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: P437526

Luminaire Tested: **ISS-SA1D-740-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: | P437526 |
| | 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-SA1D-740-U-T3-HSS |
| Description: | IMPACT ELITE LED QUARTER SPHERE LUMINAIRE |
| | (1) 70 CRI, 4000K, 800mA 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: | 4229 lumens |
| Efficiency: | N/A |
| Efficacy: | 93.6 lumens/watt |
| Luminous Opening: | Rectangular (W 0.5' x L: 0.5' x H: 0') |
| IES Classification: | Type III - Short |
| BUG Rating: | B1 - U0 - G1 |

| | |
|---|---|
| Input Watts (W): | 45.2 |
| 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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REPORT NUMBER: P437526
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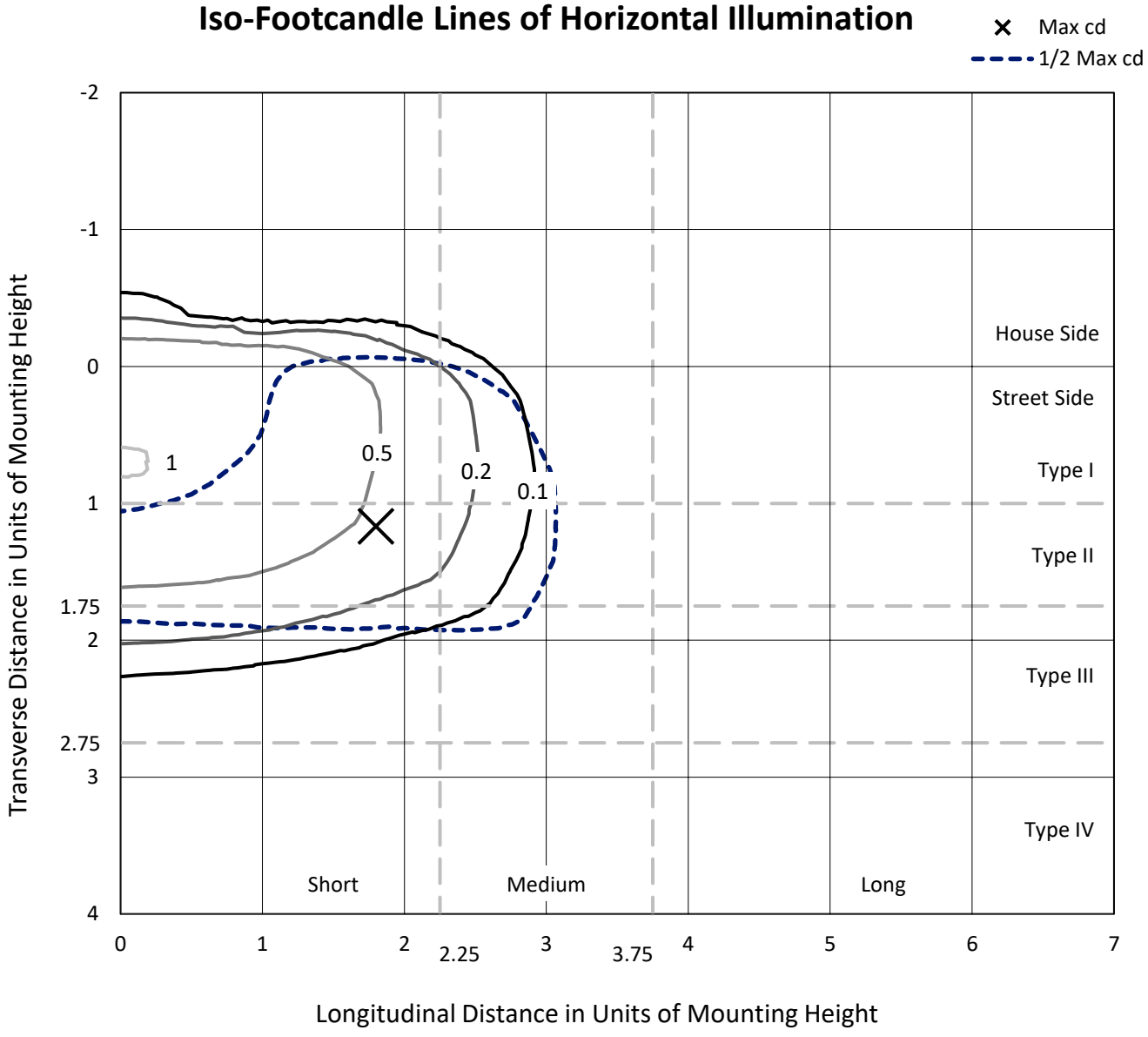
## Iso-Footcandle Lines of Horizontal Illumination




Based on 25 foot mounting height. Maximum calculated value = 1 fc
Type III - Short - N/A

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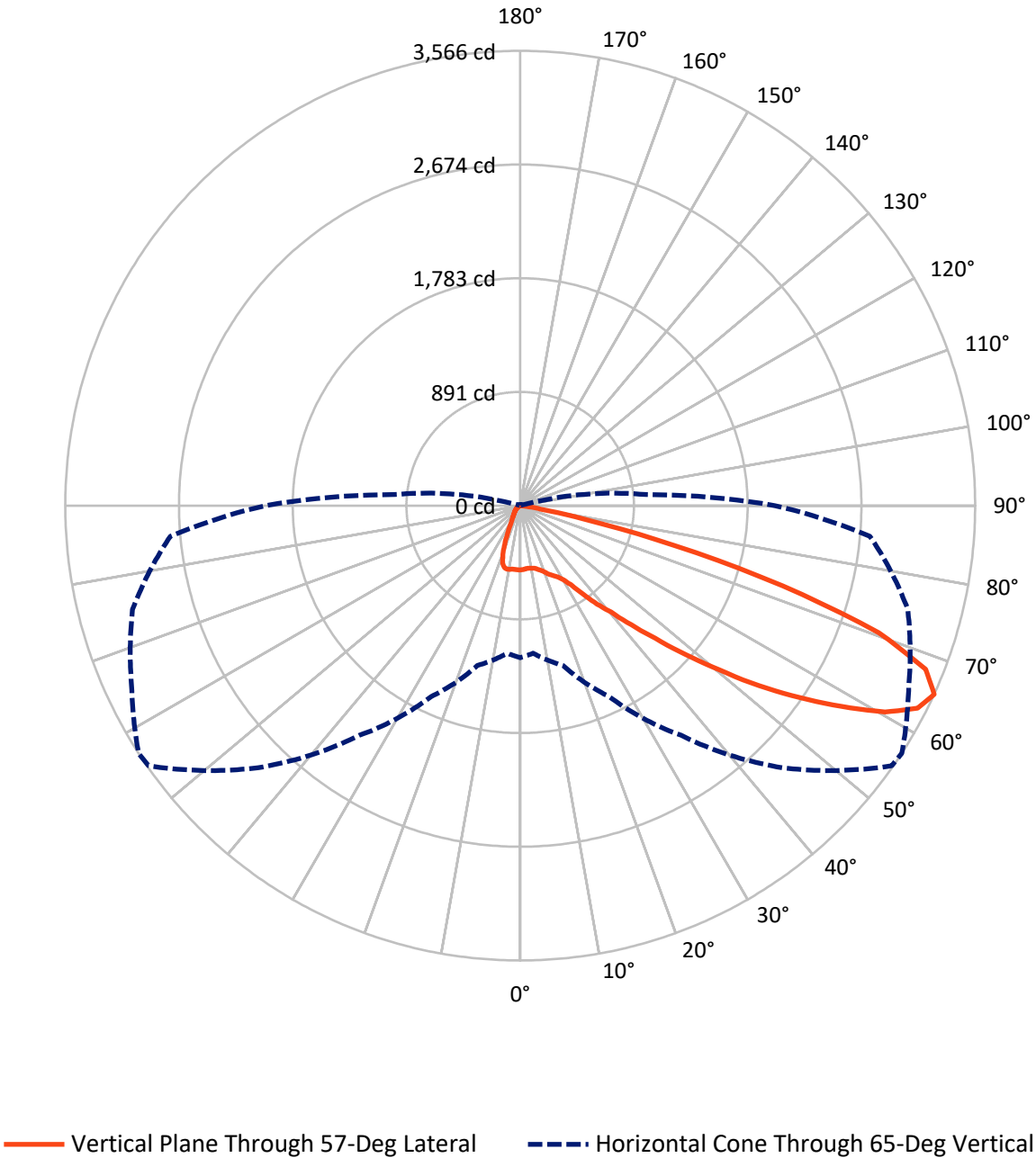
## Luminous Intensity Polar Plot



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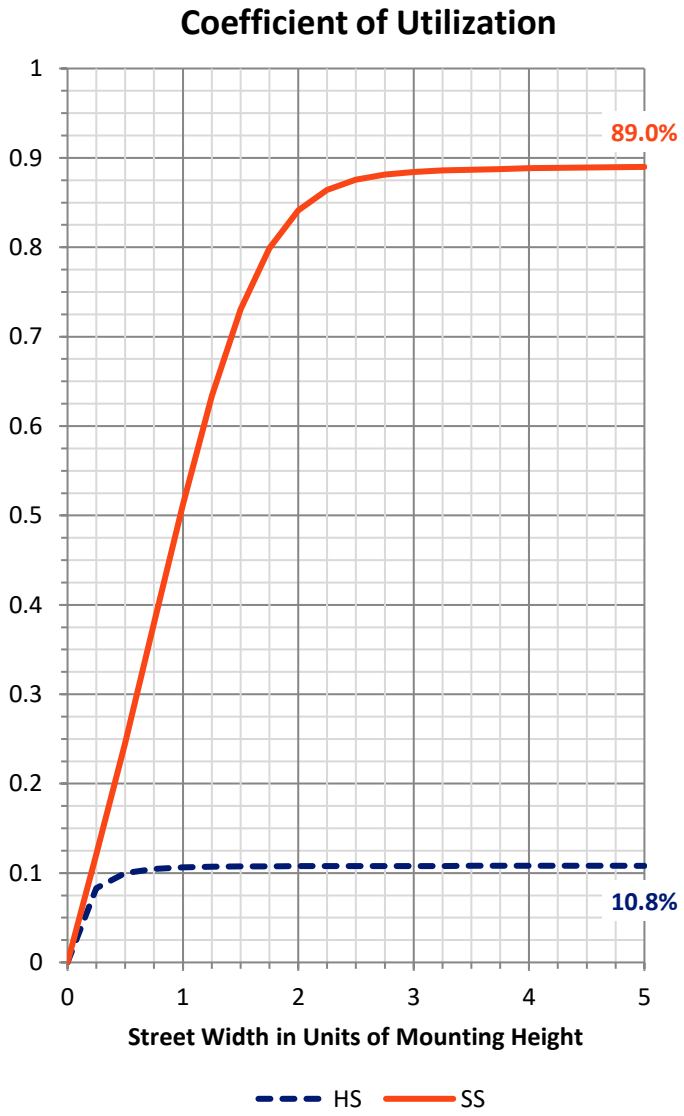
**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 461.3 | 0.0 | 461.3 |
| | % Fixture | 10.9 | 0.0 | 10.9 |
| **Street Side** | Lumens | 3767.7 | 0.0 | 3767.7 |
| | % Fixture | 89.1 | 0.0 | 89.1 |
| **Total** | Lumens | 4229.0 | 0.0 | 4229.0 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 46.8 | 1.1 |
| 10°-20° | 126.6 | 3.0 |
| 20°-30° | 218.6 | 5.2 |
| 30°-40° | 387.1 | 9.2 |
| 40°-50° | 702.2 | 16.6 |
| 50°-60° | 1182.7 | 28.0 |
| 60°-70° | 1216.1 | 28.8 |
| 70°-80° | 337.0 | 8.0 |
| 80°-90° | 12.0 | 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° | 4229.0 | 100.0 |
| 0°-180° | 4229.0 | 100.0 |



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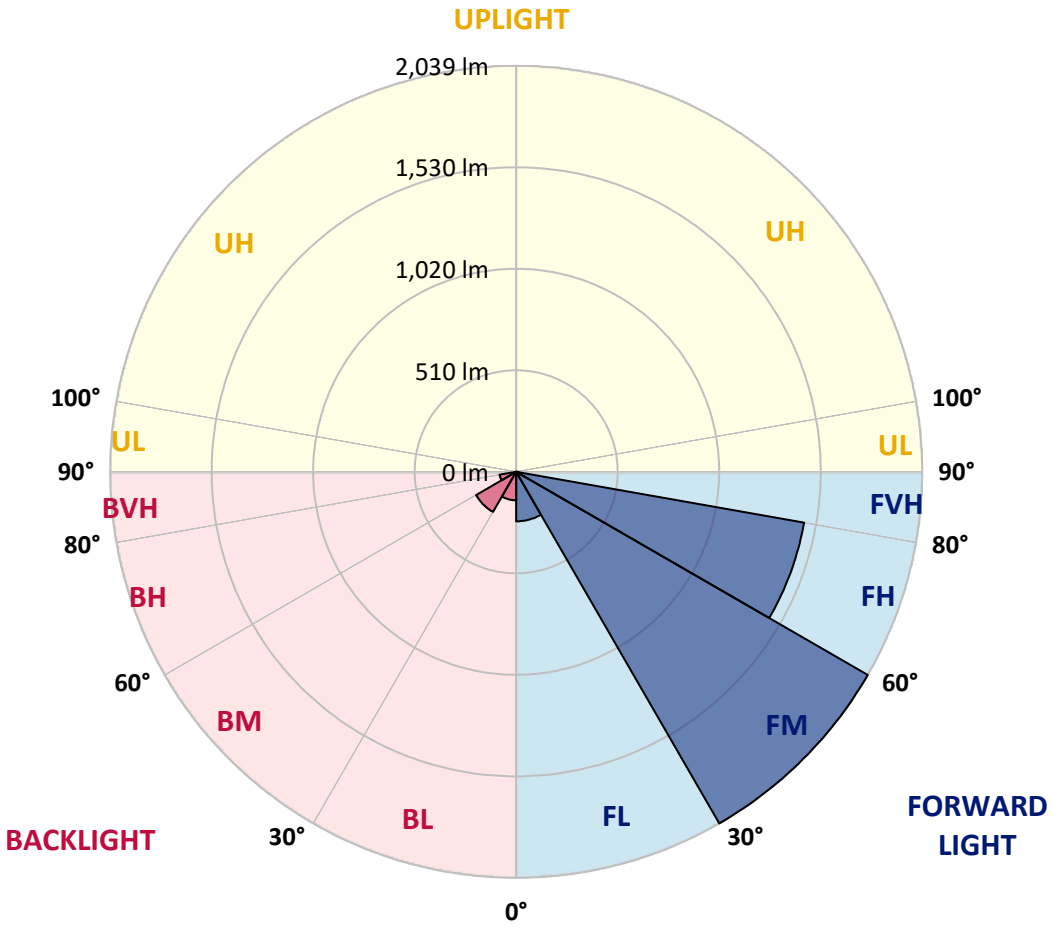
## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 248.7 | 5.9 | | | |
| FM | (30°-60°) | 2039.5 | 48.2 | | | |
| FH | (60°-80°) | 1468.5 | 34.7 | | | G1/1800 |
| FVH | (80°-90°) | 11.1 | 0.3 | | | G1/100 |
| BL | (0°-30°) | 143.2 | 3.4 | B1/500 | | |
| BM | (30°-60°) | 232.6 | 5.5 | B1/1000 | | |
| BH | (60°-80°) | 84.6 | 2.0 | B0/110 | | G0/110 |
| BVH | (80°-90°) | 0.9 | 0.0 | | | G0/10 |
| UL | (90°-100°) | 0.0 | 0.0 | | U0/0 | |
| UH | (100°-180°) | 0.0 | 0.0 | | U0/0 | |

**BUG Rating: B1-U0-G1**
Type III Short



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**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 57° | 65° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 503.2 | 503.2 | 503.2 | 503.2 | 503.2 | 503.2 | 503.2 | *503.2* | 503.2 | 503.2 | 503.2 |
| 2.5° | 488.8 | 488.8 | 492.9 | 494.9 | 494.9 | 497.0 | 499.1 | *501.1* | 501.1 | 501.1 | 505.3 |
| 5° | 464.0 | 461.9 | 466.1 | 470.2 | 476.4 | 484.6 | 490.8 | *494.9* | 501.1 | 507.3 | 509.4 |
| 7.5° | 441.3 | 441.3 | 445.4 | 451.6 | 464.0 | 476.4 | 488.8 | *494.9* | 505.3 | 517.6 | 521.8 |
| 10° | 435.1 | 433.1 | 439.3 | 445.4 | 457.8 | 472.3 | 490.8 | *499.1* | 513.5 | 530.0 | 536.2 |
| 12.5° | 431.0 | 431.0 | 433.1 | 443.4 | 455.8 | 474.3 | 497.0 | *503.2* | 525.9 | 544.4 | 558.9 |
| 15° | 428.9 | 428.9 | 433.1 | 441.3 | 455.8 | 476.4 | 507.3 | *517.6* | 544.4 | 571.2 | 583.6 |
| 17.5° | 445.4 | 443.4 | 441.3 | 445.4 | 459.9 | 482.6 | 523.8 | *534.1* | 567.1 | 600.1 | 614.6 |
| 20° | 494.9 | 492.9 | 486.7 | 472.3 | 472.3 | 499.1 | 544.4 | *556.8* | 600.1 | 633.1 | 641.4 |
| 22.5° | 587.7 | 593.9 | 571.2 | 534.1 | 507.3 | 519.7 | 571.2 | *585.7* | 635.2 | 670.2 | 670.2 |
| 25° | 721.8 | 713.5 | 692.9 | 631.1 | 577.4 | 552.7 | 593.9 | *608.4* | 668.2 | 709.4 | 701.2 |
| 27.5° | 862.0 | 864.1 | 835.2 | 765.1 | 678.5 | 612.5 | 618.7 | *635.2* | 703.2 | 750.7 | 732.1 |
| 30° | 973.4 | 965.1 | 950.7 | 893.0 | 798.1 | 707.4 | 666.1 | *676.4* | 742.4 | 796.0 | 779.5 |
| 32.5° | 1072.4 | 1068.3 | 1049.7 | 1000.2 | 915.6 | 818.7 | 744.5 | *746.5* | 798.1 | 864.1 | 843.5 |
| 35° | 1161.1 | 1165.2 | 1156.9 | 1101.2 | 1024.9 | 934.2 | 849.7 | *855.8* | 895.0 | 963.1 | 921.8 |
| 37.5° | 1272.4 | 1272.4 | 1258.0 | 1206.4 | 1148.7 | 1057.9 | 977.5 | *979.6* | 1000.2 | 1055.9 | 1004.3 |
| 40° | 1369.3 | 1373.5 | 1371.4 | 1332.2 | 1276.5 | 1194.0 | 1097.1 | *1097.1* | 1103.3 | 1169.3 | 1142.5 |
| 42.5° | 1501.3 | 1507.5 | 1505.4 | 1468.3 | 1425.0 | 1365.2 | 1282.7 | *1276.5* | 1272.4 | 1354.9 | 1326.0 |
| 45° | 1670.4 | 1684.9 | 1691.1 | 1645.7 | 1606.5 | 1571.4 | 1507.5 | *1482.8* | 1493.1 | 1569.4 | 1546.7 |
| 47.5° | 1831.3 | 1847.8 | 1876.7 | 1854.0 | 1835.4 | 1835.4 | 1748.8 | *1744.7* | 1728.2 | 1816.9 | 1755.0 |
| 50° | 1983.9 | 1986.0 | 2027.2 | 2062.3 | 2117.9 | 2107.6 | 2049.9 | *2025.1* | 2000.4 | 2060.2 | 1948.8 |
| 52.5° | 2070.5 | 2095.3 | 2148.9 | 2249.9 | 2371.6 | 2421.1 | 2361.3 | *2346.9* | 2297.4 | 2289.1 | 2136.5 |
| 55° | 2150.9 | 2150.9 | 2235.5 | 2410.8 | 2617.0 | 2722.2 | 2672.7 | *2656.2* | 2557.2 | 2528.3 | 2330.4 |
| 57.5° | 2177.7 | 2169.5 | 2282.9 | 2505.6 | 2815.0 | 2998.5 | 3008.8 | *2971.7* | 2833.5 | 2744.9 | 2528.3 |
| 60° | 2043.7 | 2029.3 | 2148.9 | 2443.8 | 2868.6 | 3198.6 | 3309.9 | *3285.2* | 3072.8 | 2955.2 | 2736.6 |
| 62.5° | 1658.1 | 1676.6 | 1829.2 | 2148.9 | 2678.9 | 3177.9 | 3510.0 | *3495.5* | 3250.1 | 3097.5 | 2819.1 |
| 65° | *1192.0* | *1161.1* | *1297.2* | *1651.9* | *2198.4* | *2905.7* | *3555.3* | *3565.6* | *3359.4* | *3144.9* | *2751.1* |
| 67.5° | 668.2 | 639.3 | 752.7 | 1022.9 | 1563.2 | 2384.0 | 3369.7 | *3427.5* | 3281.1 | 3027.4 | 2458.2 |
| 70° | 255.7 | 272.2 | 350.6 | 505.3 | 921.8 | 1645.7 | 2899.5 | *2982.0* | 2876.9 | 2526.3 | 1831.3 |
| 72.5° | 90.7 | 103.1 | 144.4 | 224.8 | 426.9 | 886.8 | 2027.2 | *2150.9* | 2120.0 | 1755.0 | 1047.6 |
| 75° | 53.6 | 55.7 | 74.2 | 109.3 | 187.7 | 346.5 | 1144.6 | *1247.7* | 1198.2 | 868.2 | 433.1 |
| 77.5° | 37.1 | 37.1 | 47.4 | 66.0 | 107.2 | 138.2 | 447.5 | *507.3* | 521.8 | 313.5 | 127.9 |
| 80° | 22.7 | 24.7 | 33.0 | 43.3 | 61.9 | 63.9 | 138.2 | *162.9* | 152.6 | 111.4 | 45.4 |
| 82.5° | 10.3 | 10.3 | 18.6 | 28.9 | 30.9 | 26.8 | 43.3 | *47.4* | 55.7 | 49.5 | 20.6 |
| 85° | 0.0 | 0.0 | 6.2 | 10.3 | 8.2 | 6.2 | 14.4 | *14.4* | 18.6 | 22.7 | 10.3 |
| 87.5° | 0.0 | 0.0 | 0.0 | 0.0 | 2.1 | 2.1 | 2.1 | *2.1* | 2.1 | 4.1 | 2.1 |
| 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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REPORT NUMBER: P437526
CATALOG NUMBER: ISS-SA1D-740-U-T3-HSS

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 503.2 | 503.2 | 503.2 | 503.2 | 503.2 | 503.2 | 503.2 | 503.2 | 503.2 | 503.2 | 503.2 |
| 2.5° | 505.3 | 507.3 | 505.3 | 503.2 | 503.2 | 501.1 | 501.1 | 501.1 | 501.1 | 501.1 | 501.1 |
| 5° | 509.4 | 511.4 | 509.4 | 505.3 | 501.1 | 497.0 | 492.9 | 492.9 | 492.9 | 492.9 | 497.0 |
| 7.5° | 521.8 | 521.8 | 517.6 | 509.4 | 499.1 | 494.9 | 486.7 | 484.6 | 480.5 | 478.4 | 480.5 |
| 10° | 540.3 | 540.3 | 532.1 | 519.7 | 503.2 | 486.7 | 472.3 | 451.6 | 439.3 | 431.0 | 428.9 |
| 12.5° | 558.9 | 556.8 | 546.5 | 530.0 | 503.2 | 466.1 | 418.6 | 367.1 | 336.1 | 313.5 | 309.3 |
| 15° | 583.6 | 581.6 | 565.1 | 536.2 | 490.8 | 412.5 | 319.7 | 249.5 | 212.4 | 195.9 | 193.9 |
| 17.5° | 610.4 | 606.3 | 583.6 | 540.3 | 451.6 | 311.4 | 210.4 | 162.9 | 148.5 | 144.4 | 144.4 |
| 20° | 639.3 | 633.1 | 598.1 | 534.1 | 373.3 | 212.4 | 146.4 | 136.1 | 134.0 | 132.0 | 132.0 |
| 22.5° | 662.0 | 651.7 | 608.4 | 503.2 | 278.4 | 146.4 | 129.9 | 127.9 | 125.8 | 123.7 | 123.7 |
| 25° | 686.7 | 670.2 | 616.6 | 435.1 | 183.5 | 125.8 | 121.7 | 119.6 | 115.5 | 113.4 | 113.4 |
| 27.5° | 715.6 | 690.9 | 629.0 | 342.3 | 127.9 | 113.4 | 109.3 | 107.2 | 101.1 | 96.9 | 96.9 |
| 30° | 752.7 | 721.8 | 635.2 | 249.5 | 107.2 | 99.0 | 94.9 | 90.7 | 82.5 | 78.4 | 78.4 |
| 32.5° | 812.5 | 785.7 | 622.8 | 167.0 | 96.9 | 88.7 | 82.5 | 74.2 | 66.0 | 61.9 | 59.8 |
| 35° | 888.8 | 851.7 | 579.5 | 117.5 | 86.6 | 78.4 | 68.1 | 57.7 | 51.6 | 49.5 | 49.5 |
| 37.5° | 973.4 | 923.9 | 513.5 | 94.9 | 78.4 | 68.1 | 57.7 | 47.4 | 41.2 | 39.2 | 39.2 |
| 40° | 1093.0 | 1016.7 | 422.8 | 82.5 | 68.1 | 57.7 | 47.4 | 39.2 | 35.1 | 33.0 | 33.0 |
| 42.5° | 1249.7 | 1134.2 | 319.7 | 76.3 | 61.9 | 49.5 | 39.2 | 33.0 | 28.9 | 26.8 | 26.8 |
| 45° | 1425.0 | 1258.0 | 233.0 | 68.1 | 53.6 | 41.2 | 30.9 | 26.8 | 22.7 | 20.6 | 20.6 |
| 47.5° | 1600.3 | 1346.7 | 160.9 | 61.9 | 45.4 | 35.1 | 26.8 | 20.6 | 16.5 | 16.5 | 14.4 |
| 50° | 1752.9 | 1394.1 | 115.5 | 53.6 | 41.2 | 28.9 | 20.6 | 16.5 | 14.4 | 12.4 | 12.4 |
| 52.5° | 1887.0 | 1414.7 | 88.7 | 47.4 | 35.1 | 24.7 | 16.5 | 14.4 | 12.4 | 12.4 | 12.4 |
| 55° | 2000.4 | 1398.2 | 70.1 | 41.2 | 30.9 | 20.6 | 14.4 | 12.4 | 10.3 | 10.3 | 10.3 |
| 57.5° | 2111.8 | 1348.7 | 55.7 | 35.1 | 24.7 | 14.4 | 12.4 | 10.3 | 8.2 | 8.2 | 8.2 |
| 60° | 2169.5 | 1284.8 | 45.4 | 28.9 | 20.6 | 12.4 | 10.3 | 8.2 | 8.2 | 6.2 | 6.2 |
| 62.5° | 2130.3 | 1154.9 | 37.1 | 24.7 | 14.4 | 10.3 | 8.2 | 6.2 | 6.2 | 4.1 | 4.1 |
| 65° | *1998.3* | *989.9* | *28.9* | *18.6* | *10.3* | *8.2* | *6.2* | *6.2* | *4.1* | *2.1* | *2.1* |
| 67.5° | 1684.9 | 775.4 | 22.7 | 14.4 | 8.2 | 6.2 | 4.1 | 4.1 | 2.1 | 0.0 | 0.0 |
| 70° | 1204.4 | 511.4 | 18.6 | 10.3 | 6.2 | 6.2 | 4.1 | 2.1 | 0.0 | 0.0 | 0.0 |
| 72.5° | 695.0 | 247.5 | 14.4 | 6.2 | 4.1 | 4.1 | 2.1 | 2.1 | 0.0 | 0.0 | 0.0 |
| 75° | 259.8 | 86.6 | 12.4 | 6.2 | 4.1 | 2.1 | 2.1 | 2.1 | 0.0 | 0.0 | 0.0 |
| 77.5° | 86.6 | 35.1 | 10.3 | 8.2 | 6.2 | 2.1 | 2.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| 80° | 26.8 | 16.5 | 4.1 | 4.1 | 4.1 | 4.1 | 2.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| 82.5° | 14.4 | 8.2 | 2.1 | 2.1 | 2.1 | 2.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 85° | 6.2 | 4.1 | 2.1 | 2.1 | 2.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 87.5° | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 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 |

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## Test Information

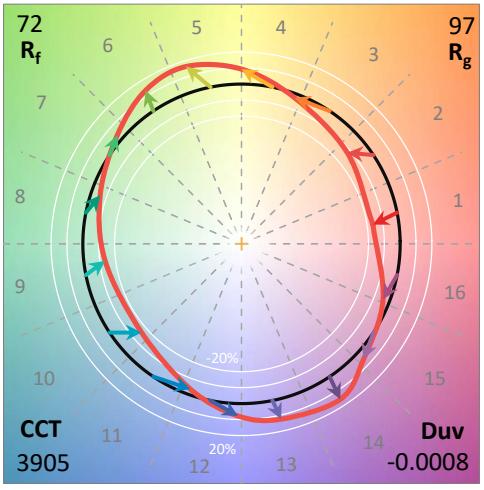
| | |
|---|---|
| Test Method: | LM-79-08 |
| Report Number: | SP1-2101-121-2 |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Photometer: | SP1 |
| Measurement Geometry: | 4π |
| Issue Date: | 03/05/2021 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS (FORMERLY EATON) |
| Product Line: | STREETWORKS |
| Catalog Number: | **IFLD-S-SA2A-740-U-T3R-HSS** |
| Description: | STREETWORKS INF FLOOD |

SHIELD, DRIVER PROGRAMMED @ 615mA.

## Spectral Parameters

| | | | | | |
|---|---|---|---|---|---|
| CCT (K): | 3905 | CRI (Ra): | 71.2 | | |
| CIE u': | 0.2273 | R1: | 68.9 | R9: | -29.7 |
| CIE v': | 0.5024 | R2: | 77.0 | R10: | 46.2 |
| Duv: | -0.0008 | R3: | 84.0 | R11: | 68.8 |
| CIE x: | 0.3841 | R4: | 71.6 | R12: | 45.6 |
| CIE y: | 0.3774 | R5: | 68.9 | R13: | 69.5 |
| CIE z: | 0.2385 | R6: | 68.3 | R14: | 90.7 |
| Peak Wavelength (nm): | 443 | R7: | 78.7 | | |
| Dominant Wavelength (nm): | 579 | R8: | 52.2 | | |
| Purity: | 28.7 | | | | |

| | |
|---|---|
| Rf: | 71.7 |
| Rg: | 96.9 |




## Test Conditions

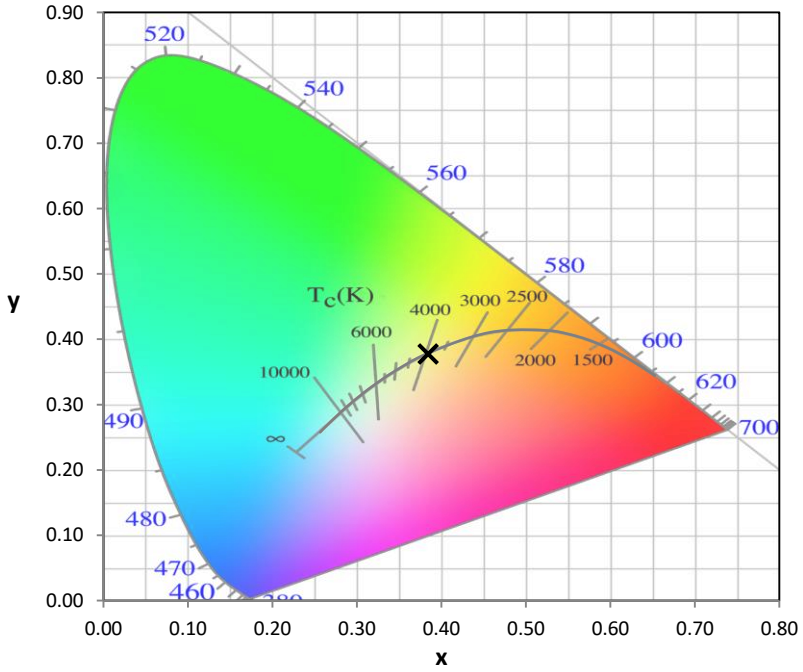
| | |
|---|---|
| Stabilization Time: | 211M |
| Operation Time: | 12H |
| Room Temperature (°C) / RH%: | 24.8/312% |
| Sphere Temperature (°C): | 24.1 |

REPORT NUMBER: SP1-2101-121-2

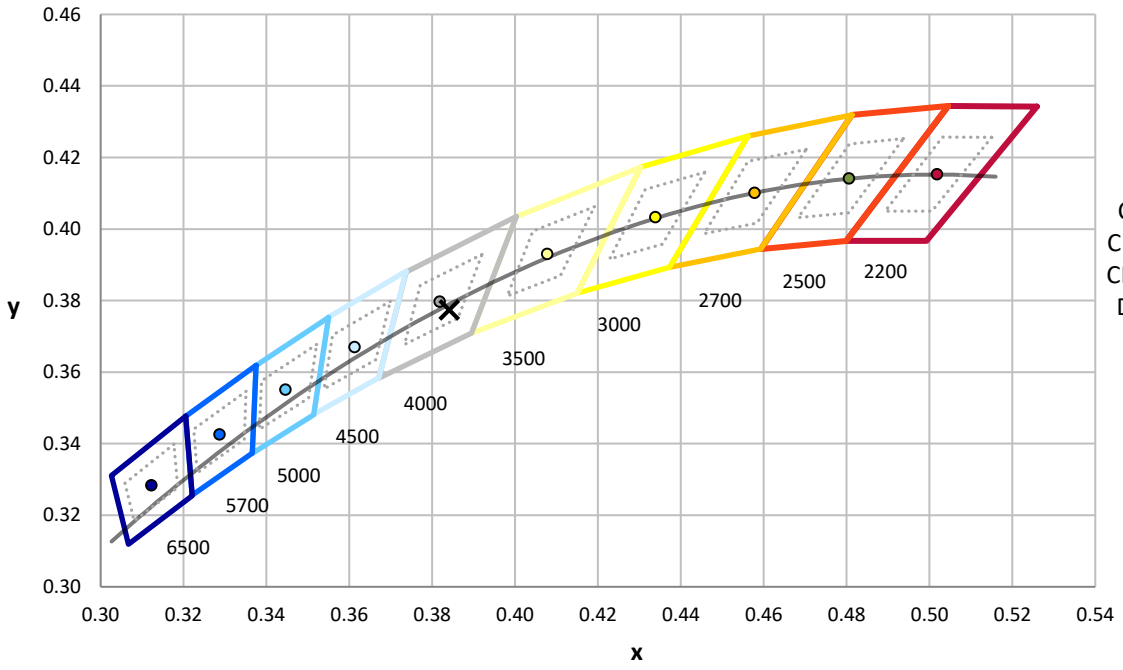
| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 1/31/2021 | 7/31/2021 |
| Power Meter | IN0071 | 12/1/2020 | 12/1/2021 |
| AC Power Source | IN0063 | 12/1/2020 | 12/1/2021 |
| DC Power Source | IN0208 | 12/1/2020 | 12/1/2021 |
| Sphere Thermometer | IN0085 | 12/1/2020 | 12/1/2021 |
| Room Thermometer | IN0046 | 12/1/2020 | 12/1/2021 |

REPORT NUMBER: SP1-2101-121-2

## CIE 1931 Chromaticity Diagram




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

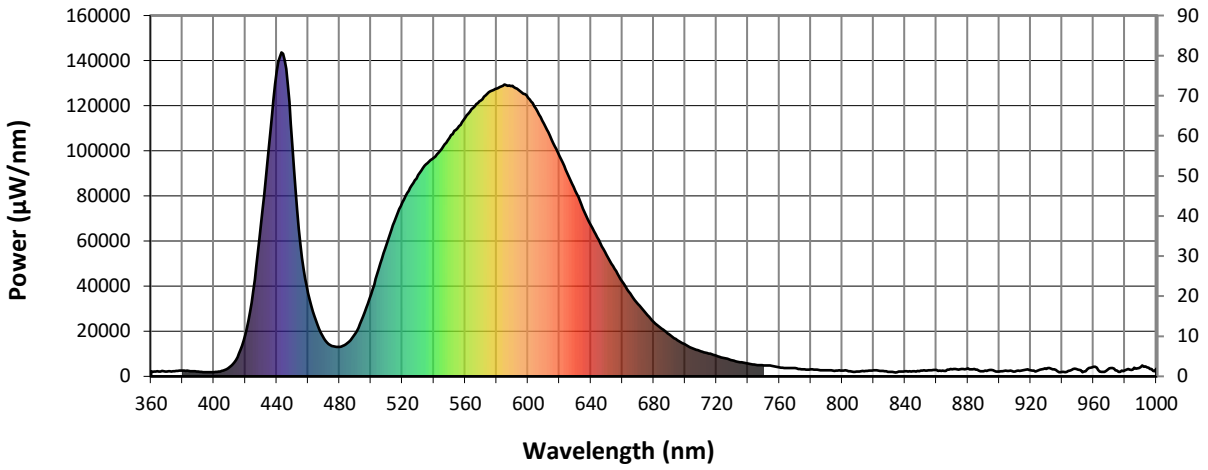



CCT = 3905K
CIE x = 0.3841
CIE y = 0.3774
Duv = -0.0008

Point lies inside the ANSI 4000K 4-step quadrangle

REPORT NUMBER: SP1-2101-121-2

## 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 | 2304 | 0.0 | 490 | 19043 | 2.7 | 620 | 97577 | 25.4 | 750 | 4830 | 0.0 | 880 | 3505 | 0.0 |
| 365 | 2150 | 0.0 | 495 | 26606 | 4.8 | 625 | 90158 | 19.9 | 755 | 4664 | 0.0 | 885 | 2991 | 0.0 |
| 370 | 2146 | 0.0 | 500 | 36376 | 8.0 | 630 | 82240 | 14.9 | 760 | 4006 | 0.0 | 890 | 2327 | 0.0 |
| 375 | 2332 | 0.0 | 505 | 47714 | 13.3 | 635 | 74361 | 11.2 | 765 | 3715 | 0.0 | 895 | 2775 | 0.0 |
| 380 | 2527 | 0.0 | 510 | 58741 | 20.2 | 640 | 66994 | 8.0 | 770 | 3696 | 0.0 | 900 | 2141 | 0.0 |
| 385 | 2304 | 0.0 | 515 | 68716 | 28.5 | 645 | 60405 | 5.8 | 775 | 3117 | 0.0 | 905 | 2421 | 0.0 |
| 390 | 2064 | 0.0 | 520 | 77136 | 37.4 | 650 | 53806 | 3.9 | 780 | 3062 | 0.0 | 910 | 2200 | 0.0 |
| 395 | 1856 | 0.0 | 525 | 83567 | 44.9 | 655 | 47610 | 2.7 | 785 | 2907 | 0.0 | 915 | 2716 | 0.0 |
| 400 | 1856 | 0.0 | 530 | 89283 | 52.6 | 660 | 42018 | 1.8 | 790 | 2655 | 0.0 | 920 | 2656 | 0.0 |
| 405 | 2374 | 0.0 | 535 | 94097 | 58.4 | 665 | 36742 | 1.2 | 795 | 2467 | 0.0 | 925 | 2671 | 0.0 |
| 410 | 4084 | 0.0 | 540 | 96845 | 63.1 | 670 | 32105 | 0.7 | 800 | 2609 | 0.0 | 930 | 3292 | 0.0 |
| 415 | 8543 | 0.0 | 545 | 100829 | 67.1 | 675 | 27946 | 0.5 | 805 | 2293 | 0.0 | 935 | 3188 | 0.0 |
| 420 | 18394 | 0.1 | 550 | 105648 | 71.8 | 680 | 24146 | 0.3 | 810 | 2188 | 0.0 | 940 | 1997 | 0.0 |
| 425 | 37987 | 0.2 | 555 | 110017 | 75.1 | 685 | 21191 | 0.2 | 815 | 2386 | 0.0 | 945 | 2623 | 0.0 |
| 430 | 67605 | 0.5 | 560 | 114586 | 77.9 | 690 | 18544 | 0.1 | 820 | 2712 | 0.0 | 950 | 2969 | 0.0 |
| 435 | 102160 | 1.2 | 565 | 118987 | 79.1 | 695 | 16058 | 0.1 | 825 | 2473 | 0.0 | 955 | 2277 | 0.0 |
| 440 | 135103 | 2.1 | 570 | 122326 | 79.5 | 700 | 14133 | 0.0 | 830 | 1969 | 0.0 | 960 | 4267 | 0.0 |
| 445 | 140126 | 2.9 | 575 | 125968 | 78.4 | 705 | 12309 | 0.0 | 835 | 1917 | 0.0 | 965 | 2034 | 0.0 |
| 450 | 102339 | 2.7 | 580 | 127613 | 75.8 | 710 | 11142 | 0.0 | 840 | 2248 | 0.0 | 970 | 3586 | 0.0 |
| 455 | 58751 | 2.0 | 585 | 129466 | 71.9 | 715 | 10143 | 0.0 | 845 | 2266 | 0.0 | 975 | 2505 | 0.0 |
| 460 | 36892 | 1.5 | 590 | 128813 | 66.6 | 720 | 9072 | 0.0 | 850 | 2558 | 0.0 | 980 | 2666 | 0.0 |
| 465 | 24637 | 1.3 | 595 | 126387 | 59.9 | 725 | 8130 | 0.0 | 855 | 2767 | 0.0 | 985 | 2934 | 0.0 |
| 470 | 16738 | 1.0 | 600 | 123477 | 53.2 | 730 | 7149 | 0.0 | 860 | 2826 | 0.0 | 990 | 4120 | 0.0 |
| 475 | 13456 | 1.1 | 605 | 118718 | 46.0 | 735 | 6311 | 0.0 | 865 | 2385 | 0.0 | 995 | 3858 | 0.0 |
| 480 | 13081 | 1.2 | 610 | 112091 | 38.5 | 740 | 5711 | 0.0 | 870 | 3194 | 0.0 | 1000 | 3405 | 0.0 |
| 485 | 14734 | 1.7 | 615 | 105039 | 31.7 | 745 | 5111 | 0.0 | 875 | 3189 | 0.0 | | | |

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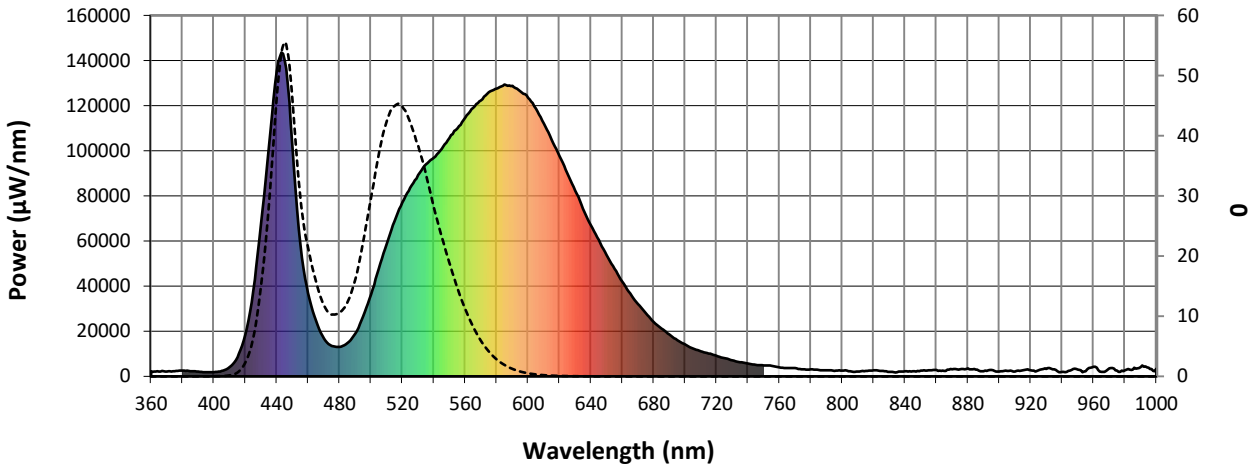
## Scotopic Flux vs. Wavelength




**Scotopic Lumens: 10425.8** **S/P: 1.47**

| 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 | 2304 | 0.0 | 490 | 19043 | 29.3 | 620 | 97577 | 1.2 | 750 | 4830 | 0.0 | 880 | 3505 | 0.0 |
| 365 | 2150 | 0.0 | 495 | 26606 | 43.0 | 625 | 90158 | 0.8 | 755 | 4664 | 0.0 | 885 | 2991 | 0.0 |
| 370 | 2146 | 0.0 | 500 | 36376 | 60.8 | 630 | 82240 | 0.5 | 760 | 4006 | 0.0 | 890 | 2327 | 0.0 |
| 375 | 2332 | 0.0 | 505 | 47714 | 81.1 | 635 | 74361 | 0.3 | 765 | 3715 | 0.0 | 895 | 2775 | 0.0 |
| 380 | 2527 | 0.0 | 510 | 58741 | 99.6 | 640 | 66994 | 0.2 | 770 | 3696 | 0.0 | 900 | 2141 | 0.0 |
| 385 | 2304 | 0.0 | 515 | 68716 | 113.9 | 645 | 60405 | 0.1 | 775 | 3117 | 0.0 | 905 | 2421 | 0.0 |
| 390 | 2064 | 0.0 | 520 | 77136 | 122.6 | 650 | 53806 | 0.1 | 780 | 3062 | 0.0 | 910 | 2200 | 0.0 |
| 395 | 1856 | 0.0 | 525 | 83567 | 125.0 | 655 | 47610 | 0.0 | 785 | 2907 | 0.0 | 915 | 2716 | 0.0 |
| 400 | 1856 | 0.0 | 530 | 89283 | 123.1 | 660 | 42018 | 0.0 | 790 | 2655 | 0.0 | 920 | 2656 | 0.0 |
| 405 | 2374 | 0.1 | 535 | 94097 | 117.3 | 665 | 36742 | 0.0 | 795 | 2467 | 0.0 | 925 | 2671 | 0.0 |
| 410 | 4084 | 0.2 | 540 | 96845 | 107.0 | 670 | 32105 | 0.0 | 800 | 2609 | 0.0 | 930 | 3292 | 0.0 |
| 415 | 8543 | 0.9 | 545 | 100829 | 96.7 | 675 | 27946 | 0.0 | 805 | 2293 | 0.0 | 935 | 3188 | 0.0 |
| 420 | 18394 | 3.0 | 550 | 105648 | 86.4 | 680 | 24146 | 0.0 | 810 | 2188 | 0.0 | 940 | 1997 | 0.0 |
| 425 | 37987 | 9.3 | 555 | 110017 | 75.2 | 685 | 21191 | 0.0 | 815 | 2386 | 0.0 | 945 | 2623 | 0.0 |
| 430 | 67605 | 23.0 | 560 | 114586 | 64.0 | 690 | 18544 | 0.0 | 820 | 2712 | 0.0 | 950 | 2969 | 0.0 |
| 435 | 102160 | 45.7 | 565 | 118987 | 53.4 | 695 | 16058 | 0.0 | 825 | 2473 | 0.0 | 955 | 2277 | 0.0 |
| 440 | 135103 | 75.5 | 570 | 122326 | 43.2 | 700 | 14133 | 0.0 | 830 | 1969 | 0.0 | 960 | 4267 | 0.0 |
| 445 | 140126 | 93.8 | 575 | 125968 | 34.3 | 705 | 12309 | 0.0 | 835 | 1917 | 0.0 | 965 | 2034 | 0.0 |
| 450 | 102339 | 79.3 | 580 | 127613 | 26.3 | 710 | 11142 | 0.0 | 840 | 2248 | 0.0 | 970 | 3586 | 0.0 |
| 455 | 58751 | 51.3 | 585 | 129466 | 19.8 | 715 | 10143 | 0.0 | 845 | 2266 | 0.0 | 975 | 2505 | 0.0 |
| 460 | 36892 | 35.6 | 590 | 128813 | 14.3 | 720 | 9072 | 0.0 | 850 | 2558 | 0.0 | 980 | 2666 | 0.0 |
| 465 | 24637 | 26.0 | 595 | 126387 | 10.1 | 725 | 8130 | 0.0 | 855 | 2767 | 0.0 | 985 | 2934 | 0.0 |
| 470 | 16738 | 19.3 | 600 | 123477 | 7.0 | 730 | 7149 | 0.0 | 860 | 2826 | 0.0 | 990 | 4120 | 0.0 |
| 475 | 13456 | 16.8 | 605 | 118718 | 4.7 | 735 | 6311 | 0.0 | 865 | 2385 | 0.0 | 995 | 3858 | 0.0 |
| 480 | 13081 | 17.7 | 610 | 112091 | 3.0 | 740 | 5711 | 0.0 | 870 | 3194 | 0.0 | 1000 | 3405 | 0.0 |
| 485 | 14734 | 21.4 | 615 | 105039 | 1.9 | 745 | 5111 | 0.0 | 875 | 3189 | 0.0 | | | |

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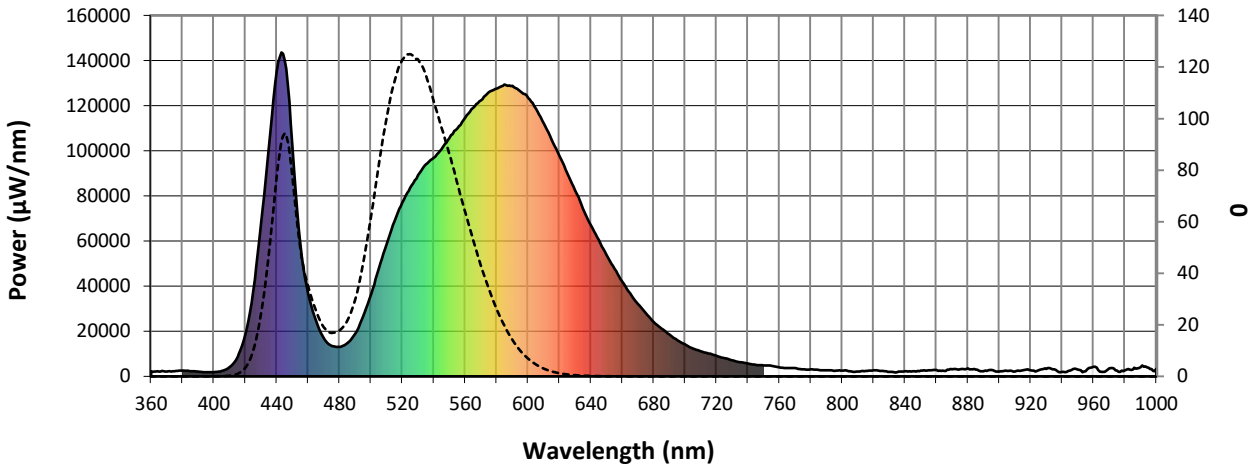
## Melanopic Flux vs. Wavelength




**Melanopic Lumens: 3927.2** **M/P: 0.55**

| 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 | 2304 | 0.0 | 490 | 19043 | 15.8 | 620 | 97577 | 0.1 | 750 | 4830 | 0.0 | 880 | 3505 | 0.0 |
| 365 | 2150 | 0.0 | 495 | 26606 | 22.0 | 625 | 90158 | 0.0 | 755 | 4664 | 0.0 | 885 | 2991 | 0.0 |
| 370 | 2146 | 0.0 | 500 | 36376 | 29.2 | 630 | 82240 | 0.0 | 760 | 4006 | 0.0 | 890 | 2327 | 0.0 |
| 375 | 2332 | 0.0 | 505 | 47714 | 36.6 | 635 | 74361 | 0.0 | 765 | 3715 | 0.0 | 895 | 2775 | 0.0 |
| 380 | 2527 | 0.0 | 510 | 58741 | 42.2 | 640 | 66994 | 0.0 | 770 | 3696 | 0.0 | 900 | 2141 | 0.0 |
| 385 | 2304 | 0.0 | 515 | 68716 | 44.9 | 645 | 60405 | 0.0 | 775 | 3117 | 0.0 | 905 | 2421 | 0.0 |
| 390 | 2064 | 0.0 | 520 | 77136 | 44.9 | 650 | 53806 | 0.0 | 780 | 3062 | 0.0 | 910 | 2200 | 0.0 |
| 395 | 1856 | 0.0 | 525 | 83567 | 42.4 | 655 | 47610 | 0.0 | 785 | 2907 | 0.0 | 915 | 2716 | 0.0 |
| 400 | 1856 | 0.0 | 530 | 89283 | 38.6 | 660 | 42018 | 0.0 | 790 | 2655 | 0.0 | 920 | 2656 | 0.0 |
| 405 | 2374 | 0.0 | 535 | 94097 | 33.9 | 665 | 36742 | 0.0 | 795 | 2467 | 0.0 | 925 | 2671 | 0.0 |
| 410 | 4084 | 0.2 | 540 | 96845 | 28.3 | 670 | 32105 | 0.0 | 800 | 2609 | 0.0 | 930 | 3292 | 0.0 |
| 415 | 8543 | 0.6 | 545 | 100829 | 23.4 | 675 | 27946 | 0.0 | 805 | 2293 | 0.0 | 935 | 3188 | 0.0 |
| 420 | 18394 | 2.1 | 550 | 105648 | 19.0 | 680 | 24146 | 0.0 | 810 | 2188 | 0.0 | 940 | 1997 | 0.0 |
| 425 | 37987 | 5.9 | 555 | 110017 | 14.8 | 685 | 21191 | 0.0 | 815 | 2386 | 0.0 | 945 | 2623 | 0.0 |
| 430 | 67605 | 14.3 | 560 | 114586 | 11.3 | 690 | 18544 | 0.0 | 820 | 2712 | 0.0 | 950 | 2969 | 0.0 |
| 435 | 102160 | 27.3 | 565 | 118987 | 8.4 | 695 | 16058 | 0.0 | 825 | 2473 | 0.0 | 955 | 2277 | 0.0 |
| 440 | 135103 | 45.1 | 570 | 122326 | 6.0 | 700 | 14133 | 0.0 | 830 | 1969 | 0.0 | 960 | 4267 | 0.0 |
| 445 | 140126 | 55.3 | 575 | 125968 | 4.2 | 705 | 12309 | 0.0 | 835 | 1917 | 0.0 | 965 | 2034 | 0.0 |
| 450 | 102339 | 47.2 | 580 | 127613 | 2.9 | 710 | 11142 | 0.0 | 840 | 2248 | 0.0 | 970 | 3586 | 0.0 |
| 455 | 58751 | 30.8 | 585 | 129466 | 1.9 | 715 | 10143 | 0.0 | 845 | 2266 | 0.0 | 975 | 2505 | 0.0 |
| 460 | 36892 | 21.7 | 590 | 128813 | 1.3 | 720 | 9072 | 0.0 | 850 | 2558 | 0.0 | 980 | 2666 | 0.0 |
| 465 | 24637 | 16.1 | 595 | 126387 | 0.8 | 725 | 8130 | 0.0 | 855 | 2767 | 0.0 | 985 | 2934 | 0.0 |
| 470 | 16738 | 12.0 | 600 | 123477 | 0.5 | 730 | 7149 | 0.0 | 860 | 2826 | 0.0 | 990 | 4120 | 0.0 |
| 475 | 13456 | 10.3 | 605 | 118718 | 0.3 | 735 | 6311 | 0.0 | 865 | 2385 | 0.0 | 995 | 3858 | 0.0 |
| 480 | 13081 | 10.5 | 610 | 112091 | 0.2 | 740 | 5711 | 0.0 | 870 | 3194 | 0.0 | 1000 | 3405 | 0.0 |
| 485 | 14734 | 12.1 | 615 | 105039 | 0.1 | 745 | 5111 | 0.0 | 875 | 3189 | 0.0 | | | |

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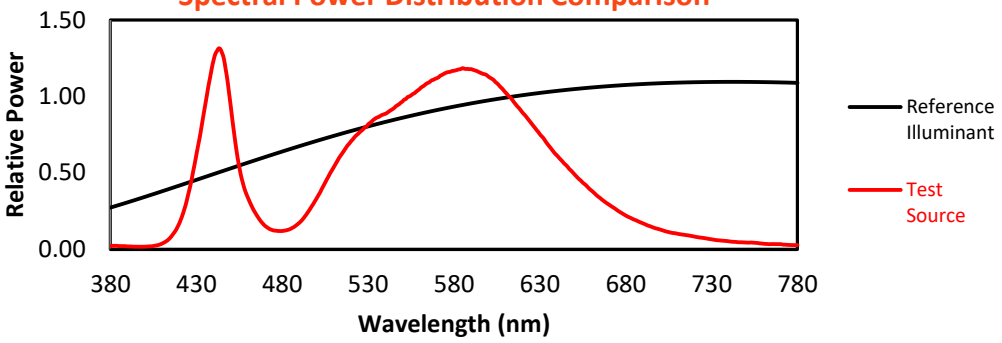
# TM-30-18

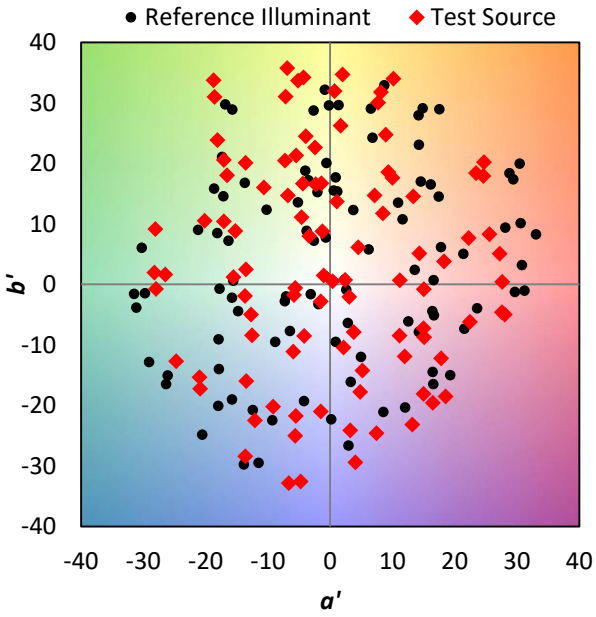
## Summary

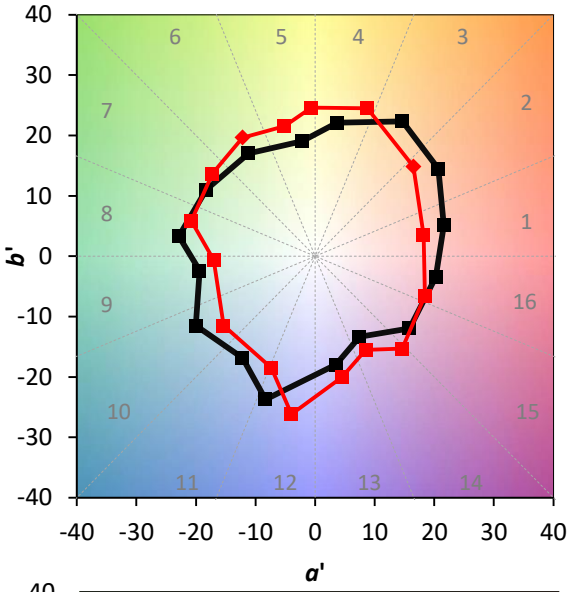
$R_f$ = 71.7
$R_g$ = 96.9
CIE $R_a$ = 71.2
$R_9$ = -29.7

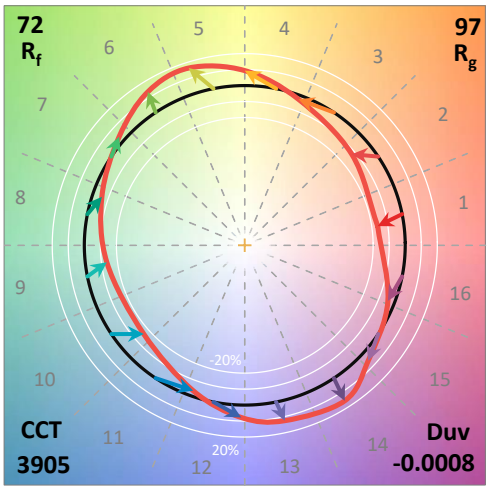
## Spectral Power Distribution Comparison

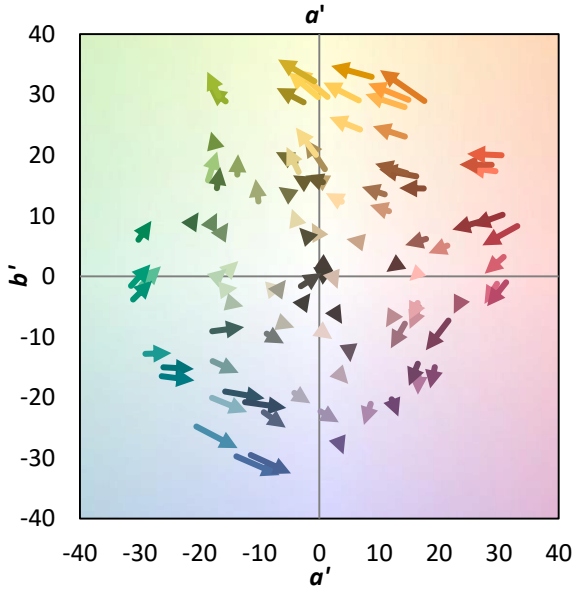



## Color Vector Graphics



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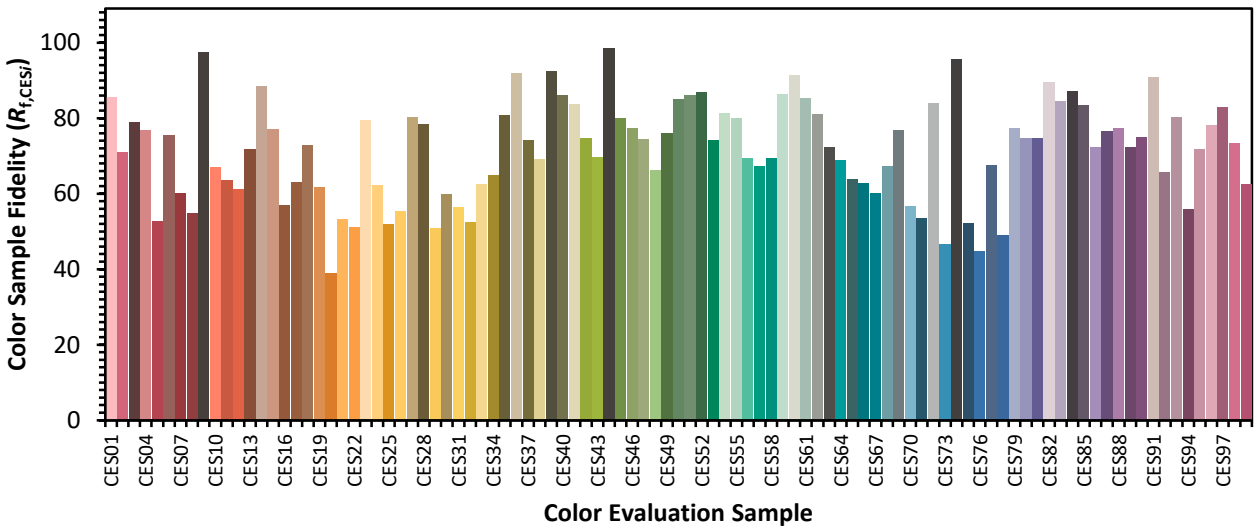
# TM-30-18

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

| | | | |
|---|---|---|---|
| CES01 = 85 | CES26 = 55 | CES51 = 86 | CES76 = 45 |
| CES02 = 61 | CES27 = 80 | CES52 = 87 | CES77 = 68 |
| CES03 = 30 | CES28 = 79 | CES53 = 74 | CES78 = 49 |
| CES04 = 70 | CES29 = 51 | CES54 = 81 | CES79 = 77 |
| CES05 = 47 | CES30 = 60 | CES55 = 80 | CES80 = 75 |
| CES06 = 50 | CES31 = 56 | CES56 = 69 | CES81 = 75 |
| CES07 = 40 | CES32 = 52 | CES57 = 67 | CES82 = 90 |
| CES08 = 39 | CES33 = 62 | CES58 = 69 | CES83 = 85 |
| CES09 = 29 | CES34 = 65 | CES59 = 86 | CES84 = 87 |
| CES10 = 74 | CES35 = 81 | CES60 = 91 | CES85 = 83 |
| CES11 = 57 | CES36 = 92 | CES61 = 85 | CES86 = 72 |
| CES12 = 63 | CES37 = 74 | CES62 = 81 | CES87 = 77 |
| CES13 = 42 | CES38 = 69 | CES63 = 72 | CES88 = 77 |
| CES14 = 74 | CES39 = 92 | CES64 = 69 | CES89 = 72 |
| CES15 = 71 | CES40 = 86 | CES65 = 64 | CES90 = 75 |
| CES16 = 46 | CES41 = 84 | CES66 = 63 | CES91 = 91 |
| CES17 = 49 | CES42 = 75 | CES67 = 60 | CES92 = 66 |
| CES18 = 56 | CES43 = 70 | CES68 = 67 | CES93 = 80 |
| CES19 = 72 | CES44 = 98 | CES69 = 77 | CES94 = 56 |
| CES20 = 65 | CES45 = 80 | CES70 = 57 | CES95 = 72 |
| CES21 = 86 | CES46 = 77 | CES71 = 53 | CES96 = 78 |
| CES22 = 78 | CES47 = 74 | CES72 = 84 | CES97 = 83 |
| CES23 = 92 | CES48 = 66 | CES73 = 47 | CES98 = 73 |
| CES24 = 91 | CES49 = 76 | CES74 = 96 | CES99 = 63 |
| CES25 = 72 | CES50 = 85 | CES75 = 52 | |



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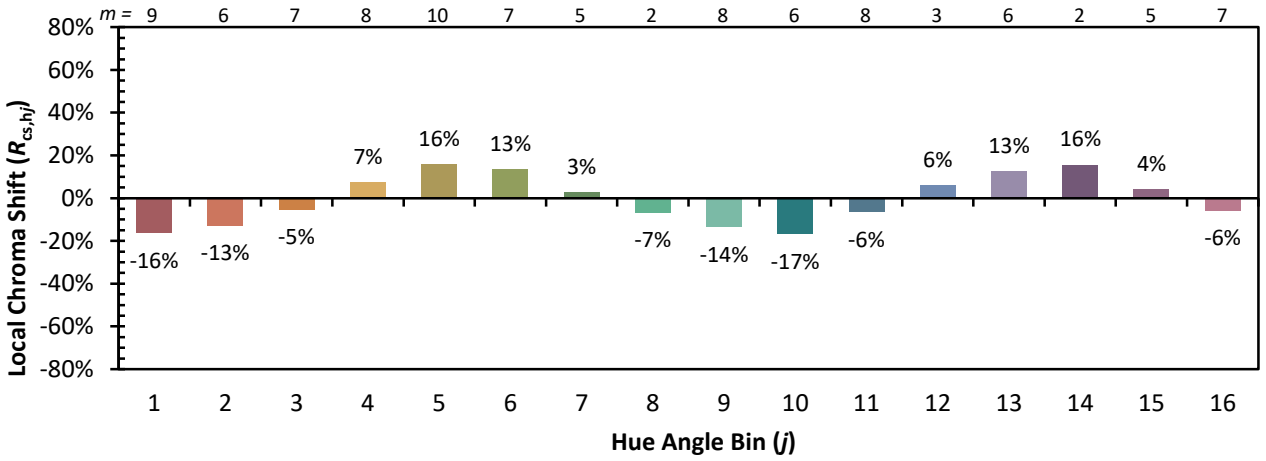
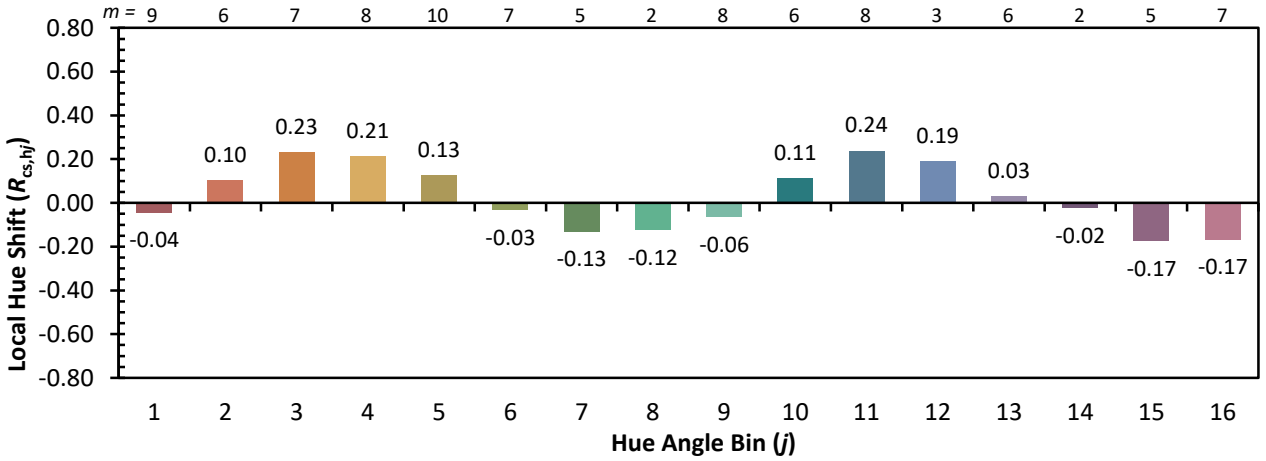
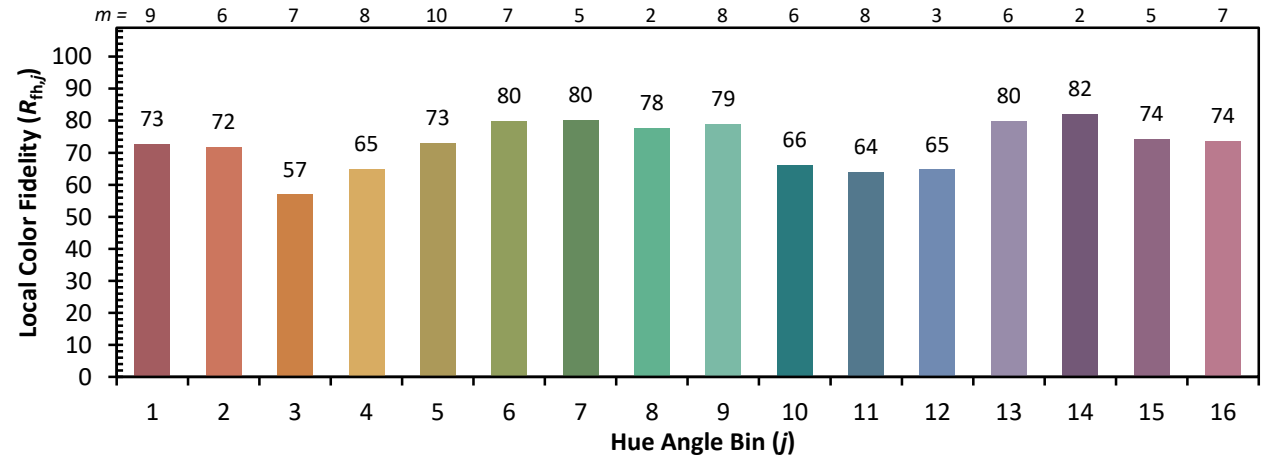
**TM-30-18**

## Color Rendition by Hue-Angle Bin



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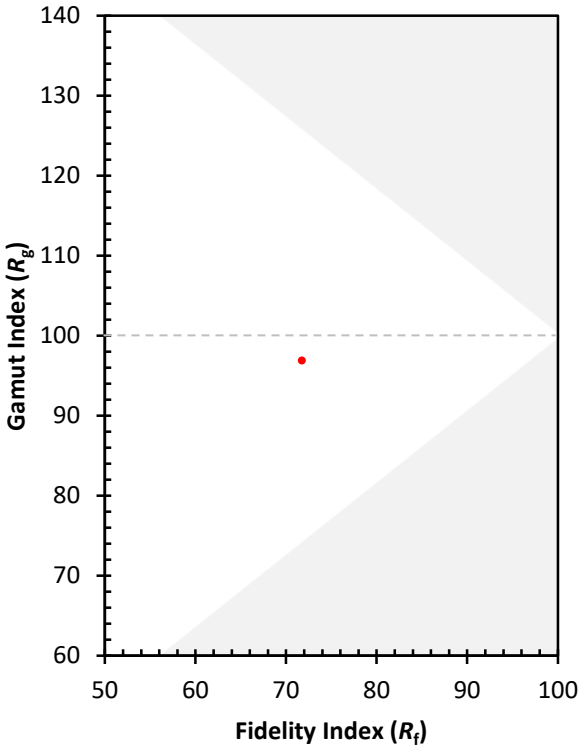
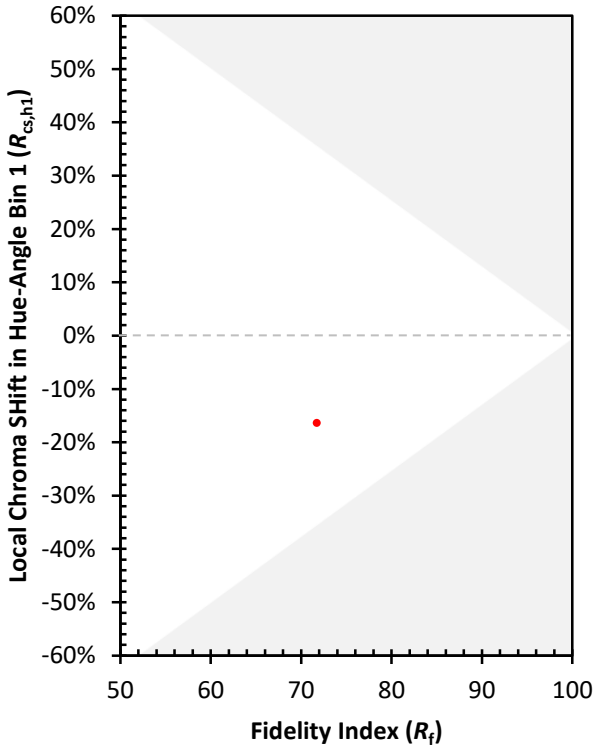
## TM-30-18

### Measure Comparisons

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