

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: P413326

Luminaire Tested: **TT-D4-830-U-RW**

Issue Date: 10/15/2020

Test Information

Test Method: LM-79-08
Report Number: P413326
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2010-981-1)
Test Lab: INNOVATION CENTER
Issue Date: 10/15/2020
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)
Product Line: MCGRAW-EDISON
Catalog Number: TT-D4-830-U-RW
Description: TOPTIER LED PARKING GARAGE LUMINAIRE
3000K, 80 CRI LEDS AND RECTANGULAR DISTRIBUTION
Light Source: -
Ballast/Driver: ELECTRONIC DRIVER

Summary

Lumens per Lamp: N/A
Luminaire Lumens: 5387 lumens
Efficiency: N/A
Efficacy: 93.5 lumens/watt
Luminous Opening: Circular (Dia: 1.12' x H: 0')
IES Classification: Type V - Short - Non-Cutoff
BUG Rating: B3 - U0 - G3

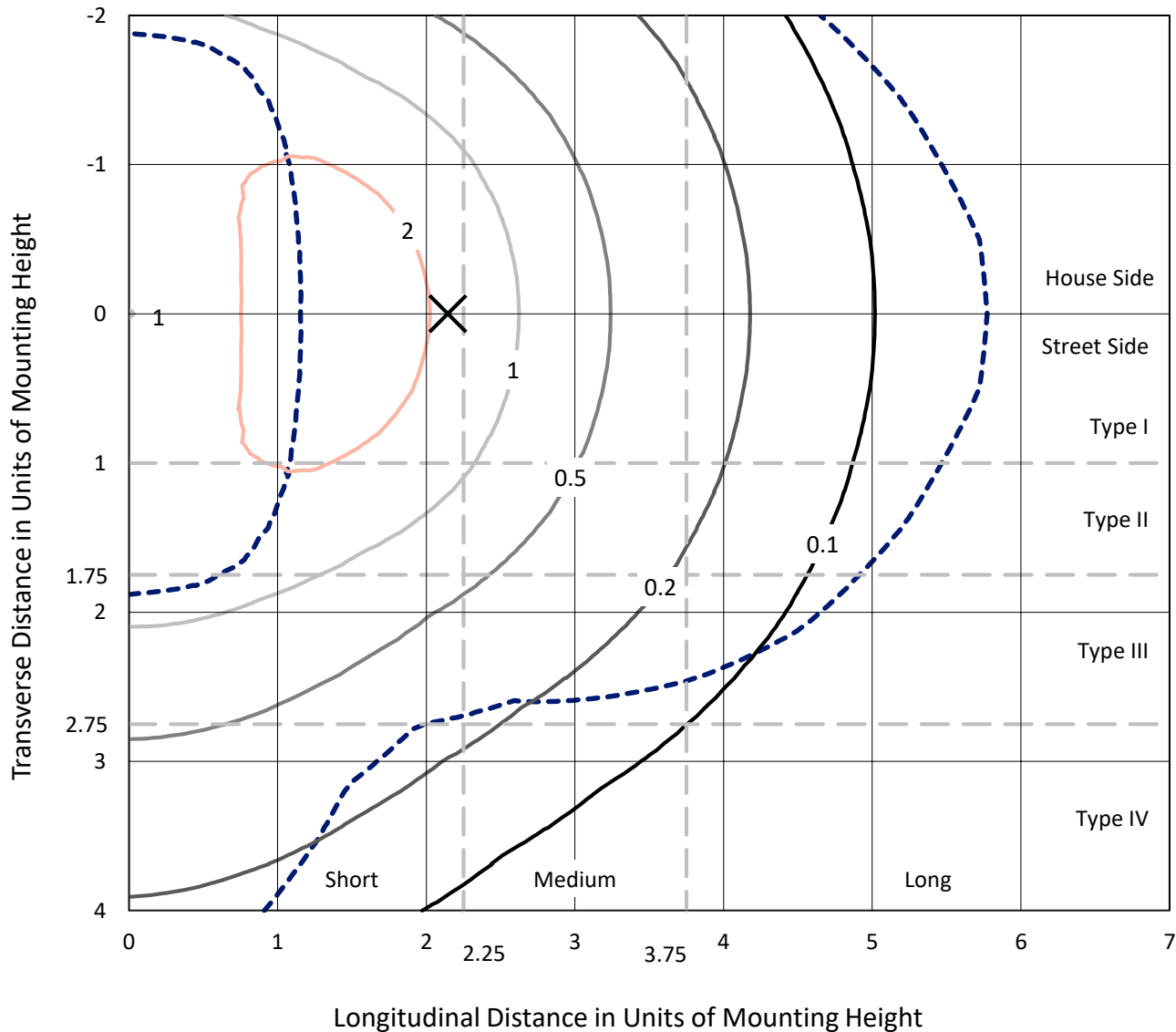
Input Watts (W): 57.6
Input Voltage (V): NR
Input Current (Ain): NR
Voltage Rise (V): NR
Power Factor: NR
Total Harmonic Distortion (THDi): NR
Frequency (hertz): 60
Stabilization Time: NR
Operation Time: NR
Ambient Temperature (°C): NR
Test Distance: 28.75 FT



REPORT NUMBER: P413326
 CATALOG NUMBER: TT-D4-830-U-RW

Iso-Footcandle Lines of Horizontal Illumination

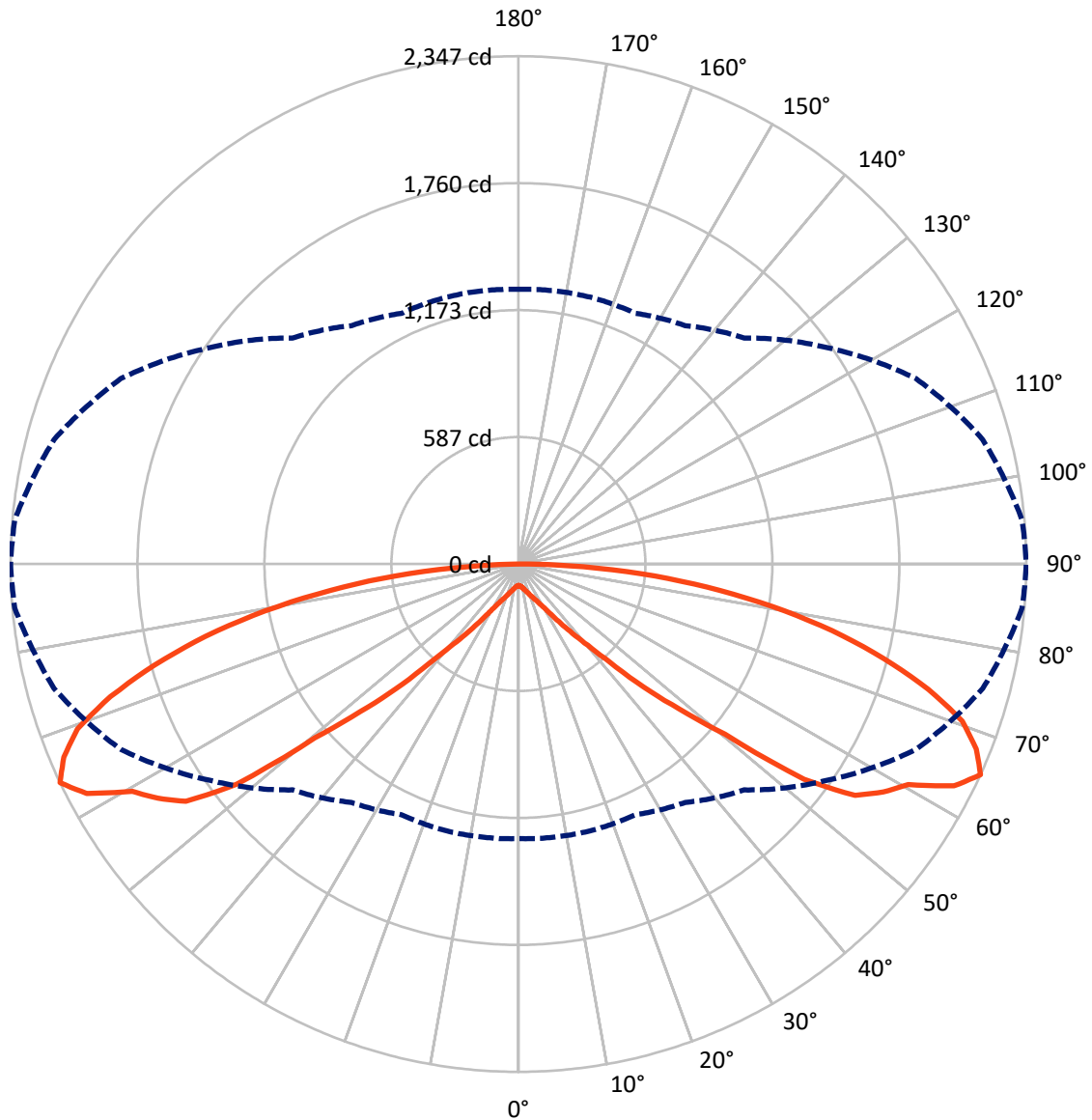
× Max cd
 - - - 1/2 Max cd



Based on 10 foot mounting height. Maximum calculated value = 3.6 fc
 Type V - Short - Non-Cutoff

REPORT NUMBER: P413326
CATALOG NUMBER: TT-D4-830-U-RW

Luminous Intensity Polar Plot



— Vertical Plane Through 90-Deg Lateral - - - Horizontal Cone Through 65-Deg Vertical

REPORT NUMBER: P413326

CATALOG NUMBER: TT-D4-830-U-RW

FLUX DISTRIBUTION:

| | | Downward | Upward | Total |
|--------------------|-----------|----------|--------|--------|
| House Side | Lumens | 2693.5 | 0.0 | 2693.5 |
| | % Fixture | 50.0 | 0.0 | 50.0 |
| Street Side | Lumens | 2693.5 | 0.0 | 2693.5 |
| | % Fixture | 50.0 | 0.0 | 50.0 |
| Total | Lumens | 5387.0 | 0.0 | 5387.0 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

Coefficient of Utilization

ZONAL LUMENS:

| Zone | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10° | 10.3 | 0.2 |
| 10°-20° | 38.4 | 0.7 |
| 20°-30° | 88.8 | 1.6 |
| 30°-40° | 200.7 | 3.7 |
| 40°-50° | 488.9 | 9.1 |
| 50°-60° | 1099.4 | 20.4 |
| 60°-70° | 1606.8 | 29.8 |
| 70°-80° | 1400.1 | 26.0 |
| 80°-90° | 453.5 | 8.4 |
| 90°-100° | 0.0 | 0.0 |
| 100°-110° | 0.0 | 0.0 |
| 110°-120° | 0.0 | 0.0 |
| 120°-130° | 0.0 | 0.0 |
| 130°-140° | 0.0 | 0.0 |
| 140°-150° | 0.0 | 0.0 |
| 150°-160° | 0.0 | 0.0 |
| 160°-170° | 0.0 | 0.0 |
| 170°-180° | 0.0 | 0.0 |
| 0°-90° | 5387.0 | 100.0 |
| 0°-180° | 5387.0 | 100.0 |



REPORT NUMBER: P413326

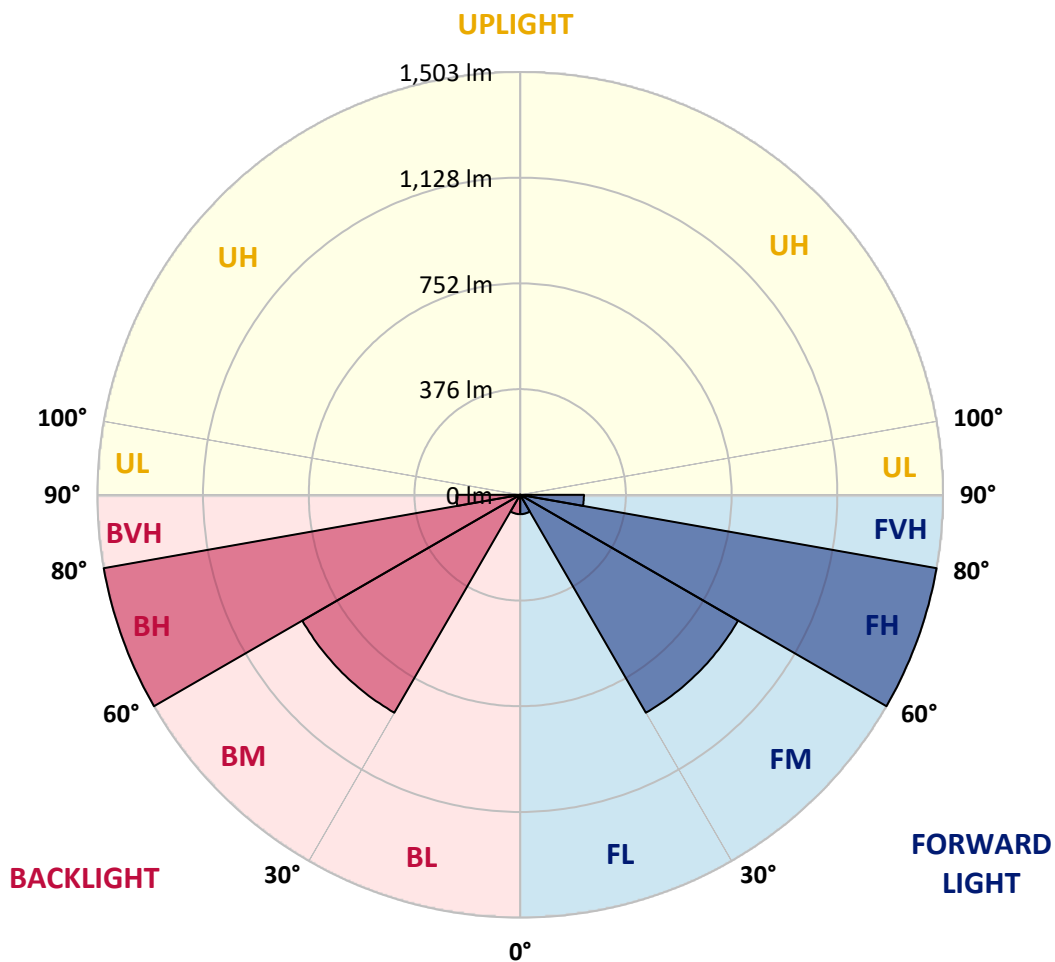
CATALOG NUMBER: TT-D4-830-U-RW

LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | Lumens | % Fixture | Zone Rating/Lumen Limit | | |
|----------------|--------|-----------|-------------------------|------|---------|
| | | | B | U | G |
| FL (0°-30°) | 68.7 | 1.3 | | | |
| FM (30°-60°) | 894.5 | 16.6 | | | |
| FH (60°-80°) | 1503.5 | 27.9 | | | G1/1800 |
| FVH (80°-90°) | 226.8 | 4.2 | | | G3/500 |
| BL (0°-30°) | 68.7 | 1.3 | B0/110 | | |
| BM (30°-60°) | 894.5 | 16.6 | B1/1000 | | |
| BH (60°-80°) | 1503.5 | 27.9 | B3/2500 | | G1/1800 |
| BVH (80°-90°) | 226.8 | 4.2 | | | G3/500 |
| UL (90°-100°) | 0.0 | 0.0 | | U0/0 | |
| UH (100°-180°) | 0.0 | 0.0 | | U0/0 | |

BUG Rating: B3-U0-G3

Type V Short





REPORT NUMBER: P413326

CATALOG NUMBER: TT-D4-830-U-RW

CANDELA DISTRIBUTION (FULL):

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 65° | 75° | 85° | 90° |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0° | 98.4 | 98.4 | 98.4 | 98.4 | 98.4 | 98.4 | 98.4 | 98.4 | 98.4 | 98.4 | 98.4 |
| 2.5° | 99.7 | 99.7 | 101.0 | 101.0 | 101.0 | 101.0 | 101.0 | 101.0 | 101.0 | 101.0 | 101.0 |
| 5° | 103.5 | 103.5 | 103.5 | 103.5 | 104.8 | 104.8 | 103.5 | 103.5 | 103.5 | 103.5 | 103.5 |
| 7.5° | 109.9 | 108.6 | 109.9 | 109.9 | 109.9 | 108.6 | 108.6 | 108.6 | 107.4 | 107.4 | 107.4 |
| 10° | 116.3 | 116.3 | 117.6 | 116.3 | 116.3 | 115.0 | 115.0 | 115.0 | 113.8 | 113.8 | 113.8 |
| 12.5° | 125.3 | 125.3 | 125.3 | 125.3 | 124.0 | 124.0 | 122.7 | 121.4 | 120.2 | 120.2 | 120.2 |
| 15° | 136.8 | 135.5 | 135.5 | 134.2 | 132.9 | 131.7 | 130.4 | 130.4 | 129.1 | 129.1 | 129.1 |
| 17.5° | 148.3 | 148.3 | 147.0 | 145.7 | 143.2 | 141.9 | 141.9 | 140.6 | 139.3 | 139.3 | 139.3 |
| 20° | 162.3 | 162.3 | 161.1 | 158.5 | 155.9 | 154.7 | 153.4 | 153.4 | 152.1 | 152.1 | 152.1 |
| 22.5° | 178.9 | 177.7 | 175.1 | 172.6 | 170.0 | 168.7 | 167.4 | 166.2 | 166.2 | 166.2 | 166.2 |
| 25° | 196.8 | 195.6 | 194.3 | 190.5 | 186.6 | 185.3 | 182.8 | 182.8 | 181.5 | 182.8 | 182.8 |
| 27.5° | 218.6 | 217.3 | 214.7 | 210.9 | 205.8 | 203.2 | 202.0 | 202.0 | 203.2 | 203.2 | 204.5 |
| 30° | 245.4 | 242.9 | 240.3 | 235.2 | 230.1 | 226.2 | 226.2 | 227.5 | 231.4 | 233.9 | 233.9 |
| 32.5° | 277.4 | 276.1 | 272.3 | 267.1 | 258.2 | 255.6 | 258.2 | 265.9 | 271.0 | 274.8 | 277.4 |
| 35° | 314.4 | 313.2 | 308.0 | 299.1 | 292.7 | 291.4 | 299.1 | 311.9 | 328.5 | 333.6 | 336.2 |
| 37.5° | 355.3 | 356.6 | 350.2 | 340.0 | 333.6 | 336.2 | 351.5 | 375.8 | 392.4 | 403.9 | 406.5 |
| 40° | 406.5 | 409.0 | 401.4 | 389.9 | 383.5 | 393.7 | 418.0 | 446.1 | 475.5 | 489.5 | 493.4 |
| 42.5° | 466.5 | 470.4 | 460.2 | 448.6 | 444.8 | 461.4 | 495.9 | 542.0 | 594.4 | 611.0 | 617.4 |
| 45° | 540.7 | 543.2 | 530.5 | 520.2 | 517.7 | 547.1 | 605.9 | 682.6 | 765.6 | 804.0 | 810.4 |
| 47.5° | 628.9 | 627.6 | 616.1 | 603.3 | 605.9 | 648.0 | 736.2 | 839.8 | 928.0 | 986.8 | 999.6 |
| 50° | 729.9 | 723.5 | 714.5 | 699.2 | 715.8 | 777.1 | 888.3 | 1013.6 | 1161.9 | 1214.3 | 1237.3 |
| 52.5° | 830.8 | 819.3 | 811.7 | 801.4 | 830.8 | 910.1 | 1066.0 | 1284.6 | 1508.3 | 1628.4 | 1652.7 |
| 55° | 921.6 | 912.6 | 908.8 | 910.1 | 956.1 | 1069.9 | 1274.4 | 1554.3 | 1770.3 | 1870.0 | 1887.9 |
| 57.5° | 1011.1 | 1005.9 | 1002.1 | 1009.8 | 1082.6 | 1230.9 | 1461.0 | 1723.0 | 1900.7 | 1974.8 | 1987.6 |
| 60° | 1095.4 | 1100.5 | 1098.0 | 1121.0 | 1209.2 | 1358.7 | 1558.1 | 1816.3 | 1987.6 | 2055.3 | 2069.4 |
| 62.5° | 1188.7 | 1192.6 | 1192.6 | 1218.1 | 1289.7 | 1421.4 | 1624.6 | 1926.2 | 2143.5 | 2243.2 | 2258.6 |
| 65° | 1269.3 | 1271.8 | 1276.9 | 1278.2 | 1344.7 | 1476.3 | 1742.2 | 2027.2 | 2221.5 | 2336.5 | 2346.8 |
| 67.5° | 1329.3 | 1331.9 | 1325.5 | 1319.1 | 1370.2 | 1489.1 | 1733.2 | 2014.4 | 2187.0 | 2273.9 | 2281.6 |
| 70° | 1377.9 | 1366.4 | 1348.5 | 1316.5 | 1333.2 | 1422.6 | 1659.1 | 1912.2 | 2086.0 | 2164.0 | 2175.5 |
| 72.5° | 1384.3 | 1374.1 | 1317.8 | 1246.2 | 1225.8 | 1303.8 | 1528.7 | 1756.2 | 1905.8 | 1979.9 | 1981.2 |
| 75° | 1345.9 | 1319.1 | 1225.8 | 1118.4 | 1080.1 | 1154.2 | 1347.2 | 1554.3 | 1674.4 | 1737.1 | 1743.5 |
| 77.5° | 1216.8 | 1191.3 | 1073.7 | 951.0 | 907.5 | 971.4 | 1135.0 | 1302.5 | 1417.5 | 1478.9 | 1482.7 |
| 80° | 988.0 | 979.1 | 871.7 | 759.2 | 706.8 | 743.9 | 887.1 | 1018.7 | 1112.0 | 1184.9 | 1191.3 |
| 82.5° | 728.6 | 720.9 | 639.1 | 540.7 | 498.5 | 529.2 | 631.4 | 728.6 | 815.5 | 874.3 | 878.1 |
| 85° | 455.0 | 439.7 | 388.6 | 319.5 | 291.4 | 311.9 | 379.6 | 444.8 | 522.8 | 568.8 | 571.4 |
| 87.5° | 152.1 | 145.7 | 125.3 | 103.5 | 86.9 | 90.8 | 111.2 | 135.5 | 198.1 | 218.6 | 231.4 |
| 90° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

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: SP1-2006-844-5

Luminaire Tested: TT-D5-830-U-MQ

Test Date: 09/30/2020

Data applicable to product families TT-x-830 and TTN-x-830

Test Information

Test Method: LM-79-08
 Report Number: SP1-2006-844-5
 Test Lab: COOPER LIGHTING SOLUTIONS
 Photometer: SP1
 Measurement Geometry: 4π
 Issue Date: 09/30/2020
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)
 Product Line: MCGRAW-EDISON
 Catalog Number: **TT-D5-830-U-MQ**
 Description: MCGRAW EDISON

DISTRIBUTION

Spectral Parameters

CCT (K): 2996
 CIE u': 0.2496
 CIE v': 0.5255
 Duv: 0.0029
 CIE x: 0.4414
 CIE y: 0.4130
 CIE z: 0.1455
 Peak Wavelength (nm): 601
 Dominant Wavelength (nm): 581
 Purity: 56.8
 Rf: 85.7
 Rg: 94.5

| | | | |
|-----------|------|------|------|
| CRI (Ra): | 81.6 | | |
| R1: | 79.1 | R9: | -0.6 |
| R2: | 89.7 | R10: | 77.8 |
| R3: | 96.7 | R11: | 80.1 |
| R4: | 80.2 | R12: | 72.7 |
| R5: | 79.8 | R13: | 81.5 |
| R6: | 88.4 | R14: | 98.5 |
| R7: | 82.6 | | |
| R8: | 56.3 | | |

Test Conditions

Stabilization Time: 55M
 Operation Time: 12H
 Room Temperature (°C) / RH%: 25.5/43%
 Sphere Temperature (°C): 25.9



REPORT NUMBER: SP1-2006-844-5

| 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: SP1-2006-844-5

CIE 1931 Chromaticity Diagram



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



CCT = 2996K
 CIE x = 0.4414
 CIE y = 0.4130
 Duv = 0.0029

Point lies inside the ANSI 3000K 4-step quadrangle

REPORT NUMBER: SP1-2006-844-5

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 | 2265 | 0.0 | 490 | 45874 | 6.5 | 620 | 162337 | 42.2 | 750 | 6976 | 0.0 | 880 | 2976 | 0.0 |
| 365 | 2167 | 0.0 | 495 | 55189 | 10.0 | 625 | 153641 | 33.9 | 755 | 6666 | 0.0 | 885 | 2283 | 0.0 |
| 370 | 2505 | 0.0 | 500 | 64204 | 14.2 | 630 | 143151 | 25.9 | 760 | 5969 | 0.0 | 890 | 2506 | 0.0 |
| 375 | 2720 | 0.0 | 505 | 71441 | 20.0 | 635 | 133763 | 20.1 | 765 | 5281 | 0.0 | 895 | 3132 | 0.0 |
| 380 | 2601 | 0.0 | 510 | 76219 | 26.2 | 640 | 123759 | 14.8 | 770 | 4732 | 0.0 | 900 | 2539 | 0.0 |
| 385 | 2461 | 0.0 | 515 | 79949 | 33.1 | 645 | 112859 | 10.9 | 775 | 3998 | 0.0 | 905 | 1252 | 0.0 |
| 390 | 2308 | 0.0 | 520 | 83077 | 40.3 | 650 | 102080 | 7.5 | 780 | 4027 | 0.0 | 910 | 1938 | 0.0 |
| 395 | 2104 | 0.0 | 525 | 86267 | 46.3 | 655 | 91102 | 5.2 | 785 | 4088 | 0.0 | 915 | 2171 | 0.0 |
| 400 | 1900 | 0.0 | 530 | 89871 | 52.9 | 660 | 79928 | 3.3 | 790 | 3700 | 0.0 | 920 | 2123 | 0.0 |
| 405 | 1945 | 0.0 | 535 | 93544 | 58.0 | 665 | 70694 | 2.2 | 795 | 3213 | 0.0 | 925 | 1954 | 0.0 |
| 410 | 2378 | 0.0 | 540 | 97371 | 63.4 | 670 | 61201 | 1.3 | 800 | 3403 | 0.0 | 930 | 2800 | 0.0 |
| 415 | 3437 | 0.0 | 545 | 103011 | 68.6 | 675 | 53092 | 0.9 | 805 | 3079 | 0.0 | 935 | 3314 | 0.0 |
| 420 | 6173 | 0.0 | 550 | 108560 | 73.8 | 680 | 45718 | 0.5 | 810 | 2921 | 0.0 | 940 | 553 | 0.0 |
| 425 | 11052 | 0.1 | 555 | 114473 | 78.2 | 685 | 39372 | 0.3 | 815 | 2705 | 0.0 | 945 | 2793 | 0.0 |
| 430 | 18756 | 0.1 | 560 | 121896 | 82.8 | 690 | 34120 | 0.2 | 820 | 2685 | 0.0 | 950 | 2629 | 0.0 |
| 435 | 29750 | 0.4 | 565 | 130192 | 86.6 | 695 | 29427 | 0.1 | 825 | 3246 | 0.0 | 955 | 2418 | 0.0 |
| 440 | 43697 | 0.7 | 570 | 139595 | 90.8 | 700 | 25380 | 0.1 | 830 | 2813 | 0.0 | 960 | 2857 | 0.0 |
| 445 | 61462 | 1.3 | 575 | 149225 | 92.8 | 705 | 22079 | 0.0 | 835 | 2097 | 0.0 | 965 | 1052 | 0.0 |
| 450 | 76648 | 2.0 | 580 | 158344 | 94.1 | 710 | 18938 | 0.0 | 840 | 1606 | 0.0 | 970 | 4009 | 0.0 |
| 455 | 65529 | 2.2 | 585 | 165704 | 92.1 | 715 | 16322 | 0.0 | 845 | 2347 | 0.0 | 975 | 2341 | 0.0 |
| 460 | 46753 | 1.9 | 590 | 172269 | 89.1 | 720 | 14132 | 0.0 | 850 | 2273 | 0.0 | 980 | 2439 | 0.0 |
| 465 | 38422 | 2.0 | 595 | 177895 | 84.3 | 725 | 12072 | 0.0 | 855 | 1971 | 0.0 | 985 | 2098 | 0.0 |
| 470 | 32450 | 2.0 | 600 | 180887 | 78.0 | 730 | 10271 | 0.0 | 860 | 1962 | 0.0 | 990 | 1159 | 0.0 |
| 475 | 29284 | 2.3 | 605 | 178880 | 69.3 | 735 | 9202 | 0.0 | 865 | 2989 | 0.0 | 995 | 2146 | 0.0 |
| 480 | 31922 | 3.0 | 610 | 175843 | 60.4 | 740 | 8451 | 0.0 | 870 | 2921 | 0.0 | 1000 | 1904 | 0.0 |
| 485 | 37800 | 4.5 | 615 | 170321 | 51.4 | 745 | 7632 | 0.0 | 875 | 3581 | 0.0 | | | |

REPORT NUMBER: SP1-2006-844-5

Scotopic Flux vs. Wavelength



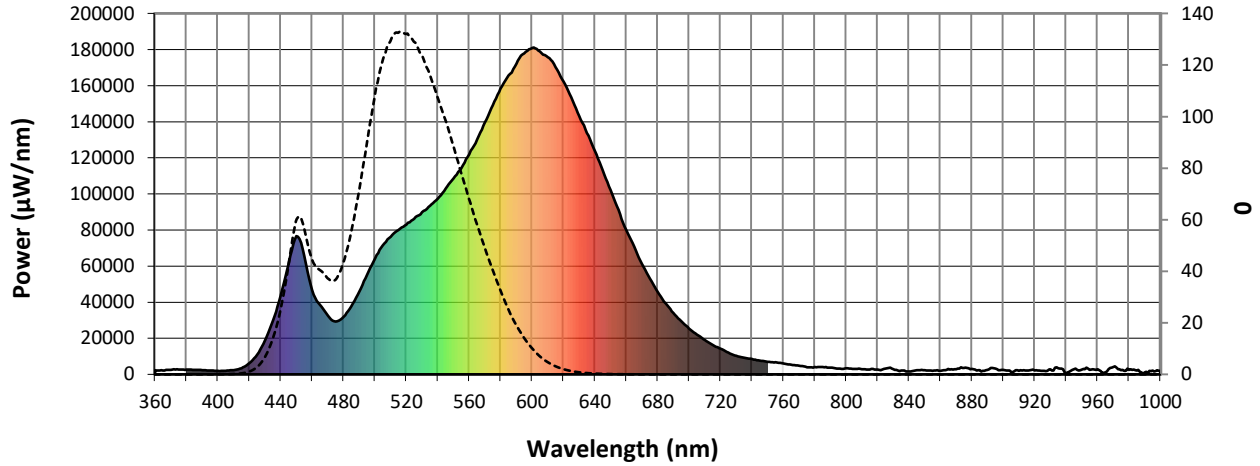
Scotopic Lumens: 4357.3

S/P: 0.5

| 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 | 2265 | 0.0 | 490 | 45874 | 70.6 | 620 | 162337 | 2.0 | 750 | 6976 | 0.0 | 880 | 2976 | 0.0 |
| 365 | 2167 | 0.0 | 495 | 55189 | 89.2 | 625 | 153641 | 1.3 | 755 | 6666 | 0.0 | 885 | 2283 | 0.0 |
| 370 | 2505 | 0.0 | 500 | 64204 | 107.4 | 630 | 143151 | 0.8 | 760 | 5969 | 0.0 | 890 | 2506 | 0.0 |
| 375 | 2720 | 0.0 | 505 | 71441 | 121.4 | 635 | 133763 | 0.5 | 765 | 5281 | 0.0 | 895 | 3132 | 0.0 |
| 380 | 2601 | 0.0 | 510 | 76219 | 129.2 | 640 | 123759 | 0.3 | 770 | 4732 | 0.0 | 900 | 2539 | 0.0 |
| 385 | 2461 | 0.0 | 515 | 79949 | 132.5 | 645 | 112859 | 0.2 | 775 | 3998 | 0.0 | 905 | 1252 | 0.0 |
| 390 | 2308 | 0.0 | 520 | 83077 | 132.1 | 650 | 102080 | 0.1 | 780 | 4027 | 0.0 | 910 | 1938 | 0.0 |
| 395 | 2104 | 0.0 | 525 | 86267 | 129.1 | 655 | 91102 | 0.1 | 785 | 4088 | 0.0 | 915 | 2171 | 0.0 |
| 400 | 1900 | 0.0 | 530 | 89871 | 123.9 | 660 | 79928 | 0.0 | 790 | 3700 | 0.0 | 920 | 2123 | 0.0 |
| 405 | 1945 | 0.1 | 535 | 93544 | 116.6 | 665 | 70694 | 0.0 | 795 | 3213 | 0.0 | 925 | 1954 | 0.0 |
| 410 | 2378 | 0.1 | 540 | 97371 | 107.6 | 670 | 61201 | 0.0 | 800 | 3403 | 0.0 | 930 | 2800 | 0.0 |
| 415 | 3437 | 0.4 | 545 | 103011 | 98.8 | 675 | 53092 | 0.0 | 805 | 3079 | 0.0 | 935 | 3314 | 0.0 |
| 420 | 6173 | 1.0 | 550 | 108560 | 88.8 | 680 | 45718 | 0.0 | 810 | 2921 | 0.0 | 940 | 553 | 0.0 |
| 425 | 11052 | 2.7 | 555 | 114473 | 78.2 | 685 | 39372 | 0.0 | 815 | 2705 | 0.0 | 945 | 2793 | 0.0 |
| 430 | 18756 | 6.4 | 560 | 121896 | 68.1 | 690 | 34120 | 0.0 | 820 | 2685 | 0.0 | 950 | 2629 | 0.0 |
| 435 | 29750 | 13.3 | 565 | 130192 | 58.4 | 695 | 29427 | 0.0 | 825 | 3246 | 0.0 | 955 | 2418 | 0.0 |
| 440 | 43697 | 24.4 | 570 | 139595 | 49.3 | 700 | 25380 | 0.0 | 830 | 2813 | 0.0 | 960 | 2857 | 0.0 |
| 445 | 61462 | 41.2 | 575 | 149225 | 40.6 | 705 | 22079 | 0.0 | 835 | 2097 | 0.0 | 965 | 1052 | 0.0 |
| 450 | 76648 | 59.4 | 580 | 158344 | 32.6 | 710 | 18938 | 0.0 | 840 | 1606 | 0.0 | 970 | 4009 | 0.0 |
| 455 | 65529 | 57.3 | 585 | 165704 | 25.3 | 715 | 16322 | 0.0 | 845 | 2347 | 0.0 | 975 | 2341 | 0.0 |
| 460 | 46753 | 45.2 | 590 | 172269 | 19.2 | 720 | 14132 | 0.0 | 850 | 2273 | 0.0 | 980 | 2439 | 0.0 |
| 465 | 38422 | 40.6 | 595 | 177895 | 14.2 | 725 | 12072 | 0.0 | 855 | 1971 | 0.0 | 985 | 2098 | 0.0 |
| 470 | 32450 | 37.4 | 600 | 180887 | 10.2 | 730 | 10271 | 0.0 | 860 | 1962 | 0.0 | 990 | 1159 | 0.0 |
| 475 | 29284 | 36.6 | 605 | 178880 | 7.0 | 735 | 9202 | 0.0 | 865 | 2989 | 0.0 | 995 | 2146 | 0.0 |
| 480 | 31922 | 43.1 | 610 | 175843 | 4.8 | 740 | 8451 | 0.0 | 870 | 2921 | 0.0 | 1000 | 1904 | 0.0 |
| 485 | 37800 | 54.8 | 615 | 170321 | 3.2 | 745 | 7632 | 0.0 | 875 | 3581 | 0.0 | | | |

REPORT NUMBER: SP1-2006-844-5

Melanopic Flux vs. Wavelength



Melanopic Lumens: 11640.4 S/P: 1.33

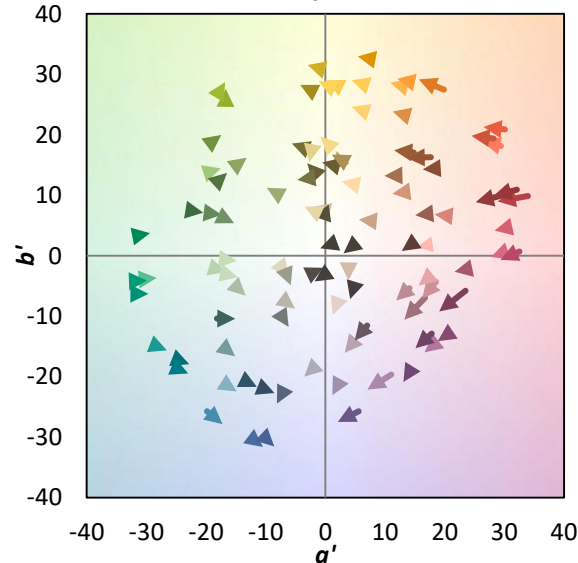
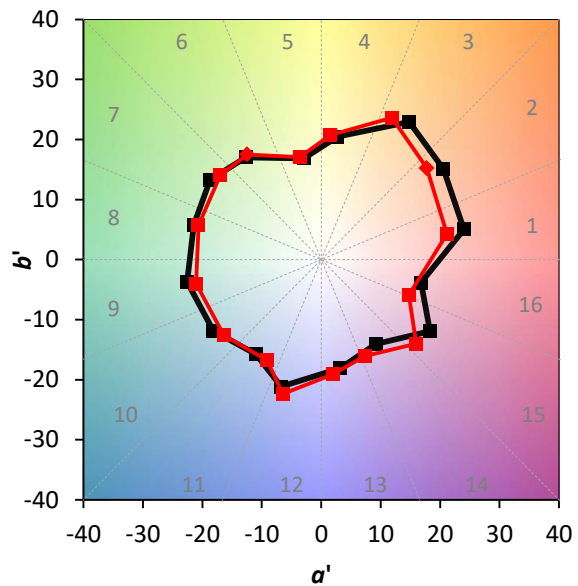
| λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) |
|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|
| 360 | 2265 | 0.0 | 490 | 45874 | 38.2 | 620 | 162337 | 0.1 | 750 | 6976 | 0.0 | 880 | 2976 | 0.0 |
| 365 | 2167 | 0.0 | 495 | 55189 | 45.6 | 625 | 153641 | 0.1 | 755 | 6666 | 0.0 | 885 | 2283 | 0.0 |
| 370 | 2505 | 0.0 | 500 | 64204 | 51.6 | 630 | 143151 | 0.0 | 760 | 5969 | 0.0 | 890 | 2506 | 0.0 |
| 375 | 2720 | 0.0 | 505 | 71441 | 54.8 | 635 | 133763 | 0.0 | 765 | 5281 | 0.0 | 895 | 3132 | 0.0 |
| 380 | 2601 | 0.0 | 510 | 76219 | 54.7 | 640 | 123759 | 0.0 | 770 | 4732 | 0.0 | 900 | 2539 | 0.0 |
| 385 | 2461 | 0.0 | 515 | 79949 | 52.2 | 645 | 112859 | 0.0 | 775 | 3998 | 0.0 | 905 | 1252 | 0.0 |
| 390 | 2308 | 0.0 | 520 | 83077 | 48.4 | 650 | 102080 | 0.0 | 780 | 4027 | 0.0 | 910 | 1938 | 0.0 |
| 395 | 2104 | 0.0 | 525 | 86267 | 43.7 | 655 | 91102 | 0.0 | 785 | 4088 | 0.0 | 915 | 2171 | 0.0 |
| 400 | 1900 | 0.0 | 530 | 89871 | 38.8 | 660 | 79928 | 0.0 | 790 | 3700 | 0.0 | 920 | 2123 | 0.0 |
| 405 | 1945 | 0.0 | 535 | 93544 | 33.7 | 665 | 70694 | 0.0 | 795 | 3213 | 0.0 | 925 | 1954 | 0.0 |
| 410 | 2378 | 0.1 | 540 | 97371 | 28.5 | 670 | 61201 | 0.0 | 800 | 3403 | 0.0 | 930 | 2800 | 0.0 |
| 415 | 3437 | 0.2 | 545 | 103011 | 23.9 | 675 | 53092 | 0.0 | 805 | 3079 | 0.0 | 935 | 3314 | 0.0 |
| 420 | 6173 | 0.7 | 550 | 108560 | 19.5 | 680 | 45718 | 0.0 | 810 | 2921 | 0.0 | 940 | 553 | 0.0 |
| 425 | 11052 | 1.7 | 555 | 114473 | 15.4 | 685 | 39372 | 0.0 | 815 | 2705 | 0.0 | 945 | 2793 | 0.0 |
| 430 | 18756 | 4.0 | 560 | 121896 | 12.0 | 690 | 34120 | 0.0 | 820 | 2685 | 0.0 | 950 | 2629 | 0.0 |
| 435 | 29750 | 7.9 | 565 | 130192 | 9.1 | 695 | 29427 | 0.0 | 825 | 3246 | 0.0 | 955 | 2418 | 0.0 |
| 440 | 43697 | 14.6 | 570 | 139595 | 6.8 | 700 | 25380 | 0.0 | 830 | 2813 | 0.0 | 960 | 2857 | 0.0 |
| 445 | 61462 | 24.2 | 575 | 149225 | 5.0 | 705 | 22079 | 0.0 | 835 | 2097 | 0.0 | 965 | 1052 | 0.0 |
| 450 | 76648 | 35.3 | 580 | 158344 | 3.5 | 710 | 18938 | 0.0 | 840 | 1606 | 0.0 | 970 | 4009 | 0.0 |
| 455 | 65529 | 34.3 | 585 | 165704 | 2.5 | 715 | 16322 | 0.0 | 845 | 2347 | 0.0 | 975 | 2341 | 0.0 |
| 460 | 46753 | 27.5 | 590 | 172269 | 1.7 | 720 | 14132 | 0.0 | 850 | 2273 | 0.0 | 980 | 2439 | 0.0 |
| 465 | 38422 | 25.1 | 595 | 177895 | 1.1 | 725 | 12072 | 0.0 | 855 | 1971 | 0.0 | 985 | 2098 | 0.0 |
| 470 | 32450 | 23.2 | 600 | 180887 | 0.8 | 730 | 10271 | 0.0 | 860 | 1962 | 0.0 | 990 | 1159 | 0.0 |
| 475 | 29284 | 22.4 | 605 | 178880 | 0.5 | 735 | 9202 | 0.0 | 865 | 2989 | 0.0 | 995 | 2146 | 0.0 |
| 480 | 31922 | 25.6 | 610 | 175843 | 0.3 | 740 | 8451 | 0.0 | 870 | 2921 | 0.0 | 1000 | 1904 | 0.0 |
| 485 | 37800 | 31.2 | 615 | 170321 | 0.2 | 745 | 7632 | 0.0 | 875 | 3581 | 0.0 | | | |

Summary

$R_f = 85.7$
 $R_g = 94.5$
 CIE $R_a = 81.6$
 $R_g = -0.6$

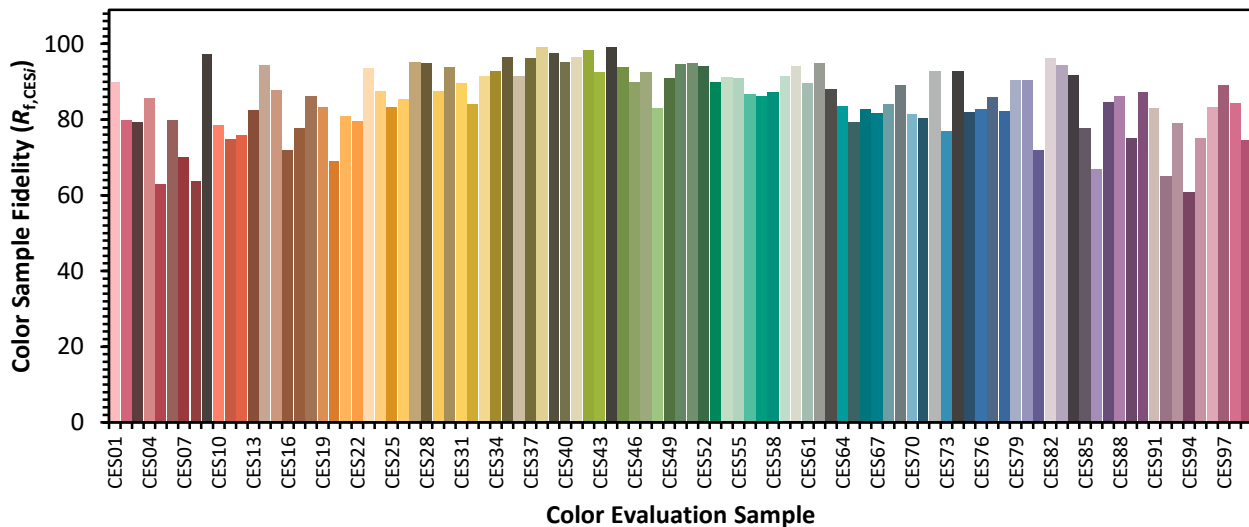


Color Vector Graphics

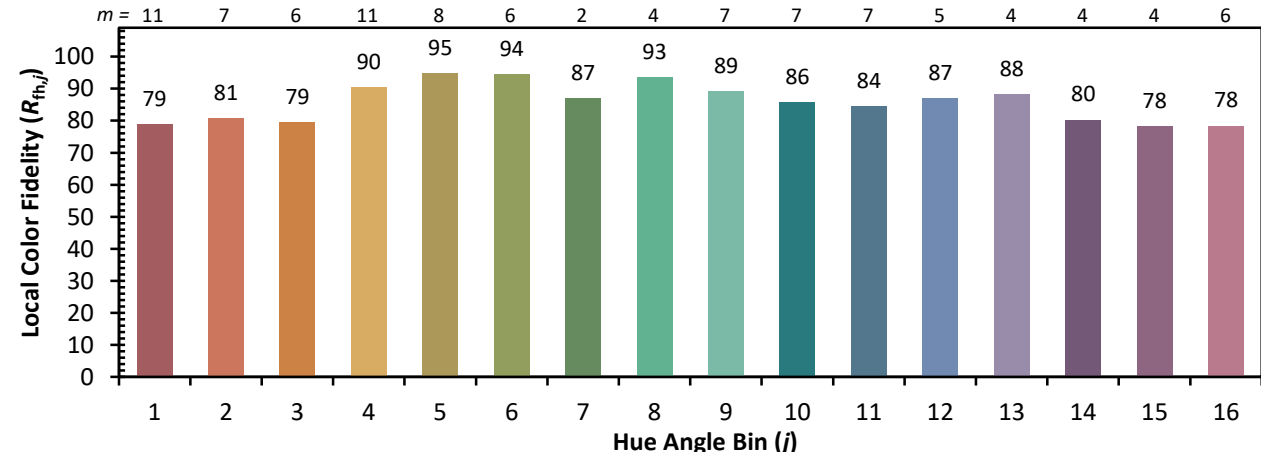
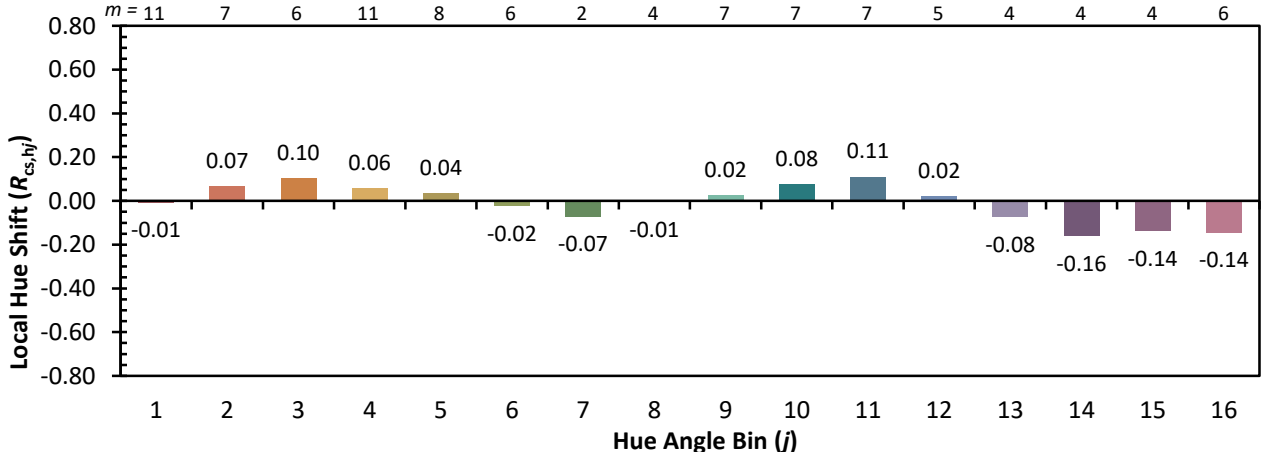
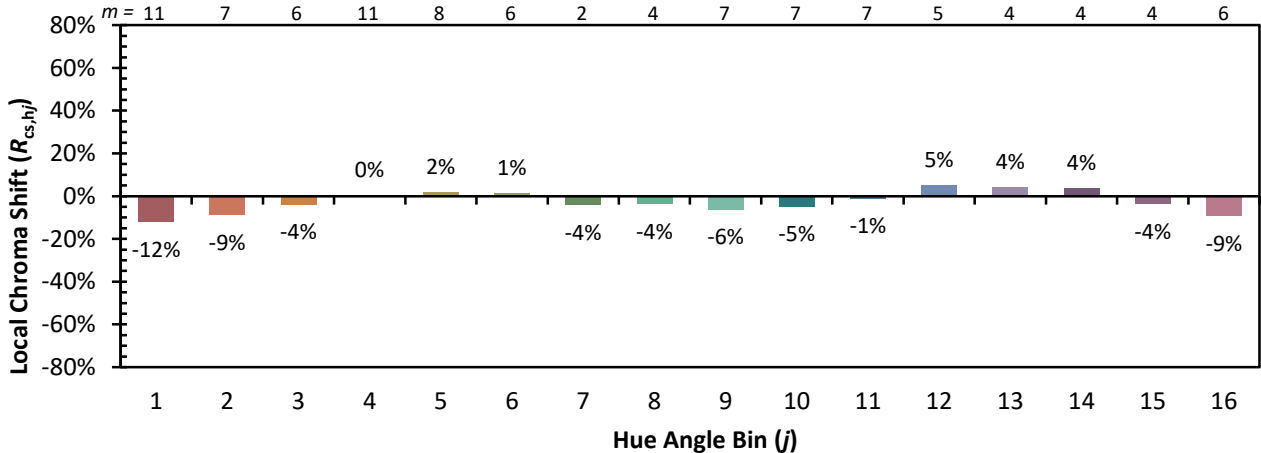


Individual Sample Fidelity Index ($R_{f,i}$)

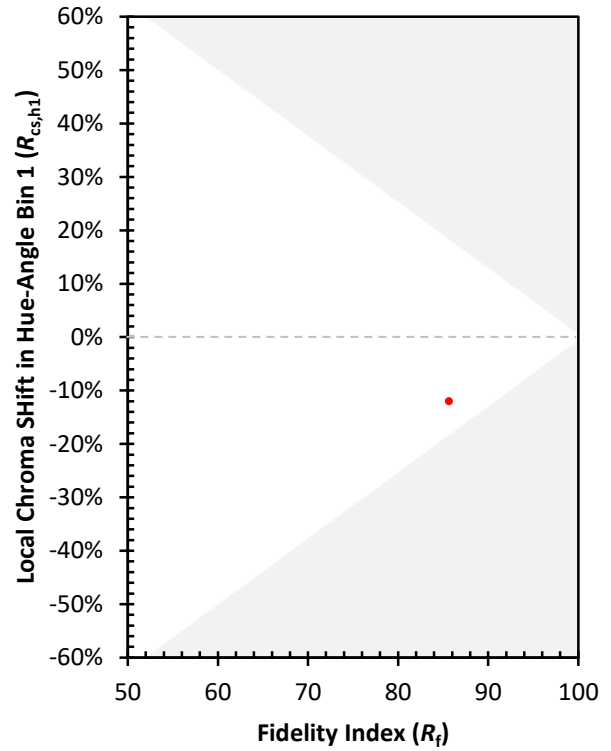
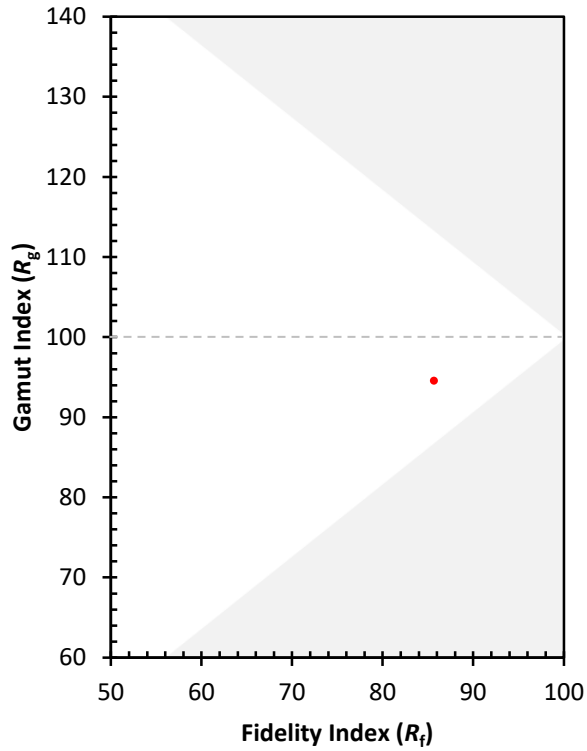
| | | | |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 85 | CES51 = 95 | CES76 = 83 |
| CES02 = 63 | CES27 = 95 | CES52 = 94 | CES77 = 86 |
| CES03 = 31 | CES28 = 95 | CES53 = 90 | CES78 = 82 |
| CES04 = 70 | CES29 = 88 | CES54 = 91 | CES79 = 91 |
| CES05 = 50 | CES30 = 94 | CES55 = 91 | CES80 = 90 |
| CES06 = 51 | CES31 = 90 | CES56 = 87 | CES81 = 72 |
| CES07 = 42 | CES32 = 84 | CES57 = 86 | CES82 = 96 |
| CES08 = 41 | CES33 = 92 | CES58 = 87 | CES83 = 94 |
| CES09 = 29 | CES34 = 93 | CES59 = 91 | CES84 = 92 |
| CES10 = 76 | CES35 = 96 | CES60 = 94 | CES85 = 78 |
| CES11 = 59 | CES36 = 91 | CES61 = 90 | CES86 = 67 |
| CES12 = 65 | CES37 = 96 | CES62 = 95 | CES87 = 85 |
| CES13 = 43 | CES38 = 99 | CES63 = 88 | CES88 = 86 |
| CES14 = 74 | CES39 = 98 | CES64 = 84 | CES89 = 75 |
| CES15 = 72 | CES40 = 95 | CES65 = 79 | CES90 = 87 |
| CES16 = 47 | CES41 = 97 | CES66 = 83 | CES91 = 83 |
| CES17 = 50 | CES42 = 98 | CES67 = 82 | CES92 = 65 |
| CES18 = 56 | CES43 = 93 | CES68 = 84 | CES93 = 79 |
| CES19 = 72 | CES44 = 99 | CES69 = 89 | CES94 = 61 |
| CES20 = 67 | CES45 = 94 | CES70 = 81 | CES95 = 75 |
| CES21 = 87 | CES46 = 90 | CES71 = 80 | CES96 = 83 |
| CES22 = 79 | CES47 = 93 | CES72 = 93 | CES97 = 89 |
| CES23 = 92 | CES48 = 83 | CES73 = 77 | CES98 = 84 |
| CES24 = 91 | CES49 = 91 | CES74 = 93 | CES99 = 75 |
| CES25 = 72 | CES50 = 95 | CES75 = 82 | |



Color Rendition by Hue-Angle Bin



Measure Comparisons



(END OF REPORT)