

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: P821253

Luminaire Tested: **TT-D5-740-24VDC-5CQ-PM**

Issue Date: 2/18/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P821253  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G3-1908-473-17)  
Test Lab: INNOVATIONS CENTER  
Issue Date: 2/18/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: MCGRAW-EDISON  
Catalog Number: TT-D5-740-24VDC-5CQ-PM  
Description: TOPTIER LED SITE LUMINAIRE  
4000K, 70 CRI LEDS AND CONCENTRATED DISTRIBUTION  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

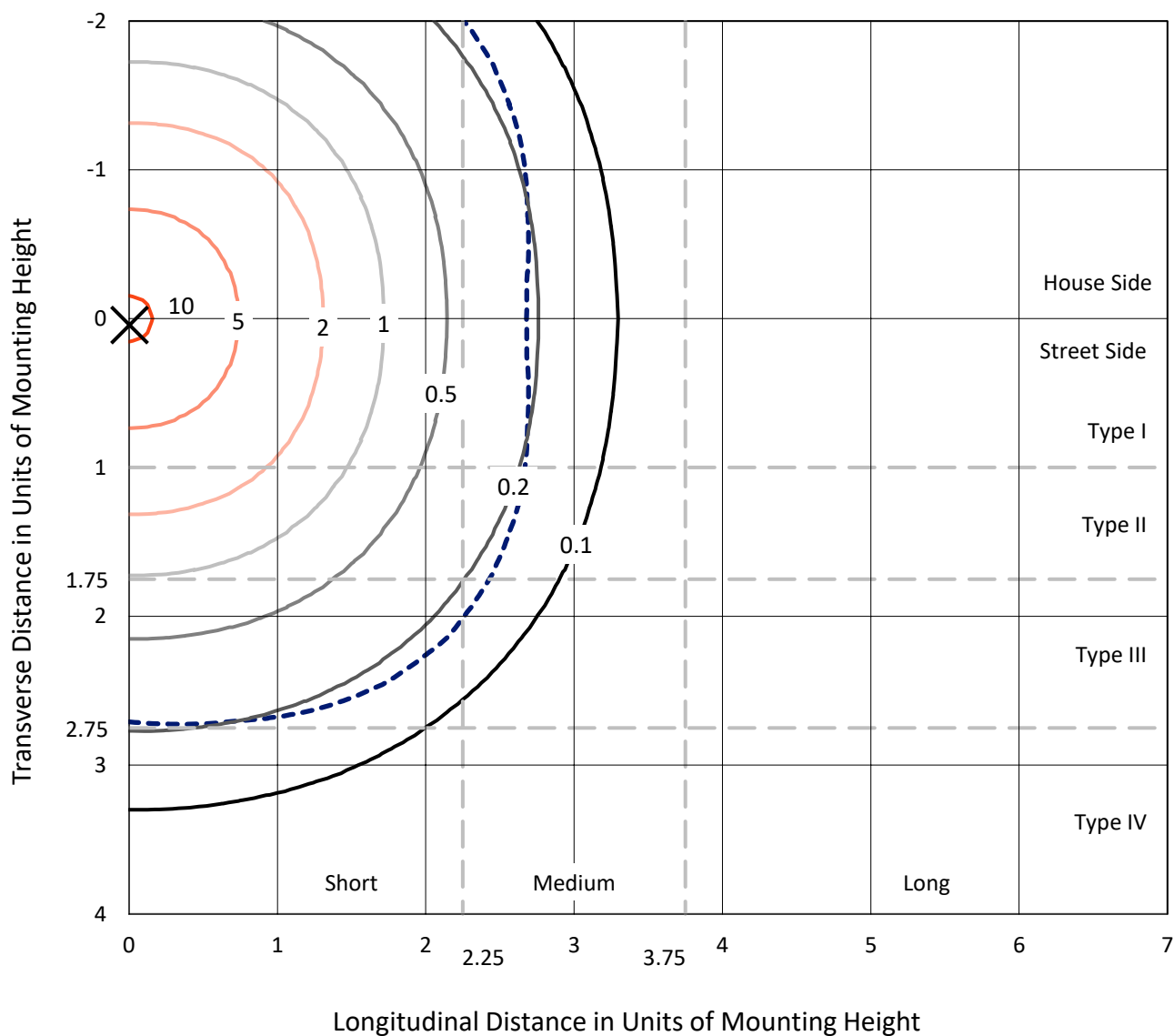
Lumens per Lamp: N/A  
Luminaire Lumens: 9415 lumens  
Efficiency: N/A  
Efficacy: 129.0 lumens/watt  
Luminous Opening: Circular (Dia: 1.12' x H: 0')  
IES Classification: Type V - Short  
BUG Rating: B3 - U0 - G1

Input Watts (W): 73  
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: 25 FT

REPORT NUMBER: P821253  
 CATALOG NUMBER: TT-D5-740-24VDC-5CQ-PM

## Iso-Footcandle Lines of Horizontal Illumination

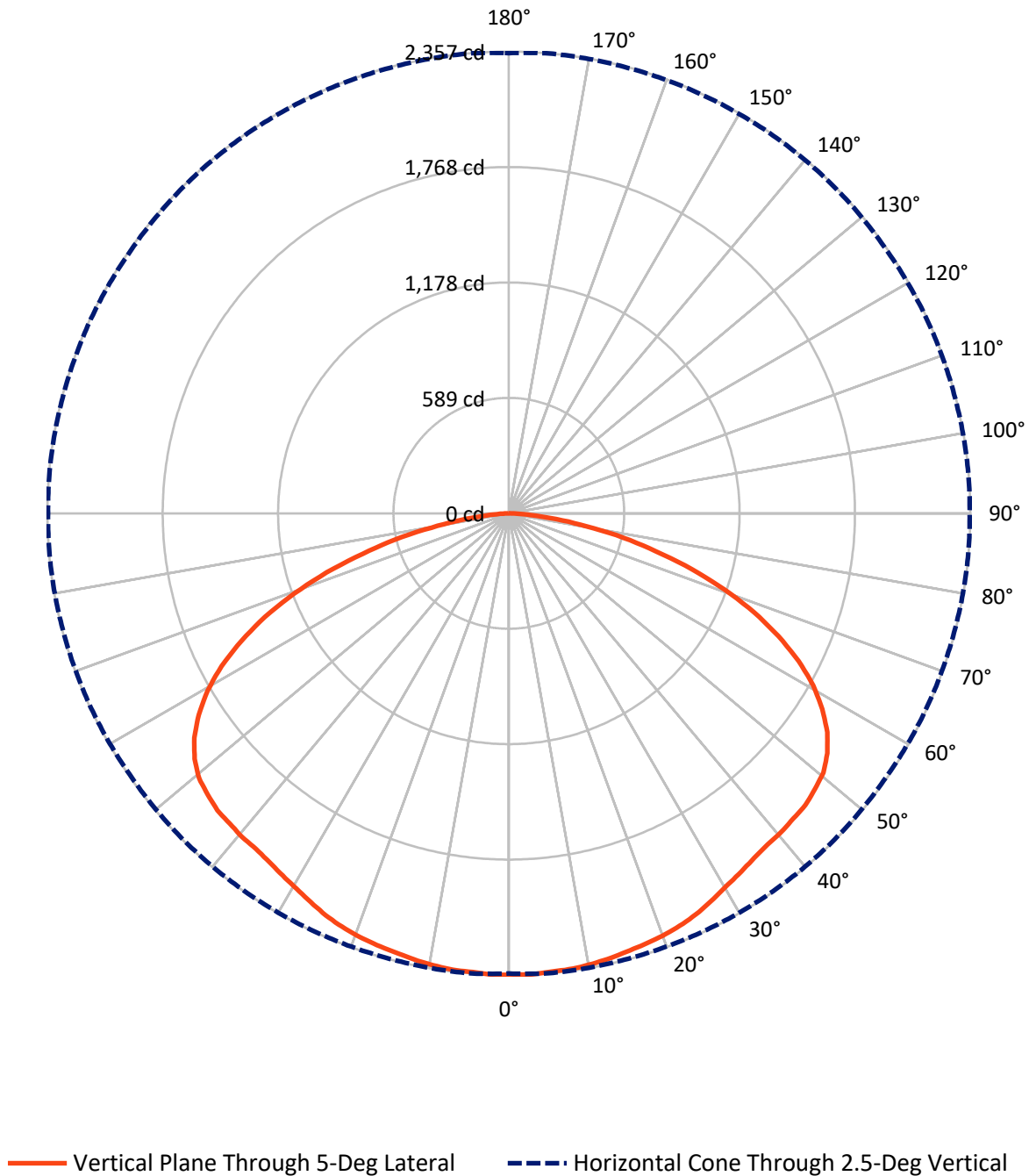
✕ Max cd  
 - - - 1/2 Max cd



Based on 15 foot mounting height. Maximum calculated value = 10.5 fc  
 Type V - Short - N/A

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## Luminous Intensity Polar Plot



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CATALOG NUMBER: TT-D5-740-24VDC-5CQ-PM

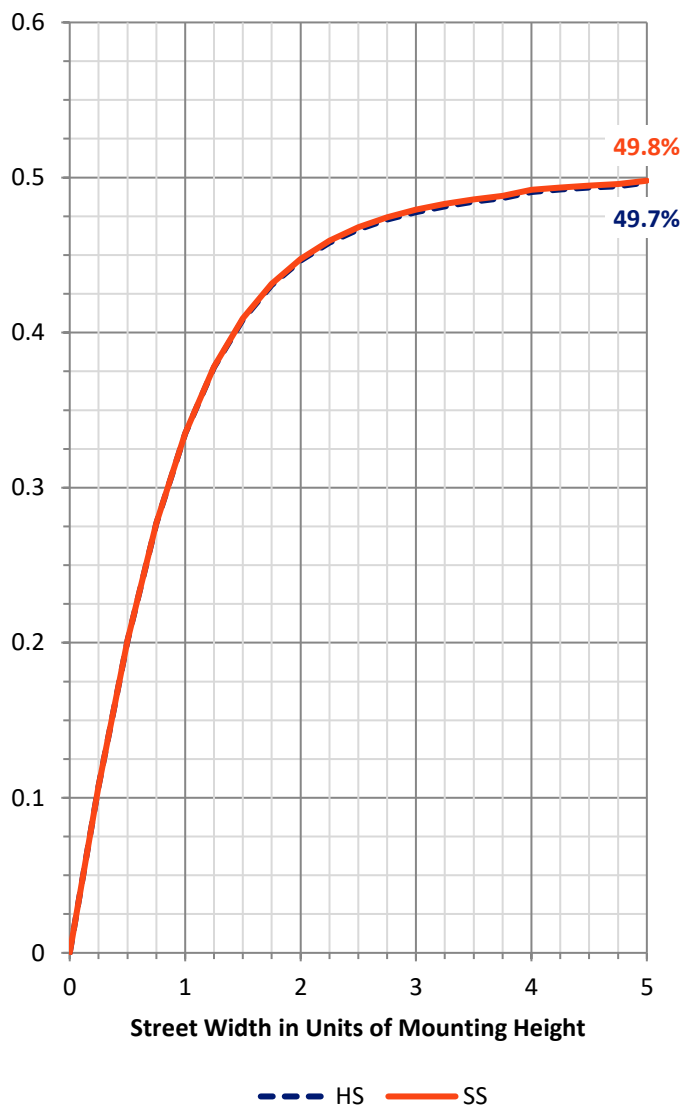
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 4707.5   | 0.0    | 4707.5 |
|                    | % Fixture | 50.0     | 0.0    | 50.0   |
| <b>Street Side</b> | Lumens    | 4707.5   | 0.0    | 4707.5 |
|                    | % Fixture | 50.0     | 0.0    | 50.0   |
| <b>Total</b>       | Lumens    | 9415.0   | 0.0    | 9415.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 224.0  | 2.4       |
| 10°-20°   | 656.1  | 7.0       |
| 20°-30°   | 1043.3 | 11.1      |
| 30°-40°   | 1372.5 | 14.6      |
| 40°-50°   | 1679.8 | 17.8      |
| 50°-60°   | 1819.5 | 19.3      |
| 60°-70°   | 1565.3 | 16.6      |
| 70°-80°   | 880.0  | 9.3       |
| 80°-90°   | 174.5  | 1.9       |
| 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°    | 9415.0 | 100.0     |
| 0°-180°   | 9415.0 | 100.0     |

**Coefficient of Utilization**



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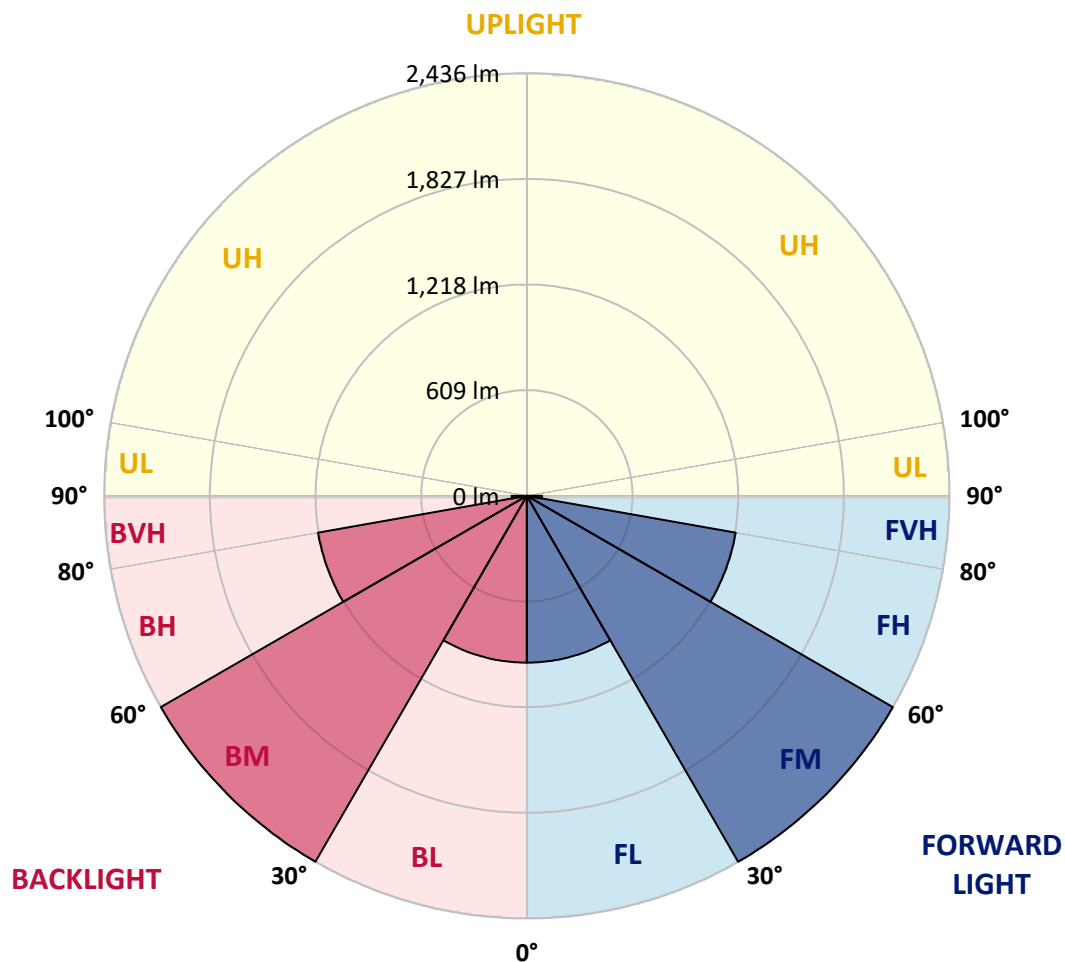
CATALOG NUMBER: TT-D5-740-24VDC-5CQ-PM

**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 961.7  | 10.2      |                         |      |         |
| FM   | (30°-60°)   | 2435.9 | 25.9      |                         |      |         |
| FH   | (60°-80°)   | 1222.7 | 13.0      |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 87.2   | 0.9       |                         |      | G1/100  |
| BL   | (0°-30°)    | 961.7  | 10.2      | B2/1000                 |      |         |
| BM   | (30°-60°)   | 2435.9 | 25.9      | B2/2500                 |      |         |
| BH   | (60°-80°)   | 1222.7 | 13.0      | B3/2500                 |      | G1/1800 |
| BVH  | (80°-90°)   | 87.2   | 0.9       |                         |      | G1/100  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B3-U0-G1**

Type V Short



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CATALOG NUMBER: TT-D5-740-24VDC-5CQ-PM

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 75°    | 85°    | 90°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 2355.4 | 2355.4 | 2355.4 | 2355.4 | 2355.4 | 2355.4 | 2355.4 | 2355.4 | 2355.4 | 2355.4 | 2355.4 |
| 2.5°  | 2349.4 | 2356.9 | 2353.9 | 2353.9 | 2353.9 | 2353.9 | 2350.9 | 2353.9 | 2353.9 | 2355.4 | 2353.9 |
| 5°    | 2350.9 | 2349.4 | 2349.4 | 2350.9 | 2350.9 | 2352.4 | 2349.4 | 2350.9 | 2352.4 | 2352.4 | 2353.9 |
| 7.5°  | 2346.4 | 2347.9 | 2344.9 | 2347.9 | 2344.9 | 2346.4 | 2346.4 | 2347.9 | 2346.4 | 2347.9 | 2350.9 |
| 10°   | 2337.4 | 2338.9 | 2337.4 | 2337.4 | 2337.4 | 2340.4 | 2334.4 | 2338.9 | 2337.4 | 2338.9 | 2337.4 |
| 12.5° | 2320.9 | 2328.4 | 2325.4 | 2328.4 | 2328.4 | 2328.4 | 2323.9 | 2326.9 | 2328.4 | 2328.4 | 2328.4 |
| 15°   | 2313.4 | 2314.9 | 2310.4 | 2316.4 | 2317.9 | 2319.4 | 2313.4 | 2316.4 | 2316.4 | 2317.9 | 2319.4 |
| 17.5° | 2296.9 | 2304.4 | 2302.9 | 2307.4 | 2305.9 | 2310.4 | 2308.9 | 2307.4 | 2305.9 | 2308.9 | 2305.9 |
| 20°   | 2284.9 | 2292.4 | 2290.9 | 2295.4 | 2296.9 | 2301.4 | 2296.9 | 2296.9 | 2292.4 | 2293.9 | 2298.4 |
| 22.5° | 2272.9 | 2275.9 | 2275.9 | 2280.4 | 2280.4 | 2284.9 | 2280.4 | 2278.9 | 2278.9 | 2277.4 | 2281.9 |
| 25°   | 2253.5 | 2255.0 | 2253.5 | 2258.0 | 2261.0 | 2264.0 | 2262.5 | 2259.5 | 2258.0 | 2258.0 | 2256.5 |
| 27.5° | 2222.0 | 2228.0 | 2231.0 | 2237.0 | 2238.5 | 2243.0 | 2237.0 | 2237.0 | 2234.0 | 2231.0 | 2232.5 |
| 30°   | 2198.0 | 2201.0 | 2201.0 | 2214.5 | 2214.5 | 2222.0 | 2214.5 | 2213.0 | 2211.5 | 2210.0 | 2207.0 |
| 32.5° | 2175.6 | 2180.1 | 2184.5 | 2195.0 | 2202.5 | 2205.5 | 2201.0 | 2198.0 | 2190.5 | 2186.0 | 2184.5 |
| 35°   | 2157.6 | 2159.1 | 2168.1 | 2183.1 | 2192.0 | 2199.5 | 2193.5 | 2186.0 | 2175.6 | 2168.1 | 2174.1 |
| 37.5° | 2144.1 | 2145.6 | 2159.1 | 2178.6 | 2195.0 | 2201.0 | 2192.0 | 2180.1 | 2163.6 | 2154.6 | 2151.6 |
| 40°   | 2132.1 | 2141.1 | 2156.1 | 2183.1 | 2201.0 | 2210.0 | 2202.5 | 2186.0 | 2162.1 | 2144.1 | 2142.6 |
| 42.5° | 2126.1 | 2130.6 | 2153.1 | 2184.5 | 2210.0 | 2222.0 | 2211.5 | 2189.0 | 2159.1 | 2138.1 | 2136.6 |
| 45°   | 2111.1 | 2124.6 | 2145.6 | 2186.0 | 2214.5 | 2229.5 | 2214.5 | 2186.0 | 2150.1 | 2126.1 | 2121.6 |
| 47.5° | 2099.1 | 2103.6 | 2136.6 | 2183.1 | 2217.5 | 2229.5 | 2214.5 | 2178.6 | 2133.6 | 2102.1 | 2099.1 |
| 50°   | 2070.7 | 2081.2 | 2114.1 | 2163.6 | 2204.0 | 2216.0 | 2198.0 | 2150.1 | 2099.1 | 2064.7 | 2058.7 |
| 52.5° | 2027.2 | 2036.2 | 2075.2 | 2136.6 | 2175.6 | 2189.0 | 2162.1 | 2111.1 | 2051.2 | 2009.2 | 2009.2 |
| 55°   | 1959.8 | 1973.3 | 2013.7 | 2076.7 | 2126.1 | 2138.1 | 2106.6 | 2052.7 | 1985.3 | 1943.3 | 1941.8 |
| 57.5° | 1878.9 | 1887.9 | 1931.3 | 2000.3 | 2048.2 | 2066.2 | 2034.7 | 1974.8 | 1907.4 | 1857.9 | 1853.4 |
| 60°   | 1774.0 | 1786.0 | 1832.4 | 1898.4 | 1947.8 | 1962.8 | 1935.8 | 1875.9 | 1807.0 | 1754.5 | 1754.5 |
| 62.5° | 1648.2 | 1661.6 | 1708.1 | 1775.5 | 1826.5 | 1848.9 | 1811.5 | 1754.5 | 1682.6 | 1631.7 | 1627.2 |
| 65°   | 1501.3 | 1513.3 | 1555.3 | 1625.7 | 1678.1 | 1694.6 | 1666.1 | 1606.2 | 1537.3 | 1489.3 | 1484.8 |
| 67.5° | 1336.5 | 1353.0 | 1394.9 | 1454.9 | 1499.8 | 1520.8 | 1502.8 | 1448.9 | 1377.0 | 1327.5 | 1323.0 |
| 70°   | 1158.2 | 1170.2 | 1203.2 | 1258.6 | 1309.5 | 1324.5 | 1297.5 | 1261.6 | 1194.2 | 1149.2 | 1143.2 |
| 72.5° | 967.9  | 978.4  | 1005.4 | 1057.8 | 1093.8 | 1113.3 | 1098.3 | 1051.8 | 997.9  | 960.4  | 966.4  |
| 75°   | 776.1  | 774.6  | 804.6  | 842.1  | 875.0  | 888.5  | 878.0  | 848.0  | 798.6  | 767.1  | 765.6  |
| 77.5° | 584.3  | 599.3  | 609.8  | 641.3  | 668.3  | 678.7  | 663.8  | 639.8  | 602.3  | 576.9  | 581.3  |
| 80°   | 410.5  | 401.5  | 421.0  | 440.5  | 458.5  | 469.0  | 460.0  | 446.5  | 421.0  | 401.5  | 398.6  |
| 82.5° | 251.7  | 244.2  | 253.2  | 271.2  | 283.2  | 286.2  | 287.7  | 271.2  | 260.7  | 245.7  | 248.7  |
| 85°   | 110.9  | 112.4  | 119.9  | 131.9  | 133.4  | 134.8  | 134.8  | 131.9  | 119.9  | 118.4  | 115.4  |
| 87.5° | 27.0   | 27.0   | 28.5   | 33.0   | 33.0   | 34.5   | 34.5   | 30.0   | 28.5   | 25.5   | 27.0   |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

LM-79-2019: Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Report Prepared for

Cooper Lighting Solutions

Streetworks

Report Number: SP1-2407-176-5

Test Date: 09/24/2024

Luminaire Tested: MEM2-HTN-VA-30-740-U-WQ

Data in this report applies to families of products including MEM2-HTN-VA-30-740-U-WQ



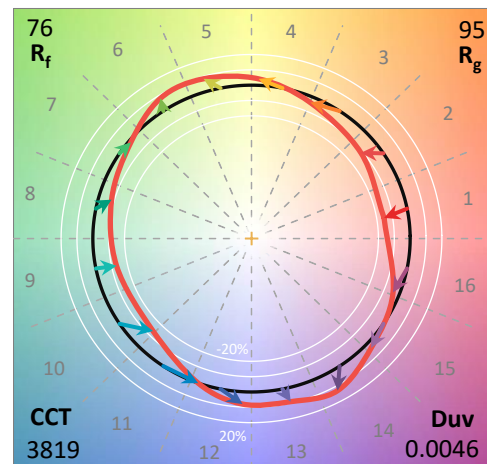
### Test Information

Test Method: LM-79-2019  
 Report Number: SP1-2407-176-5  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 09/27/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: Streetworks  
 Catalog Number: **MEM2-HTN-VA-30-740-U-WQ**  
 Description: EPIC MODERN VISUAL COMFORT 30W WAVESTREAM WIDE

### Spectral Parameters

CCT (K): 3819  
 CIE  $u'$ : 0.2261  
 CIE  $v'$ : 0.5108  
 Duv: 0.0046  
 CIE x: 0.3926  
 CIE y: 0.3942  
 CIE z: 0.2132  
 Peak Wavelength (nm): 450  
 Dominant Wavelength (nm): 577  
 Purity: 36.15483  
 R<sub>f</sub>: 75.6  
 R<sub>g</sub>: 94.8

CRI (Ra): 72.9  
 R1: 70.1  
 R2: 78.4  
 R3: 85.0  
 R4: 72.9  
 R5: 69.1  
 R6: 69.2  
 R7: 82.8  
 R8: 55.4  
 R9: -21.5  
 R10: 48.5  
 R11: 68.4  
 R12: 39.0  
 R13: 71.1  
 R14: 91.3  
 R15: 63.2



### Test Conditions

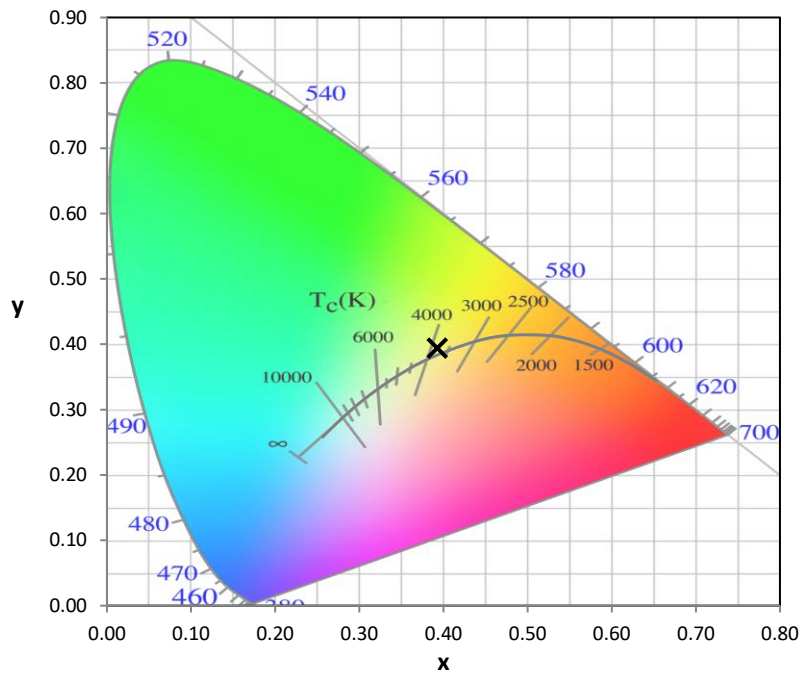
Stabilization Time: 30M  
 Operation Time: 1H 30M  
 Sphere Temperature (°C): 25.2

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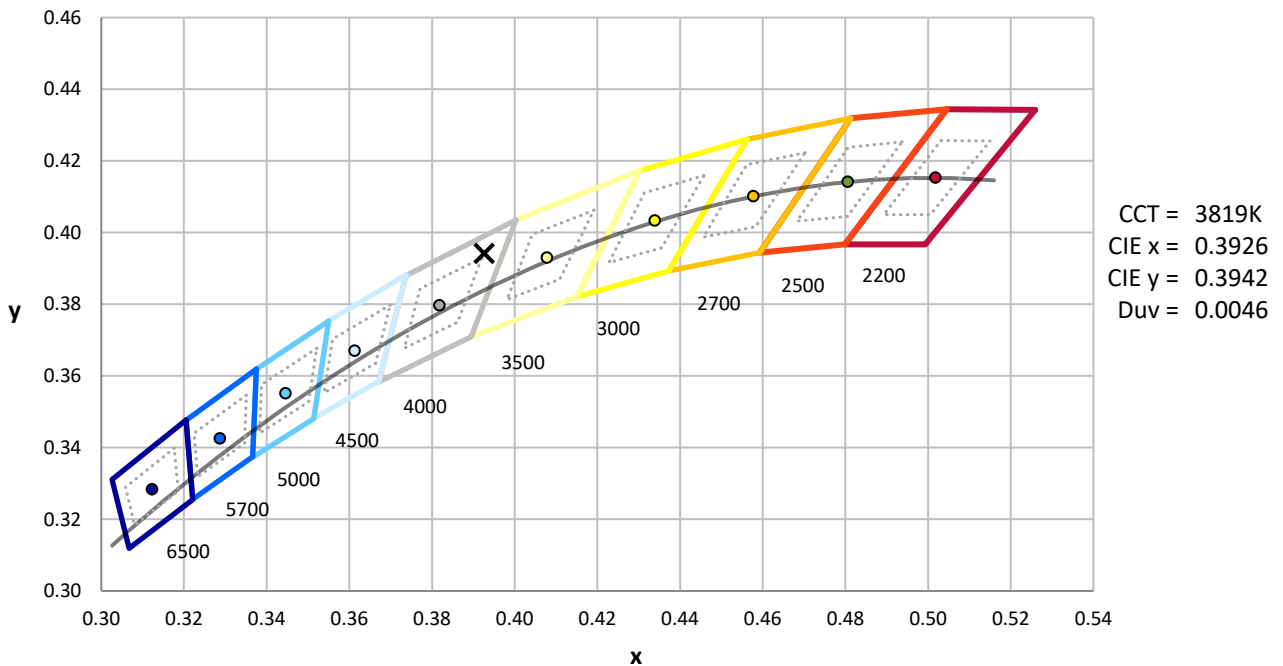
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| 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           |

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**CIE 1931 Chromaticity Diagram**



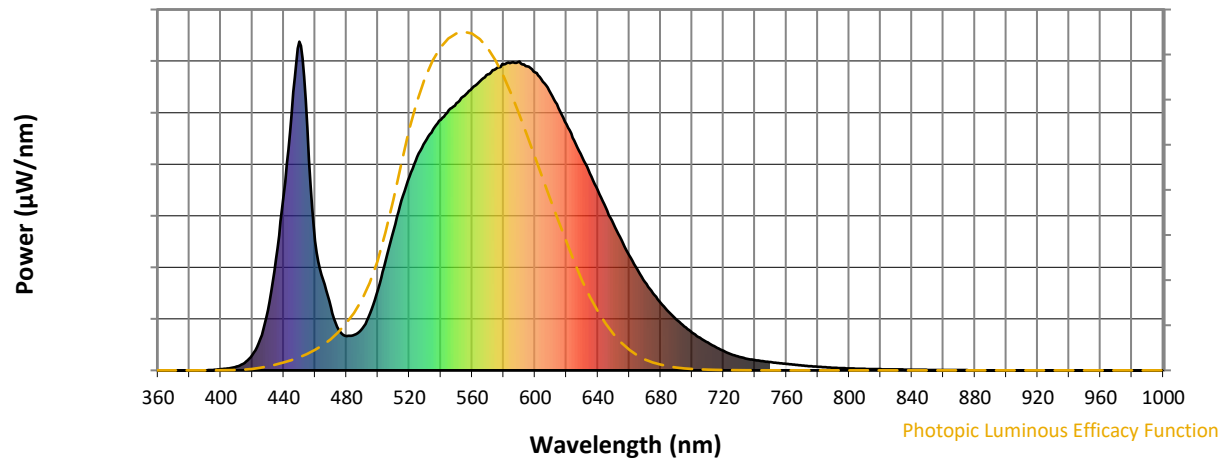
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 4000K 7-step quadrangle

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### Photopic Flux vs. Wavelength

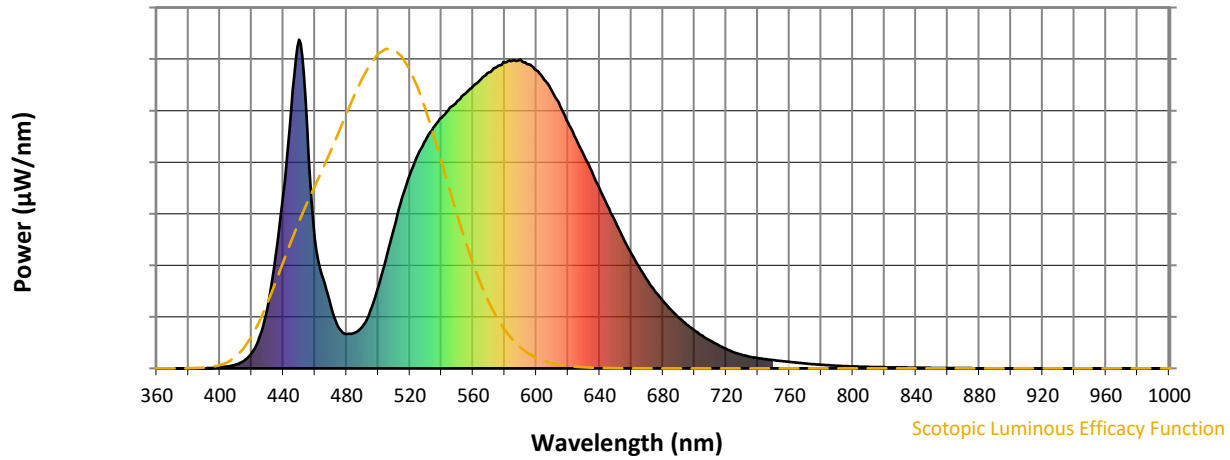


### Photopic Lumens: NR

| $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|
| 360               | 0                                    | NR                             | 490               | 127                                  | NR                             | 620               | 748                                  | NR                             | 750               | 25                                   | NR                             | 880               | 0                                    | NR                             |
| 365               | 0                                    | NR                             | 495               | 173                                  | NR                             | 625               | 699                                  | NR                             | 755               | 22                                   | NR                             | 885               | 0                                    | NR                             |
| 370               | 0                                    | NR                             | 500               | 246                                  | NR                             | 630               | 648                                  | NR                             | 760               | 20                                   | NR                             | 890               | 0                                    | NR                             |
| 375               | 0                                    | NR                             | 505               | 335                                  | NR                             | 635               | 599                                  | NR                             | 765               | 17                                   | NR                             | 895               | 0                                    | NR                             |
| 380               | 0                                    | NR                             | 510               | 427                                  | NR                             | 640               | 547                                  | NR                             | 770               | 15                                   | NR                             | 900               | 0                                    | NR                             |
| 385               | 0                                    | NR                             | 515               | 517                                  | NR                             | 645               | 495                                  | NR                             | 775               | 13                                   | NR                             | 905               | 0                                    | NR                             |
| 390               | 0                                    | NR                             | 520               | 589                                  | NR                             | 650               | 445                                  | NR                             | 780               | 11                                   | NR                             | 910               | 0                                    | NR                             |
| 395               | 1                                    | NR                             | 525               | 649                                  | NR                             | 655               | 396                                  | NR                             | 785               | 9                                    | NR                             | 915               | 0                                    | NR                             |
| 400               | 4                                    | NR                             | 530               | 695                                  | NR                             | 660               | 349                                  | NR                             | 790               | 8                                    | NR                             | 920               | 0                                    | NR                             |
| 405               | 6                                    | NR                             | 535               | 733                                  | NR                             | 665               | 308                                  | NR                             | 795               | 7                                    | NR                             | 925               | 0                                    | NR                             |
| 410               | 11                                   | NR                             | 540               | 763                                  | NR                             | 670               | 269                                  | NR                             | 800               | 6                                    | NR                             | 930               | 0                                    | NR                             |
| 415               | 23                                   | NR                             | 545               | 792                                  | NR                             | 675               | 235                                  | NR                             | 805               | 5                                    | NR                             | 935               | 0                                    | NR                             |
| 420               | 46                                   | NR                             | 550               | 813                                  | NR                             | 680               | 205                                  | NR                             | 810               | 5                                    | NR                             | 940               | 0                                    | NR                             |
| 425               | 95                                   | NR                             | 555               | 835                                  | NR                             | 685               | 178                                  | NR                             | 815               | 4                                    | NR                             | 945               | 0                                    | NR                             |
| 430               | 183                                  | NR                             | 560               | 859                                  | NR                             | 690               | 155                                  | NR                             | 820               | 3                                    | NR                             | 950               | 0                                    | NR                             |
| 435               | 338                                  | NR                             | 565               | 880                                  | NR                             | 695               | 134                                  | NR                             | 825               | 3                                    | NR                             | 955               | 0                                    | NR                             |
| 440               | 534                                  | NR                             | 570               | 900                                  | NR                             | 700               | 115                                  | NR                             | 830               | 3                                    | NR                             | 960               | 0                                    | NR                             |
| 445               | 782                                  | NR                             | 575               | 918                                  | NR                             | 705               | 99                                   | NR                             | 835               | 2                                    | NR                             | 965               | 0                                    | NR                             |
| 450               | 1000                                 | NR                             | 580               | 931                                  | NR                             | 710               | 84                                   | NR                             | 840               | 2                                    | NR                             | 970               | 0                                    | NR                             |
| 455               | 739                                  | NR                             | 585               | 937                                  | NR                             | 715               | 71                                   | NR                             | 845               | 2                                    | NR                             | 975               | 0                                    | NR                             |
| 460               | 393                                  | NR                             | 590               | 939                                  | NR                             | 720               | 59                                   | NR                             | 850               | 1                                    | NR                             | 980               | 0                                    | NR                             |
| 465               | 276                                  | NR                             | 595               | 925                                  | NR                             | 725               | 49                                   | NR                             | 855               | 1                                    | NR                             | 985               | 0                                    | NR                             |
| 470               | 190                                  | NR                             | 600               | 907                                  | NR                             | 730               | 41                                   | NR                             | 860               | 1                                    | NR                             | 990               | 0                                    | NR                             |
| 475               | 123                                  | NR                             | 605               | 878                                  | NR                             | 735               | 35                                   | NR                             | 865               | 1                                    | NR                             | 995               | 0                                    | NR                             |
| 480               | 105                                  | NR                             | 610               | 842                                  | NR                             | 740               | 31                                   | NR                             | 870               | 1                                    | NR                             | 1000              | 0                                    | NR                             |
| 485               | 108                                  | NR                             | 615               | 797                                  | NR                             | 745               | 28                                   | NR                             | 875               | 1                                    | NR                             |                   |                                      |                                |

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### Scotopic Flux vs. Wavelength



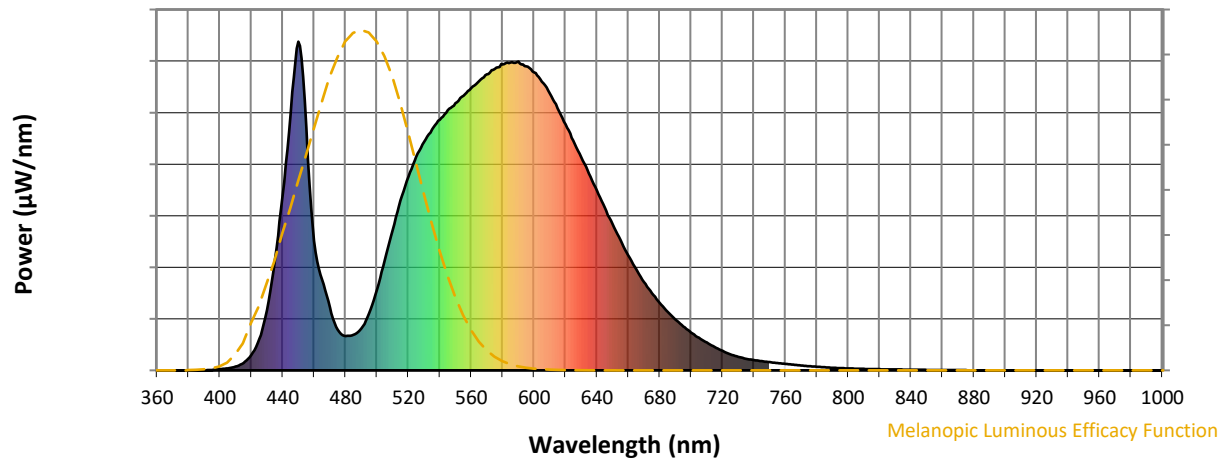
Scotopic Lumens: NR

S/P: 1.45

| λ (nm) | Power W <sup>^</sup> /nm | Lumens (Φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (Φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (Φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (Φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (Φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360    | 0                        | NR            | 490    | 127                      | NR            | 620    | 748                      | NR            | 750    | 25                       | NR            | 880    | 0                        | NR            |
| 365    | 0                        | NR            | 495    | 173                      | NR            | 625    | 699                      | NR            | 755    | 22                       | NR            | 885    | 0                        | NR            |
| 370    | 0                        | NR            | 500    | 246                      | NR            | 630    | 648                      | NR            | 760    | 20                       | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 335                      | NR            | 635    | 599                      | NR            | 765    | 17                       | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 427                      | NR            | 640    | 547                      | NR            | 770    | 15                       | NR            | 900    | 0                        | NR            |
| 385    | 0                        | NR            | 515    | 517                      | NR            | 645    | 495                      | NR            | 775    | 13                       | NR            | 905    | 0                        | NR            |
| 390    | 0                        | NR            | 520    | 589                      | NR            | 650    | 445                      | NR            | 780    | 11                       | NR            | 910    | 0                        | NR            |
| 395    | 1                        | NR            | 525    | 649                      | NR            | 655    | 396                      | NR            | 785    | 9                        | NR            | 915    | 0                        | NR            |
| 400    | 4                        | NR            | 530    | 695                      | NR            | 660    | 349                      | NR            | 790    | 8                        | NR            | 920    | 0                        | NR            |
| 405    | 6                        | NR            | 535    | 733                      | NR            | 665    | 308                      | NR            | 795    | 7                        | NR            | 925    | 0                        | NR            |
| 410    | 11                       | NR            | 540    | 763                      | NR            | 670    | 269                      | NR            | 800    | 6                        | NR            | 930    | 0                        | NR            |
| 415    | 23                       | NR            | 545    | 792                      | NR            | 675    | 235                      | NR            | 805    | 5                        | NR            | 935    | 0                        | NR            |
| 420    | 46                       | NR            | 550    | 813                      | NR            | 680    | 205                      | NR            | 810    | 5                        | NR            | 940    | 0                        | NR            |
| 425    | 95                       | NR            | 555    | 835                      | NR            | 685    | 178                      | NR            | 815    | 4                        | NR            | 945    | 0                        | NR            |
| 430    | 183                      | NR            | 560    | 859                      | NR            | 690    | 155                      | NR            | 820    | 3                        | NR            | 950    | 0                        | NR            |
| 435    | 338                      | NR            | 565    | 880                      | NR            | 695    | 134                      | NR            | 825    | 3                        | NR            | 955    | 0                        | NR            |
| 440    | 534                      | NR            | 570    | 900                      | NR            | 700    | 115                      | NR            | 830    | 3                        | NR            | 960    | 0                        | NR            |
| 445    | 782                      | NR            | 575    | 918                      | NR            | 705    | 99                       | NR            | 835    | 2                        | NR            | 965    | 0                        | NR            |
| 450    | 1000                     | NR            | 580    | 931                      | NR            | 710    | 84                       | NR            | 840    | 2                        | NR            | 970    | 0                        | NR            |
| 455    | 739                      | NR            | 585    | 937                      | NR            | 715    | 71                       | NR            | 845    | 2                        | NR            | 975    | 0                        | NR            |
| 460    | 393                      | NR            | 590    | 939                      | NR            | 720    | 59                       | NR            | 850    | 1                        | NR            | 980    | 0                        | NR            |
| 465    | 276                      | NR            | 595    | 925                      | NR            | 725    | 49                       | NR            | 855    | 1                        | NR            | 985    | 0                        | NR            |
| 470    | 190                      | NR            | 600    | 907                      | NR            | 730    | 41                       | NR            | 860    | 1                        | NR            | 990    | 0                        | NR            |
| 475    | 123                      | NR            | 605    | 878                      | NR            | 735    | 35                       | NR            | 865    | 1                        | NR            | 995    | 0                        | NR            |
| 480    | 105                      | NR            | 610    | 842                      | NR            | 740    | 31                       | NR            | 870    | 1                        | NR            | 1000   | 0                        | NR            |
| 485    | 108                      | NR            | 615    | 797                      | NR            | 745    | 28                       | NR            | 875    | 1                        | NR            |        |                          |               |

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### Melanopic Flux vs. Wavelength



Melanopic Lumens: NR

M/P: 2.76

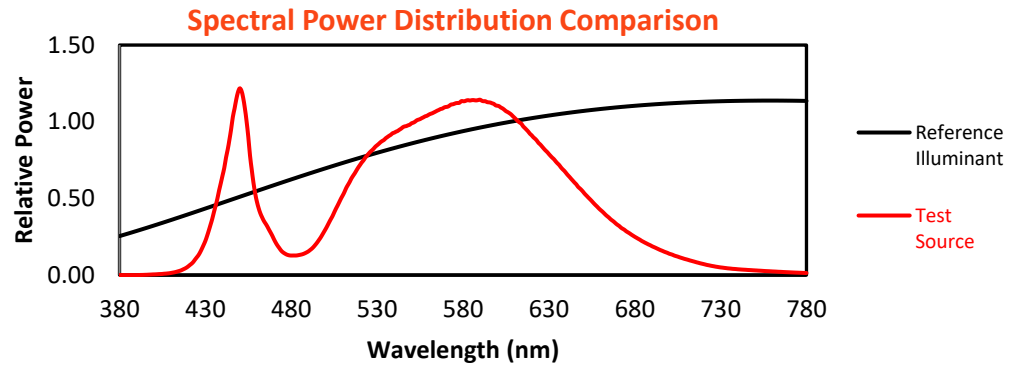
| λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) |
|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|
| 360       | 0                           | NR               | 490       | 127                         | NR               | 620       | 748                         | NR               | 750       | 25                          | NR               | 880       | 0                           | NR               |
| 365       | 0                           | NR               | 495       | 173                         | NR               | 625       | 699                         | NR               | 755       | 22                          | NR               | 885       | 0                           | NR               |
| 370       | 0                           | NR               | 500       | 246                         | NR               | 630       | 648                         | NR               | 760       | 20                          | NR               | 890       | 0                           | NR               |
| 375       | 0                           | NR               | 505       | 335                         | NR               | 635       | 599                         | NR               | 765       | 17                          | NR               | 895       | 0                           | NR               |
| 380       | 0                           | NR               | 510       | 427                         | NR               | 640       | 547                         | NR               | 770       | 15                          | NR               | 900       | 0                           | NR               |
| 385       | 0                           | NR               | 515       | 517                         | NR               | 645       | 495                         | NR               | 775       | 13                          | NR               | 905       | 0                           | NR               |
| 390       | 0                           | NR               | 520       | 589                         | NR               | 650       | 445                         | NR               | 780       | 11                          | NR               | 910       | 0                           | NR               |
| 395       | 1                           | NR               | 525       | 649                         | NR               | 655       | 396                         | NR               | 785       | 9                           | NR               | 915       | 0                           | NR               |
| 400       | 4                           | NR               | 530       | 695                         | NR               | 660       | 349                         | NR               | 790       | 8                           | NR               | 920       | 0                           | NR               |
| 405       | 6                           | NR               | 535       | 733                         | NR               | 665       | 308                         | NR               | 795       | 7                           | NR               | 925       | 0                           | NR               |
| 410       | 11                          | NR               | 540       | 763                         | NR               | 670       | 269                         | NR               | 800       | 6                           | NR               | 930       | 0                           | NR               |
| 415       | 23                          | NR               | 545       | 792                         | NR               | 675       | 235                         | NR               | 805       | 5                           | NR               | 935       | 0                           | NR               |
| 420       | 46                          | NR               | 550       | 813                         | NR               | 680       | 205                         | NR               | 810       | 5                           | NR               | 940       | 0                           | NR               |
| 425       | 95                          | NR               | 555       | 835                         | NR               | 685       | 178                         | NR               | 815       | 4                           | NR               | 945       | 0                           | NR               |
| 430       | 183                         | NR               | 560       | 859                         | NR               | 690       | 155                         | NR               | 820       | 3                           | NR               | 950       | 0                           | NR               |
| 435       | 338                         | NR               | 565       | 880                         | NR               | 695       | 134                         | NR               | 825       | 3                           | NR               | 955       | 0                           | NR               |
| 440       | 534                         | NR               | 570       | 900                         | NR               | 700       | 115                         | NR               | 830       | 3                           | NR               | 960       | 0                           | NR               |
| 445       | 782                         | NR               | 575       | 918                         | NR               | 705       | 99                          | NR               | 835       | 2                           | NR               | 965       | 0                           | NR               |
| 450       | 1000                        | NR               | 580       | 931                         | NR               | 710       | 84                          | NR               | 840       | 2                           | NR               | 970       | 0                           | NR               |
| 455       | 739                         | NR               | 585       | 937                         | NR               | 715       | 71                          | NR               | 845       | 2                           | NR               | 975       | 0                           | NR               |
| 460       | 393                         | NR               | 590       | 939                         | NR               | 720       | 59                          | NR               | 850       | 1                           | NR               | 980       | 0                           | NR               |
| 465       | 276                         | NR               | 595       | 925                         | NR               | 725       | 49                          | NR               | 855       | 1                           | NR               | 985       | 0                           | NR               |
| 470       | 190                         | NR               | 600       | 907                         | NR               | 730       | 41                          | NR               | 860       | 1                           | NR               | 990       | 0                           | NR               |
| 475       | 123                         | NR               | 605       | 878                         | NR               | 735       | 35                          | NR               | 865       | 1                           | NR               | 995       | 0                           | NR               |
| 480       | 105                         | NR               | 610       | 842                         | NR               | 740       | 31                          | NR               | 870       | 1                           | NR               | 1000      | 0                           | NR               |
| 485       | 108                         | NR               | 615       | 797                         | NR               | 745       | 28                          | NR               | 875       | 1                           | NR               |           |                             |                  |

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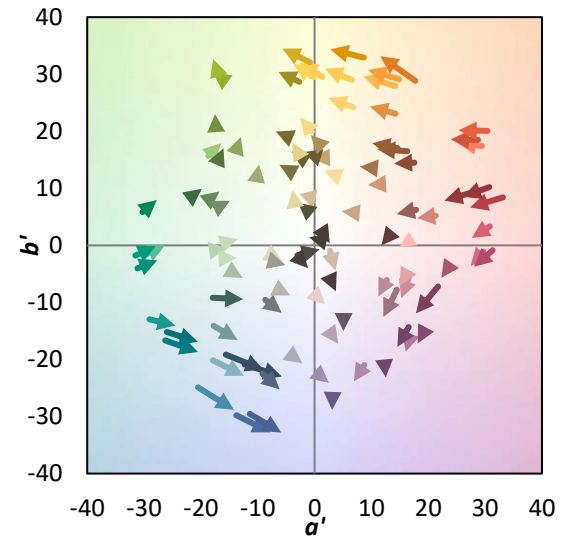
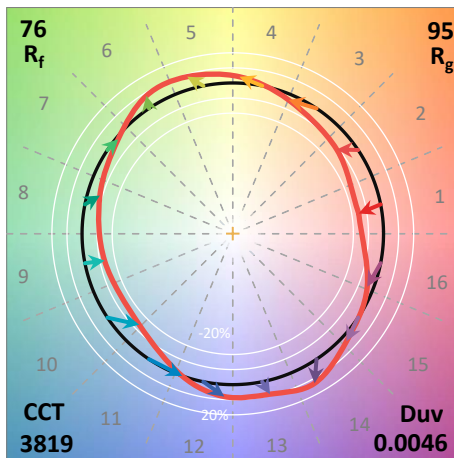
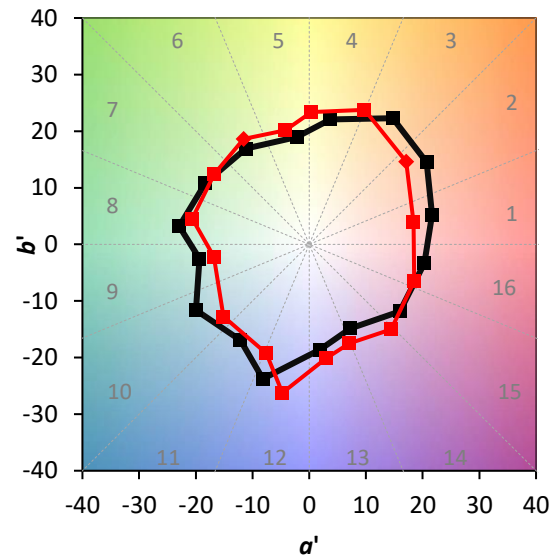
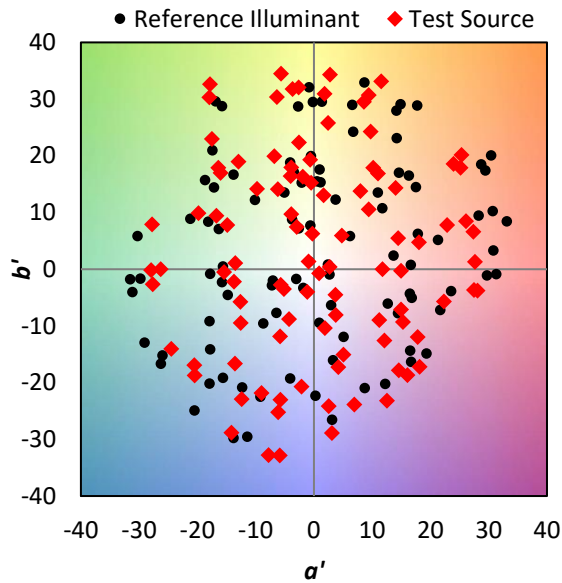
TM-30-18

### Summary

$R_f = 75.6$   
 $R_g = 94.8$   
 $CIE R_a = 72.9$   
 $R_g = -21.5$

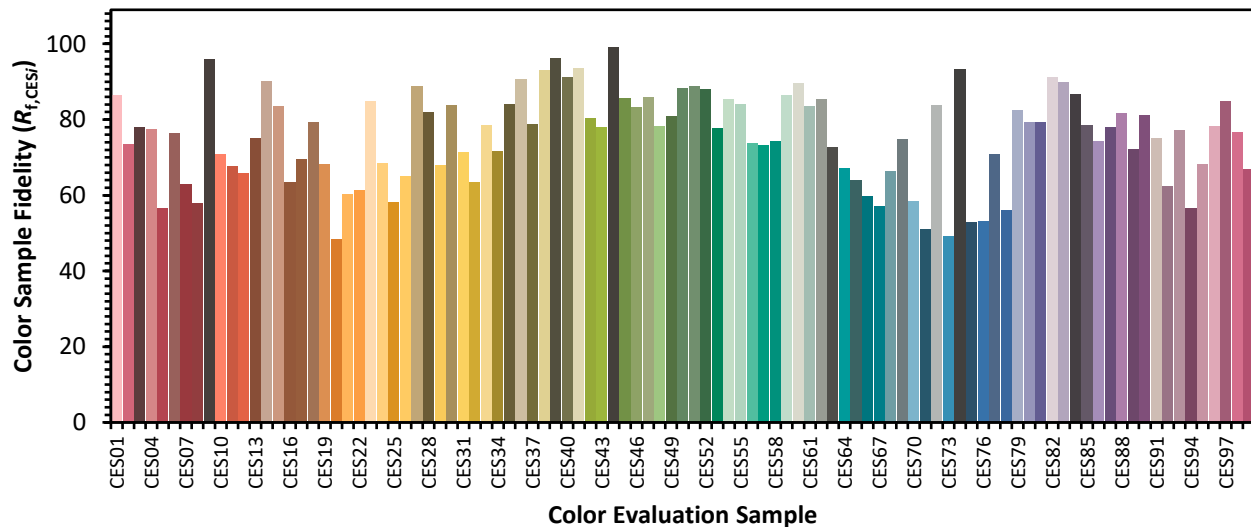


### Color Vector Graphics



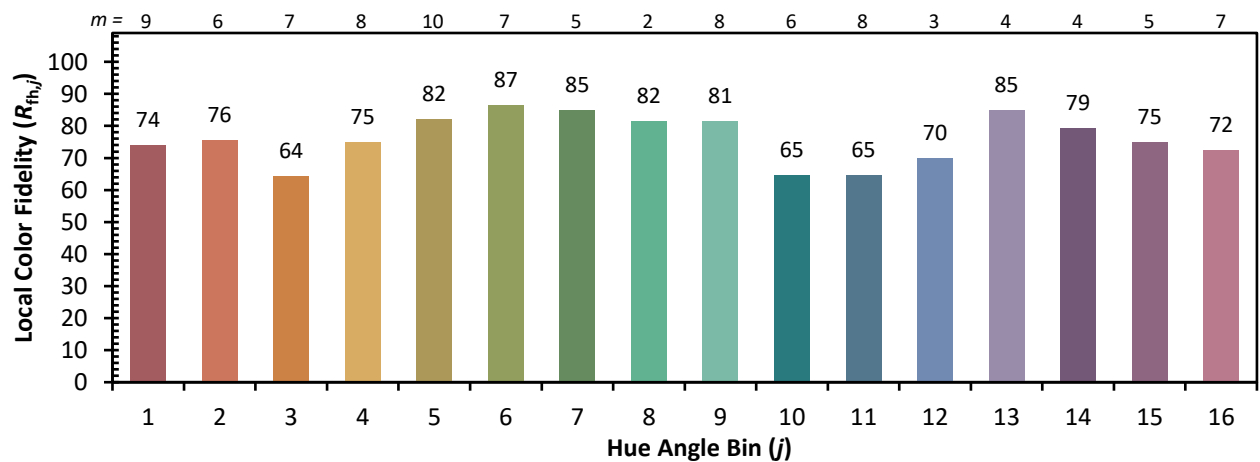
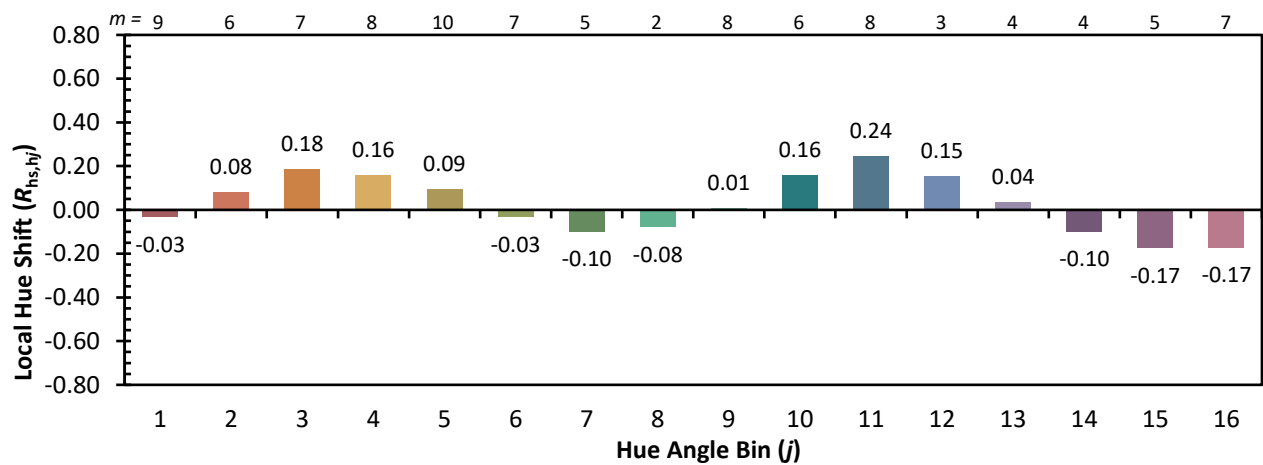
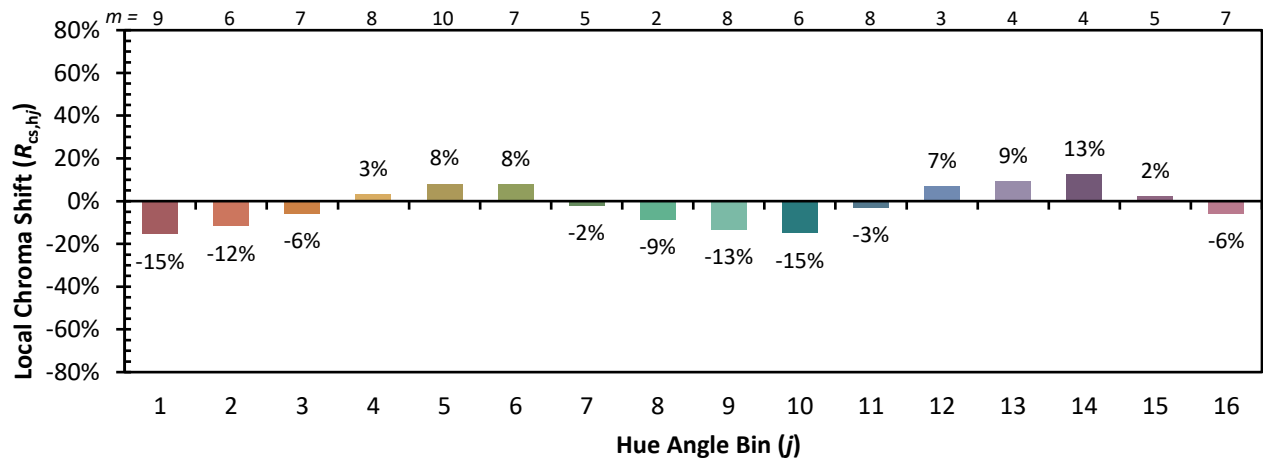
**Individual Sample Fidelity Index ( $R_{f,i}$ )**

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 65 | CES51 = 89 | CES76 = 53 |
| CES02 = 61 | CES27 = 89 | CES52 = 88 | CES77 = 71 |
| CES03 = 30 | CES28 = 82 | CES53 = 78 | CES78 = 56 |
| CES04 = 70 | CES29 = 68 | CES54 = 85 | CES79 = 83 |
| CES05 = 48 | CES30 = 84 | CES55 = 84 | CES80 = 79 |
| CES06 = 50 | CES31 = 71 | CES56 = 74 | CES81 = 79 |
| CES07 = 40 | CES32 = 63 | CES57 = 73 | CES82 = 91 |
| CES08 = 39 | CES33 = 79 | CES58 = 74 | CES83 = 90 |
| CES09 = 29 | CES34 = 72 | CES59 = 86 | CES84 = 87 |
| CES10 = 74 | CES35 = 84 | CES60 = 90 | CES85 = 78 |
| CES11 = 57 | CES36 = 91 | CES61 = 84 | CES86 = 74 |
| CES12 = 63 | CES37 = 79 | CES62 = 85 | CES87 = 78 |
| CES13 = 42 | CES38 = 93 | CES63 = 73 | CES88 = 82 |
| CES14 = 74 | CES39 = 96 | CES64 = 67 | CES89 = 72 |
| CES15 = 71 | CES40 = 91 | CES65 = 64 | CES90 = 81 |
| CES16 = 47 | CES41 = 93 | CES66 = 60 | CES91 = 75 |
| CES17 = 49 | CES42 = 80 | CES67 = 57 | CES92 = 62 |
| CES18 = 56 | CES43 = 78 | CES68 = 66 | CES93 = 77 |
| CES19 = 72 | CES44 = 99 | CES69 = 75 | CES94 = 57 |
| CES20 = 65 | CES45 = 86 | CES70 = 58 | CES95 = 68 |
| CES21 = 86 | CES46 = 83 | CES71 = 51 | CES96 = 78 |
| CES22 = 78 | CES47 = 86 | CES72 = 84 | CES97 = 85 |
| CES23 = 92 | CES48 = 78 | CES73 = 49 | CES98 = 77 |
| CES24 = 91 | CES49 = 81 | CES74 = 93 | CES99 = 67 |
| CES25 = 72 | CES50 = 88 | CES75 = 53 |            |

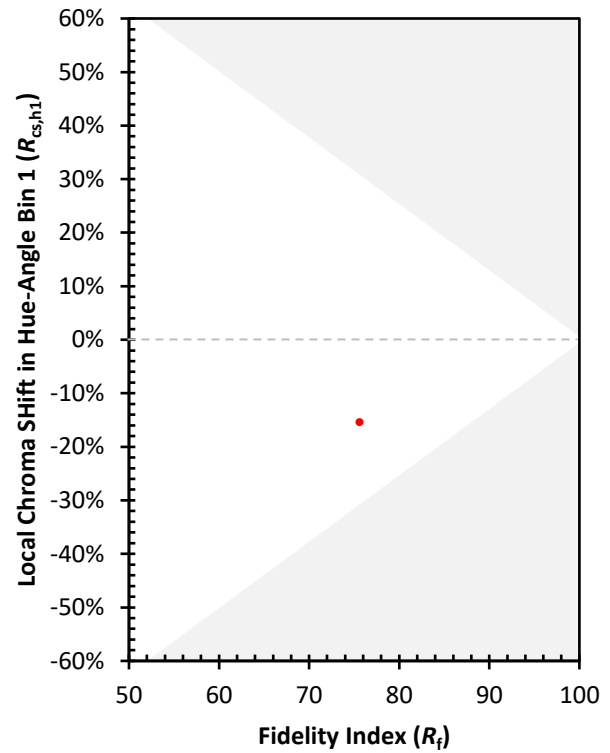
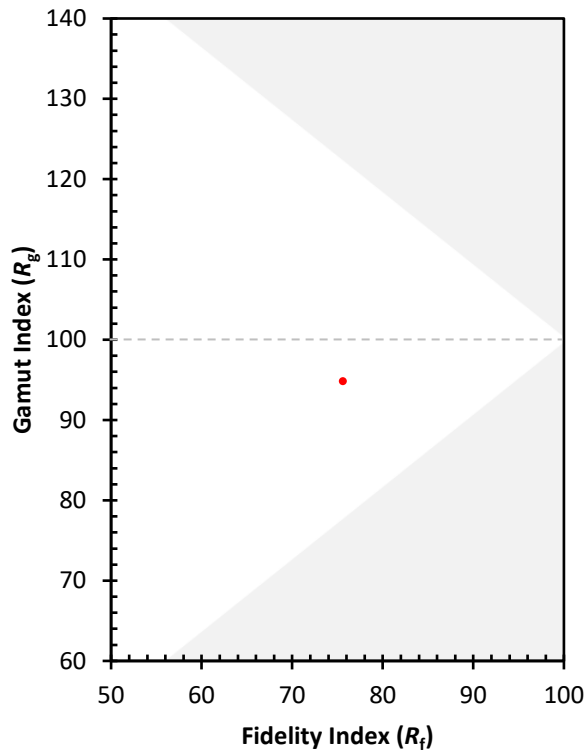




### Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)