

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: P406349

Luminaire Tested: **TT-D1-740-U-CQ-UPL**

Issue Date: 7/23/2020

Test Information

Test Method: LM-79-08
Report Number: P406349
REPORT IS FROM IESNA LM-79-08 TEST DATA - UPLIGHT (G2-2002-677-1) AND
Test Lab: INNOVATION CENTER
Issue Date: 7/23/2020
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)
Product Line: MCGRAW-EDISON
Catalog Number: TT-D1-740-U-CQ-UPL
Description: TOPTIER LED PARKING GARAGE LUMINAIRE WITH UPLIGHT
4000K, 70 CRI LEDS AND CONCENTRATED DISTRIBUTION
Light Source: -
Ballast/Driver: ELECTRONIC DRIVER

Summary

Lumens per Lamp: N/A
Luminaire Lumens: 4717.7 lumens
Efficiency: N/A
Efficacy: 131.0 lumens/watt
Luminous Opening: Vertical Cylinder (Dia: 1.12' x H: 0.1')
IES Classification: Type V - Short - Non-Cutoff
BUG Rating: B1 - U4 - G1

Input Watts (W): 36
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: 28.75 FT

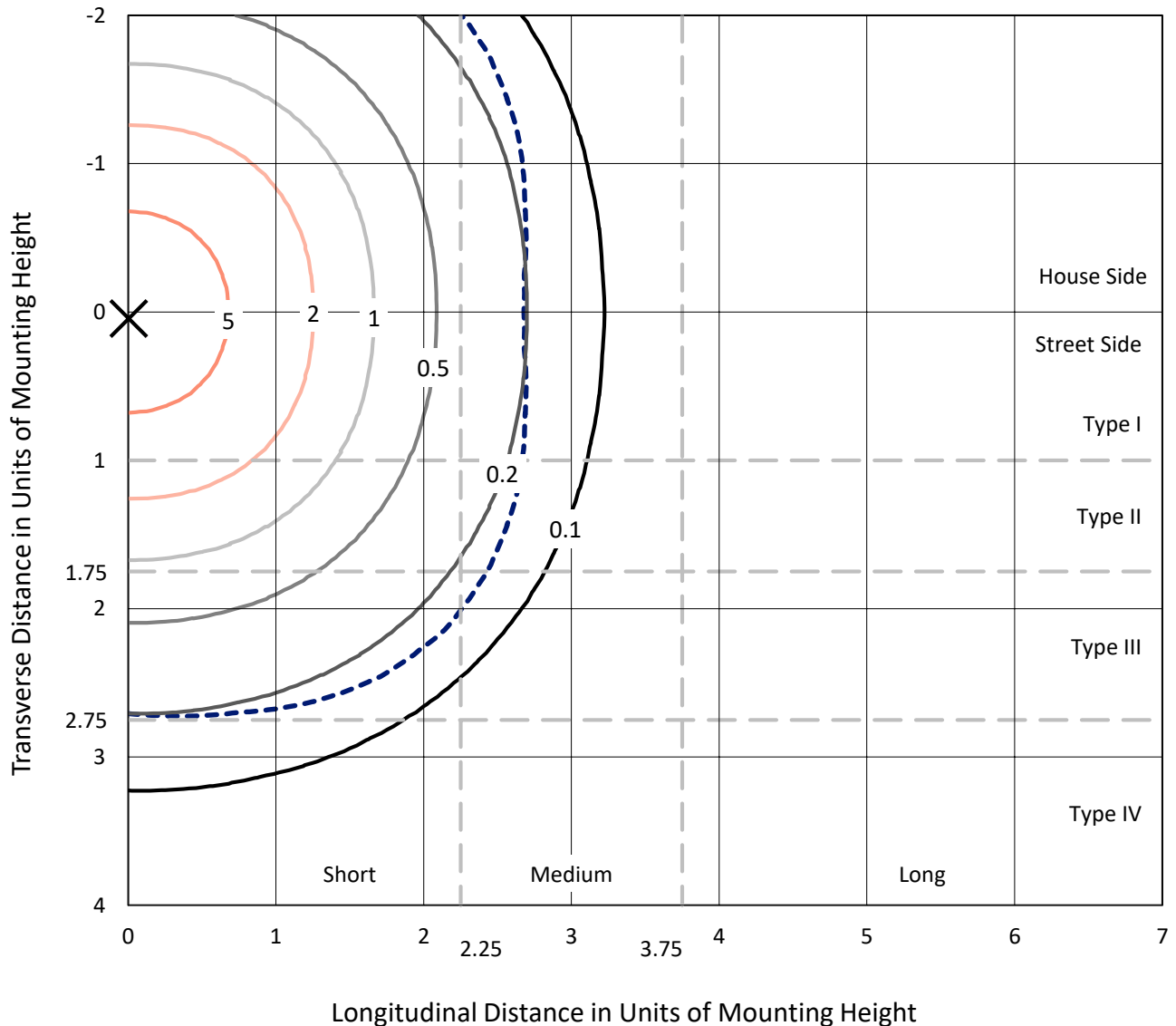


REPORT NUMBER: P406349

CATALOG NUMBER: TT-D1-740-U-CQ-UPL

Iso-Footcandle Lines of Horizontal Illumination

✕ Max cd
 - - - 1/2 Max cd

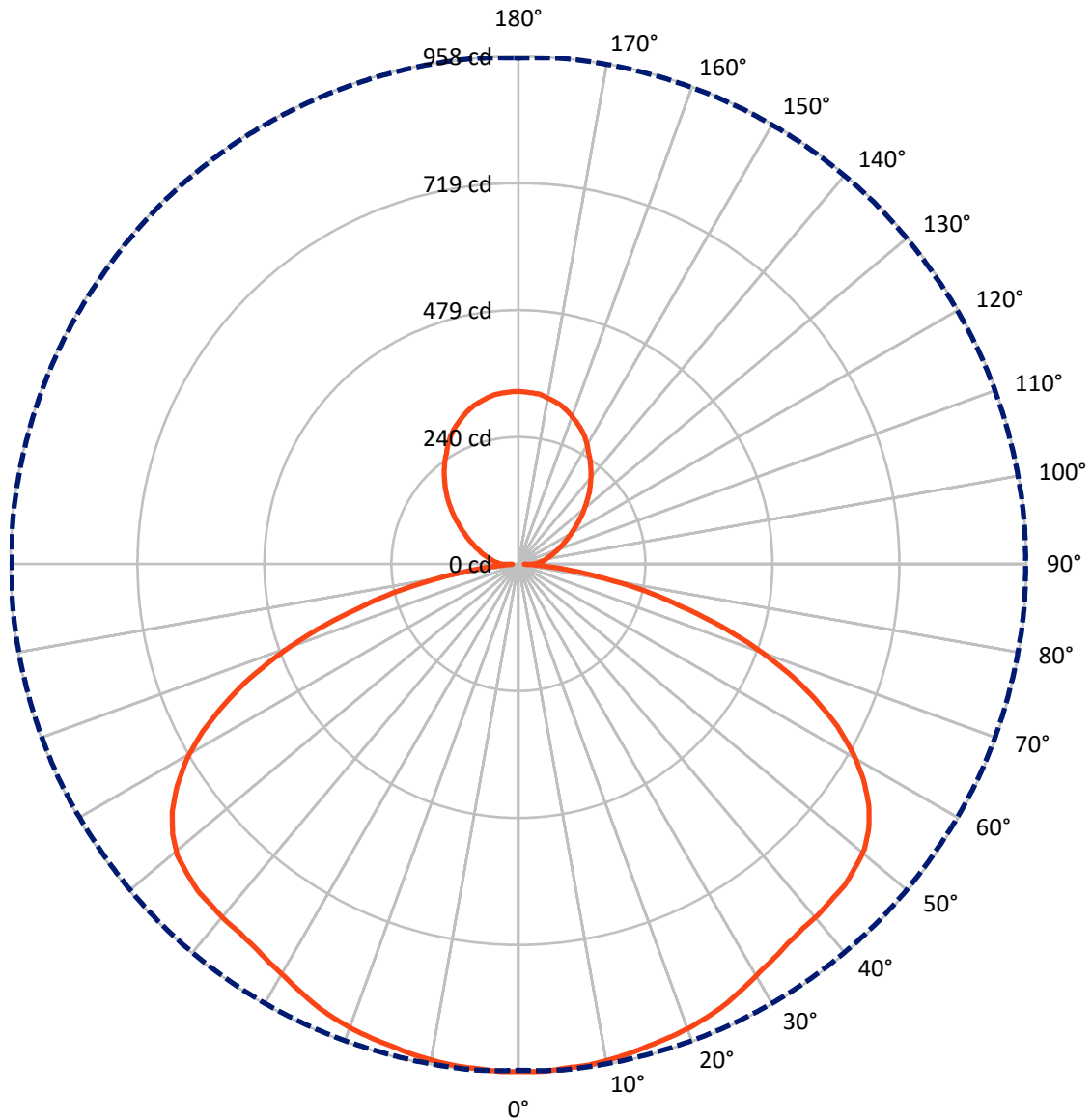


Based on 10 foot mounting height. Maximum calculated value = 9.6 fc
 Type V - Short - Non-Cutoff

REPORT NUMBER: P406349

CATALOG NUMBER: TT-D1-740-U-CQ-UPL

Luminous Intensity Polar Plot



— Vertical Plane Through 5-Deg Lateral - - - Horizontal Cone Through 2.5-Deg Vertical

REPORT NUMBER: P406349

CATALOG NUMBER: TT-D1-740-U-CQ-UPL

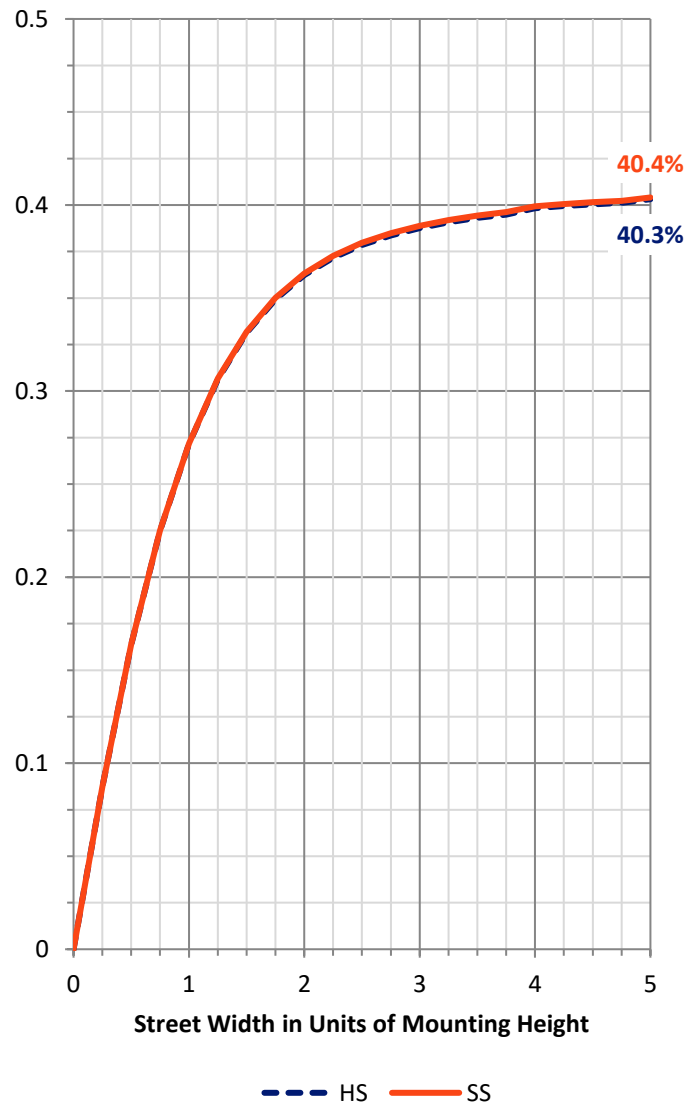
FLUX DISTRIBUTION:

| | | Downward | Upward | Total |
|--------------------|-----------|----------|--------|--------|
| House Side | Lumens | 1916.1 | 442.7 | 2358.9 |
| | % Fixture | 40.6 | 9.4 | 50.0 |
| Street Side | Lumens | 1916.1 | 442.7 | 2358.9 |
| | % Fixture | 40.6 | 9.4 | 50.0 |
| Total | Lumens | 3832.3 | 885.5 | 4717.7 |
| | % Fixture | 81.2 | 18.8 | 100.0 |

Coefficient of Utilization

ZONAL LUMENS:

| Zone | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10° | 91.1 | 1.9 |
| 10°-20° | 266.7 | 5.7 |
| 20°-30° | 424.2 | 9.0 |
| 30°-40° | 558.0 | 11.8 |
| 40°-50° | 683.0 | 14.5 |
| 50°-60° | 739.8 | 15.7 |
| 60°-70° | 636.4 | 13.5 |
| 70°-80° | 357.8 | 7.6 |
| 80°-90° | 75.2 | 1.6 |
| 90°-100° | 45.4 | 1.0 |
| 100°-110° | 70.3 | 1.5 |
| 110°-120° | 97.7 | 2.1 |
| 120°-130° | 126.6 | 2.7 |
| 130°-140° | 147.6 | 3.1 |
| 140°-150° | 149.5 | 3.2 |
| 150°-160° | 129.8 | 2.8 |
| 160°-170° | 87.7 | 1.9 |
| 170°-180° | 30.8 | 0.7 |
| 0°-90° | 3832.3 | 81.2 |
| 0°-180° | 4717.7 | 100.0 |



REPORT NUMBER: P406349

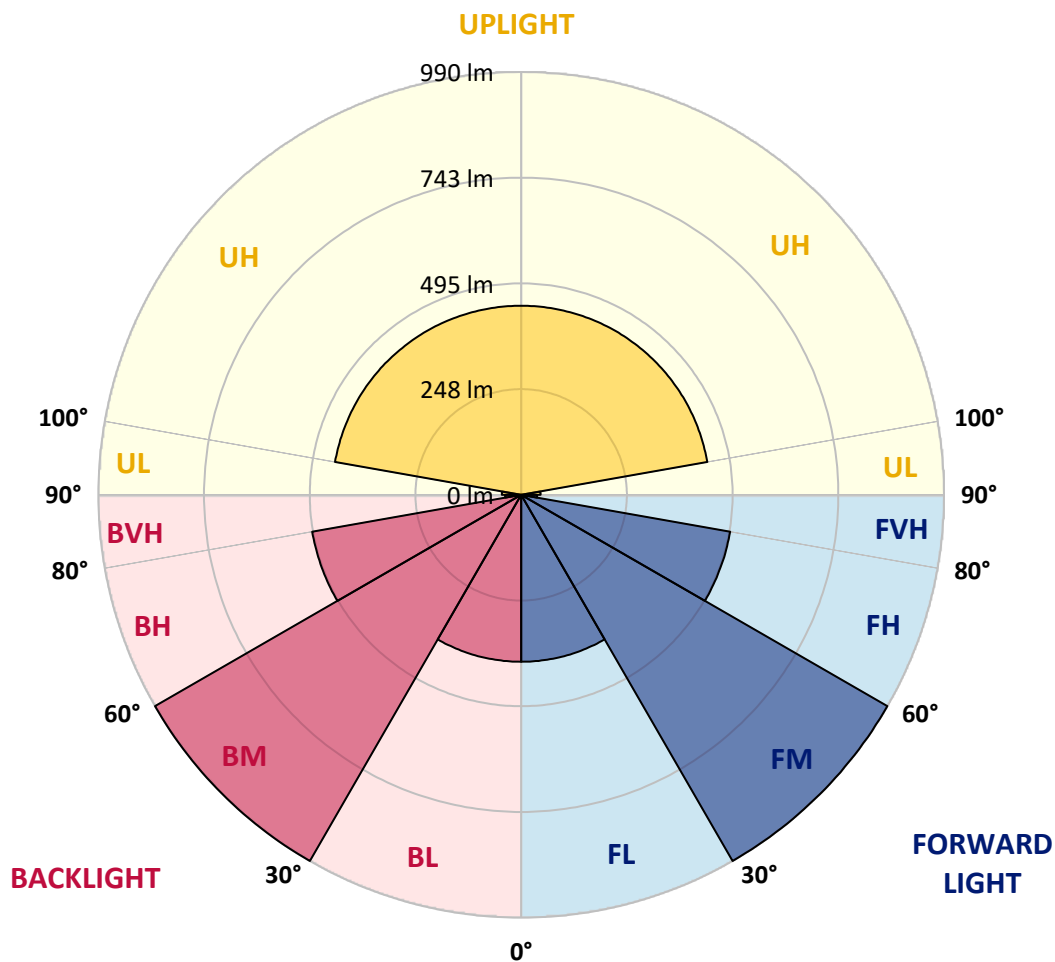
CATALOG NUMBER: TT-D1-740-U-CQ-UPL

LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | Lumens | % Fixture | Zone Rating/Lumen Limit | | |
|----------------|--------|-----------|-------------------------|--------|--------|
| | | | B | U | G |
| FL (0°-30°) | 391.0 | 8.3 | | | |
| FM (30°-60°) | 990.4 | 21.0 | | | |
| FH (60°-80°) | 497.1 | 10.5 | | | G0/660 |
| FVH (80°-90°) | 37.6 | 0.8 | | | G1/100 |
| BL (0°-30°) | 391.0 | 8.3 | B1/500 | | |
| BM (30°-60°) | 990.4 | 21.0 | B1/1000 | | |
| BH (60°-80°) | 497.1 | 10.5 | B1/500 | | G0/660 |
| BVH (80°-90°) | 37.6 | 0.8 | | | G1/100 |
| UL (90°-100°) | 45.4 | 1.0 | | U2/50 | |
| UH (100°-180°) | 442.7 | 9.4 | | U3/500 | |

BUG Rating: B1-U4-G1

Type V Short





REPORT NUMBER: P406349

CATALOG NUMBER: TT-D1-740-U-CQ-UPL

CANDELA DISTRIBUTION (FULL):

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 65° | 75° | 85° | 90° |
|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0° | 957.7 | 957.7 | 957.7 | 957.7 | 957.7 | 957.7 | 957.7 | 957.7 | 957.7 | 957.7 | 957.7 |
| 2.5° | 955.2 | 958.3 | 957.0 | 957.0 | 957.0 | 957.0 | 955.8 | 957.0 | 957.0 | 957.7 | 957.0 |
| 5° | 955.8 | 955.2 | 955.2 | 955.8 | 955.8 | 956.4 | 955.2 | 955.8 | 956.4 | 956.4 | 957.0 |
| 7.5° | 954.0 | 954.6 | 953.4 | 954.6 | 953.4 | 954.0 | 954.0 | 954.6 | 954.0 | 954.6 | 955.8 |
| 10° | 950.3 | 951.0 | 950.3 | 950.3 | 950.3 | 951.6 | 949.1 | 951.0 | 950.3 | 951.0 | 950.3 |
| 12.5° | 943.6 | 946.7 | 945.5 | 946.7 | 946.7 | 946.7 | 944.9 | 946.1 | 946.7 | 946.7 | 946.7 |
| 15° | 940.6 | 941.2 | 939.4 | 941.8 | 942.4 | 943.0 | 940.6 | 941.8 | 941.8 | 942.4 | 943.0 |
| 17.5° | 933.9 | 936.9 | 936.3 | 938.2 | 937.6 | 939.4 | 938.8 | 938.2 | 937.6 | 938.8 | 937.6 |
| 20° | 929.0 | 932.1 | 931.5 | 933.3 | 933.9 | 935.7 | 933.9 | 933.9 | 932.1 | 932.7 | 934.5 |
| 22.5° | 924.1 | 925.4 | 925.4 | 927.2 | 927.2 | 929.0 | 927.2 | 926.6 | 926.6 | 926.0 | 927.8 |
| 25° | 916.2 | 916.8 | 916.2 | 918.1 | 919.3 | 920.5 | 919.9 | 918.7 | 918.1 | 918.1 | 917.4 |
| 27.5° | 903.4 | 905.9 | 907.1 | 909.5 | 910.1 | 912.0 | 909.5 | 909.5 | 908.3 | 907.1 | 907.7 |
| 30° | 893.7 | 894.9 | 894.9 | 900.4 | 900.4 | 903.4 | 900.4 | 899.8 | 899.2 | 898.6 | 897.3 |
| 32.5° | 884.6 | 886.4 | 888.2 | 892.5 | 895.5 | 896.7 | 894.9 | 893.7 | 890.6 | 888.8 | 888.2 |
| 35° | 877.2 | 877.8 | 881.5 | 887.6 | 891.3 | 894.3 | 891.9 | 888.8 | 884.6 | 881.5 | 883.9 |
| 37.5° | 871.8 | 872.4 | 877.8 | 885.8 | 892.5 | 894.9 | 891.3 | 886.4 | 879.7 | 876.0 | 874.8 |
| 40° | 866.9 | 870.5 | 876.6 | 887.6 | 894.9 | 898.6 | 895.5 | 888.8 | 879.1 | 871.8 | 871.1 |
| 42.5° | 864.4 | 866.3 | 875.4 | 888.2 | 898.6 | 903.4 | 899.2 | 890.0 | 877.8 | 869.3 | 868.7 |
| 45° | 858.4 | 863.8 | 872.4 | 888.8 | 900.4 | 906.5 | 900.4 | 888.8 | 874.2 | 864.4 | 862.6 |
| 47.5° | 853.5 | 855.3 | 868.7 | 887.6 | 901.6 | 906.5 | 900.4 | 885.8 | 867.5 | 854.7 | 853.5 |
| 50° | 841.9 | 846.2 | 859.6 | 879.7 | 896.1 | 901.0 | 893.7 | 874.2 | 853.5 | 839.5 | 837.0 |
| 52.5° | 824.2 | 827.9 | 843.7 | 868.7 | 884.6 | 890.0 | 879.1 | 858.4 | 834.0 | 816.9 | 816.9 |
| 55° | 796.8 | 802.3 | 818.8 | 844.3 | 864.4 | 869.3 | 856.5 | 834.6 | 807.2 | 790.1 | 789.5 |
| 57.5° | 763.9 | 767.6 | 785.3 | 813.3 | 832.8 | 840.1 | 827.3 | 802.9 | 775.5 | 755.4 | 753.6 |
| 60° | 721.3 | 726.2 | 745.0 | 771.8 | 792.0 | 798.0 | 787.1 | 762.7 | 734.7 | 713.4 | 713.4 |
| 62.5° | 670.1 | 675.6 | 694.5 | 721.9 | 742.6 | 751.7 | 736.5 | 713.4 | 684.1 | 663.4 | 661.6 |
| 65° | 610.4 | 615.3 | 632.3 | 661.0 | 682.3 | 689.0 | 677.4 | 653.1 | 625.0 | 605.5 | 603.7 |
| 67.5° | 543.4 | 550.1 | 567.2 | 591.5 | 609.8 | 618.3 | 611.0 | 589.1 | 559.8 | 539.7 | 537.9 |
| 70° | 470.9 | 475.8 | 489.2 | 511.7 | 532.4 | 538.5 | 527.6 | 512.9 | 485.5 | 467.3 | 464.8 |
| 72.5° | 393.5 | 397.8 | 408.8 | 430.1 | 444.7 | 452.6 | 446.5 | 427.7 | 405.7 | 390.5 | 392.9 |
| 75° | 315.6 | 315.0 | 327.1 | 342.4 | 355.8 | 361.3 | 357.0 | 344.8 | 324.7 | 311.9 | 311.3 |
| 77.5° | 237.6 | 243.7 | 247.9 | 260.7 | 271.7 | 276.0 | 269.9 | 260.1 | 244.9 | 234.5 | 236.4 |
| 80° | 166.9 | 163.3 | 171.2 | 179.1 | 186.4 | 190.7 | 187.0 | 181.5 | 171.2 | 163.3 | 162.0 |
| 82.5° | 102.3 | 99.3 | 103.0 | 110.3 | 115.1 | 116.4 | 117.0 | 110.3 | 106.0 | 99.9 | 101.1 |
| 85° | 45.1 | 45.7 | 48.7 | 53.6 | 54.2 | 54.8 | 54.8 | 53.6 | 48.7 | 48.1 | 46.9 |
| 87.5° | 11.0 | 11.0 | 11.6 | 13.4 | 13.4 | 14.0 | 14.0 | 12.2 | 11.6 | 10.4 | 11.0 |
| 90° | 32.0 | 31.0 | 31.0 | 31.0 | 31.0 | 31.0 | 31.0 | 31.0 | 31.0 | 31.0 | 31.0 |
| 92.5° | 37.0 | 37.0 | 36.0 | 36.0 | 36.0 | 36.0 | 36.0 | 36.0 | 36.0 | 36.0 | 36.0 |
| 95° | 42.0 | 42.0 | 42.0 | 41.0 | 41.0 | 41.0 | 41.0 | 41.0 | 41.0 | 41.0 | 41.0 |
| 97.5° | 48.0 | 48.0 | 47.0 | 47.0 | 47.0 | 47.0 | 47.0 | 47.0 | 47.0 | 47.0 | 47.0 |
| 100° | 53.0 | 53.0 | 53.0 | 53.0 | 53.0 | 53.0 | 53.0 | 53.0 | 53.0 | 53.0 | 53.0 |
| 102.5° | 60.0 | 59.0 | 60.0 | 60.0 | 59.0 | 59.0 | 59.0 | 60.0 | 60.0 | 60.0 | 59.0 |
| 105° | 66.0 | 66.0 | 66.0 | 66.0 | 66.0 | 66.0 | 66.0 | 67.0 | 66.0 | 66.0 | 66.0 |
| 107.5° | 73.0 | 73.0 | 73.0 | 74.0 | 74.0 | 74.0 | 74.0 | 74.0 | 73.0 | 74.0 | 73.0 |
| 110° | 80.0 | 80.0 | 81.0 | 81.0 | 81.0 | 81.0 | 81.0 | 81.0 | 81.0 | 81.0 | 81.0 |



REPORT NUMBER: P406349

CATALOG NUMBER: TT-D1-740-U-CQ-UPL

CANDELA DISTRIBUTION (continued):

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 65° | 75° | 85° | 90° |
|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 112.5° | 89.0 | 89.0 | 89.0 | 89.0 | 89.0 | 90.0 | 90.0 | 90.0 | 90.0 | 90.0 | 89.0 |
| 115° | 97.0 | 97.0 | 98.0 | 98.0 | 98.0 | 98.0 | 99.0 | 99.0 | 98.0 | 98.0 | 98.0 |
| 117.5° | 107.0 | 107.0 | 107.0 | 107.0 | 107.0 | 108.0 | 108.0 | 108.0 | 108.0 | 108.0 | 107.0 |
| 120° | 117.0 | 117.0 | 117.0 | 118.0 | 118.0 | 118.0 | 119.0 | 119.0 | 118.0 | 118.0 | 118.0 |
| 122.5° | 129.0 | 128.0 | 129.0 | 129.0 | 129.0 | 129.0 | 130.0 | 130.0 | 130.0 | 130.0 | 129.0 |
| 125° | 140.0 | 140.0 | 141.0 | 141.0 | 141.0 | 141.0 | 142.0 | 142.0 | 142.0 | 142.0 | 141.0 |
| 127.5° | 153.0 | 153.0 | 153.0 | 153.0 | 153.0 | 154.0 | 154.0 | 154.0 | 154.0 | 154.0 | 154.0 |
| 130° | 165.0 | 165.0 | 166.0 | 166.0 | 166.0 | 166.0 | 167.0 | 167.0 | 167.0 | 167.0 | 166.0 |
| 132.5° | 179.0 | 178.0 | 179.0 | 178.0 | 178.0 | 179.0 | 179.0 | 180.0 | 179.0 | 180.0 | 179.0 |
| 135° | 191.0 | 191.0 | 191.0 | 191.0 | 191.0 | 192.0 | 192.0 | 192.0 | 192.0 | 192.0 | 192.0 |
| 137.5° | 204.0 | 203.0 | 204.0 | 203.0 | 203.0 | 204.0 | 204.0 | 204.0 | 204.0 | 204.0 | 204.0 |
| 140° | 216.0 | 215.0 | 216.0 | 215.0 | 216.0 | 216.0 | 216.0 | 216.0 | 216.0 | 216.0 | 216.0 |
| 142.5° | 228.0 | 227.0 | 228.0 | 227.0 | 227.0 | 228.0 | 228.0 | 228.0 | 228.0 | 228.0 | 228.0 |
| 145° | 239.0 | 239.0 | 239.0 | 238.0 | 239.0 | 239.0 | 239.0 | 239.0 | 239.0 | 239.0 | 239.0 |
| 147.5° | 250.0 | 249.0 | 250.0 | 249.0 | 249.0 | 250.0 | 250.0 | 250.0 | 250.0 | 250.0 | 250.0 |
| 150° | 263.0 | 262.0 | 263.0 | 262.0 | 263.0 | 263.0 | 263.0 | 263.0 | 263.0 | 263.0 | 263.0 |
| 152.5° | 273.0 | 273.0 | 273.0 | 273.0 | 273.0 | 273.0 | 273.0 | 273.0 | 273.0 | 273.0 | 273.0 |
| 155° | 282.0 | 282.0 | 283.0 | 282.0 | 282.0 | 282.0 | 283.0 | 282.0 | 282.0 | 282.0 | 282.0 |
| 157.5° | 290.0 | 290.0 | 290.0 | 290.0 | 290.0 | 290.0 | 291.0 | 291.0 | 290.0 | 291.0 | 290.0 |
| 160° | 298.0 | 298.0 | 299.0 | 298.0 | 298.0 | 298.0 | 299.0 | 298.0 | 298.0 | 298.0 | 298.0 |
| 162.5° | 306.0 | 305.0 | 306.0 | 305.0 | 306.0 | 306.0 | 306.0 | 306.0 | 306.0 | 306.0 | 306.0 |
| 165° | 311.0 | 311.0 | 312.0 | 311.0 | 311.0 | 311.0 | 312.0 | 311.0 | 311.0 | 311.0 | 311.0 |
| 167.5° | 316.0 | 315.0 | 316.0 | 316.0 | 316.0 | 316.0 | 316.0 | 316.0 | 316.0 | 316.0 | 316.0 |
| 170° | 319.0 | 319.0 | 320.0 | 319.0 | 319.0 | 319.0 | 320.0 | 319.0 | 319.0 | 319.0 | 319.0 |
| 172.5° | 323.0 | 323.0 | 323.0 | 323.0 | 323.0 | 323.0 | 323.0 | 323.0 | 323.0 | 323.0 | 323.0 |
| 175° | 324.0 | 324.0 | 325.0 | 324.0 | 325.0 | 324.0 | 325.0 | 324.0 | 324.0 | 324.0 | 324.0 |
| 177.5° | 325.0 | 325.0 | 326.0 | 325.0 | 325.0 | 325.0 | 325.0 | 325.0 | 325.0 | 325.0 | 325.0 |
| 180° | 326.0 | 326.0 | 326.0 | 326.0 | 326.0 | 326.0 | 326.0 | 326.0 | 326.0 | 326.0 | 326.0 |

LM-79-08: Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

McGRAW-EDISON

Report Number: SP1-2006-844-6

Luminaire Tested: TT-D2-740-U-RW

Test Date: 06/30/2020

Data applicable to product families TT-x-740 and TTN-x-740

Test Information

Test Method: LM-79-08
 Report Number: SP1-2006-844-6
 Test Lab: COOPER LIGHTING SOLUTIONS
 Photometer: SP1
 Measurement Geometry: 4π
 Issue Date: 06/30/2020
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)
 Product Line: MCGRAW-EDISON
 Catalog Number: **TT-D2-740-U-RW**
 Description: MCGRAW EDISON

RECTANGULAR DISTRIBUTION

Spectral Parameters

CCT (K): 3623
 CIE u': 0.2297
 CIE v': 0.5166
 Duv: 0.0060
 CIE x: 0.4044
 CIE y: 0.4042
 CIE z: 0.1914
 Peak Wavelength (nm): 588
 Dominant Wavelength (nm): 578
 Purity: 42.8
 Rf: 76.2
 Rg: 94.3

| | | | |
|-----------|------|------|-------|
| CRI (Ra): | 72.6 | | |
| R1: | 69.4 | R9: | -22.4 |
| R2: | 78.4 | R10: | 49.0 |
| R3: | 86.1 | R11: | 67.4 |
| R4: | 72.3 | R12: | 39.3 |
| R5: | 68.2 | R13: | 70.5 |
| R6: | 69.2 | R14: | 91.9 |
| R7: | 83.0 | | |
| R8: | 54.2 | | |

Test Conditions

Stabilization Time: 207M
 Operation Time: 12H
 Room Temperature (°C) / RH%: 25.9/42%
 Sphere Temperature (°C): 25.8

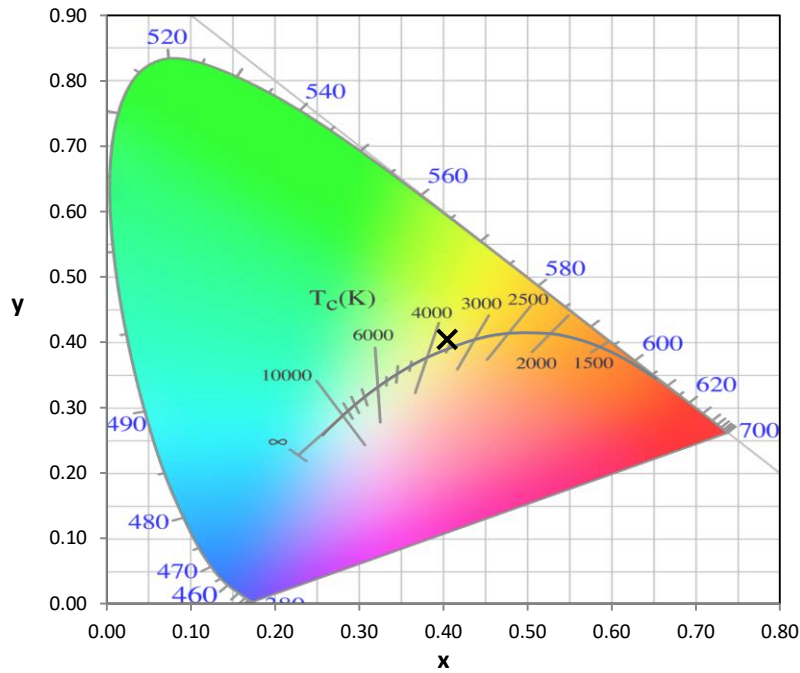


REPORT NUMBER: SP1-2006-844-6

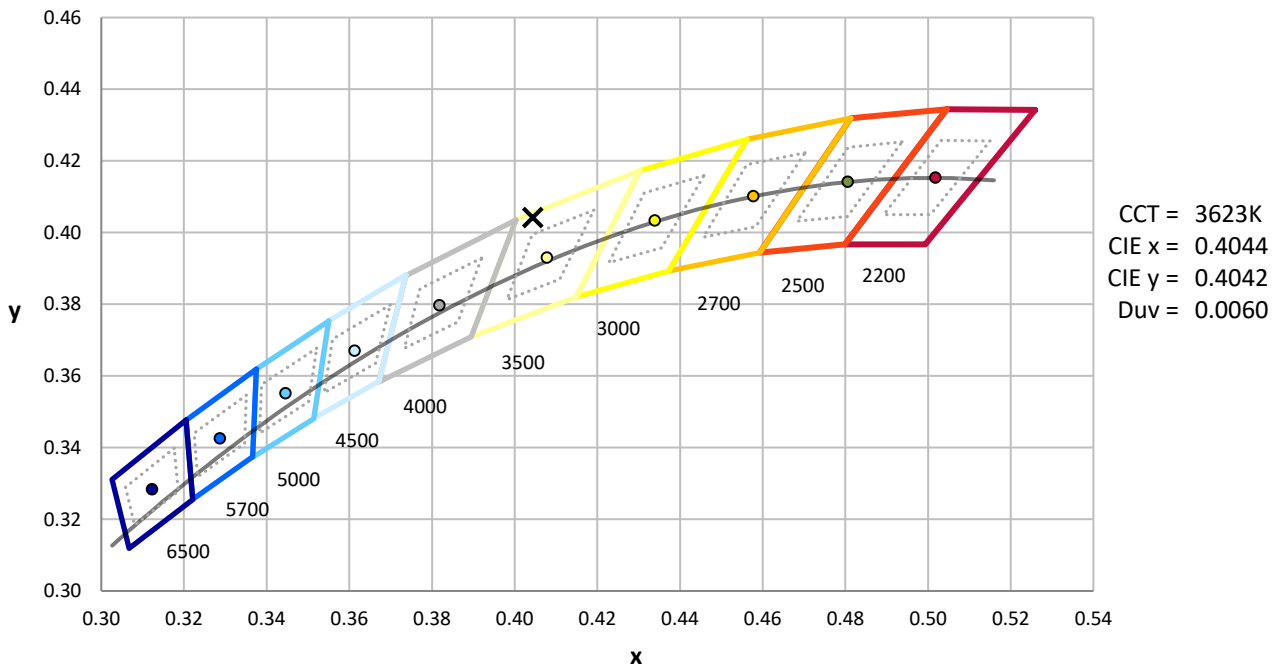
| Measurement and Test Equipment | | | |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 7/29/2020 | 1/29/2021 |
| Power Meter | IN0071 | 12/3/2019 | 12/3/2020 |
| AC Power Source | IN0063 | 12/3/2019 | 12/3/2020 |
| DC Power Source | IN0208 | 12/3/2019 | 12/3/2020 |
| Sphere Thermometer | IN0085 | 12/3/2019 | 12/3/2020 |
| Room Thermometer | IN0046 | 12/3/2019 | 12/3/2020 |

REPORT NUMBER: SP1-2006-844-6

CIE 1931 Chromaticity Diagram



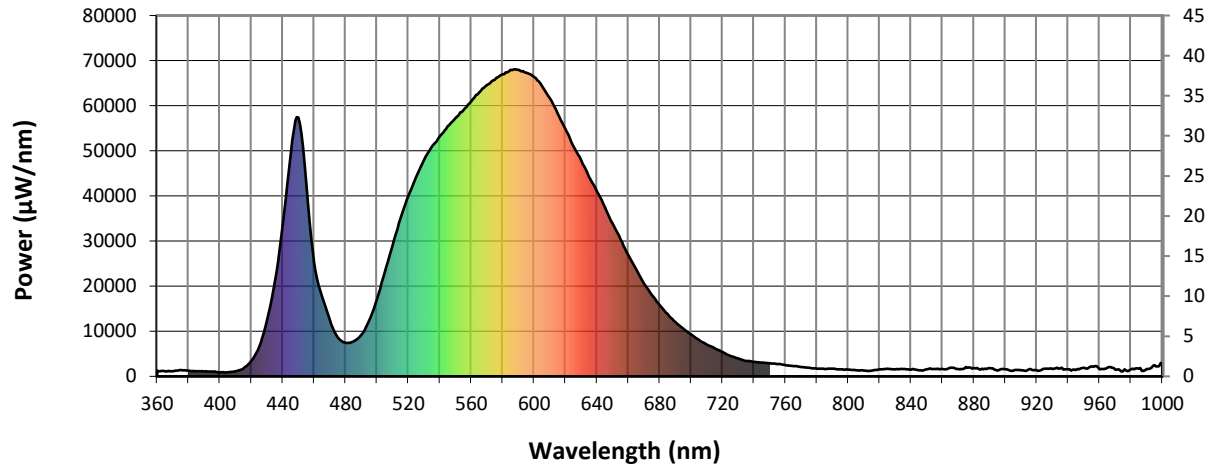
CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles



Point lies inside the ANSI 3500K 7-step quadrangle

REPORT NUMBER: SP1-2006-844-6

Photopic Flux vs. Wavelength



#####

| λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) |
|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|
| 360 | 1254 | 0.0 | 490 | 9219 | 1.3 | 620 | 54761 | 14.3 | 750 | 2901 | 0.0 | 880 | 1835 | 0.0 |
| 365 | 1158 | 0.0 | 495 | 12322 | 2.2 | 625 | 51064 | 11.3 | 755 | 2733 | 0.0 | 885 | 1690 | 0.0 |
| 370 | 1131 | 0.0 | 500 | 17160 | 3.8 | 630 | 47879 | 8.7 | 760 | 2503 | 0.0 | 890 | 1819 | 0.0 |
| 375 | 1414 | 0.0 | 505 | 23071 | 6.5 | 635 | 44248 | 6.6 | 765 | 2289 | 0.0 | 895 | 1314 | 0.0 |
| 380 | 1275 | 0.0 | 510 | 29162 | 10.0 | 640 | 41034 | 4.9 | 770 | 2078 | 0.0 | 900 | 1547 | 0.0 |
| 385 | 1122 | 0.0 | 515 | 34992 | 14.5 | 645 | 37515 | 3.6 | 775 | 1927 | 0.0 | 905 | 1281 | 0.0 |
| 390 | 1074 | 0.0 | 520 | 40102 | 19.4 | 650 | 33900 | 2.5 | 780 | 1724 | 0.0 | 910 | 1345 | 0.0 |
| 395 | 1058 | 0.0 | 525 | 44194 | 23.7 | 655 | 30384 | 1.7 | 785 | 1617 | 0.0 | 915 | 1561 | 0.0 |
| 400 | 885 | 0.0 | 530 | 48014 | 28.3 | 660 | 26883 | 1.1 | 790 | 1709 | 0.0 | 920 | 1368 | 0.0 |
| 405 | 912 | 0.0 | 535 | 51019 | 31.6 | 665 | 23703 | 0.8 | 795 | 1561 | 0.0 | 925 | 1730 | 0.0 |
| 410 | 1108 | 0.0 | 540 | 53190 | 34.7 | 670 | 20603 | 0.5 | 800 | 1525 | 0.0 | 930 | 1629 | 0.0 |
| 415 | 1763 | 0.0 | 545 | 55452 | 36.9 | 675 | 18039 | 0.3 | 805 | 1332 | 0.0 | 935 | 1796 | 0.0 |
| 420 | 3421 | 0.0 | 550 | 57280 | 38.9 | 680 | 15849 | 0.2 | 810 | 1269 | 0.0 | 940 | 1595 | 0.0 |
| 425 | 6610 | 0.0 | 555 | 59041 | 40.3 | 685 | 13806 | 0.1 | 815 | 1261 | 0.0 | 945 | 1410 | 0.0 |
| 430 | 12444 | 0.1 | 560 | 60976 | 41.4 | 690 | 12093 | 0.1 | 820 | 1551 | 0.0 | 950 | 1937 | 0.0 |
| 435 | 21116 | 0.2 | 565 | 62904 | 41.8 | 695 | 10566 | 0.0 | 825 | 1708 | 0.0 | 955 | 2186 | 0.0 |
| 440 | 33463 | 0.5 | 570 | 64555 | 42.0 | 700 | 9300 | 0.0 | 830 | 1592 | 0.0 | 960 | 1583 | 0.0 |
| 445 | 49089 | 1.0 | 575 | 65785 | 40.9 | 705 | 8110 | 0.0 | 835 | 1642 | 0.0 | 965 | 1953 | 0.0 |
| 450 | 57374 | 1.5 | 580 | 66948 | 39.8 | 710 | 7052 | 0.0 | 840 | 1514 | 0.0 | 970 | 1519 | 0.0 |
| 455 | 42663 | 1.4 | 585 | 67963 | 37.8 | 715 | 6233 | 0.0 | 845 | 1376 | 0.0 | 975 | 1168 | 0.0 |
| 460 | 25334 | 1.0 | 590 | 68001 | 35.2 | 720 | 5362 | 0.0 | 850 | 1592 | 0.0 | 980 | 1593 | 0.0 |
| 465 | 17751 | 0.9 | 595 | 67308 | 31.9 | 725 | 4563 | 0.0 | 855 | 1667 | 0.0 | 985 | 1722 | 0.0 |
| 470 | 12447 | 0.8 | 600 | 66343 | 28.6 | 730 | 3976 | 0.0 | 860 | 1662 | 0.0 | 990 | 1648 | 0.0 |
| 475 | 8641 | 0.7 | 605 | 64393 | 24.9 | 735 | 3424 | 0.0 | 865 | 1916 | 0.0 | 995 | 2495 | 0.0 |
| 480 | 7423 | 0.7 | 610 | 61634 | 21.2 | 740 | 3222 | 0.0 | 870 | 1655 | 0.0 | 1000 | 2643 | 0.0 |
| 485 | 7759 | 0.9 | 615 | 58349 | 17.6 | 745 | 3060 | 0.0 | 875 | 2036 | 0.0 | | | |

REPORT NUMBER: SP1-2006-844-6

Scotopic Flux vs. Wavelength



Scotopic Lumens: 1941.7

S/P: 0.51

| λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) | λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) | λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) | λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) | λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) |
|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|
| 360 | 1254 | 0.0 | 490 | 9219 | 14.2 | 620 | 54761 | 0.7 | 750 | 2901 | 0.0 | 880 | 1835 | 0.0 |
| 365 | 1158 | 0.0 | 495 | 12322 | 19.9 | 625 | 51064 | 0.4 | 755 | 2733 | 0.0 | 885 | 1690 | 0.0 |
| 370 | 1131 | 0.0 | 500 | 17160 | 28.7 | 630 | 47879 | 0.3 | 760 | 2503 | 0.0 | 890 | 1819 | 0.0 |
| 375 | 1414 | 0.0 | 505 | 23071 | 39.2 | 635 | 44248 | 0.2 | 765 | 2289 | 0.0 | 895 | 1314 | 0.0 |
| 380 | 1275 | 0.0 | 510 | 29162 | 49.4 | 640 | 41034 | 0.1 | 770 | 2078 | 0.0 | 900 | 1547 | 0.0 |
| 385 | 1122 | 0.0 | 515 | 34992 | 58.0 | 645 | 37515 | 0.1 | 775 | 1927 | 0.0 | 905 | 1281 | 0.0 |
| 390 | 1074 | 0.0 | 520 | 40102 | 63.7 | 650 | 33900 | 0.0 | 780 | 1724 | 0.0 | 910 | 1345 | 0.0 |
| 395 | 1058 | 0.0 | 525 | 44194 | 66.1 | 655 | 30384 | 0.0 | 785 | 1617 | 0.0 | 915 | 1561 | 0.0 |
| 400 | 885 | 0.0 | 530 | 48014 | 66.2 | 660 | 26883 | 0.0 | 790 | 1709 | 0.0 | 920 | 1368 | 0.0 |
| 405 | 912 | 0.0 | 535 | 51019 | 63.6 | 665 | 23703 | 0.0 | 795 | 1561 | 0.0 | 925 | 1730 | 0.0 |
| 410 | 1108 | 0.1 | 540 | 53190 | 58.8 | 670 | 20603 | 0.0 | 800 | 1525 | 0.0 | 930 | 1629 | 0.0 |
| 415 | 1763 | 0.2 | 545 | 55452 | 53.2 | 675 | 18039 | 0.0 | 805 | 1332 | 0.0 | 935 | 1796 | 0.0 |
| 420 | 3421 | 0.6 | 550 | 57280 | 46.8 | 680 | 15849 | 0.0 | 810 | 1269 | 0.0 | 940 | 1595 | 0.0 |
| 425 | 6610 | 1.6 | 555 | 59041 | 40.3 | 685 | 13806 | 0.0 | 815 | 1261 | 0.0 | 945 | 1410 | 0.0 |
| 430 | 12444 | 4.2 | 560 | 60976 | 34.1 | 690 | 12093 | 0.0 | 820 | 1551 | 0.0 | 950 | 1937 | 0.0 |
| 435 | 21116 | 9.4 | 565 | 62904 | 28.2 | 695 | 10566 | 0.0 | 825 | 1708 | 0.0 | 955 | 2186 | 0.0 |
| 440 | 33463 | 18.7 | 570 | 64555 | 22.8 | 700 | 9300 | 0.0 | 830 | 1592 | 0.0 | 960 | 1583 | 0.0 |
| 445 | 49089 | 32.9 | 575 | 65785 | 17.9 | 705 | 8110 | 0.0 | 835 | 1642 | 0.0 | 965 | 1953 | 0.0 |
| 450 | 57374 | 44.5 | 580 | 66948 | 13.8 | 710 | 7052 | 0.0 | 840 | 1514 | 0.0 | 970 | 1519 | 0.0 |
| 455 | 42663 | 37.3 | 585 | 67963 | 10.4 | 715 | 6233 | 0.0 | 845 | 1376 | 0.0 | 975 | 1168 | 0.0 |
| 460 | 25334 | 24.5 | 590 | 68001 | 7.6 | 720 | 5362 | 0.0 | 850 | 1592 | 0.0 | 980 | 1593 | 0.0 |
| 465 | 17751 | 18.7 | 595 | 67308 | 5.4 | 725 | 4563 | 0.0 | 855 | 1667 | 0.0 | 985 | 1722 | 0.0 |
| 470 | 12447 | 14.3 | 600 | 66343 | 3.7 | 730 | 3976 | 0.0 | 860 | 1662 | 0.0 | 990 | 1648 | 0.0 |
| 475 | 8641 | 10.8 | 605 | 64393 | 2.5 | 735 | 3424 | 0.0 | 865 | 1916 | 0.0 | 995 | 2495 | 0.0 |
| 480 | 7423 | 10.0 | 610 | 61634 | 1.7 | 740 | 3222 | 0.0 | 870 | 1655 | 0.0 | 1000 | 2643 | 0.0 |
| 485 | 7759 | 11.2 | 615 | 58349 | 1.1 | 745 | 3060 | 0.0 | 875 | 2036 | 0.0 | | | |

REPORT NUMBER: SP1-2006-844-6

Melanopic Flux vs. Wavelength

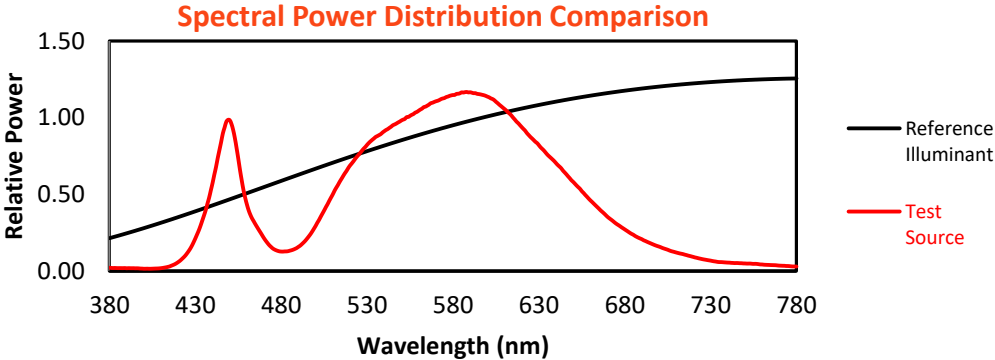


Melanopic Lumens: 5289.9 S/P: 1.39

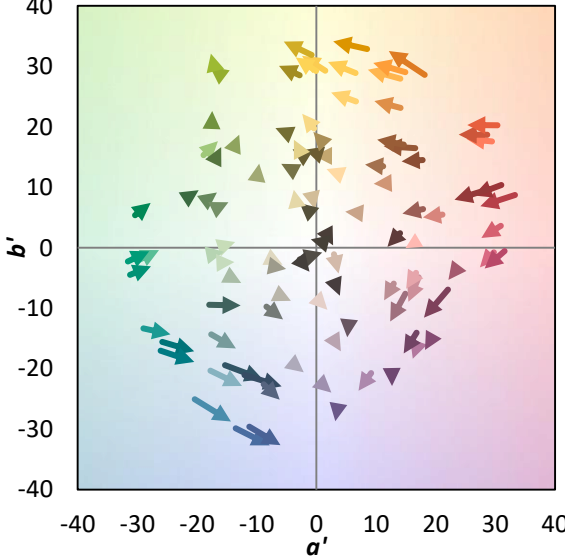
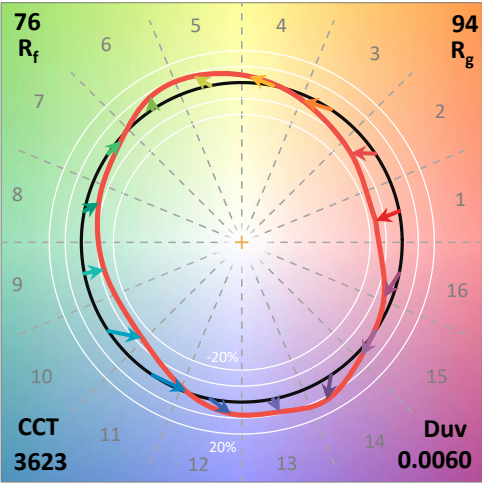
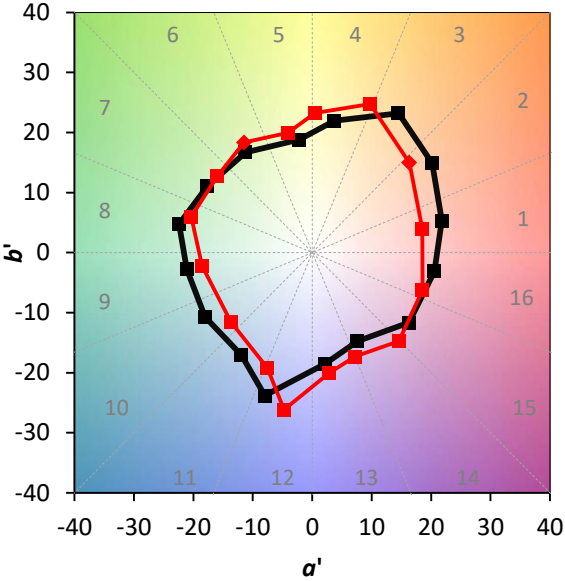
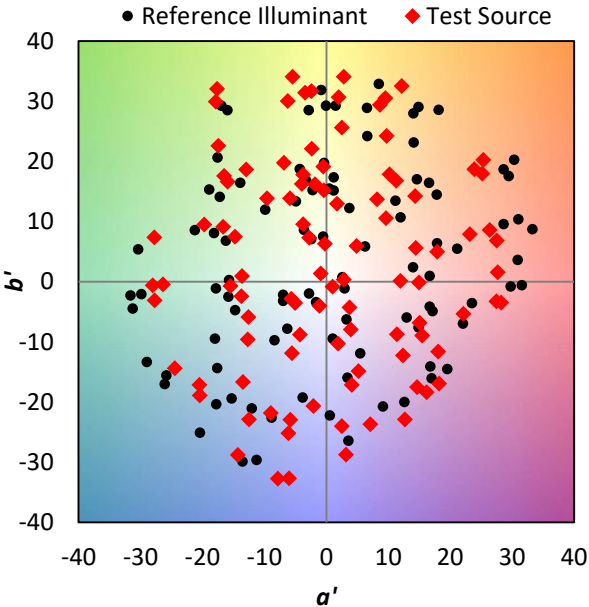
| λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) |
|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|
| 360 | 1254 | 0.0 | 490 | 9219 | 7.7 | 620 | 54761 | 0.0 | 750 | 2901 | 0.0 | 880 | 1835 | 0.0 |
| 365 | 1158 | 0.0 | 495 | 12322 | 10.2 | 625 | 51064 | 0.0 | 755 | 2733 | 0.0 | 885 | 1690 | 0.0 |
| 370 | 1131 | 0.0 | 500 | 17160 | 13.8 | 630 | 47879 | 0.0 | 760 | 2503 | 0.0 | 890 | 1819 | 0.0 |
| 375 | 1414 | 0.0 | 505 | 23071 | 17.7 | 635 | 44248 | 0.0 | 765 | 2289 | 0.0 | 895 | 1314 | 0.0 |
| 380 | 1275 | 0.0 | 510 | 29162 | 20.9 | 640 | 41034 | 0.0 | 770 | 2078 | 0.0 | 900 | 1547 | 0.0 |
| 385 | 1122 | 0.0 | 515 | 34992 | 22.9 | 645 | 37515 | 0.0 | 775 | 1927 | 0.0 | 905 | 1281 | 0.0 |
| 390 | 1074 | 0.0 | 520 | 40102 | 23.3 | 650 | 33900 | 0.0 | 780 | 1724 | 0.0 | 910 | 1345 | 0.0 |
| 395 | 1058 | 0.0 | 525 | 44194 | 22.4 | 655 | 30384 | 0.0 | 785 | 1617 | 0.0 | 915 | 1561 | 0.0 |
| 400 | 885 | 0.0 | 530 | 48014 | 20.7 | 660 | 26883 | 0.0 | 790 | 1709 | 0.0 | 920 | 1368 | 0.0 |
| 405 | 912 | 0.0 | 535 | 51019 | 18.4 | 665 | 23703 | 0.0 | 795 | 1561 | 0.0 | 925 | 1730 | 0.0 |
| 410 | 1108 | 0.0 | 540 | 53190 | 15.6 | 670 | 20603 | 0.0 | 800 | 1525 | 0.0 | 930 | 1629 | 0.0 |
| 415 | 1763 | 0.1 | 545 | 55452 | 12.9 | 675 | 18039 | 0.0 | 805 | 1332 | 0.0 | 935 | 1796 | 0.0 |
| 420 | 3421 | 0.4 | 550 | 57280 | 10.3 | 680 | 15849 | 0.0 | 810 | 1269 | 0.0 | 940 | 1595 | 0.0 |
| 425 | 6610 | 1.0 | 555 | 59041 | 8.0 | 685 | 13806 | 0.0 | 815 | 1261 | 0.0 | 945 | 1410 | 0.0 |
| 430 | 12444 | 2.6 | 560 | 60976 | 6.0 | 690 | 12093 | 0.0 | 820 | 1551 | 0.0 | 950 | 1937 | 0.0 |
| 435 | 21116 | 5.6 | 565 | 62904 | 4.4 | 695 | 10566 | 0.0 | 825 | 1708 | 0.0 | 955 | 2186 | 0.0 |
| 440 | 33463 | 11.2 | 570 | 64555 | 3.2 | 700 | 9300 | 0.0 | 830 | 1592 | 0.0 | 960 | 1583 | 0.0 |
| 445 | 49089 | 19.4 | 575 | 65785 | 2.2 | 705 | 8110 | 0.0 | 835 | 1642 | 0.0 | 965 | 1953 | 0.0 |
| 450 | 57374 | 26.4 | 580 | 66948 | 1.5 | 710 | 7052 | 0.0 | 840 | 1514 | 0.0 | 970 | 1519 | 0.0 |
| 455 | 42663 | 22.4 | 585 | 67963 | 1.0 | 715 | 6233 | 0.0 | 845 | 1376 | 0.0 | 975 | 1168 | 0.0 |
| 460 | 25334 | 14.9 | 590 | 68001 | 0.7 | 720 | 5362 | 0.0 | 850 | 1592 | 0.0 | 980 | 1593 | 0.0 |
| 465 | 17751 | 11.6 | 595 | 67308 | 0.4 | 725 | 4563 | 0.0 | 855 | 1667 | 0.0 | 985 | 1722 | 0.0 |
| 470 | 12447 | 8.9 | 600 | 66343 | 0.3 | 730 | 3976 | 0.0 | 860 | 1662 | 0.0 | 990 | 1648 | 0.0 |
| 475 | 8641 | 6.6 | 605 | 64393 | 0.2 | 735 | 3424 | 0.0 | 865 | 1916 | 0.0 | 995 | 2495 | 0.0 |
| 480 | 7423 | 6.0 | 610 | 61634 | 0.1 | 740 | 3222 | 0.0 | 870 | 1655 | 0.0 | 1000 | 2643 | 0.0 |
| 485 | 7759 | 6.4 | 615 | 58349 | 0.1 | 745 | 3060 | 0.0 | 875 | 2036 | 0.0 | | | |

Summary

$R_f = 76.2$
 $R_g = 94.3$
 CIE $R_a = 72.6$
 $R_g = -22.4$

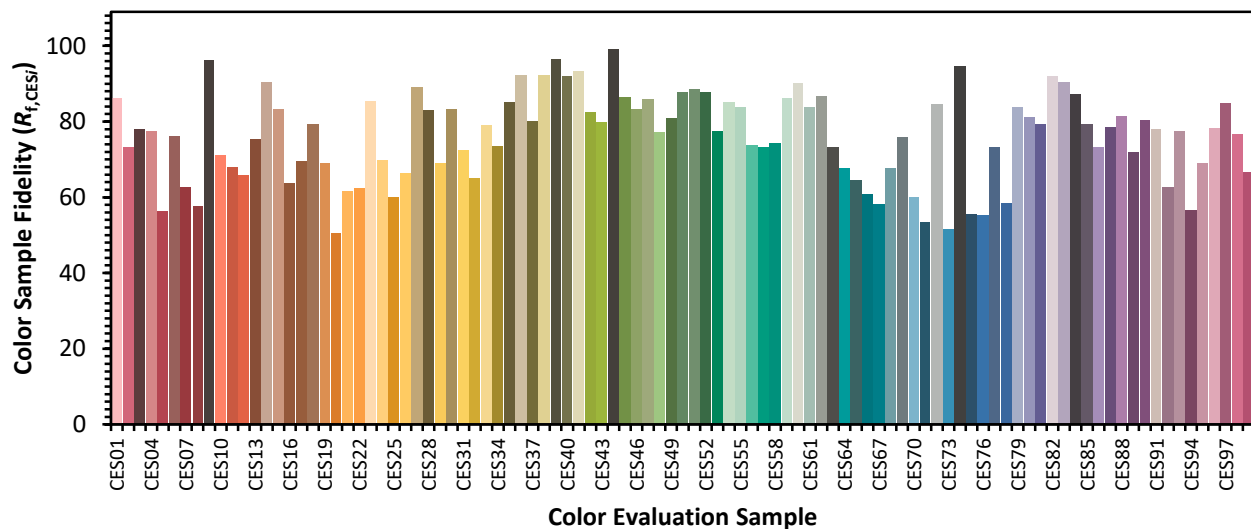


Color Vector Graphics

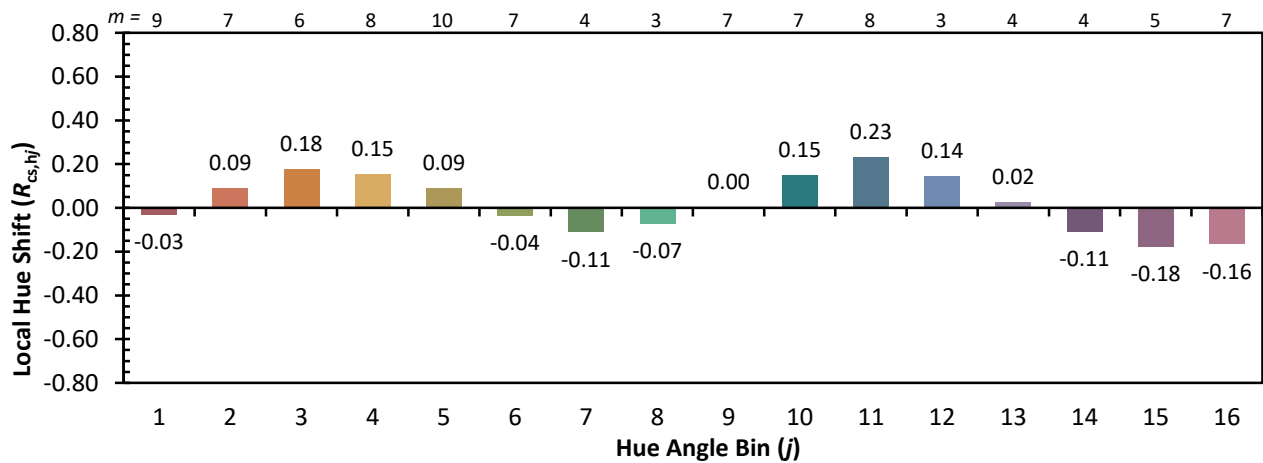
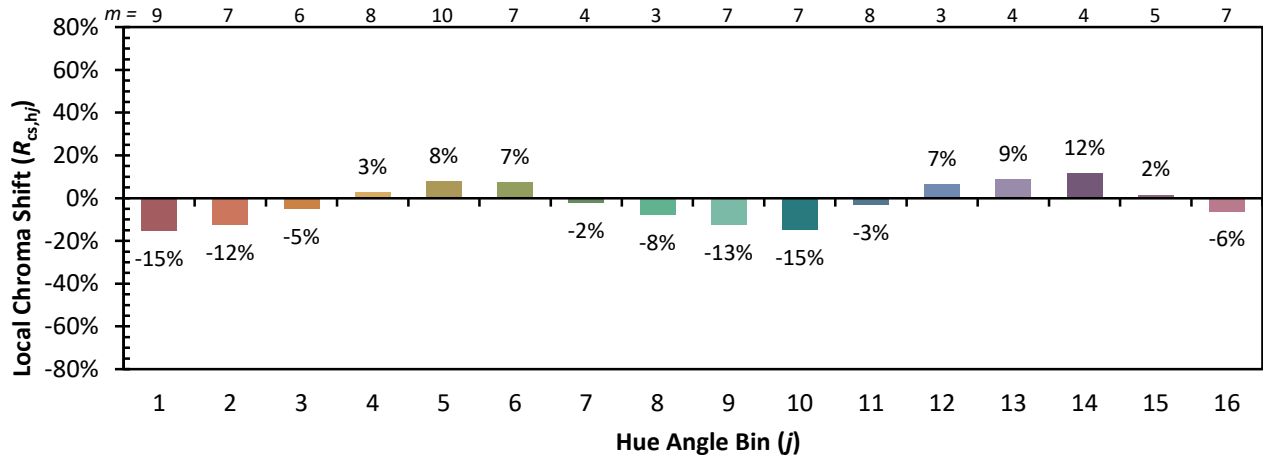


Individual Sample Fidelity Index ($R_{f,i}$)

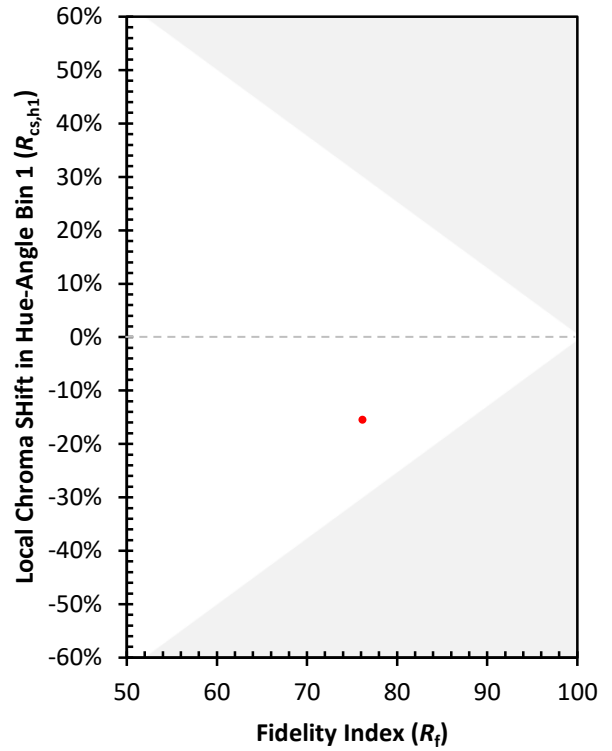
| | | | |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 66 | CES51 = 88 | CES76 = 55 |
| CES02 = 61 | CES27 = 89 | CES52 = 88 | CES77 = 73 |
| CES03 = 31 | CES28 = 83 | CES53 = 78 | CES78 = 59 |
| CES04 = 70 | CES29 = 69 | CES54 = 85 | CES79 = 84 |
| CES05 = 48 | CES30 = 83 | CES55 = 84 | CES80 = 81 |
| CES06 = 51 | CES31 = 73 | CES56 = 74 | CES81 = 79 |
| CES07 = 40 | CES32 = 65 | CES57 = 73 | CES82 = 92 |
| CES08 = 39 | CES33 = 79 | CES58 = 74 | CES83 = 90 |
| CES09 = 29 | CES34 = 74 | CES59 = 86 | CES84 = 87 |
| CES10 = 74 | CES35 = 85 | CES60 = 90 | CES85 = 79 |
| CES11 = 57 | CES36 = 92 | CES61 = 84 | CES86 = 73 |
| CES12 = 63 | CES37 = 80 | CES62 = 87 | CES87 = 78 |
| CES13 = 42 | CES38 = 92 | CES63 = 73 | CES88 = 81 |
| CES14 = 74 | CES39 = 97 | CES64 = 68 | CES89 = 72 |
| CES15 = 71 | CES40 = 92 | CES65 = 65 | CES90 = 80 |
| CES16 = 47 | CES41 = 93 | CES66 = 61 | CES91 = 78 |
| CES17 = 49 | CES42 = 82 | CES67 = 58 | CES92 = 63 |
| CES18 = 56 | CES43 = 80 | CES68 = 68 | CES93 = 77 |
| CES19 = 72 | CES44 = 99 | CES69 = 76 | CES94 = 57 |
| CES20 = 65 | CES45 = 86 | CES70 = 60 | CES95 = 69 |
| CES21 = 86 | CES46 = 83 | CES71 = 54 | CES96 = 78 |
| CES22 = 78 | CES47 = 86 | CES72 = 85 | CES97 = 85 |
| CES23 = 92 | CES48 = 77 | CES73 = 52 | CES98 = 77 |
| CES24 = 91 | CES49 = 81 | CES74 = 95 | CES99 = 67 |
| CES25 = 72 | CES50 = 88 | CES75 = 56 | |



Color Rendition by Hue-Angle Bin



Measure Comparisons



(END OF REPORT)