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: P437260

Luminaire Tested: **ISS-SA1B-830-U-T3-HSS**

Issue Date: 12/9/2020

Report Generated By 670245982

Cooper Lighting Solutions Photometric Lab
1121 Highway 74 South
Peachtree City, GA 30269

Scaled Data Report

**Test Information**

| | |
|---|---|
| Test Method: | LM-79-08 |
| Report Number: | P437260 |
| | TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G3-2011-074-9) |
| Test Lab: | INNOVATION CENTER |
| Issue Date: | 12/9/2020 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS (FORMERLY EATON) |
| Product Line: | McGRAW-EDISON |
| Catalog Number: | ISS-SA1B-830-U-T3-HSS |
| Description: | IMPACT ELITE LED QUARTER SPHERE LUMINAIRE |
| | (1) 80 CRI, 3000K, 450mA LIGHTSQUARE WITH 16 LEDS AND TYPE III OPTICS WITH HOUSE SIDE SHIELD |
| Light Source: | - |
| Ballast/Driver: | ELECTRONIC DRIVER |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 2036 lumens |
| Efficiency: | N/A |
| Efficacy: | 80.2 lumens/watt |
| Luminous Opening: | Rectangular (W 0.5' x L: 0.5' x H: 0') |
| IES Classification: | Type III - Short |
| BUG Rating: | B0 - U0 - G1 |

| | |
|---|---|
| Input Watts (W): | 25.4 |
| 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 |

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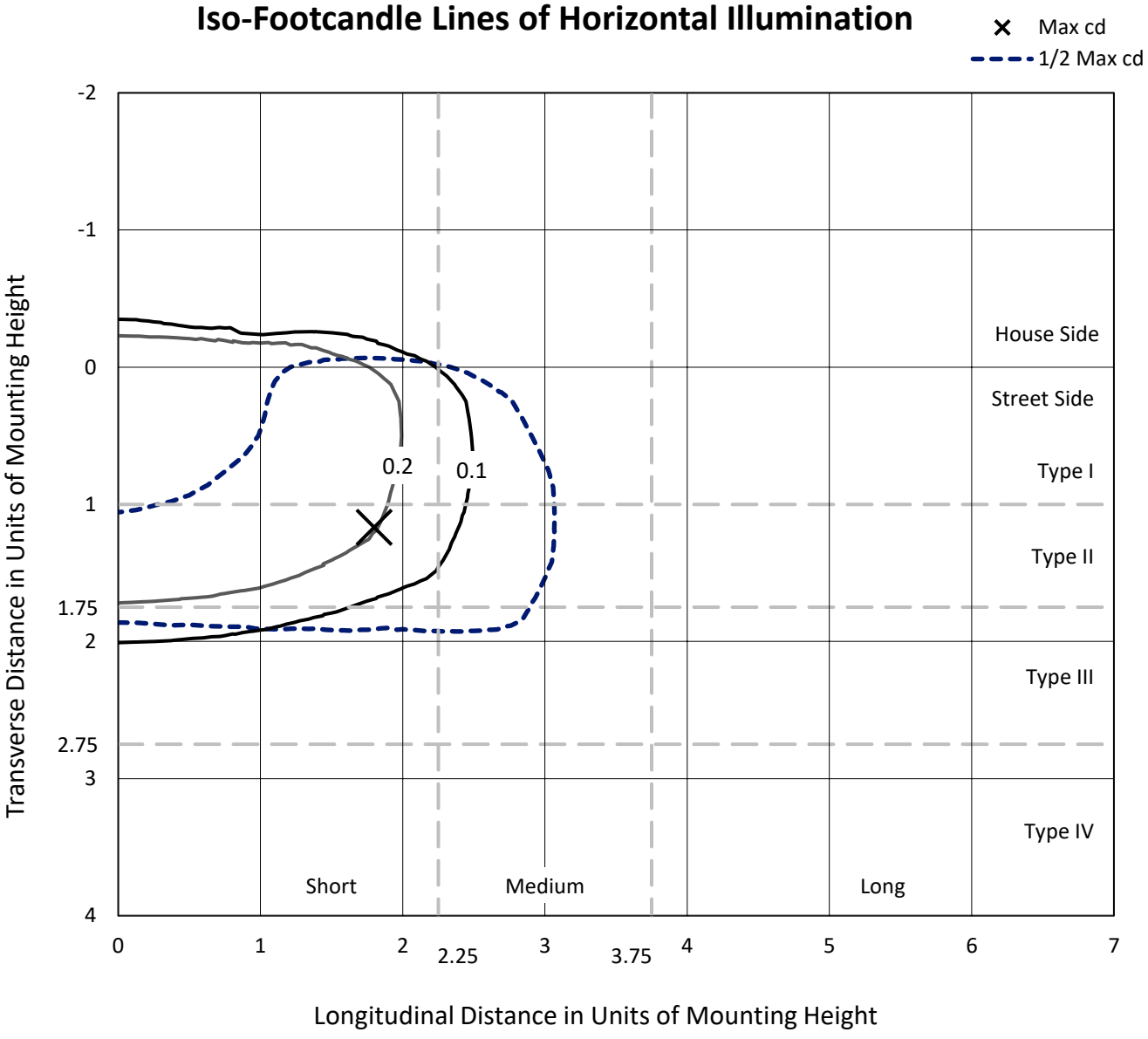
Scaled Data Report

REPORT NUMBER: P437260
CATALOG NUMBER: ISS-SA1B-830-U-T3-HSS

## Iso-Footcandle Lines of Horizontal Illumination




Based on 25 foot mounting height. Maximum calculated value = 0.5 fc
Type III - Short - N/A

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REPORT NUMBER: P437260
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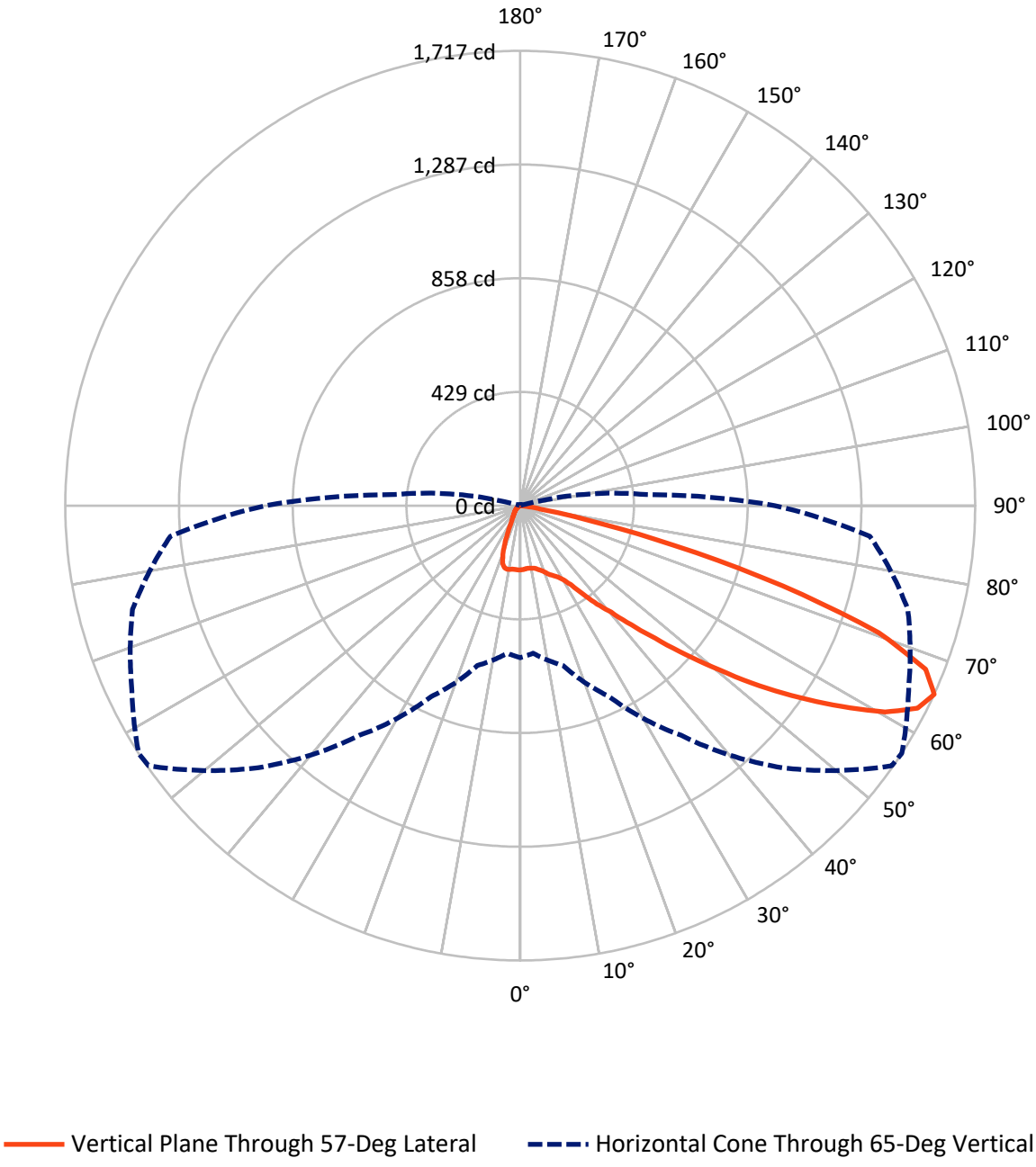
## Luminous Intensity Polar Plot



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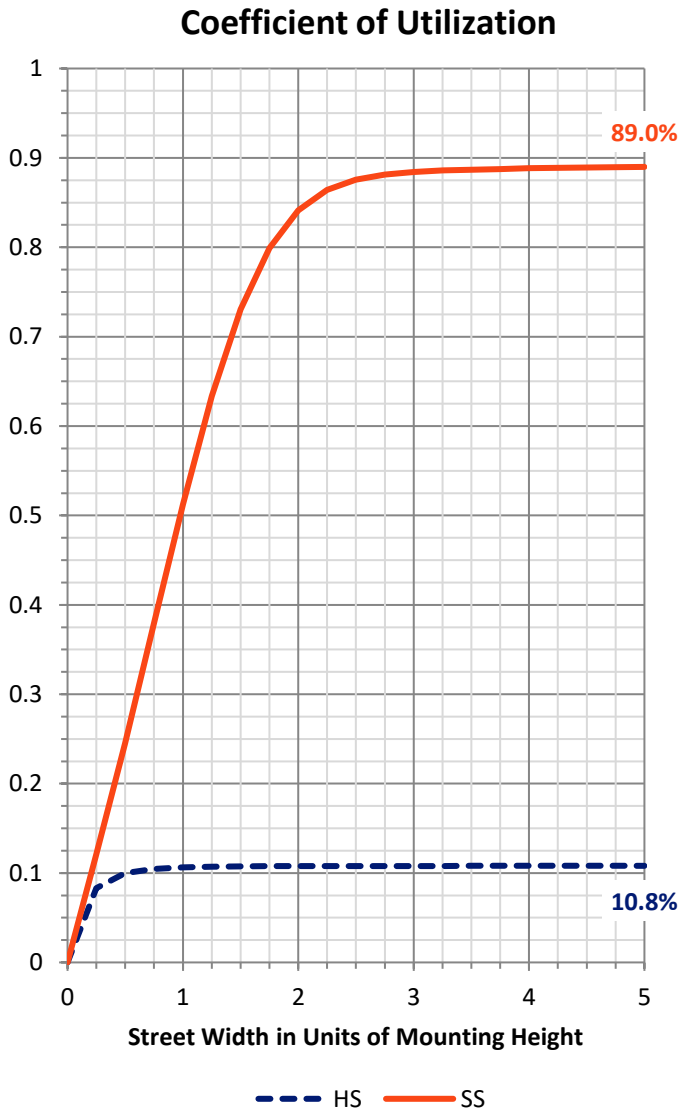
**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 222.1 | 0.0 | 222.1 |
| | % Fixture | 10.9 | 0.0 | 10.9 |
| **Street Side** | Lumens | 1813.9 | 0.0 | 1813.9 |
| | % Fixture | 89.1 | 0.0 | 89.1 |
| **Total** | Lumens | 2036.0 | 0.0 | 2036.0 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 22.5 | 1.1 |
| 10°-20° | 60.9 | 3.0 |
| 20°-30° | 105.2 | 5.2 |
| 30°-40° | 186.4 | 9.2 |
| 40°-50° | 338.0 | 16.6 |
| 50°-60° | 569.4 | 28.0 |
| 60°-70° | 585.5 | 28.8 |
| 70°-80° | 162.3 | 8.0 |
| 80°-90° | 5.8 | 0.3 |
| 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° | 2036.0 | 100.0 |
| 0°-180° | 2036.0 | 100.0 |



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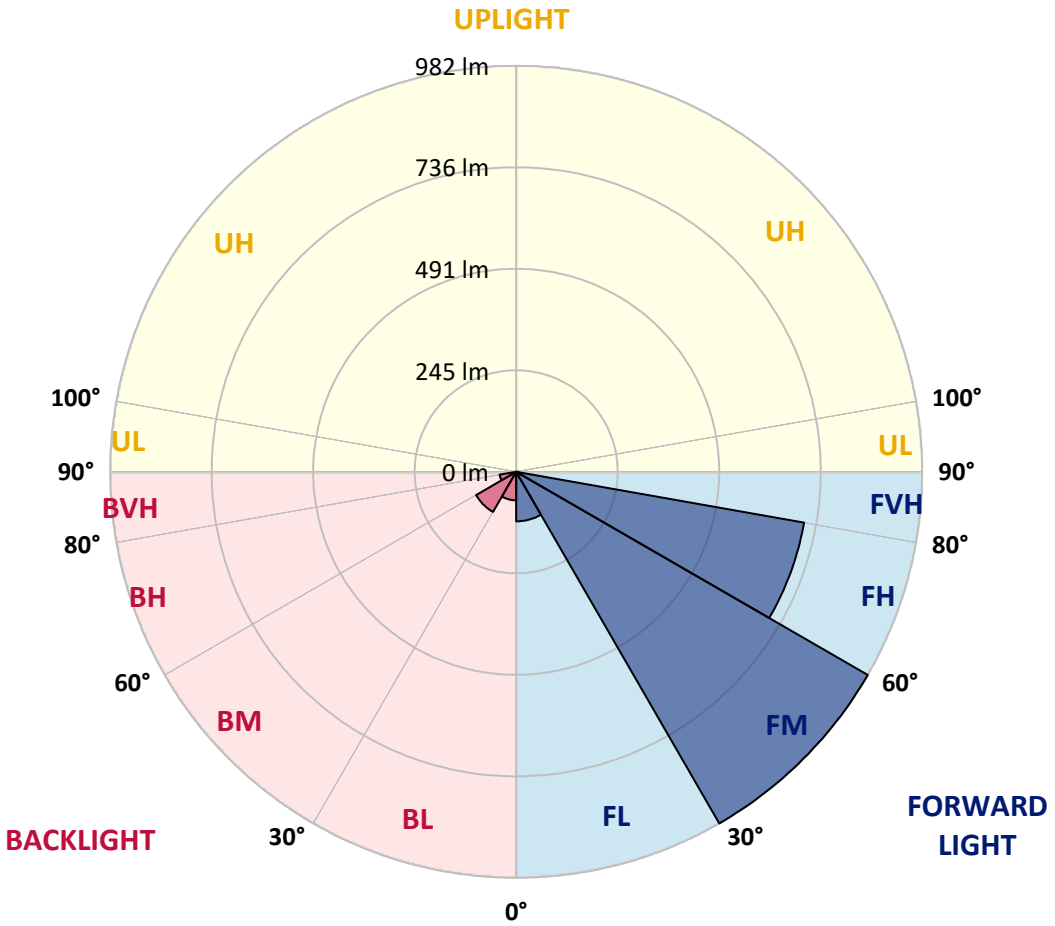
## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 119.7 | 5.9 | | | |
| FM | (30°-60°) | 981.9 | 48.2 | | | |
| FH | (60°-80°) | 707.0 | 34.7 | | | G1/1800 |
| FVH | (80°-90°) | 5.3 | 0.3 | | | G0/10 |
| BL | (0°-30°) | 69.0 | 3.4 | B0/110 | | |
| BM | (30°-60°) | 112.0 | 5.5 | B0/220 | | |
| BH | (60°-80°) | 40.7 | 2.0 | B0/110 | | G0/110 |
| BVH | (80°-90°) | 0.4 | 0.0 | | | G0/10 |
| UL | (90°-100°) | 0.0 | 0.0 | | U0/0 | |
| UH | (100°-180°) | 0.0 | 0.0 | | U0/0 | |

**BUG Rating: B0-U0-G1**
Type III Short



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REPORT NUMBER: P437260
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**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 57° | 65° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 242.3 | 242.3 | 242.3 | 242.3 | 242.3 | 242.3 | 242.3 | *242.3* | 242.3 | 242.3 | 242.3 |
| 2.5° | 235.3 | 235.3 | 237.3 | 238.3 | 238.3 | 239.3 | 240.3 | *241.3* | 241.3 | 241.3 | 243.2 |
| 5° | 223.4 | 222.4 | 224.4 | 226.4 | 229.3 | 233.3 | 236.3 | *238.3* | 241.3 | 244.2 | 245.2 |
| 7.5° | 212.5 | 212.5 | 214.5 | 217.4 | 223.4 | 229.3 | 235.3 | *238.3* | 243.2 | 249.2 | 251.2 |
| 10° | 209.5 | 208.5 | 211.5 | 214.5 | 220.4 | 227.4 | 236.3 | *240.3* | 247.2 | 255.2 | 258.1 |
| 12.5° | 207.5 | 207.5 | 208.5 | 213.5 | 219.4 | 228.4 | 239.3 | *242.3* | 253.2 | 262.1 | 269.1 |
| 15° | 206.5 | 206.5 | 208.5 | 212.5 | 219.4 | 229.3 | 244.2 | *249.2* | 262.1 | 275.0 | 281.0 |
| 17.5° | 214.5 | 213.5 | 212.5 | 214.5 | 221.4 | 232.3 | 252.2 | *257.1* | 273.0 | 288.9 | 295.9 |
| 20° | 238.3 | 237.3 | 234.3 | 227.4 | 227.4 | 240.3 | 262.1 | *268.1* | 288.9 | 304.8 | 308.8 |
| 22.5° | 283.0 | 285.9 | 275.0 | 257.1 | 244.2 | 250.2 | 275.0 | *282.0* | 305.8 | 322.7 | 322.7 |
| 25° | 347.5 | 343.5 | 333.6 | 303.8 | 278.0 | 266.1 | 285.9 | *292.9* | 321.7 | 341.5 | 337.6 |
| 27.5° | 415.0 | 416.0 | 402.1 | 368.3 | 326.6 | 294.9 | 297.9 | *305.8* | 338.6 | 361.4 | 352.5 |
| 30° | 468.6 | 464.7 | 457.7 | 429.9 | 384.2 | 340.5 | 320.7 | *325.7* | 357.4 | 383.2 | 375.3 |
| 32.5° | 516.3 | 514.3 | 505.4 | 481.5 | 440.8 | 394.2 | 358.4 | *359.4* | 384.2 | 416.0 | 406.1 |
| 35° | 559.0 | 561.0 | 557.0 | 530.2 | 493.4 | 449.8 | 409.1 | *412.0* | 430.9 | 463.7 | 443.8 |
| 37.5° | 612.6 | 612.6 | 605.6 | 580.8 | 553.0 | 509.3 | 470.6 | *471.6* | 481.5 | 508.3 | 483.5 |
| 40° | 659.3 | 661.2 | 660.2 | 641.4 | 614.6 | 574.9 | 528.2 | *528.2* | 531.2 | 562.9 | 550.0 |
| 42.5° | 722.8 | 725.8 | 724.8 | 706.9 | 686.1 | 657.3 | 617.6 | *614.6* | 612.6 | 652.3 | 638.4 |
| 45° | 804.2 | 811.2 | 814.1 | 792.3 | 773.4 | 756.6 | 725.8 | *713.9* | 718.8 | 755.6 | 744.6 |
| 47.5° | 881.7 | 889.6 | 903.5 | 892.6 | 883.6 | 883.6 | 841.9 | *840.0* | 832.0 | 874.7 | 844.9 |
| 50° | 955.1 | 956.1 | 976.0 | 992.8 | 1019.7 | 1014.7 | 986.9 | *975.0* | 963.1 | 991.9 | 938.2 |
| 52.5° | 996.8 | 1008.7 | 1034.5 | 1083.2 | 1141.8 | 1165.6 | 1136.8 | *1129.9* | 1106.0 | 1102.1 | 1028.6 |
| 55° | 1035.5 | 1035.5 | 1076.2 | 1160.6 | 1259.9 | 1310.6 | 1286.7 | *1278.8* | 1231.1 | 1217.2 | 1121.9 |
| 57.5° | 1048.4 | 1044.5 | 1099.1 | 1206.3 | 1355.2 | 1443.6 | 1448.6 | *1430.7* | 1364.2 | 1321.5 | 1217.2 |
| 60° | 983.9 | 977.0 | 1034.5 | 1176.5 | 1381.1 | 1539.9 | 1593.5 | *1581.6* | 1479.3 | 1422.8 | 1317.5 |
| 62.5° | 798.3 | 807.2 | 880.7 | 1034.5 | 1289.7 | 1530.0 | 1689.8 | *1682.9* | 1564.7 | 1491.3 | 1357.2 |
| 65° | *573.9* | *559.0* | *624.5* | *795.3* | *1058.4* | *1398.9* | *1711.7* | *1716.6* | *1617.4* | *1514.1* | *1324.5* |
| 67.5° | 321.7 | 307.8 | 362.4 | 492.5 | 752.6 | 1147.7 | 1622.3 | *1650.1* | 1579.6 | 1457.5 | 1183.5 |
| 70° | 123.1 | 131.1 | 168.8 | 243.2 | 443.8 | 792.3 | 1395.9 | *1435.7* | 1385.0 | 1216.2 | 881.7 |
| 72.5° | 43.7 | 49.6 | 69.5 | 108.2 | 205.5 | 426.9 | 976.0 | *1035.5* | 1020.6 | 844.9 | 504.4 |
| 75° | 25.8 | 26.8 | 35.7 | 52.6 | 90.3 | 166.8 | 551.0 | *600.7* | 576.8 | 418.0 | 208.5 |
| 77.5° | 17.9 | 17.9 | 22.8 | 31.8 | 51.6 | 66.5 | 215.4 | *244.2* | 251.2 | 150.9 | 61.6 |
| 80° | 10.9 | 11.9 | 15.9 | 20.8 | 29.8 | 30.8 | 66.5 | *78.4* | 73.5 | 53.6 | 21.8 |
| 82.5° | 5.0 | 5.0 | 8.9 | 13.9 | 14.9 | 12.9 | 20.8 | *22.8* | 26.8 | 23.8 | 9.9 |
| 85° | 0.0 | 0.0 | 3.0 | 5.0 | 4.0 | 3.0 | 6.9 | *6.9* | 8.9 | 10.9 | 5.0 |
| 87.5° | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 1.0 | 1.0 | *1.0* | 1.0 | 2.0 | 1.0 |
| 90° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | *0.0* | 0.0 | 0.0 | 0.0 |

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Scaled Data Report

REPORT NUMBER: P437260
CATALOG NUMBER: ISS-SA1B-830-U-T3-HSS

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 242.3 | 242.3 | 242.3 | 242.3 | 242.3 | 242.3 | 242.3 | 242.3 | 242.3 | 242.3 | 242.3 |
| 2.5° | 243.2 | 244.2 | 243.2 | 242.3 | 242.3 | 241.3 | 241.3 | 241.3 | 241.3 | 241.3 | 241.3 |
| 5° | 245.2 | 246.2 | 245.2 | 243.2 | 241.3 | 239.3 | 237.3 | 237.3 | 237.3 | 237.3 | 239.3 |
| 7.5° | 251.2 | 251.2 | 249.2 | 245.2 | 240.3 | 238.3 | 234.3 | 233.3 | 231.3 | 230.3 | 231.3 |
| 10° | 260.1 | 260.1 | 256.2 | 250.2 | 242.3 | 234.3 | 227.4 | 217.4 | 211.5 | 207.5 | 206.5 |
| 12.5° | 269.1 | 268.1 | 263.1 | 255.2 | 242.3 | 224.4 | 201.5 | 176.7 | 161.8 | 150.9 | 148.9 |
| 15° | 281.0 | 280.0 | 272.0 | 258.1 | 236.3 | 198.6 | 153.9 | 120.1 | 102.3 | 94.3 | 93.3 |
| 17.5° | 293.9 | 291.9 | 281.0 | 260.1 | 217.4 | 149.9 | 101.3 | 78.4 | 71.5 | 69.5 | 69.5 |
| 20° | 307.8 | 304.8 | 287.9 | 257.1 | 179.7 | 102.3 | 70.5 | 65.5 | 64.5 | 63.5 | 63.5 |
| 22.5° | 318.7 | 313.7 | 292.9 | 242.3 | 134.0 | 70.5 | 62.5 | 61.6 | 60.6 | 59.6 | 59.6 |
| 25° | 330.6 | 322.7 | 296.9 | 209.5 | 88.4 | 60.6 | 58.6 | 57.6 | 55.6 | 54.6 | 54.6 |
| 27.5° | 344.5 | 332.6 | 302.8 | 164.8 | 61.6 | 54.6 | 52.6 | 51.6 | 48.6 | 46.7 | 46.7 |
| 30° | 362.4 | 347.5 | 305.8 | 120.1 | 51.6 | 47.7 | 45.7 | 43.7 | 39.7 | 37.7 | 37.7 |
| 32.5° | 391.2 | 378.3 | 299.8 | 80.4 | 46.7 | 42.7 | 39.7 | 35.7 | 31.8 | 29.8 | 28.8 |
| 35° | 427.9 | 410.0 | 279.0 | 56.6 | 41.7 | 37.7 | 32.8 | 27.8 | 24.8 | 23.8 | 23.8 |
| 37.5° | 468.6 | 444.8 | 247.2 | 45.7 | 37.7 | 32.8 | 27.8 | 22.8 | 19.9 | 18.9 | 18.9 |
| 40° | 526.2 | 489.5 | 203.5 | 39.7 | 32.8 | 27.8 | 22.8 | 18.9 | 16.9 | 15.9 | 15.9 |
| 42.5° | 601.7 | 546.1 | 153.9 | 36.7 | 29.8 | 23.8 | 18.9 | 15.9 | 13.9 | 12.9 | 12.9 |
| 45° | 686.1 | 605.6 | 112.2 | 32.8 | 25.8 | 19.9 | 14.9 | 12.9 | 10.9 | 9.9 | 9.9 |
| 47.5° | 770.5 | 648.3 | 77.4 | 29.8 | 21.8 | 16.9 | 12.9 | 9.9 | 7.9 | 7.9 | 6.9 |
| 50° | 843.9 | 671.2 | 55.6 | 25.8 | 19.9 | 13.9 | 9.9 | 7.9 | 6.9 | 6.0 | 6.0 |
| 52.5° | 908.5 | 681.1 | 42.7 | 22.8 | 16.9 | 11.9 | 7.9 | 6.9 | 6.0 | 6.0 | 6.0 |
| 55° | 963.1 | 673.2 | 33.8 | 19.9 | 14.9 | 9.9 | 6.9 | 6.0 | 5.0 | 5.0 | 5.0 |
| 57.5° | 1016.7 | 649.3 | 26.8 | 16.9 | 11.9 | 6.9 | 6.0 | 5.0 | 4.0 | 4.0 | 4.0 |
| 60° | 1044.5 | 618.5 | 21.8 | 13.9 | 9.9 | 6.0 | 5.0 | 4.0 | 4.0 | 3.0 | 3.0 |
| 62.5° | 1025.6 | 556.0 | 17.9 | 11.9 | 6.9 | 5.0 | 4.0 | 3.0 | 3.0 | 2.0 | 2.0 |
| 65° | *962.1* | *476.6* | *13.9* | *8.9* | *5.0* | *4.0* | *3.0* | *3.0* | *2.0* | *1.0* | *1.0* |
| 67.5° | 811.2 | 373.3 | 10.9 | 6.9 | 4.0 | 3.0 | 2.0 | 2.0 | 1.0 | 0.0 | 0.0 |
| 70° | 579.8 | 246.2 | 8.9 | 5.0 | 3.0 | 3.0 | 2.0 | 1.0 | 0.0 | 0.0 | 0.0 |
| 72.5° | 334.6 | 119.1 | 6.9 | 3.0 | 2.0 | 2.0 | 1.0 | 1.0 | 0.0 | 0.0 | 0.0 |
| 75° | 125.1 | 41.7 | 6.0 | 3.0 | 2.0 | 1.0 | 1.0 | 1.0 | 0.0 | 0.0 | 0.0 |
| 77.5° | 41.7 | 16.9 | 5.0 | 4.0 | 3.0 | 1.0 | 1.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 80° | 12.9 | 7.9 | 2.0 | 2.0 | 2.0 | 2.0 | 1.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 82.5° | 6.9 | 4.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 85° | 3.0 | 2.0 | 1.0 | 1.0 | 1.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 87.5° | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 90° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

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

MCGRAW EDISON

Report Number: SP1-2408-195-9

Test Date: 08/07/2024

Luminaire Tested: GALN-SB1A-830-U-5WQ

Data in this report applies to families of products including GALN-SB1A-830-U-5WQ.

Report Generated By FNC07603 / LDUCLS01DT446
Version: v7.04

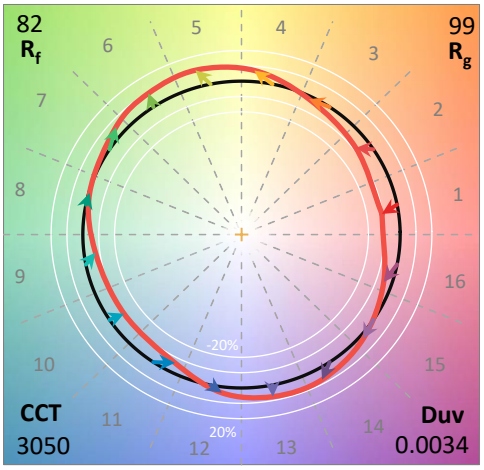
## Test Information

| | |
|---|---|
| Test Method: | LM-79-2019 |
| Report Number: | SP1-2408-195-9 |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Photometer: | SP1 - 76IN SPHERE |
| Measurement Geometry: | 4π |
| Issue Date: | 08/07/2024 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS |
| Product Line: | MCGRAW EDISON |
| Catalog Number: | **GALN-SB1A-830-U-5WQ** |
| Description: | GALLEON AREA AND ROADWAY LUMINAIRE. (1) 80 CRI, 3000K, 350MA HIGH DENSITY LIGHTSQUARE WITH 26 LEDS AND TYPE V WIDE OPTICS |

## Spectral Parameters

| | | | | | |
|---|---|---|---|---|---|
| CCT (K): | 3050 | CRI (Ra): | 81.0 | | |
| CIE u': | 0.2476 | R1: | 79.6 | R9: | 7.1 |
| CIE v': | 0.5251 | R2: | 85.6 | R10: | 67.0 |
| Duv: | 0.0034 | R3: | 92.0 | R11: | 82.7 |
| CIE x: | 0.4383 | R4: | 82.6 | R12: | 63.2 |
| CIE y: | 0.4131 | R5: | 78.9 | R13: | 80.3 |
| CIE z: | 0.1487 | R6: | 81.7 | R14: | 95.0 |
| Peak Wavelength (nm): | 603 | R7: | 85.2 | R15: | 71.7 |
| Dominant Wavelength (nm): | 581 | R8: | 62.0 | | |
| Purity: | 55.55201 | | | | |

| | |
|---|---|
| Rf: | 81.5 |
| Rg: | 99.2 |




## Test Conditions

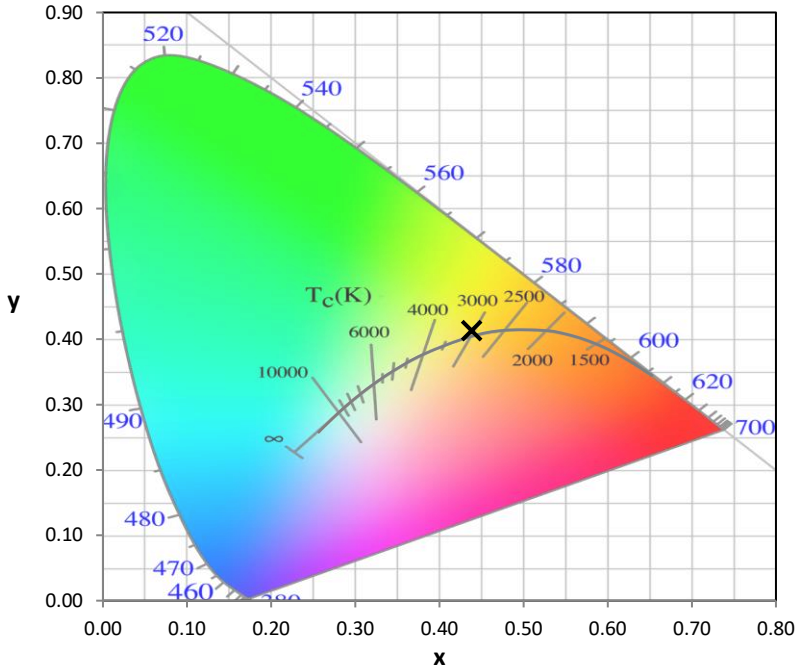
| | |
|---|---|
| Stabilization Time: | 20M |
| Operation Time: | 1H 20M |
| Sphere Temperature (°C): | 24.2 |

REPORT NUMBER: SP1-2408-195-9

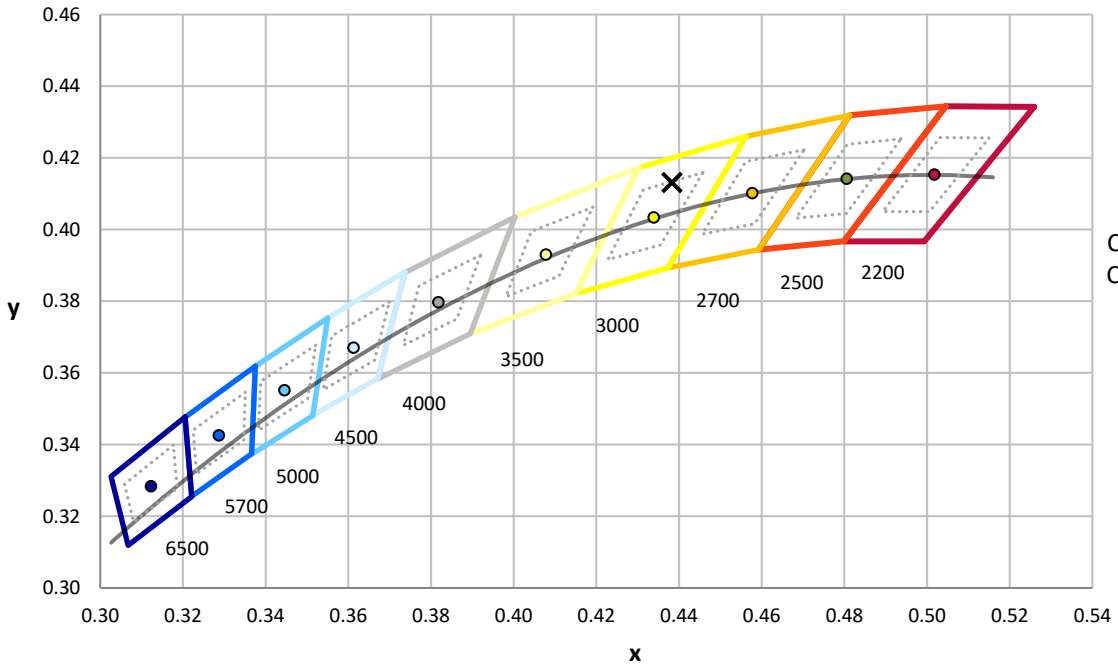
| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 6/18/2024 | 12/18/2024 |
| Power Meter | INXT2011004 | 2/8/2024 | 2/8/2025 |
| AC Power Source | IN0063 | 10/24/2023 | 10/24/2024 |
| DC Power Source | IN0208 | 10/24/2023 | 10/24/2024 |
| Sphere Thermometer | IN0085 | 10/24/2023 | 10/24/2024 |
| Room Thermometer | IN0046 | 10/24/2023 | 10/24/2024 |

REPORT NUMBER: SP1-2408-195-9

## CIE 1931 Chromaticity Diagram




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

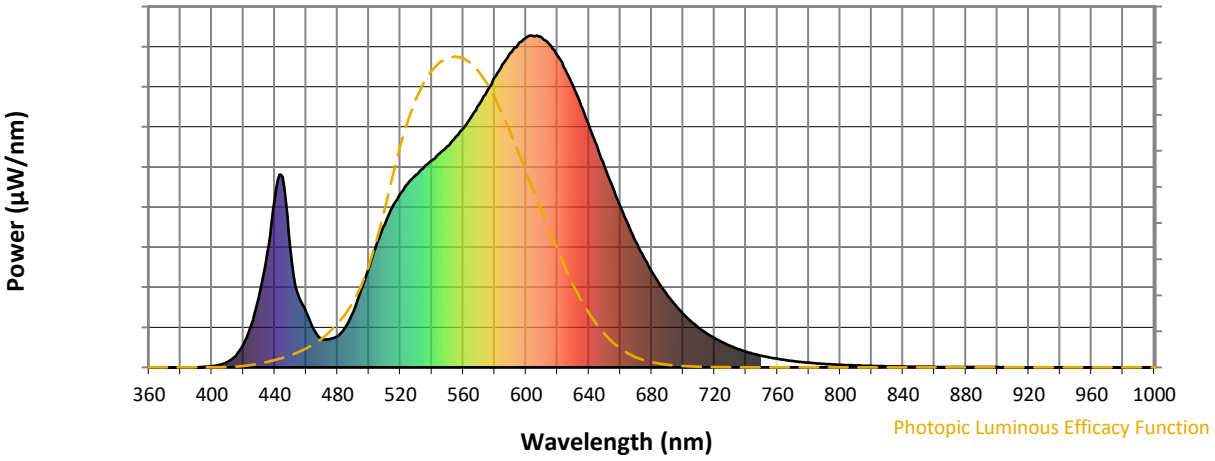



CCT = 3050K
CIE x = 0.4383
CIE y = 0.4131
Duv = 0.0034

Point lies inside the ANSI 3000K 4-step quadrangle

REPORT NUMBER: SP1-2408-195-9

## 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 | 168 | NR | 620 | 940 | NR | 750 | 35 | NR | 880 | 1 | NR |
| 365 | 0 | NR | 495 | 233 | NR | 625 | 897 | NR | 755 | 30 | NR | 885 | 1 | NR |
| 370 | 0 | NR | 500 | 300 | NR | 630 | 847 | NR | 760 | 26 | NR | 890 | 1 | NR |
| 375 | 0 | NR | 505 | 372 | NR | 635 | 790 | NR | 765 | 22 | NR | 895 | 1 | NR |
| 380 | 0 | NR | 510 | 430 | NR | 640 | 730 | NR | 770 | 19 | NR | 900 | 1 | NR |
| 385 | 0 | NR | 515 | 483 | NR | 645 | 668 | NR | 775 | 16 | NR | 905 | 1 | NR |
| 390 | 0 | NR | 520 | 524 | NR | 650 | 605 | NR | 780 | 14 | NR | 910 | 0 | NR |
| 395 | 2 | NR | 525 | 555 | NR | 655 | 545 | NR | 785 | 12 | NR | 915 | 0 | NR |
| 400 | 4 | NR | 530 | 581 | NR | 660 | 485 | NR | 790 | 10 | NR | 920 | 0 | NR |
| 405 | 7 | NR | 535 | 604 | NR | 665 | 430 | NR | 795 | 9 | NR | 925 | 0 | NR |
| 410 | 17 | NR | 540 | 623 | NR | 670 | 378 | NR | 800 | 8 | NR | 930 | 0 | NR |
| 415 | 34 | NR | 545 | 645 | NR | 675 | 331 | NR | 805 | 7 | NR | 935 | 0 | NR |
| 420 | 68 | NR | 550 | 667 | NR | 680 | 290 | NR | 810 | 6 | NR | 940 | 0 | NR |
| 425 | 128 | NR | 555 | 693 | NR | 685 | 251 | NR | 815 | 5 | NR | 945 | 0 | NR |
| 430 | 214 | NR | 560 | 719 | NR | 690 | 218 | NR | 820 | 4 | NR | 950 | 0 | NR |
| 435 | 339 | NR | 565 | 754 | NR | 695 | 188 | NR | 825 | 4 | NR | 955 | 0 | NR |
| 440 | 507 | NR | 570 | 791 | NR | 700 | 162 | NR | 830 | 3 | NR | 960 | 0 | NR |
| 445 | 573 | NR | 575 | 830 | NR | 705 | 139 | NR | 835 | 3 | NR | 965 | 0 | NR |
| 450 | 356 | NR | 580 | 873 | NR | 710 | 119 | NR | 840 | 3 | NR | 970 | 0 | NR |
| 455 | 217 | NR | 585 | 913 | NR | 715 | 102 | NR | 845 | 2 | NR | 975 | 0 | NR |
| 460 | 168 | NR | 590 | 948 | NR | 720 | 88 | NR | 850 | 2 | NR | 980 | 0 | NR |
| 465 | 113 | NR | 595 | 974 | NR | 725 | 76 | NR | 855 | 2 | NR | 985 | 0 | NR |
| 470 | 85 | NR | 600 | 994 | NR | 730 | 65 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 85 | NR | 605 | 998 | NR | 735 | 55 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 94 | NR | 610 | 994 | NR | 740 | 47 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 120 | NR | 615 | 973 | NR | 745 | 41 | NR | 875 | 1 | NR | | | |

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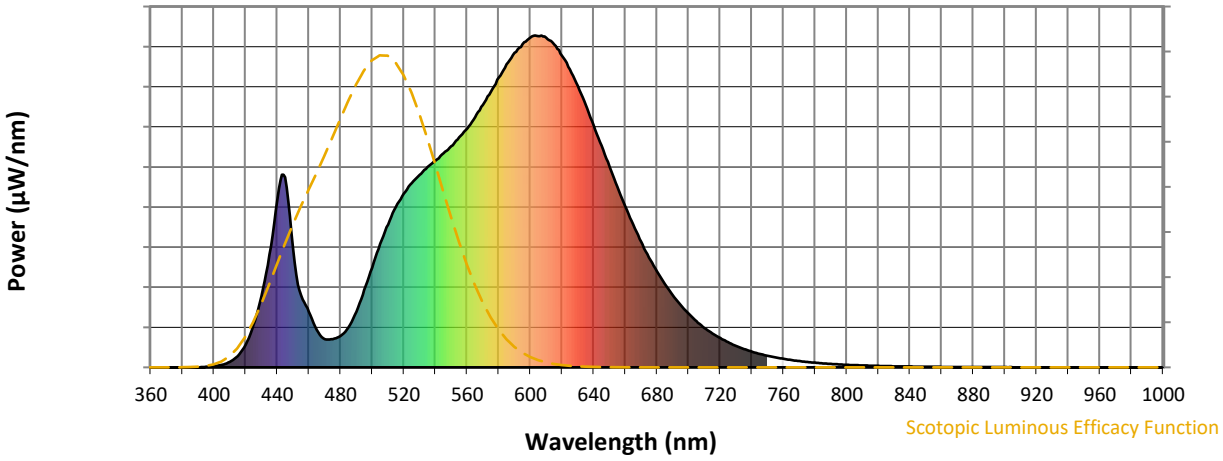
## Scotopic Flux vs. Wavelength




**Scotopic Lumens: NR** **S/P: 1.27**

| 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 | 168 | NR | 620 | 940 | NR | 750 | 35 | NR | 880 | 1 | NR |
| 365 | 0 | NR | 495 | 233 | NR | 625 | 897 | NR | 755 | 30 | NR | 885 | 1 | NR |
| 370 | 0 | NR | 500 | 300 | NR | 630 | 847 | NR | 760 | 26 | NR | 890 | 1 | NR |
| 375 | 0 | NR | 505 | 372 | NR | 635 | 790 | NR | 765 | 22 | NR | 895 | 1 | NR |
| 380 | 0 | NR | 510 | 430 | NR | 640 | 730 | NR | 770 | 19 | NR | 900 | 1 | NR |
| 385 | 0 | NR | 515 | 483 | NR | 645 | 668 | NR | 775 | 16 | NR | 905 | 1 | NR |
| 390 | 0 | NR | 520 | 524 | NR | 650 | 605 | NR | 780 | 14 | NR | 910 | 0 | NR |
| 395 | 2 | NR | 525 | 555 | NR | 655 | 545 | NR | 785 | 12 | NR | 915 | 0 | NR |
| 400 | 4 | NR | 530 | 581 | NR | 660 | 485 | NR | 790 | 10 | NR | 920 | 0 | NR |
| 405 | 7 | NR | 535 | 604 | NR | 665 | 430 | NR | 795 | 9 | NR | 925 | 0 | NR |
| 410 | 17 | NR | 540 | 623 | NR | 670 | 378 | NR | 800 | 8 | NR | 930 | 0 | NR |
| 415 | 34 | NR | 545 | 645 | NR | 675 | 331 | NR | 805 | 7 | NR | 935 | 0 | NR |
| 420 | 68 | NR | 550 | 667 | NR | 680 | 290 | NR | 810 | 6 | NR | 940 | 0 | NR |
| 425 | 128 | NR | 555 | 693 | NR | 685 | 251 | NR | 815 | 5 | NR | 945 | 0 | NR |
| 430 | 214 | NR | 560 | 719 | NR | 690 | 218 | NR | 820 | 4 | NR | 950 | 0 | NR |
| 435 | 339 | NR | 565 | 754 | NR | 695 | 188 | NR | 825 | 4 | NR | 955 | 0 | NR |
| 440 | 507 | NR | 570 | 791 | NR | 700 | 162 | NR | 830 | 3 | NR | 960 | 0 | NR |
| 445 | 573 | NR | 575 | 830 | NR | 705 | 139 | NR | 835 | 3 | NR | 965 | 0 | NR |
| 450 | 356 | NR | 580 | 873 | NR | 710 | 119 | NR | 840 | 3 | NR | 970 | 0 | NR |
| 455 | 217 | NR | 585 | 913 | NR | 715 | 102 | NR | 845 | 2 | NR | 975 | 0 | NR |
| 460 | 168 | NR | 590 | 948 | NR | 720 | 88 | NR | 850 | 2 | NR | 980 | 0 | NR |
| 465 | 113 | NR | 595 | 974 | NR | 725 | 76 | NR | 855 | 2 | NR | 985 | 0 | NR |
| 470 | 85 | NR | 600 | 994 | NR | 730 | 65 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 85 | NR | 605 | 998 | NR | 735 | 55 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 94 | NR | 610 | 994 | NR | 740 | 47 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 120 | NR | 615 | 973 | NR | 745 | 41 | NR | 875 | 1 | NR | | | |

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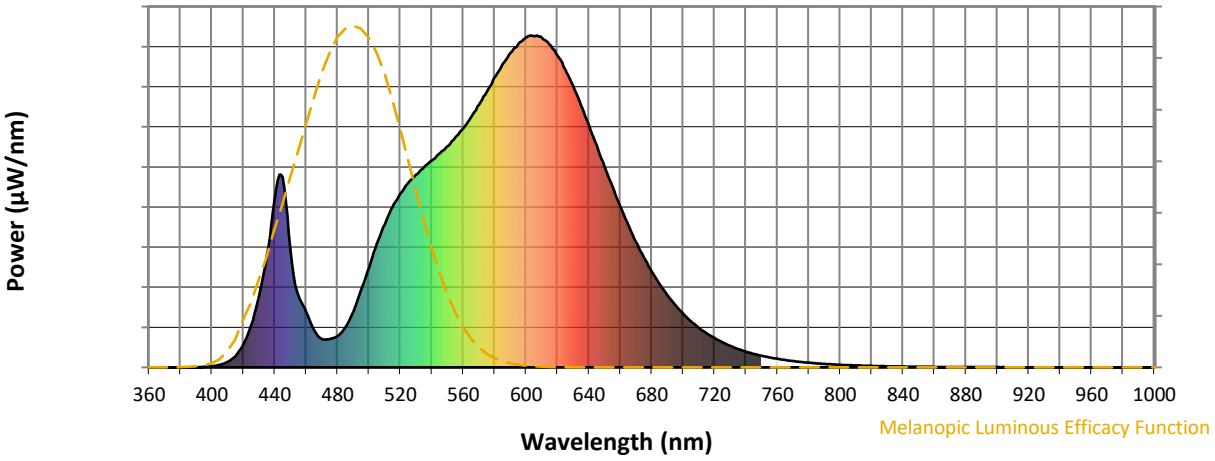
## Melanopic Flux vs. Wavelength




**Melanopic Lumens: NR** **M/P: 2.32**

| 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 | 168 | NR | 620 | 940 | NR | 750 | 35 | NR | 880 | 1 | NR |
| 365 | 0 | NR | 495 | 233 | NR | 625 | 897 | NR | 755 | 30 | NR | 885 | 1 | NR |
| 370 | 0 | NR | 500 | 300 | NR | 630 | 847 | NR | 760 | 26 | NR | 890 | 1 | NR |
| 375 | 0 | NR | 505 | 372 | NR | 635 | 790 | NR | 765 | 22 | NR | 895 | 1 | NR |
| 380 | 0 | NR | 510 | 430 | NR | 640 | 730 | NR | 770 | 19 | NR | 900 | 1 | NR |
| 385 | 0 | NR | 515 | 483 | NR | 645 | 668 | NR | 775 | 16 | NR | 905 | 1 | NR |
| 390 | 0 | NR | 520 | 524 | NR | 650 | 605 | NR | 780 | 14 | NR | 910 | 0 | NR |
| 395 | 2 | NR | 525 | 555 | NR | 655 | 545 | NR | 785 | 12 | NR | 915 | 0 | NR |
| 400 | 4 | NR | 530 | 581 | NR | 660 | 485 | NR | 790 | 10 | NR | 920 | 0 | NR |
| 405 | 7 | NR | 535 | 604 | NR | 665 | 430 | NR | 795 | 9 | NR | 925 | 0 | NR |
| 410 | 17 | NR | 540 | 623 | NR | 670 | 378 | NR | 800 | 8 | NR | 930 | 0 | NR |
| 415 | 34 | NR | 545 | 645 | NR | 675 | 331 | NR | 805 | 7 | NR | 935 | 0 | NR |
| 420 | 68 | NR | 550 | 667 | NR | 680 | 290 | NR | 810 | 6 | NR | 940 | 0 | NR |
| 425 | 128 | NR | 555 | 693 | NR | 685 | 251 | NR | 815 | 5 | NR | 945 | 0 | NR |
| 430 | 214 | NR | 560 | 719 | NR | 690 | 218 | NR | 820 | 4 | NR | 950 | 0 | NR |
| 435 | 339 | NR | 565 | 754 | NR | 695 | 188 | NR | 825 | 4 | NR | 955 | 0 | NR |
| 440 | 507 | NR | 570 | 791 | NR | 700 | 162 | NR | 830 | 3 | NR | 960 | 0 | NR |
| 445 | 573 | NR | 575 | 830 | NR | 705 | 139 | NR | 835 | 3 | NR | 965 | 0 | NR |
| 450 | 356 | NR | 580 | 873 | NR | 710 | 119 | NR | 840 | 3 | NR | 970 | 0 | NR |
| 455 | 217 | NR | 585 | 913 | NR | 715 | 102 | NR | 845 | 2 | NR | 975 | 0 | NR |
| 460 | 168 | NR | 590 | 948 | NR | 720 | 88 | NR | 850 | 2 | NR | 980 | 0 | NR |
| 465 | 113 | NR | 595 | 974 | NR | 725 | 76 | NR | 855 | 2 | NR | 985 | 0 | NR |
| 470 | 85 | NR | 600 | 994 | NR | 730 | 65 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 85 | NR | 605 | 998 | NR | 735 | 55 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 94 | NR | 610 | 994 | NR | 740 | 47 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 120 | NR | 615 | 973 | NR | 745 | 41 | NR | 875 | 1 | NR | | | |

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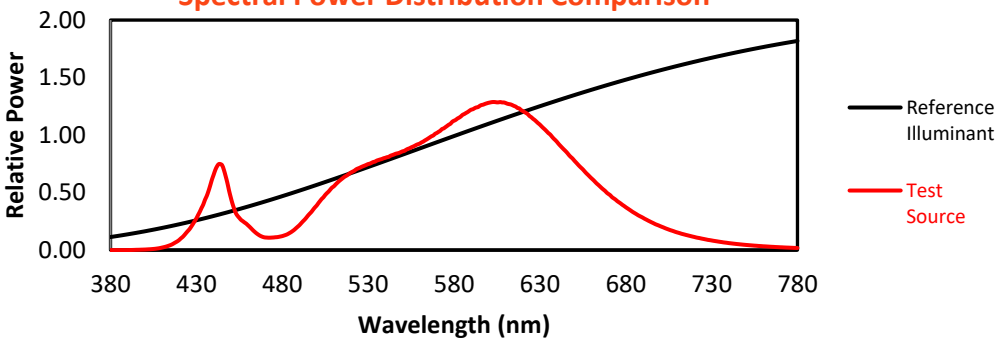
# TM-30-18

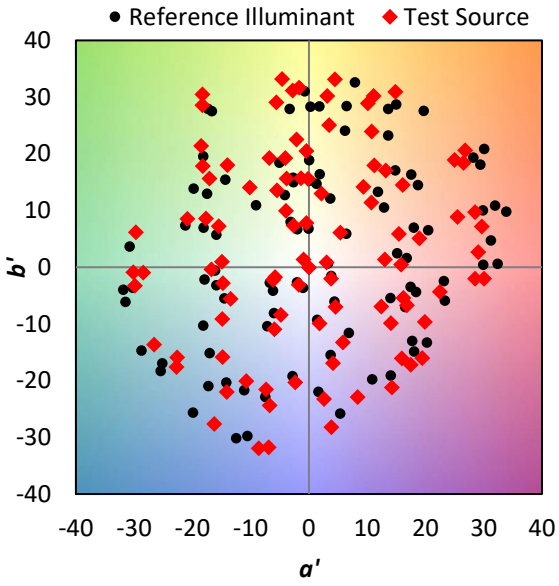
## Summary

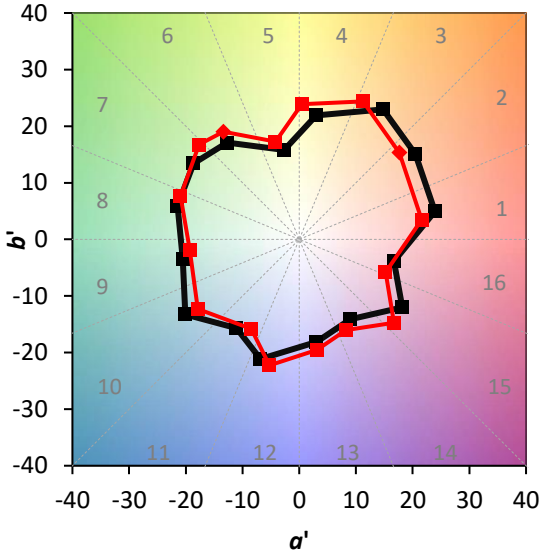
$R_f$ = 81.5
$R_g$ = 99.2
CIE $R_a$ = 81.0
$R_9$ = 7.1

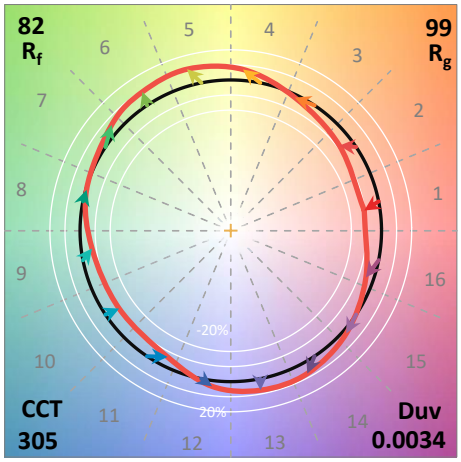
## Spectral Power Distribution Comparison

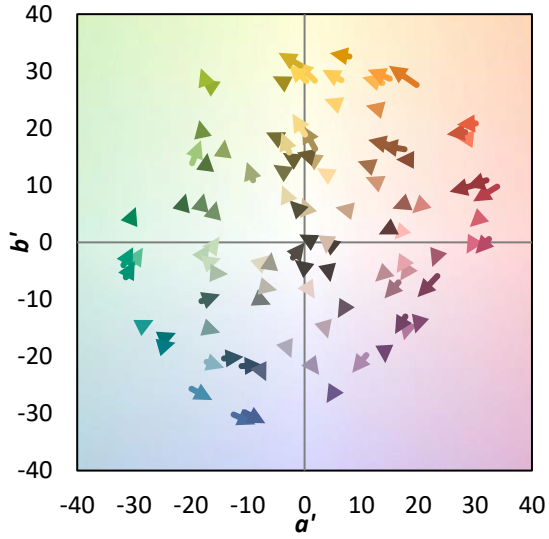



## Color Vector Graphics



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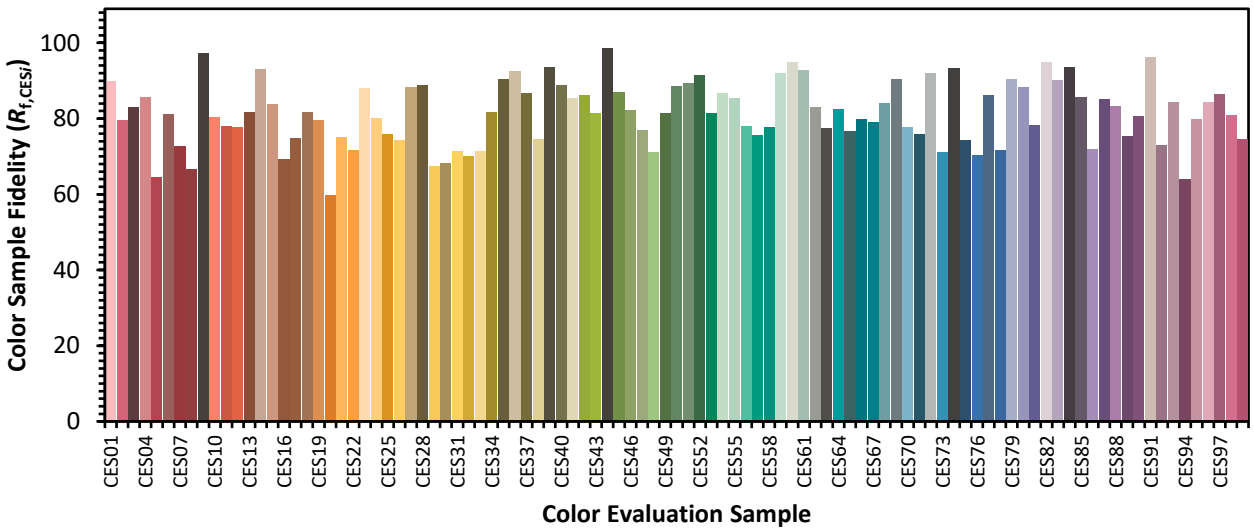
# TM-30-18

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

| | | | |
|---|---|---|---|
| CES01 = 86 | CES26 = 74 | CES51 = 89 | CES76 = 70 |
| CES02 = 63 | CES27 = 88 | CES52 = 92 | CES77 = 86 |
| CES03 = 31 | CES28 = 89 | CES53 = 81 | CES78 = 72 |
| CES04 = 70 | CES29 = 67 | CES54 = 87 | CES79 = 90 |
| CES05 = 50 | CES30 = 68 | CES55 = 85 | CES80 = 88 |
| CES06 = 51 | CES31 = 71 | CES56 = 78 | CES81 = 78 |
| CES07 = 42 | CES32 = 70 | CES57 = 76 | CES82 = 95 |
| CES08 = 41 | CES33 = 71 | CES58 = 78 | CES83 = 90 |
| CES09 = 29 | CES34 = 82 | CES59 = 92 | CES84 = 94 |
| CES10 = 76 | CES35 = 90 | CES60 = 95 | CES85 = 86 |
| CES11 = 59 | CES36 = 93 | CES61 = 93 | CES86 = 72 |
| CES12 = 65 | CES37 = 87 | CES62 = 83 | CES87 = 85 |
| CES13 = 43 | CES38 = 75 | CES63 = 77 | CES88 = 83 |
| CES14 = 74 | CES39 = 94 | CES64 = 83 | CES89 = 75 |
| CES15 = 71 | CES40 = 89 | CES65 = 77 | CES90 = 81 |
| CES16 = 47 | CES41 = 85 | CES66 = 80 | CES91 = 96 |
| CES17 = 50 | CES42 = 86 | CES67 = 79 | CES92 = 73 |
| CES18 = 56 | CES43 = 81 | CES68 = 84 | CES93 = 84 |
| CES19 = 72 | CES44 = 99 | CES69 = 91 | CES94 = 64 |
| CES20 = 66 | CES45 = 87 | CES70 = 78 | CES95 = 80 |
| CES21 = 87 | CES46 = 82 | CES71 = 76 | CES96 = 84 |
| CES22 = 79 | CES47 = 77 | CES72 = 92 | CES97 = 87 |
| CES23 = 92 | CES48 = 71 | CES73 = 71 | CES98 = 81 |
| CES24 = 91 | CES49 = 81 | CES74 = 93 | CES99 = 74 |
| CES25 = 72 | CES50 = 89 | CES75 = 74 | |



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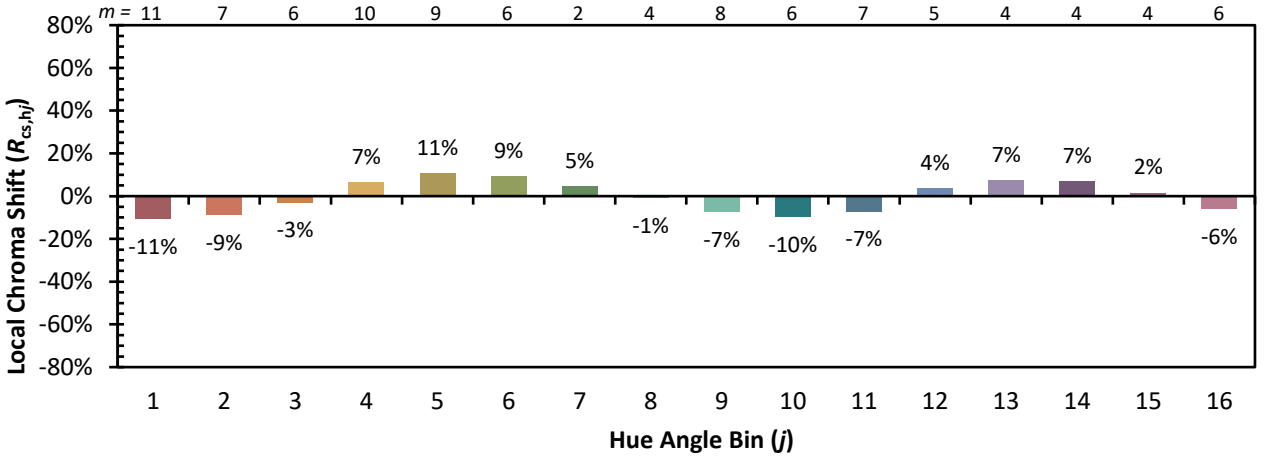
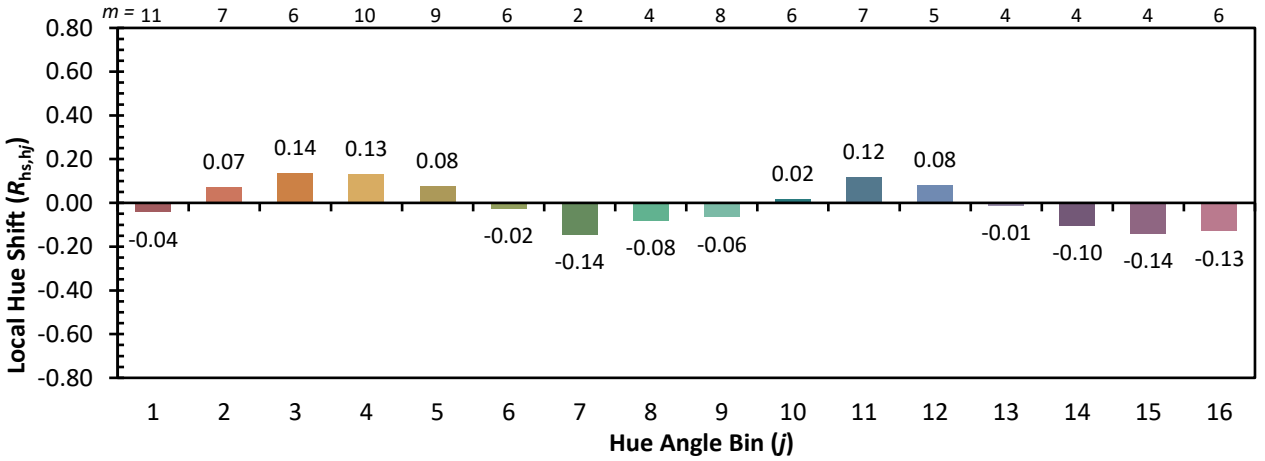
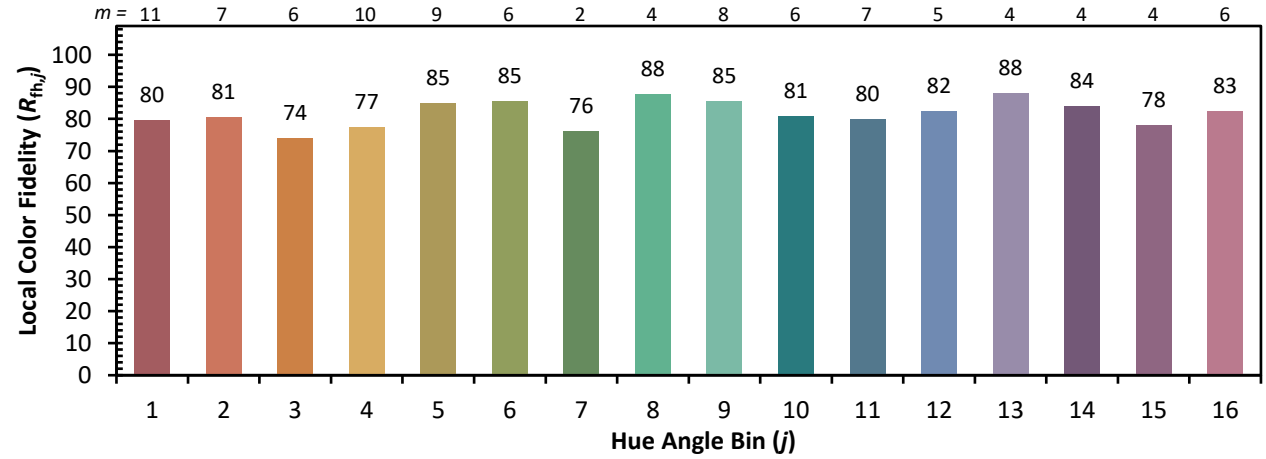
# TM-30-18

## Color Rendition by Hue-Angle Bin



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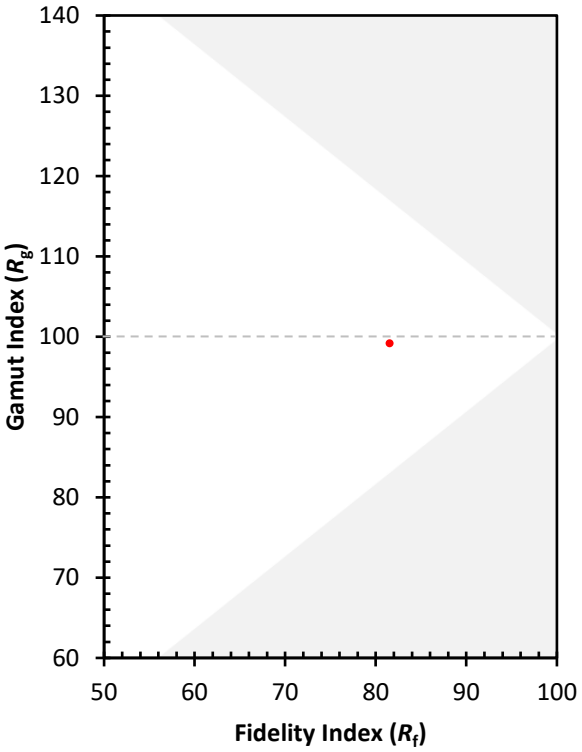
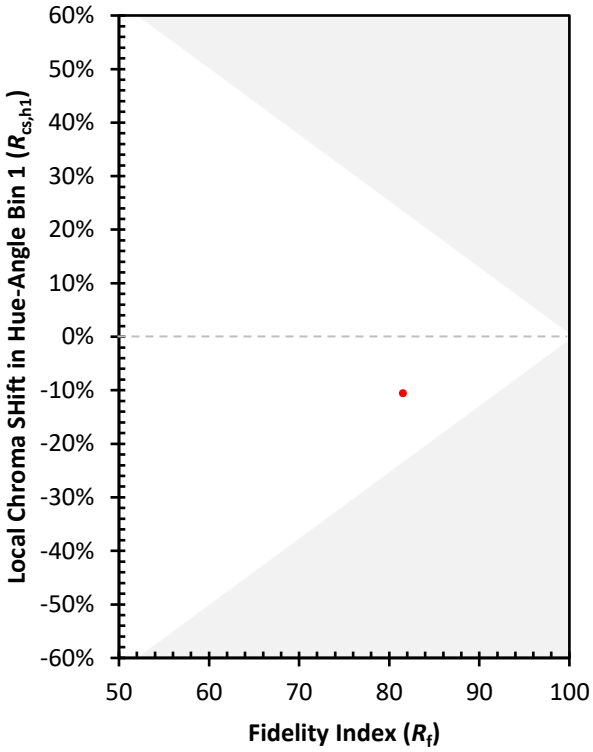
## Measure Comparisons

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