

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: McGRAW-EDISON

Report Number: P833544

Luminaire Tested: **TTN-D2-735-U-WQ-CG-UPL3**

Issue Date: 5/15/2024

Test Information

Test Method: LM-79-08
Report Number: P833544
REPORT IS FROM IESNA LM-79-08 TEST DATA - UPLIGHT (G3-2308-121-4) AND
Test Lab: INNOVATION CENTER
Issue Date: 5/15/2024
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)
Product Line: MCGRAW-EDISON
Catalog Number: TTN-D2-735-U-WQ-CG-UPL3
Description: TOPTIER NANO LED PARKING GARAGE LUMINAIRE WITH UPLIGHT
3500K, 70 CRI LEDS AND WIDE DISTRIBUTION WITH CLEAR GLASS
Light Source: -
Ballast/Driver: -

Summary

Lumens per Lamp: N/A
Luminaire Lumens: 5513.7 lumens
Efficiency: N/A
Efficacy: 111.4 lumens/watt
Luminous Opening: Vertical Cylinder (Dia: 0.71' x H: 0.1')
IES Classification: Type V - Short
BUG Rating: B2 - U4 - G1

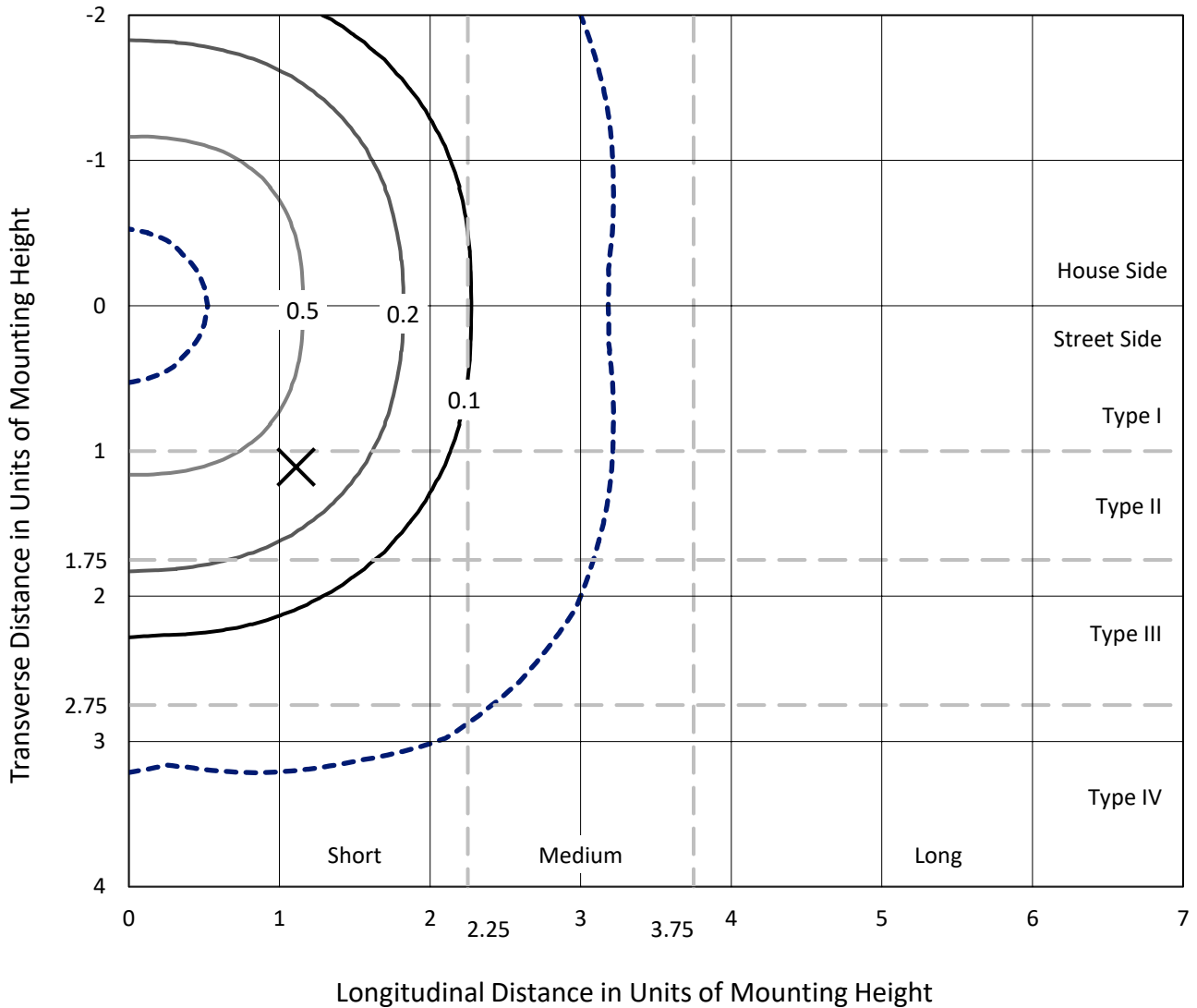
Input Watts (W): 49.5
Input Voltage (V): NR
Input Current (Ain): NR
Voltage Rise (V): NR
Power Factor: NR
Total Harmonic Distortion (THDi): NR
Frequency (hertz): 60
Stabilization Time: NR
Operation Time: NR
Ambient Temperature (°C): NR
Test Distance: 24 FT



REPORT NUMBER: P833544
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Iso-Footcandle Lines of Horizontal Illumination

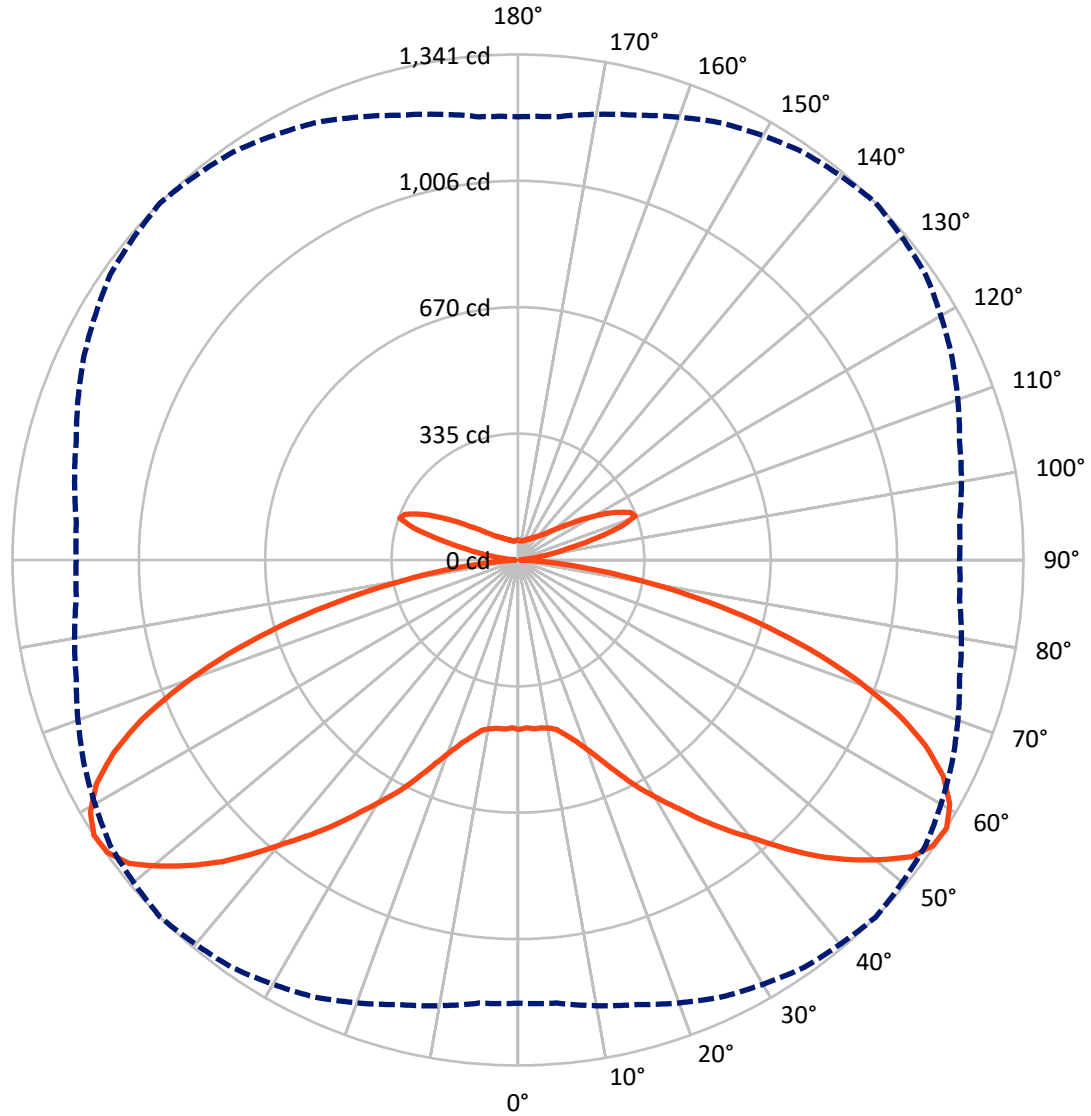
✕ Max cd
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 0.8 fc
 Type V - Short - N/A

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Luminous Intensity Polar Plot



— Vertical Plane Through 45-Deg Lateral - - - Horizontal Cone Through 57.5-Deg Vertical

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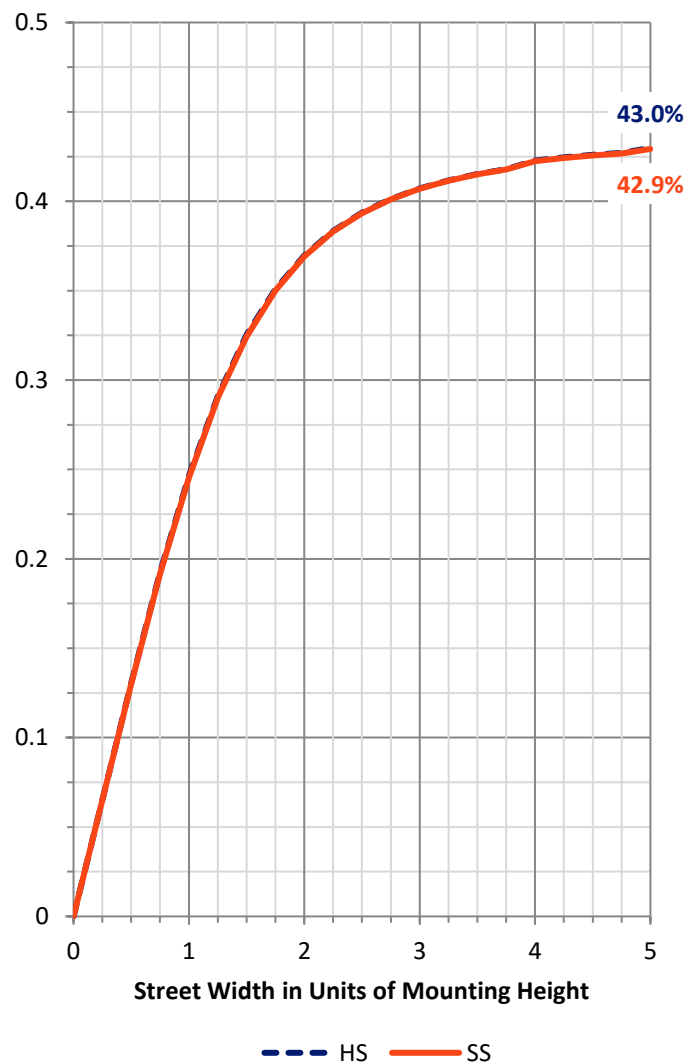
FLUX DISTRIBUTION:

| | | Downward | Upward | Total |
|--------------------|-----------|----------|--------|--------|
| House Side | Lumens | 2380.5 | 376.3 | 2756.8 |
| | % Fixture | 43.2 | 6.8 | 50.0 |
| Street Side | Lumens | 2380.5 | 376.3 | 2756.8 |
| | % Fixture | 43.2 | 6.8 | 50.0 |
| Total | Lumens | 4761.0 | 752.7 | 5513.7 |
| | % Fixture | 86.3 | 13.7 | 100.0 |

Coefficient of Utilization

ZONAL LUMENS:

| Zone | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10° | 42.9 | 0.8 |
| 10°-20° | 138.6 | 2.5 |
| 20°-30° | 291.7 | 5.3 |
| 30°-40° | 525.9 | 9.5 |
| 40°-50° | 836.0 | 15.2 |
| 50°-60° | 1115.3 | 20.2 |
| 60°-70° | 1077.6 | 19.5 |
| 70°-80° | 624.4 | 11.3 |
| 80°-90° | 108.6 | 2.0 |
| 90°-100° | 16.8 | 0.3 |
| 100°-110° | 170.7 | 3.1 |
| 110°-120° | 249.6 | 4.5 |
| 120°-130° | 144.9 | 2.6 |
| 130°-140° | 76.7 | 1.4 |
| 140°-150° | 45.6 | 0.8 |
| 150°-160° | 28.1 | 0.5 |
| 160°-170° | 15.3 | 0.3 |
| 170°-180° | 5.0 | 0.1 |
| 0°-90° | 4761.0 | 86.3 |
| 0°-180° | 5513.7 | 100.0 |

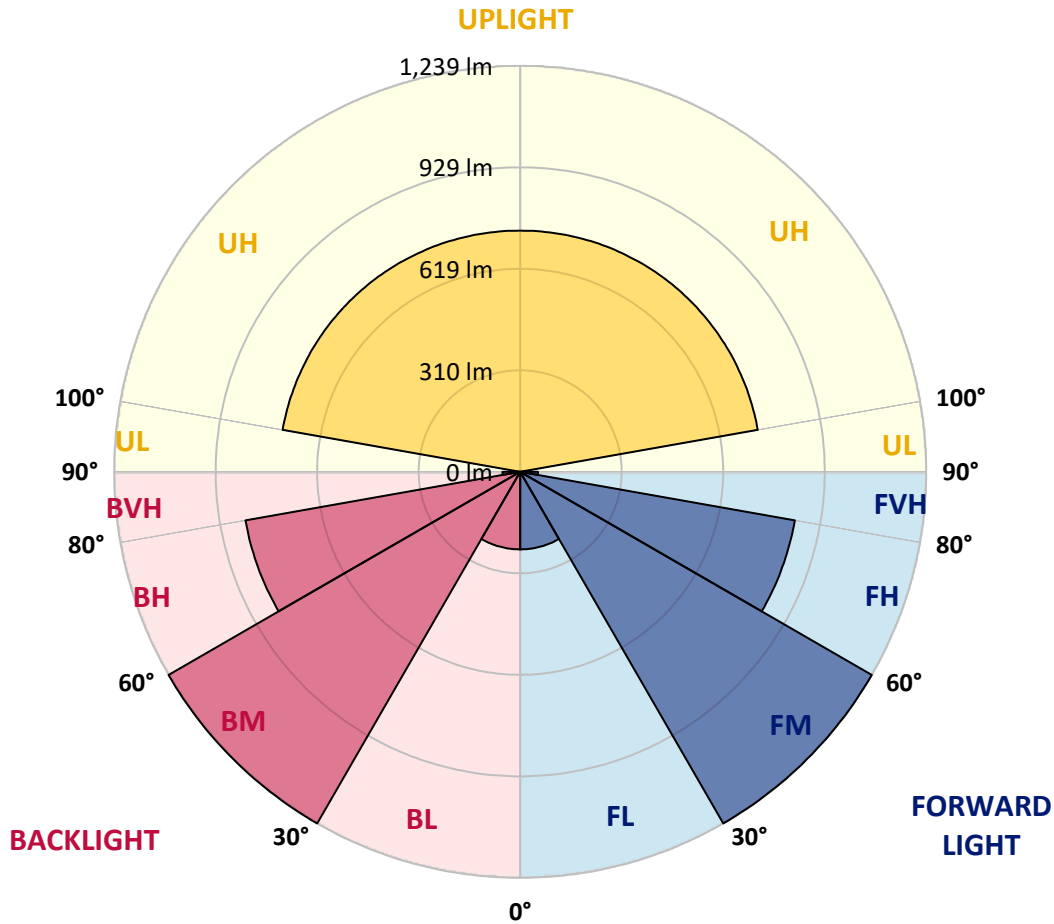


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LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | Lumens | % Fixture | Zone Rating/Lumen Limit | | |
|----------------|--------|-----------|-------------------------|---------|---------|
| | | | B | U | G |
| FL (0°-30°) | 236.6 | 4.3 | | | |
| FM (30°-60°) | 1238.6 | 22.5 | | | |
| FH (60°-80°) | 851.0 | 15.4 | | | G1/1800 |
| FVH (80°-90°) | 54.3 | 1.0 | | | G1/100 |
| BL (0°-30°) | 236.6 | 4.3 | B1/500 | | |
| BM (30°-60°) | 1238.6 | 22.5 | B2/2500 | | |
| BH (60°-80°) | 851.0 | 15.4 | B2/1000 | | G1/1800 |
| BVH (80°-90°) | 54.3 | 1.0 | | | G1/100 |
| UL (90°-100°) | 16.8 | 0.3 | | U2/50 | |
| UH (100°-180°) | 735.8 | 13.3 | | U4/1000 | |

BUG Rating: B2-U4-G1
 Type V Short





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CANDELA DISTRIBUTION (FULL):

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 65° | 75° | 85° | 90° |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0° | 449.7 | 449.7 | 449.7 | 449.7 | 449.7 | 449.7 | 449.7 | 449.7 | 449.7 | 449.7 | 449.7 |
| 2.5° | 445.5 | 445.5 | 445.5 | 445.5 | 445.5 | 445.5 | 445.5 | 445.5 | 445.5 | 445.5 | 445.5 |
| 5° | 449.7 | 449.7 | 449.7 | 449.7 | 449.7 | 449.7 | 449.7 | 449.7 | 449.7 | 449.7 | 449.7 |
| 7.5° | 445.5 | 445.5 | 449.7 | 449.7 | 449.7 | 449.7 | 449.7 | 449.7 | 449.7 | 445.5 | 445.5 |
| 10° | 449.7 | 449.7 | 449.7 | 453.8 | 453.8 | 453.8 | 453.8 | 453.8 | 449.7 | 449.7 | 449.7 |
| 12.5° | 457.9 | 457.9 | 462.0 | 462.0 | 462.0 | 462.0 | 462.0 | 462.0 | 462.0 | 457.9 | 457.9 |
| 15° | 478.5 | 478.5 | 478.5 | 482.7 | 482.7 | 482.7 | 482.7 | 482.7 | 478.5 | 478.5 | 478.5 |
| 17.5° | 499.2 | 499.2 | 503.3 | 503.3 | 507.4 | 507.4 | 507.4 | 503.3 | 503.3 | 503.3 | 503.3 |
| 20° | 528.0 | 528.0 | 532.2 | 532.2 | 536.3 | 540.4 | 540.4 | 536.3 | 532.2 | 532.2 | 532.2 |
| 22.5° | 565.2 | 569.3 | 569.3 | 569.3 | 573.4 | 581.7 | 577.6 | 573.4 | 569.3 | 569.3 | 569.3 |
| 25° | 610.6 | 614.7 | 618.8 | 618.8 | 622.9 | 631.2 | 631.2 | 618.8 | 618.8 | 618.8 | 618.8 |
| 27.5° | 664.2 | 668.3 | 672.4 | 672.4 | 676.6 | 684.8 | 680.7 | 672.4 | 672.4 | 668.3 | 668.3 |
| 30° | 713.7 | 717.8 | 721.9 | 726.1 | 730.2 | 734.3 | 734.3 | 726.1 | 721.9 | 717.8 | 713.7 |
| 32.5° | 763.2 | 763.2 | 771.4 | 779.7 | 787.9 | 787.9 | 792.1 | 779.7 | 771.4 | 763.2 | 759.1 |
| 35° | 812.7 | 816.8 | 820.9 | 833.3 | 845.7 | 849.8 | 845.7 | 833.3 | 820.9 | 812.7 | 812.7 |
| 37.5° | 866.3 | 870.5 | 874.6 | 891.1 | 903.5 | 911.7 | 903.5 | 891.1 | 874.6 | 866.3 | 862.2 |
| 40° | 924.1 | 928.2 | 932.3 | 953.0 | 965.3 | 973.6 | 961.2 | 948.8 | 932.3 | 924.1 | 920.0 |
| 42.5° | 977.7 | 986.0 | 994.2 | 1019.0 | 1039.6 | 1047.8 | 1035.5 | 1014.8 | 998.3 | 977.7 | 973.6 |
| 45° | 1043.7 | 1052.0 | 1064.3 | 1089.1 | 1109.7 | 1122.1 | 1105.6 | 1085.0 | 1060.2 | 1043.7 | 1039.6 |
| 47.5° | 1097.3 | 1105.6 | 1118.0 | 1151.0 | 1179.9 | 1188.1 | 1171.6 | 1146.9 | 1113.8 | 1093.2 | 1089.1 |
| 50° | 1138.6 | 1146.9 | 1171.6 | 1208.7 | 1241.7 | 1250.0 | 1233.5 | 1200.5 | 1163.4 | 1134.5 | 1130.3 |
| 52.5° | 1171.6 | 1179.9 | 1208.7 | 1258.2 | 1295.4 | 1307.7 | 1287.1 | 1250.0 | 1200.5 | 1167.5 | 1163.4 |
| 55° | 1188.1 | 1192.2 | 1229.4 | 1283.0 | 1320.1 | 1336.6 | 1316.0 | 1274.7 | 1221.1 | 1184.0 | 1179.9 |
| 57.5° | 1175.7 | 1179.9 | 1221.1 | 1278.9 | 1320.1 | 1340.7 | 1320.1 | 1270.6 | 1212.9 | 1175.7 | 1171.6 |
| 60° | 1151.0 | 1151.0 | 1188.1 | 1254.1 | 1303.6 | 1316.0 | 1295.4 | 1245.9 | 1184.0 | 1146.9 | 1142.7 |
| 62.5° | 1105.6 | 1101.5 | 1146.9 | 1204.6 | 1254.1 | 1266.5 | 1250.0 | 1200.5 | 1138.6 | 1101.5 | 1097.3 |
| 65° | 1019.0 | 1010.7 | 1076.7 | 1130.3 | 1175.7 | 1188.1 | 1175.7 | 1130.3 | 1072.6 | 1014.8 | 1006.6 |
| 67.5° | 915.8 | 903.5 | 965.3 | 1027.2 | 1068.5 | 1085.0 | 1068.5 | 1031.3 | 965.3 | 907.6 | 903.5 |
| 70° | 808.6 | 796.2 | 845.7 | 899.3 | 944.7 | 953.0 | 936.5 | 899.3 | 837.4 | 800.3 | 800.3 |
| 72.5° | 680.7 | 668.3 | 713.7 | 754.9 | 800.3 | 808.6 | 792.1 | 759.1 | 713.7 | 676.6 | 672.4 |
| 75° | 540.4 | 528.0 | 569.3 | 602.3 | 647.7 | 651.8 | 643.6 | 606.4 | 569.3 | 532.2 | 532.2 |
| 77.5° | 400.2 | 387.8 | 420.8 | 449.7 | 486.8 | 486.8 | 482.7 | 453.8 | 420.8 | 396.0 | 396.0 |
| 80° | 264.0 | 255.8 | 284.6 | 297.0 | 330.0 | 330.0 | 325.9 | 305.3 | 280.5 | 264.0 | 259.9 |
| 82.5° | 148.5 | 140.3 | 165.0 | 169.1 | 193.9 | 193.9 | 189.8 | 173.3 | 156.8 | 144.4 | 144.4 |
| 85° | 57.8 | 49.5 | 66.0 | 70.1 | 82.5 | 82.5 | 78.4 | 74.3 | 61.9 | 53.6 | 53.6 |
| 87.5° | 4.1 | 4.1 | 8.3 | 8.3 | 12.4 | 12.4 | 12.4 | 8.3 | 8.3 | 4.1 | 4.1 |
| 90° | 6.4 | 6.4 | 7.7 | 7.7 | 7.7 | 7.7 | 7.7 | 7.7 | 7.7 | 6.4 | 6.4 |
| 92.5° | 6.4 | 6.4 | 6.4 | 9.0 | 10.3 | 9.0 | 10.3 | 7.7 | 7.7 | 6.4 | 6.4 |
| 95° | 7.7 | 7.7 | 9.0 | 11.6 | 14.2 | 15.5 | 15.5 | 9.0 | 9.0 | 7.7 | 7.7 |
| 97.5° | 10.3 | 11.6 | 11.6 | 14.2 | 23.2 | 42.5 | 25.8 | 12.9 | 12.9 | 11.6 | 10.3 |
| 100° | 16.7 | 18.0 | 18.0 | 32.2 | 68.2 | 91.4 | 65.7 | 33.5 | 24.5 | 18.0 | 18.0 |
| 102.5° | 54.1 | 56.7 | 69.5 | 104.3 | 154.5 | 140.4 | 118.5 | 112.0 | 77.3 | 61.8 | 59.2 |
| 105° | 137.8 | 136.5 | 146.8 | 173.8 | 216.3 | 212.5 | 195.7 | 177.7 | 153.2 | 141.6 | 141.6 |
| 107.5° | 181.6 | 181.6 | 190.6 | 213.8 | 245.9 | 287.1 | 291.0 | 230.5 | 202.2 | 189.3 | 188.0 |
| 110° | 204.7 | 204.7 | 212.5 | 231.8 | 274.3 | 332.2 | 329.6 | 284.6 | 249.8 | 233.1 | 230.5 |



REPORT NUMBER: P833544

CATALOG NUMBER: TTN-D2-735-U-WQ-CG-UPL3

CANDELA DISTRIBUTION (continued):

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 65° | 75° | 85° | 90° |
|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 112.5° | 209.9 | 211.2 | 221.5 | 251.1 | 297.5 | 323.2 | 311.6 | 293.6 | 278.1 | 265.3 | 262.7 |
| 115° | 217.6 | 217.6 | 229.2 | 257.5 | 283.3 | 293.6 | 280.7 | 266.5 | 256.2 | 251.1 | 253.7 |
| 117.5° | 215.0 | 218.9 | 221.5 | 236.9 | 253.7 | 261.4 | 255.0 | 235.6 | 227.9 | 225.3 | 221.5 |
| 120° | 199.6 | 199.6 | 202.2 | 209.9 | 218.9 | 222.8 | 220.2 | 207.3 | 200.9 | 199.6 | 197.0 |
| 122.5° | 177.7 | 179.0 | 177.7 | 181.6 | 188.0 | 191.9 | 189.3 | 179.0 | 176.4 | 176.4 | 173.8 |
| 125° | 155.8 | 155.8 | 154.5 | 157.1 | 161.0 | 159.7 | 161.0 | 155.8 | 154.5 | 154.5 | 153.2 |
| 127.5° | 140.4 | 139.1 | 136.5 | 137.8 | 139.1 | 139.1 | 140.4 | 135.2 | 136.5 | 137.8 | 136.5 |
| 130° | 124.9 | 124.9 | 122.3 | 122.3 | 122.3 | 119.8 | 122.3 | 119.8 | 121.0 | 122.3 | 123.6 |
| 132.5° | 110.7 | 110.7 | 106.9 | 105.6 | 105.6 | 105.6 | 106.9 | 105.6 | 108.2 | 110.7 | 110.7 |
| 135° | 99.2 | 99.2 | 95.3 | 96.6 | 96.6 | 95.3 | 96.6 | 95.3 | 97.9 | 99.2 | 99.2 |
| 137.5° | 90.1 | 90.1 | 87.6 | 87.6 | 87.6 | 86.3 | 87.6 | 87.6 | 88.8 | 91.4 | 92.7 |
| 140° | 82.4 | 82.4 | 81.1 | 81.1 | 79.8 | 81.1 | 81.1 | 81.1 | 82.4 | 83.7 | 83.7 |
| 142.5° | 78.5 | 77.3 | 76.0 | 74.7 | 76.0 | 76.0 | 76.0 | 74.7 | 76.0 | 78.5 | 78.5 |
| 145° | 72.1 | 72.1 | 70.8 | 70.8 | 70.8 | 72.1 | 70.8 | 70.8 | 72.1 | 72.1 | 73.4 |
| 147.5° | 68.2 | 68.2 | 67.0 | 68.2 | 68.2 | 68.2 | 68.2 | 67.0 | 68.2 | 68.2 | 69.5 |
| 150° | 67.0 | 65.7 | 64.4 | 65.7 | 65.7 | 64.4 | 64.4 | 64.4 | 64.4 | 65.7 | 65.7 |
| 152.5° | 63.1 | 63.1 | 61.8 | 63.1 | 61.8 | 61.8 | 61.8 | 61.8 | 61.8 | 63.1 | 64.4 |
| 155° | 60.5 | 60.5 | 59.2 | 60.5 | 60.5 | 60.5 | 60.5 | 60.5 | 60.5 | 60.5 | 60.5 |
| 157.5° | 57.9 | 59.2 | 57.9 | 57.9 | 57.9 | 57.9 | 57.9 | 57.9 | 57.9 | 59.2 | 59.2 |
| 160° | 56.7 | 56.7 | 56.7 | 56.7 | 55.4 | 55.4 | 55.4 | 56.7 | 56.7 | 56.7 | 57.9 |
| 162.5° | 55.4 | 55.4 | 55.4 | 55.4 | 54.1 | 54.1 | 54.1 | 54.1 | 55.4 | 55.4 | 56.7 |
| 165° | 55.4 | 54.1 | 54.1 | 54.1 | 52.8 | 52.8 | 52.8 | 52.8 | 54.1 | 55.4 | 54.1 |
| 167.5° | 52.8 | 52.8 | 52.8 | 52.8 | 52.8 | 51.5 | 51.5 | 52.8 | 52.8 | 52.8 | 54.1 |
| 170° | 52.8 | 52.8 | 51.5 | 51.5 | 51.5 | 51.5 | 51.5 | 51.5 | 51.5 | 51.5 | 52.8 |
| 172.5° | 52.8 | 52.8 | 52.8 | 52.8 | 51.5 | 51.5 | 51.5 | 51.5 | 51.5 | 52.8 | 52.8 |
| 175° | 52.8 | 52.8 | 52.8 | 52.8 | 51.5 | 51.5 | 51.5 | 52.8 | 52.8 | 52.8 | 51.5 |
| 177.5° | 52.8 | 52.8 | 52.8 | 52.8 | 51.5 | 52.8 | 52.8 | 52.8 | 52.8 | 52.8 | 52.8 |
| 180° | 52.8 | 52.8 | 52.8 | 52.8 | 52.8 | 52.8 | 52.8 | 52.8 | 52.8 | 52.8 | 52.8 |

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

MCGRAW EDISON

Report Number: SP1-2411-284-1

Test Date: 11/15/2024

Luminaire Tested: TTN-D0-735-U-WQ

Data in this report applies to TT and TTN families of products

Test Information

Test Method: LM-79-2019
 Report Number: SP1-2411-284-1
 Test Lab: COOPER LIGHTING SOLUTIONS
 Photometer: SP1 - 76IN SPHERE
 Measurement Geometry: 4π
 Issue Date: 11/15/2024
 Manufacturer: COOPER LIGHTING SOLUTIONS
 Product Line: MCGRAW EDISON
 Catalog Number: **TTN-D0-735-U-WQ**
 Description: TOPTIER NANO LED PARKING GARAGE LUMINAIRE. 3500K, 70 CRI LEDS AND WIDE DISTRIBUTION

Spectral Parameters

CCT (K): 3405
 CIE u': 0.2365
 CIE v': 0.5180
 Duv: 0.0036
 CIE x: 0.4148
 CIE y: 0.4038
 CIE z: 0.1814
 Peak Wavelength (nm): 596
 Dominant Wavelength (nm): 579
 Purity: 45.70672
 Rf: 76.6
 Rg: 95.4

| | | | |
|-----------|------|------|-------|
| CRI (Ra): | 73.9 | | |
| R1: | 71.3 | R9: | -18.0 |
| R2: | 80.3 | R10: | 53.1 |
| R3: | 87.8 | R11: | 68.6 |
| R4: | 73.2 | R12: | 42.6 |
| R5: | 69.8 | R13: | 72.5 |
| R6: | 71.8 | R14: | 92.7 |
| R7: | 82.8 | R15: | 64.3 |
| R8: | 54.1 | | |



Test Conditions

Stabilization Time: 38M
 Operation Time: 1H 38M
 Sphere Temperature (°C): 24.9

REPORT NUMBER: SP1-2411-284-1

| 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 | 10/22/2024 | 10/22/2025 |
| DC Power Source | IN0208 | 10/22/2024 | 10/22/2025 |
| Sphere Thermometer | IN0085 | 10/22/2024 | 10/22/2025 |
| Room Thermometer | IN0046 | 10/22/2024 | 10/22/2025 |

REPORT NUMBER: SP1-2411-284-1

CIE 1931 Chromaticity Diagram



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



CCT = 3405K
 CIE x = 0.4148
 CIE y = 0.4038
 Duv = 0.0036

Point lies inside the ANSI 3500K 4-step quadrangle

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Photopic Flux vs. Wavelength



Photopic Lumens: NR

| λ (nm) | Power W [^] /nm | Lumens (φ/nm) | λ (nm) | Power W [^] /nm | Lumens (φ/nm) | λ (nm) | Power W [^] /nm | Lumens (φ/nm) | λ (nm) | Power W [^] /nm | Lumens (φ/nm) | λ (nm) | Power W [^] /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360 | 0 | NR | 490 | 119 | NR | 620 | 846 | NR | 750 | 28 | NR | 880 | 1 | NR |
| 365 | 0 | NR | 495 | 160 | NR | 625 | 793 | NR | 755 | 25 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 225 | NR | 630 | 739 | NR | 760 | 22 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 308 | NR | 635 | 681 | NR | 765 | 19 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 392 | NR | 640 | 623 | NR | 770 | 16 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 474 | NR | 645 | 563 | NR | 775 | 14 | NR | 905 | 0 | NR |
| 390 | 0 | NR | 520 | 545 | NR | 650 | 506 | NR | 780 | 12 | NR | 910 | 0 | NR |
| 395 | 1 | NR | 525 | 603 | NR | 655 | 451 | NR | 785 | 10 | NR | 915 | 0 | NR |
| 400 | 3 | NR | 530 | 649 | NR | 660 | 399 | NR | 790 | 9 | NR | 920 | 0 | NR |
| 405 | 5 | NR | 535 | 687 | NR | 665 | 352 | NR | 795 | 8 | NR | 925 | 0 | NR |
| 410 | 11 | NR | 540 | 721 | NR | 670 | 307 | NR | 800 | 6 | NR | 930 | 0 | NR |
| 415 | 21 | NR | 545 | 751 | NR | 675 | 268 | NR | 805 | 6 | NR | 935 | 0 | NR |
| 420 | 43 | NR | 550 | 779 | NR | 680 | 234 | NR | 810 | 5 | NR | 940 | 0 | NR |
| 425 | 88 | NR | 555 | 811 | NR | 685 | 203 | NR | 815 | 4 | NR | 945 | 0 | NR |
| 430 | 163 | NR | 560 | 843 | NR | 690 | 176 | NR | 820 | 4 | NR | 950 | 0 | NR |
| 435 | 288 | NR | 565 | 873 | NR | 695 | 152 | NR | 825 | 3 | NR | 955 | 0 | NR |
| 440 | 416 | NR | 570 | 907 | NR | 700 | 131 | NR | 830 | 3 | NR | 960 | 0 | NR |
| 445 | 566 | NR | 575 | 938 | NR | 705 | 112 | NR | 835 | 3 | NR | 965 | 0 | NR |
| 450 | 810 | NR | 580 | 965 | NR | 710 | 96 | NR | 840 | 2 | NR | 970 | 0 | NR |
| 455 | 669 | NR | 585 | 986 | NR | 715 | 81 | NR | 845 | 2 | NR | 975 | 0 | NR |
| 460 | 338 | NR | 590 | 997 | NR | 720 | 69 | NR | 850 | 2 | NR | 980 | 0 | NR |
| 465 | 246 | NR | 595 | 997 | NR | 725 | 58 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 182 | NR | 600 | 991 | NR | 730 | 49 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 115 | NR | 605 | 968 | NR | 735 | 42 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 97 | NR | 610 | 939 | NR | 740 | 37 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 103 | NR | 615 | 896 | NR | 745 | 32 | NR | 875 | 1 | NR | | | |

REPORT NUMBER: SP1-2411-284-1

Scotopic Flux vs. Wavelength



Scotopic Lumens: NR

S/P: 1.33

| λ (nm) | Power W [^] /nm | Lumens (φ/nm) | λ (nm) | Power W [^] /nm | Lumens (φ/nm) | λ (nm) | Power W [^] /nm | Lumens (φ/nm) | λ (nm) | Power W [^] /nm | Lumens (φ/nm) | λ (nm) | Power W [^] /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360 | 0 | NR | 490 | 119 | NR | 620 | 846 | NR | 750 | 28 | NR | 880 | 1 | NR |
| 365 | 0 | NR | 495 | 160 | NR | 625 | 793 | NR | 755 | 25 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 225 | NR | 630 | 739 | NR | 760 | 22 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 308 | NR | 635 | 681 | NR | 765 | 19 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 392 | NR | 640 | 623 | NR | 770 | 16 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 474 | NR | 645 | 563 | NR | 775 | 14 | NR | 905 | 0 | NR |
| 390 | 0 | NR | 520 | 545 | NR | 650 | 506 | NR | 780 | 12 | NR | 910 | 0 | NR |
| 395 | 1 | NR | 525 | 603 | NR | 655 | 451 | NR | 785 | 10 | NR | 915 | 0 | NR |
| 400 | 3 | NR | 530 | 649 | NR | 660 | 399 | NR | 790 | 9 | NR | 920 | 0 | NR |
| 405 | 5 | NR | 535 | 687 | NR | 665 | 352 | NR | 795 | 8 | NR | 925 | 0 | NR |
| 410 | 11 | NR | 540 | 721 | NR | 670 | 307 | NR | 800 | 6 | NR | 930 | 0 | NR |
| 415 | 21 | NR | 545 | 751 | NR | 675 | 268 | NR | 805 | 6 | NR | 935 | 0 | NR |
| 420 | 43 | NR | 550 | 779 | NR | 680 | 234 | NR | 810 | 5 | NR | 940 | 0 | NR |
| 425 | 88 | NR | 555 | 811 | NR | 685 | 203 | NR | 815 | 4 | NR | 945 | 0 | NR |
| 430 | 163 | NR | 560 | 843 | NR | 690 | 176 | NR | 820 | 4 | NR | 950 | 0 | NR |
| 435 | 288 | NR | 565 | 873 | NR | 695 | 152 | NR | 825 | 3 | NR | 955 | 0 | NR |
| 440 | 416 | NR | 570 | 907 | NR | 700 | 131 | NR | 830 | 3 | NR | 960 | 0 | NR |
| 445 | 566 | NR | 575 | 938 | NR | 705 | 112 | NR | 835 | 3 | NR | 965 | 0 | NR |
| 450 | 810 | NR | 580 | 965 | NR | 710 | 96 | NR | 840 | 2 | NR | 970 | 0 | NR |
| 455 | 669 | NR | 585 | 986 | NR | 715 | 81 | NR | 845 | 2 | NR | 975 | 0 | NR |
| 460 | 338 | NR | 590 | 997 | NR | 720 | 69 | NR | 850 | 2 | NR | 980 | 0 | NR |
| 465 | 246 | NR | 595 | 997 | NR | 725 | 58 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 182 | NR | 600 | 991 | NR | 730 | 49 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 115 | NR | 605 | 968 | NR | 735 | 42 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 97 | NR | 610 | 939 | NR | 740 | 37 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 103 | NR | 615 | 896 | NR | 745 | 32 | NR | 875 | 1 | NR | | | |

REPORT NUMBER: SP1-2411-284-1

Melanopic Flux vs. Wavelength



Melanopic Lumens: NR

M/P: 2.47

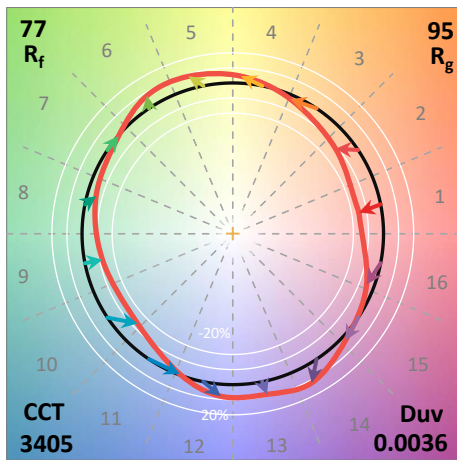
| λ (nm) | Power W [^] /nm | Lumens (φ/nm) | λ (nm) | Power W [^] /nm | Lumens (φ/nm) | λ (nm) | Power W [^] /nm | Lumens (φ/nm) | λ (nm) | Power W [^] /nm | Lumens (φ/nm) | λ (nm) | Power W [^] /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360 | 0 | NR | 490 | 119 | NR | 620 | 846 | NR | 750 | 28 | NR | 880 | 1 | NR |
| 365 | 0 | NR | 495 | 160 | NR | 625 | 793 | NR | 755 | 25 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 225 | NR | 630 | 739 | NR | 760 | 22 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 308 | NR | 635 | 681 | NR | 765 | 19 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 392 | NR | 640 | 623 | NR | 770 | 16 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 474 | NR | 645 | 563 | NR | 775 | 14 | NR | 905 | 0 | NR |
| 390 | 0 | NR | 520 | 545 | NR | 650 | 506 | NR | 780 | 12 | NR | 910 | 0 | NR |
| 395 | 1 | NR | 525 | 603 | NR | 655 | 451 | NR | 785 | 10 | NR | 915 | 0 | NR |
| 400 | 3 | NR | 530 | 649 | NR | 660 | 399 | NR | 790 | 9 | NR | 920 | 0 | NR |
| 405 | 5 | NR | 535 | 687 | NR | 665 | 352 | NR | 795 | 8 | NR | 925 | 0 | NR |
| 410 | 11 | NR | 540 | 721 | NR | 670 | 307 | NR | 800 | 6 | NR | 930 | 0 | NR |
| 415 | 21 | NR | 545 | 751 | NR | 675 | 268 | NR | 805 | 6 | NR | 935 | 0 | NR |
| 420 | 43 | NR | 550 | 779 | NR | 680 | 234 | NR | 810 | 5 | NR | 940 | 0 | NR |
| 425 | 88 | NR | 555 | 811 | NR | 685 | 203 | NR | 815 | 4 | NR | 945 | 0 | NR |
| 430 | 163 | NR | 560 | 843 | NR | 690 | 176 | NR | 820 | 4 | NR | 950 | 0 | NR |
| 435 | 288 | NR | 565 | 873 | NR | 695 | 152 | NR | 825 | 3 | NR | 955 | 0 | NR |
| 440 | 416 | NR | 570 | 907 | NR | 700 | 131 | NR | 830 | 3 | NR | 960 | 0 | NR |
| 445 | 566 | NR | 575 | 938 | NR | 705 | 112 | NR | 835 | 3 | NR | 965 | 0 | NR |
| 450 | 810 | NR | 580 | 965 | NR | 710 | 96 | NR | 840 | 2 | NR | 970 | 0 | NR |
| 455 | 669 | NR | 585 | 986 | NR | 715 | 81 | NR | 845 | 2 | NR | 975 | 0 | NR |
| 460 | 338 | NR | 590 | 997 | NR | 720 | 69 | NR | 850 | 2 | NR | 980 | 0 | NR |
| 465 | 246 | NR | 595 | 997 | NR | 725 | 58 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 182 | NR | 600 | 991 | NR | 730 | 49 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 115 | NR | 605 | 968 | NR | 735 | 42 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 97 | NR | 610 | 939 | NR | 740 | 37 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 103 | NR | 615 | 896 | NR | 745 | 32 | NR | 875 | 1 | NR | | | |

Summary

$R_f = 76.6$
 $R_g = 95.4$
 $CIE R_a = 73.9$
 $R_g = -18.0$

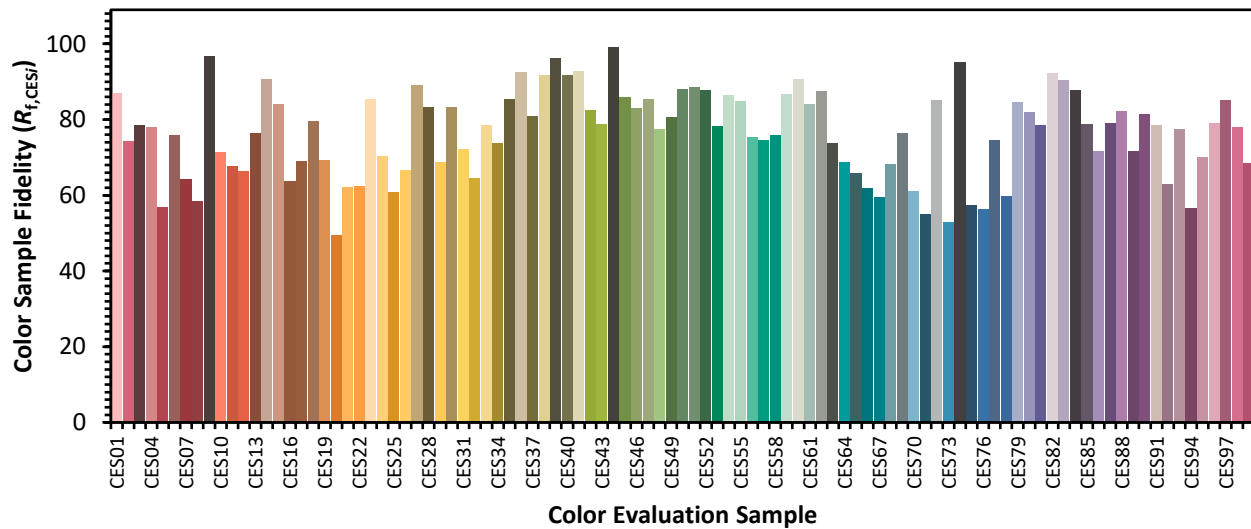


Color Vector Graphics



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

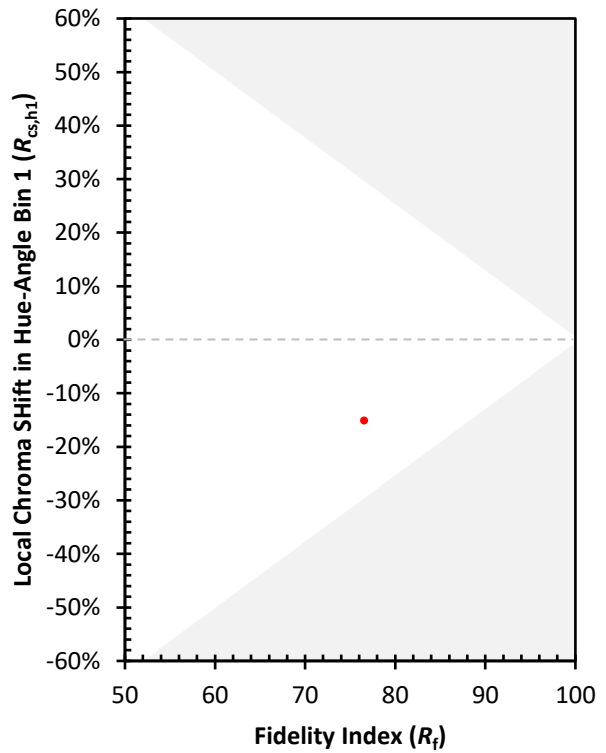
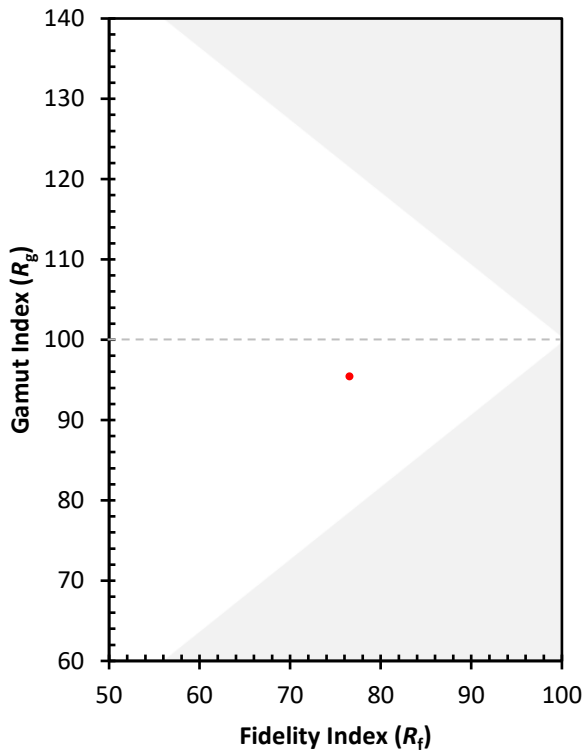
| | | | |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 67 | CES51 = 88 | CES76 = 56 |
| CES02 = 62 | CES27 = 89 | CES52 = 88 | CES77 = 75 |
| CES03 = 31 | CES28 = 83 | CES53 = 78 | CES78 = 60 |
| CES04 = 70 | CES29 = 69 | CES54 = 86 | CES79 = 85 |
| CES05 = 48 | CES30 = 83 | CES55 = 85 | CES80 = 82 |
| CES06 = 51 | CES31 = 72 | CES56 = 75 | CES81 = 78 |
| CES07 = 41 | CES32 = 65 | CES57 = 75 | CES82 = 92 |
| CES08 = 40 | CES33 = 78 | CES58 = 76 | CES83 = 90 |
| CES09 = 29 | CES34 = 74 | CES59 = 87 | CES84 = 88 |
| CES10 = 75 | CES35 = 86 | CES60 = 91 | CES85 = 79 |
| CES11 = 58 | CES36 = 93 | CES61 = 84 | CES86 = 72 |
| CES12 = 64 | CES37 = 81 | CES62 = 88 | CES87 = 79 |
| CES13 = 43 | CES38 = 92 | CES63 = 74 | CES88 = 82 |
| CES14 = 74 | CES39 = 96 | CES64 = 69 | CES89 = 72 |
| CES15 = 71 | CES40 = 92 | CES65 = 66 | CES90 = 82 |
| CES16 = 47 | CES41 = 93 | CES66 = 62 | CES91 = 79 |
| CES17 = 50 | CES42 = 83 | CES67 = 60 | CES92 = 63 |
| CES18 = 56 | CES43 = 79 | CES68 = 68 | CES93 = 77 |
| CES19 = 72 | CES44 = 99 | CES69 = 76 | CES94 = 56 |
| CES20 = 65 | CES45 = 86 | CES70 = 61 | CES95 = 70 |
| CES21 = 86 | CES46 = 83 | CES71 = 55 | CES96 = 79 |
| CES22 = 79 | CES47 = 85 | CES72 = 85 | CES97 = 85 |
| CES23 = 92 | CES48 = 78 | CES73 = 53 | CES98 = 78 |
| CES24 = 91 | CES49 = 81 | CES74 = 95 | CES99 = 68 |
| CES25 = 72 | CES50 = 88 | CES75 = 57 | |



Color Rendition by Hue-Angle Bin



Measure Comparisons



(END OF REPORT)