68 | CES95 = 69 |
| CES21 = 88 | CES46 = 78 | CES71 = 69 | CES96 = 77 |
| CES22 = 81 | CES47 = 82 | CES72 = 88 | CES97 = 79 |
| CES23 = 92 | CES48 = 69 | CES73 = 62 | CES98 = 74 |
| CES24 = 92 | CES49 = 77 | CES74 = 88 | CES99 = 65 |
| CES25 = 74 | CES50 = 85 | CES75 = 73 |            |



Color Rendition by Hue-Angle Bin



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Measure Comparisons



(END OF REPORT)