

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: INVUE

Report Number: P553721

Luminaire Tested: **LXS-VA2-730-U-ASC-S**

Issue Date: 7/13/2021

**Test Information**

Test Method: LM-79-08  
Report Number: P553721  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1803-687-15-R2)  
Test Lab: INNOVATION CENTER  
Issue Date: 7/13/2021  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: INVUE  
Catalog Number: LXS-VA2-730-U-ASC-S  
Description: LUXESCAPE OUTDOOR ARCHITECTURAL LUMINAIRE  
70 CRI, 3000K LEDS AND TYPE II OPTIC, SPIDER MOUNT  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 3417 lumens  
Efficiency: N/A  
Efficacy: 71.2 lumens/watt  
Luminous Opening: Circular (Dia: 1.62' x H: 0')  
IES Classification: Type III - Short  
BUG Rating: B2 - U0 - G2

Input Watts (W): 48  
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

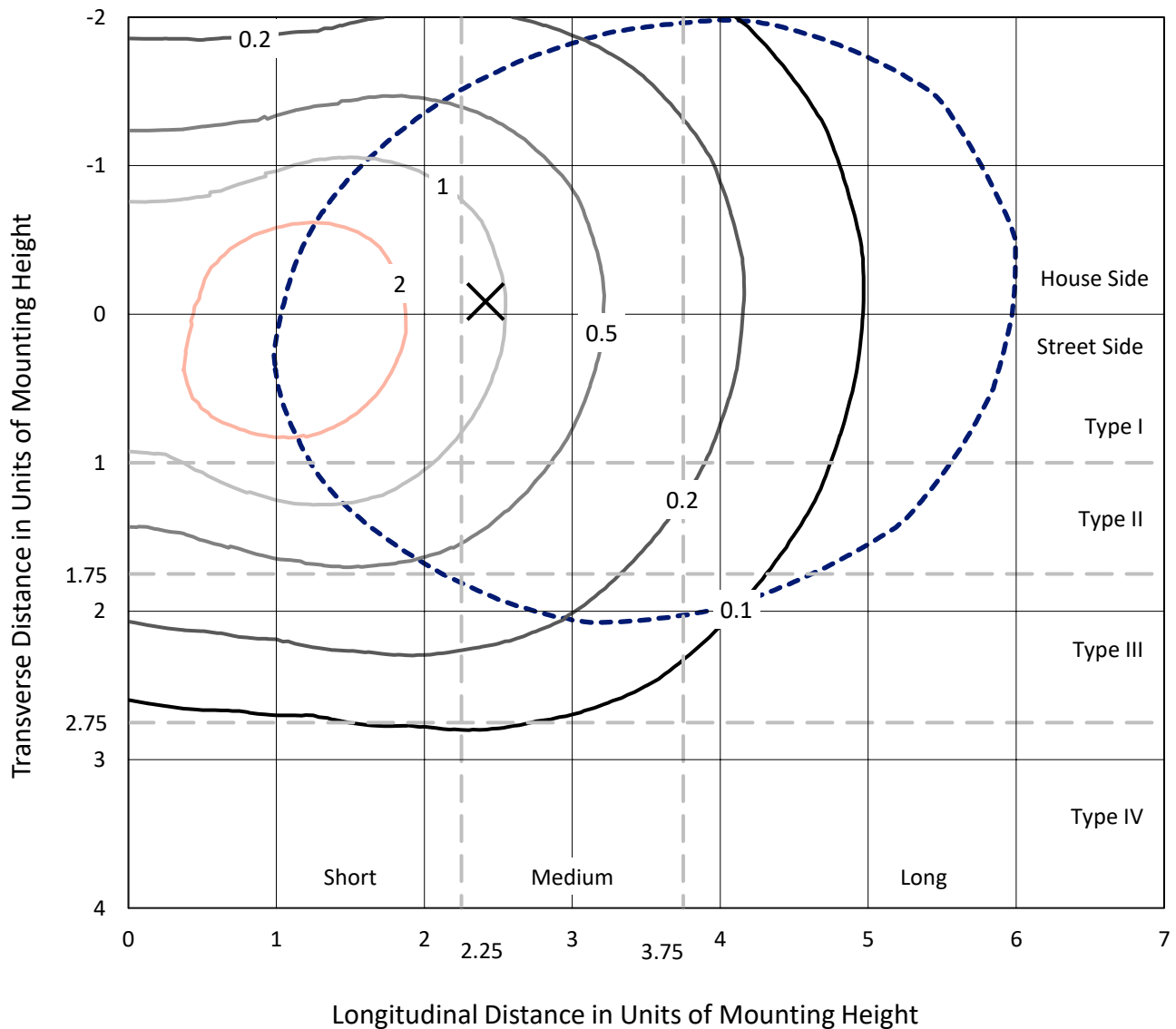


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## Iso-Footcandle Lines of Horizontal Illumination

× Max cd  
--- 1/2 Max cd

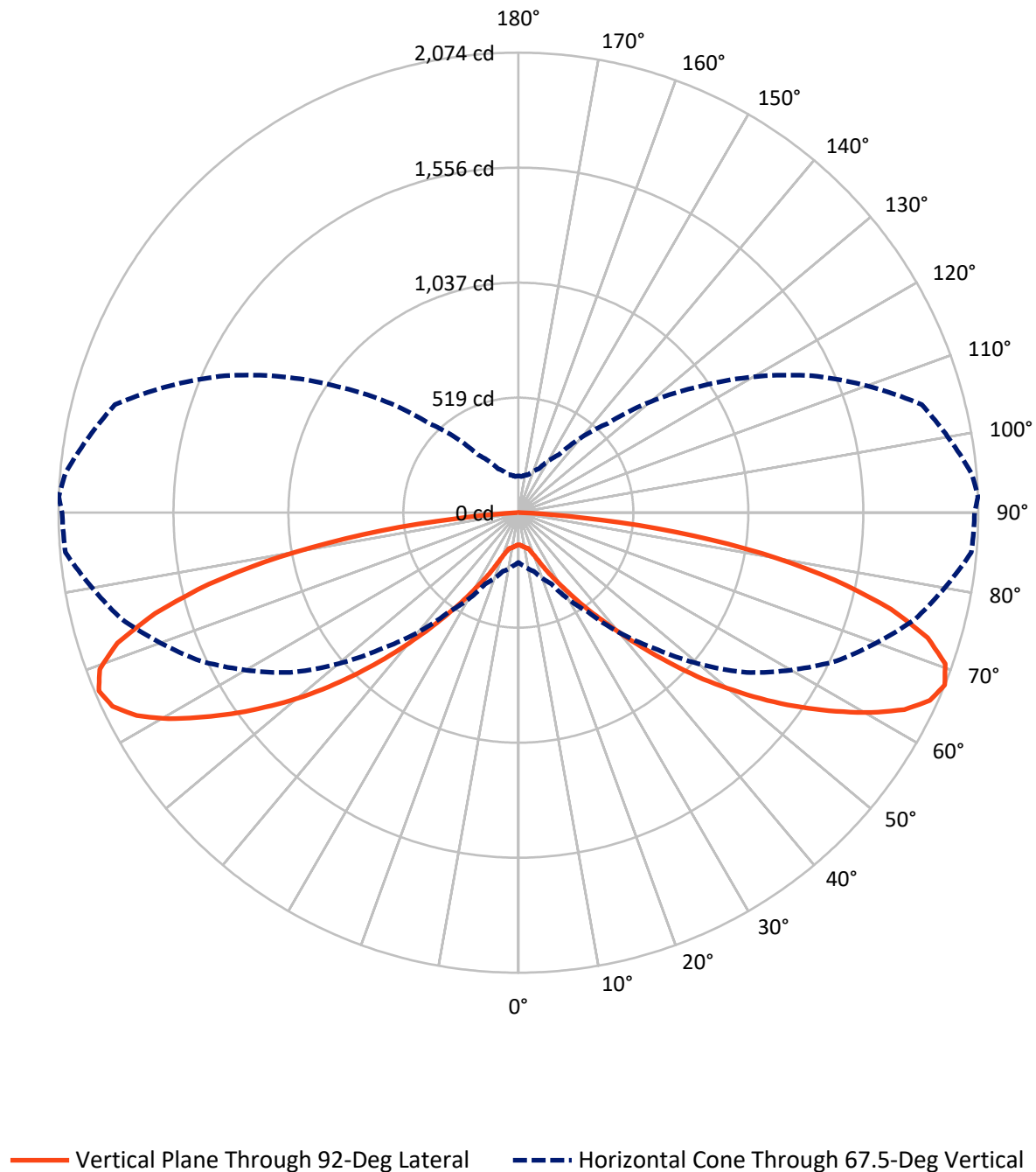


Based on 10 foot mounting height. Maximum calculated value = 3.6 fc  
Type III - Short - N/A

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## Luminous Intensity Polar Plot



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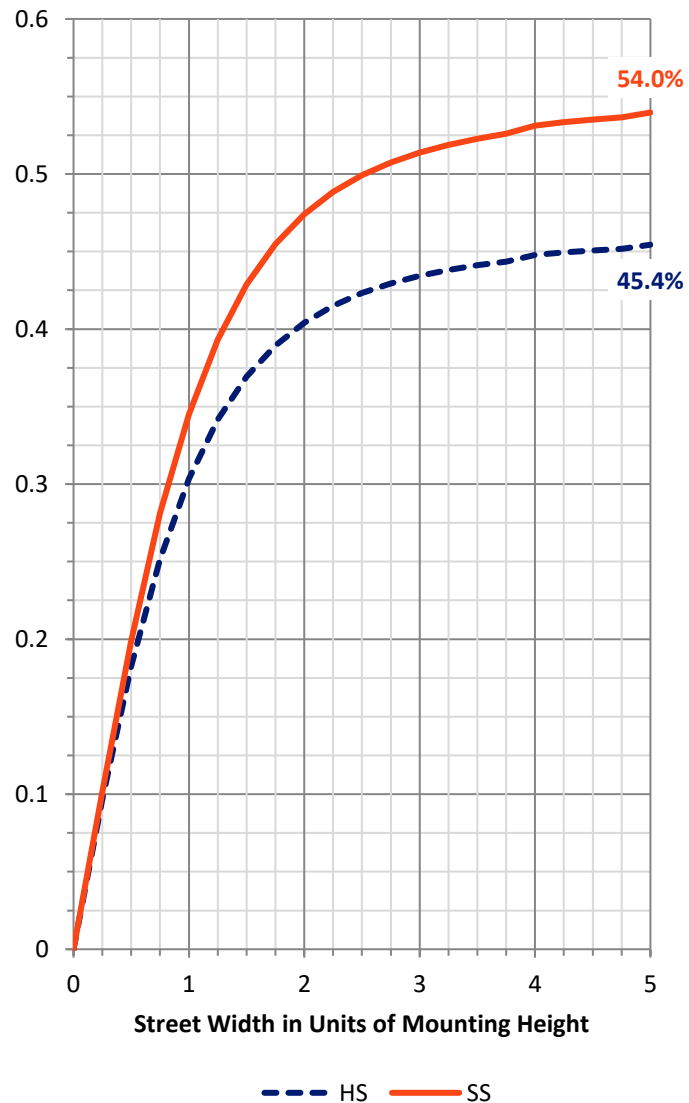
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 1563.3   | 0.0    | 1563.3 |
|                    | % Fixture | 45.7     | 0.0    | 45.7   |
| <b>Street Side</b> | Lumens    | 1853.8   | 0.0    | 1853.8 |
|                    | % Fixture | 54.3     | 0.0    | 54.3   |
| <b>Total</b>       | Lumens    | 3417.0   | 0.0    | 3417.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 14.5   | 0.4       |
| 10°-20°   | 48.1   | 1.4       |
| 20°-30°   | 109.1  | 3.2       |
| 30°-40°   | 232.0  | 6.8       |
| 40°-50°   | 430.8  | 12.6      |
| 50°-60°   | 694.7  | 20.3      |
| 60°-70°   | 914.8  | 26.8      |
| 70°-80°   | 779.4  | 22.8      |
| 80°-90°   | 193.6  | 5.7       |
| 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°    | 3417.0 | 100.0     |
| 0°-180°   | 3417.0 | 100.0     |

**Coefficient of Utilization**



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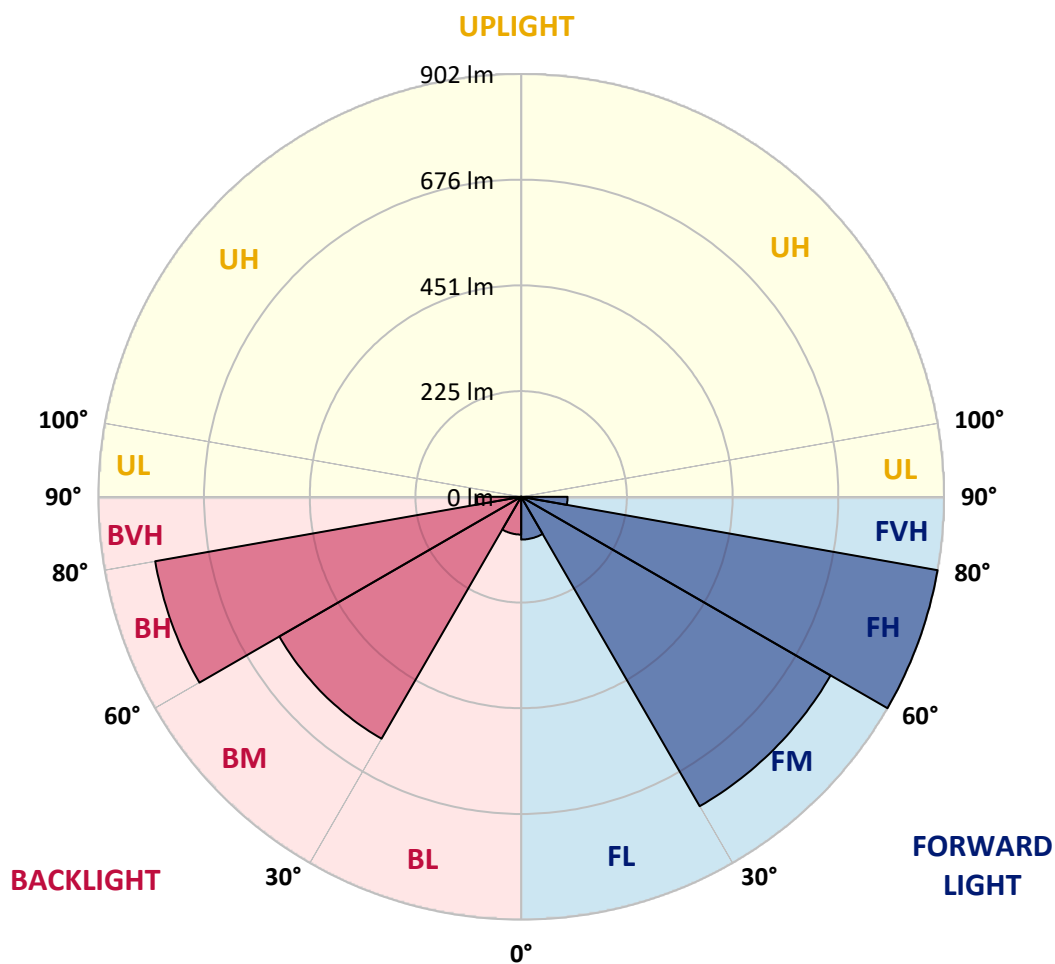
CATALOG NUMBER: LXS-VA2-730-U-ASC-S

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 91.2   | 2.7       |                         |      |         |
| FM   | (30°-60°)   | 761.9  | 22.3      |                         |      |         |
| FH   | (60°-80°)   | 901.7  | 26.4      |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 98.9   | 2.9       |                         |      | G1/100  |
| BL   | (0°-30°)    | 80.5   | 2.4       | B0/110                  |      |         |
| BM   | (30°-60°)   | 595.6  | 17.4      | B1/1000                 |      |         |
| BH   | (60°-80°)   | 792.5  | 23.2      | B2/1000                 |      | G2/1000 |
| BVH  | (80°-90°)   | 94.7   | 2.8       |                         |      | G1/100  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B2-U0-G2**

Type III Short



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°    | 5°    | 15°   | 25°   | 35°   | 45°   | 55°    | 65°    | 75°    | 85°    | 90°    |
|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|
| 0°    | 144.4 | 144.4 | 144.4 | 144.4 | 144.4 | 144.4 | 144.4  | 144.4  | 144.4  | 144.4  | 144.4  |
| 2.5°  | 146.1 | 146.1 | 146.1 | 146.1 | 147.9 | 147.9 | 146.1  | 146.1  | 146.1  | 146.1  | 146.1  |
| 5°    | 151.5 | 149.7 | 151.5 | 151.5 | 151.5 | 151.5 | 149.7  | 149.7  | 149.7  | 149.7  | 149.7  |
| 7.5°  | 153.3 | 153.3 | 153.3 | 153.3 | 155.0 | 155.0 | 155.0  | 153.3  | 153.3  | 153.3  | 155.0  |
| 10°   | 153.3 | 155.0 | 155.0 | 156.8 | 158.6 | 160.4 | 160.4  | 158.6  | 158.6  | 158.6  | 158.6  |
| 12.5° | 158.6 | 158.6 | 158.6 | 160.4 | 164.0 | 164.0 | 165.7  | 165.7  | 164.0  | 162.2  | 164.0  |
| 15°   | 164.0 | 164.0 | 165.7 | 167.5 | 171.1 | 171.1 | 171.1  | 171.1  | 169.3  | 167.5  | 165.7  |
| 17.5° | 172.9 | 172.9 | 176.4 | 178.2 | 183.6 | 185.3 | 187.1  | 188.9  | 187.1  | 183.6  | 183.6  |
| 20°   | 185.3 | 185.3 | 188.9 | 192.5 | 196.0 | 201.4 | 204.9  | 204.9  | 204.9  | 204.9  | 204.9  |
| 22.5° | 190.7 | 192.5 | 197.8 | 206.7 | 213.9 | 221.0 | 226.3  | 231.7  | 238.8  | 238.8  | 237.0  |
| 25°   | 196.0 | 197.8 | 206.7 | 217.4 | 233.5 | 247.7 | 265.5  | 283.4  | 292.3  | 285.1  | 283.4  |
| 27.5° | 204.9 | 206.7 | 215.6 | 229.9 | 251.3 | 283.4 | 319.0  | 347.5  | 354.6  | 336.8  | 331.5  |
| 30°   | 210.3 | 212.1 | 226.3 | 244.2 | 269.1 | 324.3 | 377.8  | 415.2  | 417.0  | 395.6  | 386.7  |
| 32.5° | 222.8 | 224.5 | 237.0 | 258.4 | 299.4 | 370.7 | 445.5  | 486.5  | 495.4  | 470.5  | 456.2  |
| 35°   | 238.8 | 240.6 | 253.1 | 276.2 | 335.0 | 424.1 | 513.2  | 556.0  | 577.4  | 556.0  | 534.6  |
| 37.5° | 244.2 | 247.7 | 262.0 | 294.0 | 368.9 | 481.2 | 579.2  | 636.2  | 671.9  | 650.5  | 627.3  |
| 40°   | 249.5 | 251.3 | 265.5 | 310.1 | 401.0 | 531.1 | 645.1  | 728.9  | 777.0  | 757.4  | 736.0  |
| 42.5° | 253.1 | 254.8 | 269.1 | 322.6 | 431.3 | 570.3 | 712.8  | 826.9  | 891.1  | 880.4  | 857.2  |
| 45°   | 253.1 | 254.8 | 272.7 | 336.8 | 458.0 | 611.3 | 782.3  | 923.1  | 1012.2 | 1012.2 | 985.5  |
| 47.5° | 254.8 | 254.8 | 272.7 | 351.1 | 479.4 | 655.8 | 853.6  | 1014.0 | 1128.1 | 1154.8 | 1121.0 |
| 50°   | 260.2 | 262.0 | 283.4 | 361.8 | 507.9 | 705.7 | 932.0  | 1108.5 | 1245.7 | 1288.5 | 1267.1 |
| 52.5° | 260.2 | 260.2 | 290.5 | 376.0 | 532.9 | 746.7 | 999.8  | 1204.7 | 1366.9 | 1418.6 | 1409.7 |
| 55°   | 267.3 | 269.1 | 299.4 | 392.1 | 552.5 | 791.3 | 1071.1 | 1300.9 | 1488.1 | 1554.0 | 1552.2 |
| 57.5° | 265.5 | 270.9 | 306.5 | 399.2 | 572.1 | 842.9 | 1154.8 | 1393.6 | 1611.0 | 1698.4 | 1687.7 |
| 60°   | 258.4 | 265.5 | 306.5 | 399.2 | 584.5 | 878.6 | 1226.1 | 1486.3 | 1712.6 | 1839.1 | 1824.9 |
| 62.5° | 249.5 | 258.4 | 299.4 | 392.1 | 582.8 | 892.8 | 1267.1 | 1555.8 | 1792.8 | 1956.8 | 1944.3 |
| 65°   | 238.8 | 253.1 | 288.7 | 376.0 | 568.5 | 887.5 | 1277.8 | 1591.4 | 1842.7 | 2031.6 | 2026.3 |
| 67.5° | 224.5 | 238.8 | 274.4 | 354.6 | 545.3 | 862.5 | 1256.4 | 1582.5 | 1853.4 | 2051.2 | 2058.3 |
| 70°   | 208.5 | 221.0 | 253.1 | 327.9 | 511.5 | 819.8 | 1206.5 | 1523.7 | 1807.1 | 2003.1 | 2024.5 |
| 72.5° | 192.5 | 199.6 | 228.1 | 292.3 | 461.6 | 755.6 | 1121.0 | 1416.8 | 1698.4 | 1881.9 | 1914.0 |
| 75°   | 172.9 | 176.4 | 199.6 | 253.1 | 399.2 | 668.3 | 1001.6 | 1249.3 | 1511.2 | 1685.9 | 1709.1 |
| 77.5° | 147.9 | 147.9 | 167.5 | 206.7 | 329.7 | 556.0 | 841.2  | 1049.7 | 1276.0 | 1413.2 | 1448.9 |
| 80°   | 119.4 | 117.6 | 128.3 | 156.8 | 245.9 | 418.8 | 645.1  | 796.6  | 976.6  | 1080.0 | 1108.5 |
| 82.5° | 85.5  | 83.8  | 87.3  | 99.8  | 156.8 | 274.4 | 418.8  | 513.2  | 636.2  | 700.4  | 718.2  |
| 85°   | 44.6  | 44.6  | 44.6  | 48.1  | 65.9  | 112.3 | 171.1  | 188.9  | 269.1  | 278.0  | 290.5  |
| 87.5° | 10.7  | 10.7  | 10.7  | 8.9   | 7.1   | 7.1   | 5.3    | 5.3    | 5.3    | 5.3    | 3.6    |
| 90°   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

REPORT NUMBER: P553721

CATALOG NUMBER: LXS-VA2-730-U-ASC-S

**CANDELA DISTRIBUTION (continued):**

|       | 92°    | 95°    | 105°   | 115°   | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|--------|--------|--------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 144.4  | 144.4  | 144.4  | 144.4  | 144.4 | 144.4 | 144.4 | 144.4 | 144.4 | 144.4 | 144.4 |
| 2.5°  | 146.1  | 146.1  | 146.1  | 147.9  | 147.9 | 147.9 | 147.9 | 147.9 | 147.9 | 147.9 | 147.9 |
| 5°    | 149.7  | 151.5  | 151.5  | 151.5  | 151.5 | 149.7 | 149.7 | 149.7 | 147.9 | 147.9 | 147.9 |
| 7.5°  | 155.0  | 155.0  | 155.0  | 153.3  | 153.3 | 153.3 | 151.5 | 151.5 | 151.5 | 151.5 | 151.5 |
| 10°   | 158.6  | 158.6  | 158.6  | 156.8  | 156.8 | 156.8 | 156.8 | 155.0 | 153.3 | 153.3 | 153.3 |
| 12.5° | 164.0  | 164.0  | 162.2  | 160.4  | 160.4 | 160.4 | 158.6 | 155.0 | 153.3 | 153.3 | 153.3 |
| 15°   | 167.5  | 165.7  | 164.0  | 162.2  | 162.2 | 162.2 | 158.6 | 156.8 | 155.0 | 153.3 | 153.3 |
| 17.5° | 183.6  | 181.8  | 178.2  | 172.9  | 171.1 | 169.3 | 165.7 | 162.2 | 158.6 | 155.0 | 155.0 |
| 20°   | 206.7  | 203.2  | 197.8  | 187.1  | 180.0 | 178.2 | 176.4 | 165.7 | 156.8 | 153.3 | 153.3 |
| 22.5° | 238.8  | 237.0  | 221.0  | 206.7  | 196.0 | 190.7 | 185.3 | 172.9 | 162.2 | 155.0 | 153.3 |
| 25°   | 281.6  | 272.7  | 253.1  | 233.5  | 217.4 | 203.2 | 196.0 | 183.6 | 171.1 | 164.0 | 164.0 |
| 27.5° | 327.9  | 319.0  | 294.0  | 270.9  | 245.9 | 217.4 | 206.7 | 190.7 | 178.2 | 176.4 | 176.4 |
| 30°   | 383.2  | 372.5  | 342.2  | 308.3  | 272.7 | 233.5 | 215.6 | 194.3 | 185.3 | 187.1 | 188.9 |
| 32.5° | 449.1  | 434.8  | 393.8  | 352.9  | 303.0 | 253.1 | 222.8 | 201.4 | 192.5 | 194.3 | 194.3 |
| 35°   | 529.3  | 511.5  | 461.6  | 402.8  | 333.3 | 272.7 | 229.9 | 210.3 | 197.8 | 194.3 | 194.3 |
| 37.5° | 616.6  | 597.0  | 538.2  | 465.1  | 370.7 | 288.7 | 240.6 | 215.6 | 203.2 | 197.8 | 197.8 |
| 40°   | 723.5  | 696.8  | 622.0  | 532.9  | 413.5 | 310.1 | 251.3 | 224.5 | 210.3 | 199.6 | 199.6 |
| 42.5° | 842.9  | 814.4  | 720.0  | 605.9  | 463.4 | 336.8 | 262.0 | 235.2 | 210.3 | 199.6 | 199.6 |
| 45°   | 974.8  | 942.7  | 830.5  | 686.1  | 515.0 | 363.6 | 274.4 | 238.8 | 212.1 | 201.4 | 201.4 |
| 47.5° | 1121.0 | 1088.9 | 953.4  | 773.4  | 566.7 | 388.5 | 288.7 | 244.2 | 215.6 | 203.2 | 203.2 |
| 50°   | 1260.0 | 1229.7 | 1087.1 | 869.7  | 623.7 | 413.5 | 299.4 | 251.3 | 213.9 | 201.4 | 199.6 |
| 52.5° | 1406.1 | 1366.9 | 1226.1 | 971.3  | 689.7 | 445.5 | 310.1 | 253.1 | 213.9 | 201.4 | 201.4 |
| 55°   | 1548.7 | 1504.1 | 1372.2 | 1080.0 | 757.4 | 481.2 | 322.6 | 253.1 | 213.9 | 199.6 | 199.6 |
| 57.5° | 1689.4 | 1644.9 | 1514.8 | 1190.5 | 821.6 | 509.7 | 331.5 | 253.1 | 210.3 | 196.0 | 196.0 |
| 60°   | 1830.2 | 1789.2 | 1646.7 | 1292.0 | 880.4 | 532.9 | 335.0 | 251.3 | 204.9 | 192.5 | 190.7 |
| 62.5° | 1955.0 | 1917.6 | 1759.0 | 1375.8 | 932.0 | 552.5 | 333.3 | 242.4 | 199.6 | 185.3 | 185.3 |
| 65°   | 2040.5 | 2010.2 | 1842.7 | 1434.6 | 971.3 | 566.7 | 329.7 | 231.7 | 190.7 | 176.4 | 174.6 |
| 67.5° | 2074.4 | 2051.2 | 1883.7 | 1461.3 | 989.1 | 568.5 | 319.0 | 219.2 | 178.2 | 164.0 | 165.7 |
| 70°   | 2042.3 | 2024.5 | 1865.9 | 1447.1 | 978.4 | 552.5 | 301.2 | 203.2 | 164.0 | 151.5 | 151.5 |
| 72.5° | 1930.0 | 1921.1 | 1769.6 | 1379.4 | 928.5 | 518.6 | 274.4 | 181.8 | 147.9 | 135.4 | 137.2 |
| 75°   | 1735.8 | 1735.8 | 1598.6 | 1256.4 | 841.2 | 466.9 | 242.4 | 156.8 | 130.1 | 119.4 | 119.4 |
| 77.5° | 1459.6 | 1466.7 | 1347.3 | 1069.3 | 716.4 | 395.6 | 203.2 | 131.9 | 108.7 | 99.8  | 99.8  |
| 80°   | 1115.6 | 1121.0 | 1030.1 | 837.6  | 561.4 | 311.9 | 156.8 | 101.6 | 83.8  | 76.6  | 78.4  |
| 82.5° | 718.2  | 723.5  | 666.5  | 552.5  | 379.6 | 213.9 | 108.7 | 69.5  | 58.8  | 53.5  | 53.5  |
| 85°   | 283.4  | 292.3  | 267.3  | 224.5  | 174.6 | 106.9 | 55.2  | 35.6  | 33.9  | 28.5  | 26.7  |
| 87.5° | 5.3    | 5.3    | 7.1    | 10.7   | 14.3  | 14.3  | 10.7  | 8.9   | 8.9   | 10.7  | 8.9   |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |



Signify Classified - Internal  
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

(formerly Eaton)

INVUE

Report Number: SP1-2205-670-3

Test Date: 07/01/2022

Luminaire Tested: LXS-VA1-730-U-SYM-A

Data in this report applies to families of products including LXS-VA1-730.

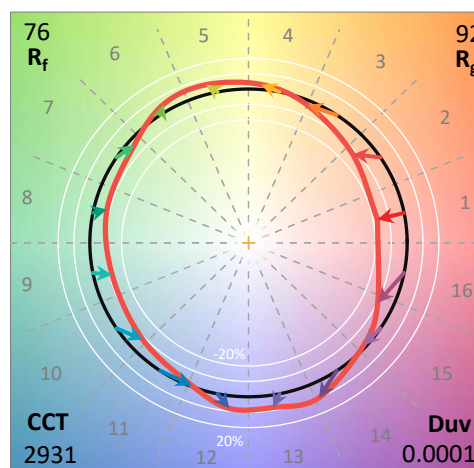
### Test Information

Test Method: LM-79-2019  
 Report Number: SP1-2205-670-3  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 07/01/2022  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: INVUE  
 Catalog Number: **LXS-VA1-730-U-SYM-A**  
 Description: INVUE LUXESCAPE

ARM MOUNT

### Spectral Parameters

|                           |        |           |      |      |       |
|---------------------------|--------|-----------|------|------|-------|
| CCT (K):                  | 2931   | CRI (Ra): | 71.7 |      |       |
| CIE u':                   | 0.2530 | R1:       | 67.7 | R9:  | -37.7 |
| CIE v':                   | 0.5229 | R2:       | 83.8 | R10: | 64.3  |
| Duv:                      | 0.0001 | R3:       | 94.3 | R11: | 62.0  |
| CIE x:                    | 0.4420 | R4:       | 66.3 | R12: | 53.4  |
| CIE y:                    | 0.4060 | R5:       | 67.6 | R13: | 70.9  |
| CIE z:                    | 0.1520 | R6:       | 78.5 | R14: | 97.3  |
| Peak Wavelength (nm):     | 593    | R7:       | 75.4 |      |       |
| Dominant Wavelength (nm): | 583    | R8:       | 39.8 |      |       |
| Purity:                   | 54.7   |           |      |      |       |
| Rf:                       | 76.1   |           |      |      |       |
| Rg:                       | 92.5   |           |      |      |       |



### Test Conditions

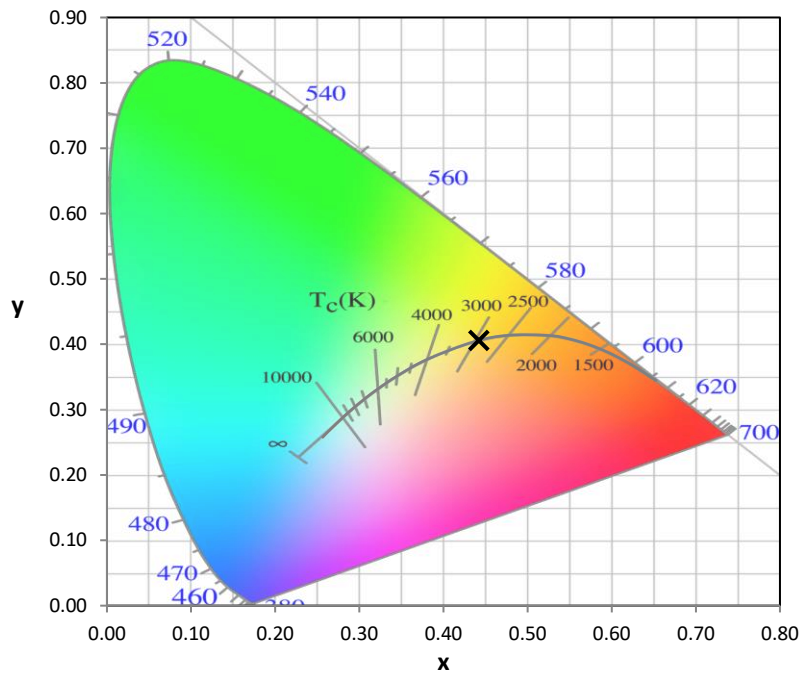
Stabilization Time: 76M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 26.0/60%  
 Sphere Temperature (°C): 25.8

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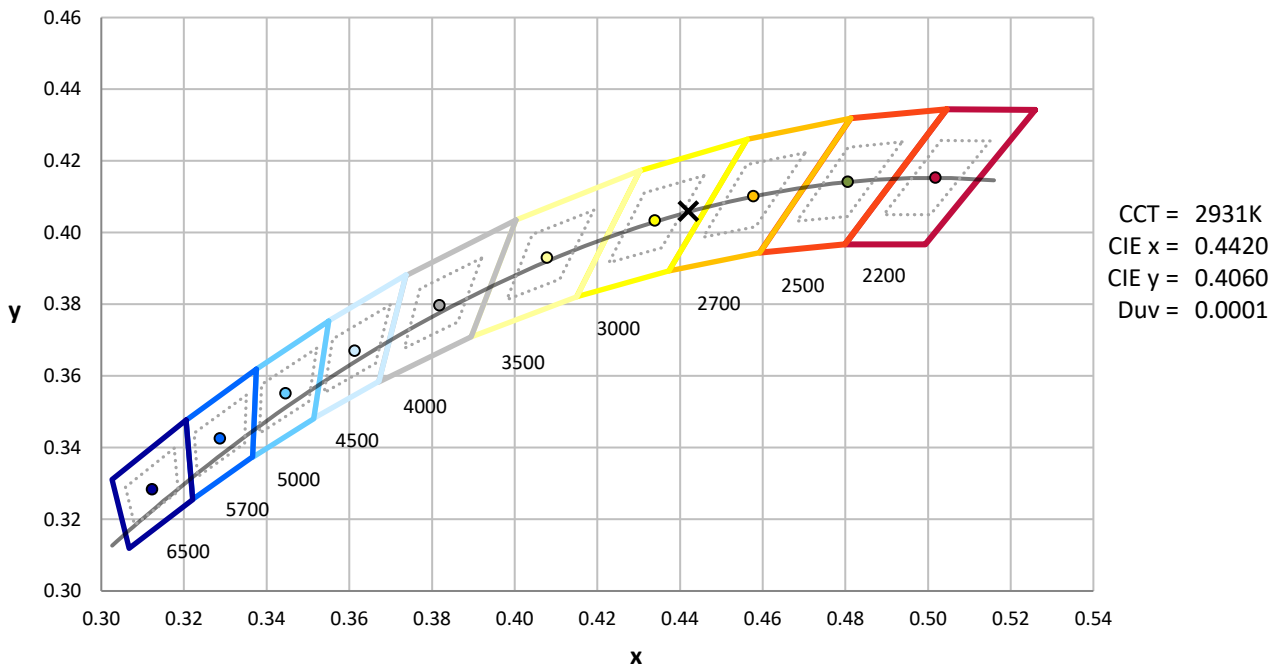
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | 76INCH SPHERE IN0058  | 2/7/2022         | 8/7/2022             |
| Power Meter                    | XITRON 2801 IN0071    | 11/29/2021       | 11/29/2022           |
| AC Power Source                | CHROMA 61603 IN0063   | 11/29/2021       | 11/29/2022           |
| DC Power Source                | AGILENT E3634A IN0208 | 11/29/2021       | 11/29/2022           |
| Sphere Thermometer             | ONSET IN0085          | 11/29/2021       | 11/29/2022           |
| Room Thermometer               | ONSET IN0046          | 11/29/2021       | 11/29/2022           |

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**CIE 1931 Chromaticity Diagram**



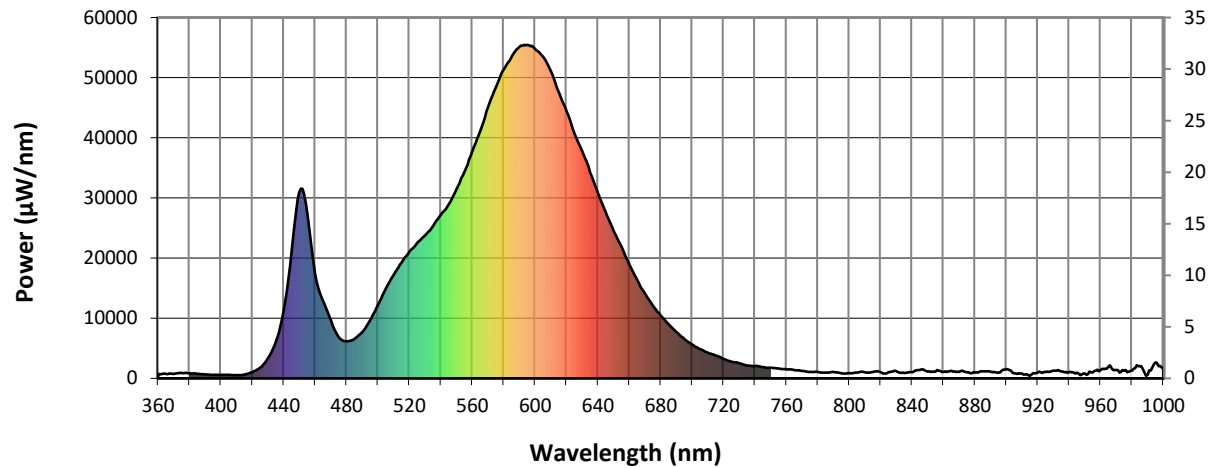
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 3000K 7-step quadrangle

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**Photopic Flux vs. Wavelength**

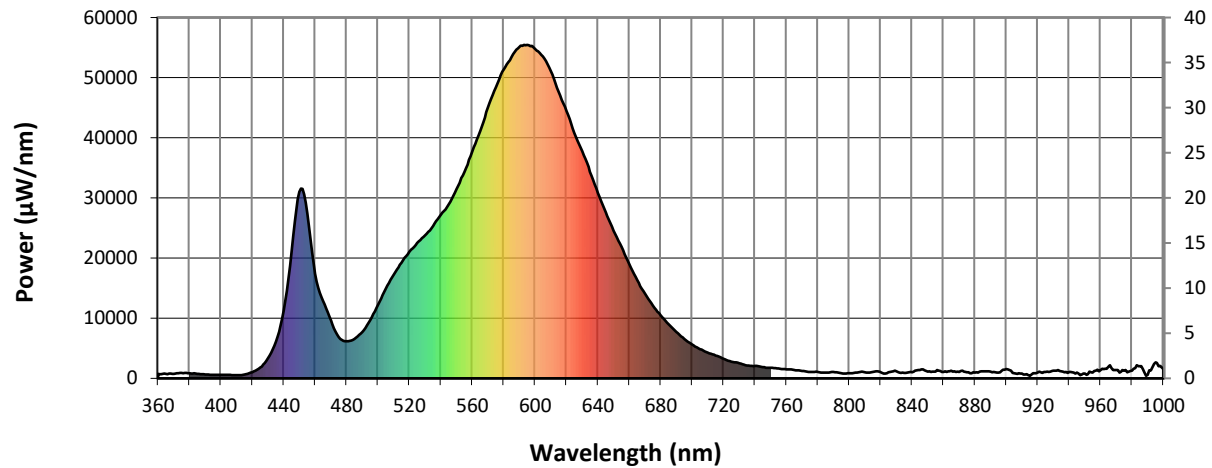


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| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 759              | NR               | 490       | 7726             | NR               | 620       | 44418            | NR               | 750       | 1761             | NR               | 880       | 979              | NR               |
| 365       | 724              | NR               | 495       | 9658             | NR               | 625       | 40836            | NR               | 755       | 1670             | NR               | 885       | 1196             | NR               |
| 370       | 743              | NR               | 500       | 12246            | NR               | 630       | 37768            | NR               | 760       | 1515             | NR               | 890       | 1123             | NR               |
| 375       | 925              | NR               | 505       | 14899            | NR               | 635       | 34326            | NR               | 765       | 1364             | NR               | 895       | 947              | NR               |
| 380       | 837              | NR               | 510       | 17223            | NR               | 640       | 30833            | NR               | 770       | 1232             | NR               | 900       | 1531             | NR               |
| 385       | 766              | NR               | 515       | 19222            | NR               | 645       | 27583            | NR               | 775       | 1086             | NR               | 905       | 875              | NR               |
| 390       | 641              | NR               | 520       | 21080            | NR               | 650       | 24548            | NR               | 780       | 1082             | NR               | 910       | 776              | NR               |
| 395       | 605              | NR               | 525       | 22505            | NR               | 655       | 21894            | NR               | 785       | 966              | NR               | 915       | 422              | NR               |
| 400       | 598              | NR               | 530       | 23799            | NR               | 660       | 19024            | NR               | 790       | 1040             | NR               | 920       | 971              | NR               |
| 405       | 576              | NR               | 535       | 25334            | NR               | 665       | 16327            | NR               | 795       | 840              | NR               | 925       | 1041             | NR               |
| 410       | 529              | NR               | 540       | 27169            | NR               | 670       | 14097            | NR               | 800       | 838              | NR               | 930       | 1265             | NR               |
| 415       | 633              | NR               | 545       | 28947            | NR               | 675       | 12075            | NR               | 805       | 973              | NR               | 935       | 1163             | NR               |
| 420       | 1033             | NR               | 550       | 31471            | NR               | 680       | 10464            | NR               | 810       | 1020             | NR               | 940       | 1076             | NR               |
| 425       | 1791             | NR               | 555       | 34342            | NR               | 685       | 8996             | NR               | 815       | 1067             | NR               | 945       | 966              | NR               |
| 430       | 3342             | NR               | 560       | 37667            | NR               | 690       | 7713             | NR               | 820       | 1016             | NR               | 950       | 777              | NR               |
| 435       | 6130             | NR               | 565       | 41063            | NR               | 695       | 6542             | NR               | 825       | 1001             | NR               | 955       | 950              | NR               |
| 440       | 11205            | NR               | 570       | 45025            | NR               | 700       | 5618             | NR               | 830       | 1180             | NR               | 960       | 1369             | NR               |
| 445       | 21174            | NR               | 575       | 48356            | NR               | 705       | 4869             | NR               | 835       | 923              | NR               | 965       | 1917             | NR               |
| 450       | 31019            | NR               | 580       | 51301            | NR               | 710       | 4264             | NR               | 840       | 1038             | NR               | 970       | 1401             | NR               |
| 455       | 27378            | NR               | 585       | 53409            | NR               | 715       | 3805             | NR               | 845       | 1393             | NR               | 975       | 1291             | NR               |
| 460       | 17416            | NR               | 590       | 55137            | NR               | 720       | 3265             | NR               | 850       | 1114             | NR               | 980       | 1296             | NR               |
| 465       | 12872            | NR               | 595       | 55426            | NR               | 725       | 2772             | NR               | 855       | 1132             | NR               | 985       | 2010             | NR               |
| 470       | 9610             | NR               | 600       | 54778            | NR               | 730       | 2505             | NR               | 860       | 1045             | NR               | 990       | 605              | NR               |
| 475       | 6871             | NR               | 605       | 53509            | NR               | 735       | 2131             | NR               | 865       | 1255             | NR               | 995       | 2672             | NR               |
| 480       | 6151             | NR               | 610       | 51056            | NR               | 740       | 2054             | NR               | 870       | 1093             | NR               | 1000      | 1530             | NR               |
| 485       | 6565             | NR               | 615       | 47700            | NR               | 745       | 1890             | NR               | 875       | 1015             | NR               |           |                  |                  |

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Scotopic Flux vs. Wavelength



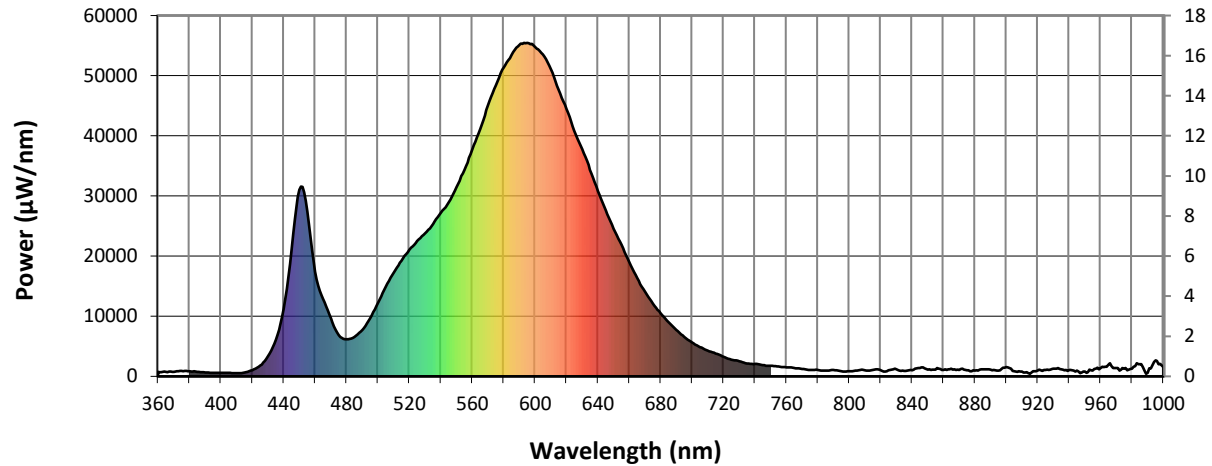
Scotopic Lumens: 3103

S/P: 1.21

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 759              | NR               | 490       | 7726             | NR               | 620       | 44418            | NR               | 750       | 1761             | NR               | 880       | 979              | NR               |
| 365       | 724              | NR               | 495       | 9658             | NR               | 625       | 40836            | NR               | 755       | 1670             | NR               | 885       | 1196             | NR               |
| 370       | 743              | NR               | 500       | 12246            | NR               | 630       | 37768            | NR               | 760       | 1515             | NR               | 890       | 1123             | NR               |
| 375       | 925              | NR               | 505       | 14899            | NR               | 635       | 34326            | NR               | 765       | 1364             | NR               | 895       | 947              | NR               |
| 380       | 837              | NR               | 510       | 17223            | NR               | 640       | 30833            | NR               | 770       | 1232             | NR               | 900       | 1531             | NR               |
| 385       | 766              | NR               | 515       | 19222            | NR               | 645       | 27583            | NR               | 775       | 1086             | NR               | 905       | 875              | NR               |
| 390       | 641              | NR               | 520       | 21080            | NR               | 650       | 24548            | NR               | 780       | 1082             | NR               | 910       | 776              | NR               |
| 395       | 605              | NR               | 525       | 22505            | NR               | 655       | 21894            | NR               | 785       | 966              | NR               | 915       | 422              | NR               |
| 400       | 598              | NR               | 530       | 23799            | NR               | 660       | 19024            | NR               | 790       | 1040             | NR               | 920       | 971              | NR               |
| 405       | 576              | NR               | 535       | 25334            | NR               | 665       | 16327            | NR               | 795       | 840              | NR               | 925       | 1041             | NR               |
| 410       | 529              | NR               | 540       | 27169            | NR               | 670       | 14097            | NR               | 800       | 838              | NR               | 930       | 1265             | NR               |
| 415       | 633              | NR               | 545       | 28947            | NR               | 675       | 12075            | NR               | 805       | 973              | NR               | 935       | 1163             | NR               |
| 420       | 1033             | NR               | 550       | 31471            | NR               | 680       | 10464            | NR               | 810       | 1020             | NR               | 940       | 1076             | NR               |
| 425       | 1791             | NR               | 555       | 34342            | NR               | 685       | 8996             | NR               | 815       | 1067             | NR               | 945       | 966              | NR               |
| 430       | 3342             | NR               | 560       | 37667            | NR               | 690       | 7713             | NR               | 820       | 1016             | NR               | 950       | 777              | NR               |
| 435       | 6130             | NR               | 565       | 41063            | NR               | 695       | 6542             | NR               | 825       | 1001             | NR               | 955       | 950              | NR               |
| 440       | 11205            | NR               | 570       | 45025            | NR               | 700       | 5618             | NR               | 830       | 1180             | NR               | 960       | 1369             | NR               |
| 445       | 21174            | NR               | 575       | 48356            | NR               | 705       | 4869             | NR               | 835       | 923              | NR               | 965       | 1917             | NR               |
| 450       | 31019            | NR               | 580       | 51301            | NR               | 710       | 4264             | NR               | 840       | 1038             | NR               | 970       | 1401             | NR               |
| 455       | 27378            | NR               | 585       | 53409            | NR               | 715       | 3805             | NR               | 845       | 1393             | NR               | 975       | 1291             | NR               |
| 460       | 17416            | NR               | 590       | 55137            | NR               | 720       | 3265             | NR               | 850       | 1114             | NR               | 980       | 1296             | NR               |
| 465       | 12872            | NR               | 595       | 55426            | NR               | 725       | 2772             | NR               | 855       | 1132             | NR               | 985       | 2010             | NR               |
| 470       | 9610             | NR               | 600       | 54778            | NR               | 730       | 2505             | NR               | 860       | 1045             | NR               | 990       | 605              | NR               |
| 475       | 6871             | NR               | 605       | 53509            | NR               | 735       | 2131             | NR               | 865       | 1255             | NR               | 995       | 2672             | NR               |
| 480       | 6151             | NR               | 610       | 51056            | NR               | 740       | 2054             | NR               | 870       | 1093             | NR               | 1000      | 1530             | NR               |
| 485       | 6565             | NR               | 615       | 47700            | NR               | 745       | 1890             | NR               | 875       | 1015             | NR               |           |                  |                  |

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**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 1136.3 S/P: 0.44**

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 759              | NR               | 490       | 7726             | NR               | 620       | 44418            | NR               | 750       | 1761             | NR               | 880       | 979              | NR               |
| 365       | 724              | NR               | 495       | 9658             | NR               | 625       | 40836            | NR               | 755       | 1670             | NR               | 885       | 1196             | NR               |
| 370       | 743              | NR               | 500       | 12246            | NR               | 630       | 37768            | NR               | 760       | 1515             | NR               | 890       | 1123             | NR               |
| 375       | 925              | NR               | 505       | 14899            | NR               | 635       | 34326            | NR               | 765       | 1364             | NR               | 895       | 947              | NR               |
| 380       | 837              | NR               | 510       | 17223            | NR               | 640       | 30833            | NR               | 770       | 1232             | NR               | 900       | 1531             | NR               |
| 385       | 766              | NR               | 515       | 19222            | NR               | 645       | 27583            | NR               | 775       | 1086             | NR               | 905       | 875              | NR               |
| 390       | 641              | NR               | 520       | 21080            | NR               | 650       | 24548            | NR               | 780       | 1082             | NR               | 910       | 776              | NR               |
| 395       | 605              | NR               | 525       | 22505            | NR               | 655       | 21894            | NR               | 785       | 966              | NR               | 915       | 422              | NR               |
| 400       | 598              | NR               | 530       | 23799            | NR               | 660       | 19024            | NR               | 790       | 1040             | NR               | 920       | 971              | NR               |
| 405       | 576              | NR               | 535       | 25334            | NR               | 665       | 16327            | NR               | 795       | 840              | NR               | 925       | 1041             | NR               |
| 410       | 529              | NR               | 540       | 27169            | NR               | 670       | 14097            | NR               | 800       | 838              | NR               | 930       | 1265             | NR               |
| 415       | 633              | NR               | 545       | 28947            | NR               | 675       | 12075            | NR               | 805       | 973              | NR               | 935       | 1163             | NR               |
| 420       | 1033             | NR               | 550       | 31471            | NR               | 680       | 10464            | NR               | 810       | 1020             | NR               | 940       | 1076             | NR               |
| 425       | 1791             | NR               | 555       | 34342            | NR               | 685       | 8996             | NR               | 815       | 1067             | NR               | 945       | 966              | NR               |
| 430       | 3342             | NR               | 560       | 37667            | NR               | 690       | 7713             | NR               | 820       | 1016             | NR               | 950       | 777              | NR               |
| 435       | 6130             | NR               | 565       | 41063            | NR               | 695       | 6542             | NR               | 825       | 1001             | NR               | 955       | 950              | NR               |
| 440       | 11205            | NR               | 570       | 45025            | NR               | 700       | 5618             | NR               | 830       | 1180             | NR               | 960       | 1369             | NR               |
| 445       | 21174            | NR               | 575       | 48356            | NR               | 705       | 4869             | NR               | 835       | 923              | NR               | 965       | 1917             | NR               |
| 450       | 31019            | NR               | 580       | 51301            | NR               | 710       | 4264             | NR               | 840       | 1038             | NR               | 970       | 1401             | NR               |
| 455       | 27378            | NR               | 585       | 53409            | NR               | 715       | 3805             | NR               | 845       | 1393             | NR               | 975       | 1291             | NR               |
| 460       | 17416            | NR               | 590       | 55137            | NR               | 720       | 3265             | NR               | 850       | 1114             | NR               | 980       | 1296             | NR               |
| 465       | 12872            | NR               | 595       | 55426            | NR               | 725       | 2772             | NR               | 855       | 1132             | NR               | 985       | 2010             | NR               |
| 470       | 9610             | NR               | 600       | 54778            | NR               | 730       | 2505             | NR               | 860       | 1045             | NR               | 990       | 605              | NR               |
| 475       | 6871             | NR               | 605       | 53509            | NR               | 735       | 2131             | NR               | 865       | 1255             | NR               | 995       | 2672             | NR               |
| 480       | 6151             | NR               | 610       | 51056            | NR               | 740       | 2054             | NR               | 870       | 1093             | NR               | 1000      | 1530             | NR               |
| 485       | 6565             | NR               | 615       | 47700            | NR               | 745       | 1890             | NR               | 875       | 1015             | NR               |           |                  |                  |

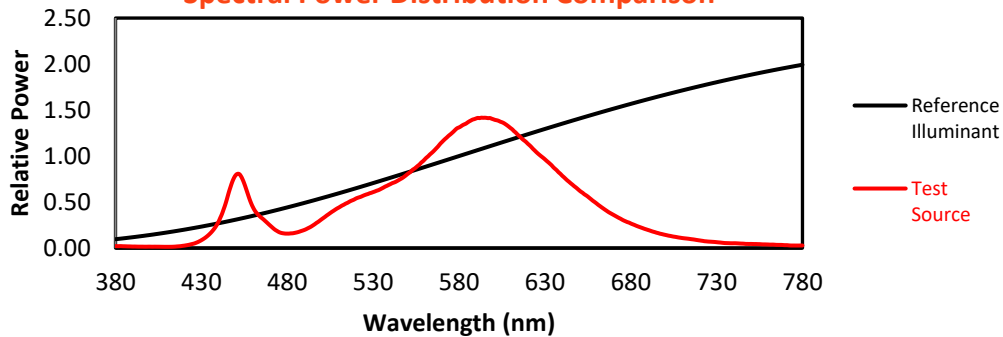
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**TM-30-18**

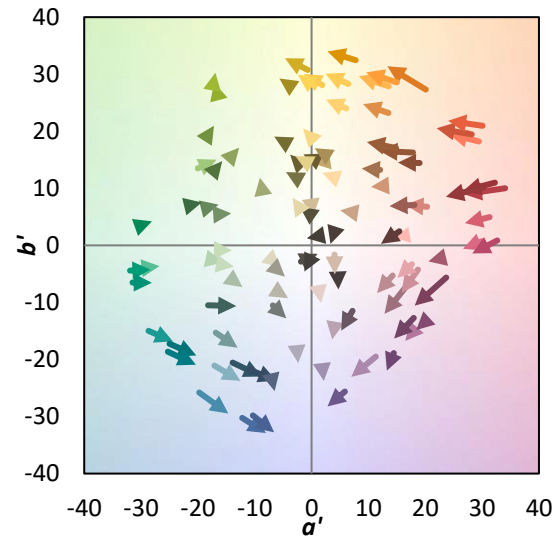
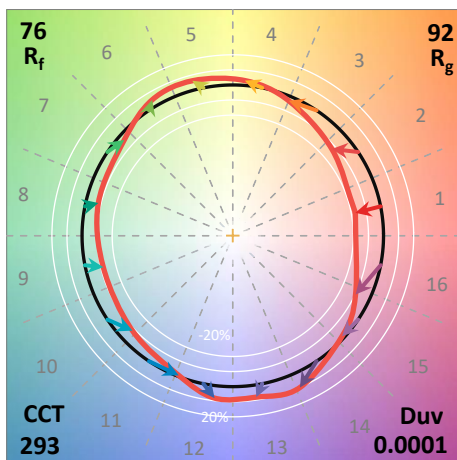
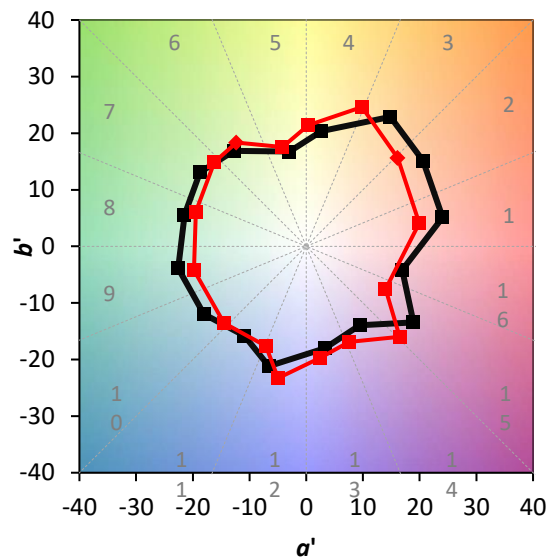
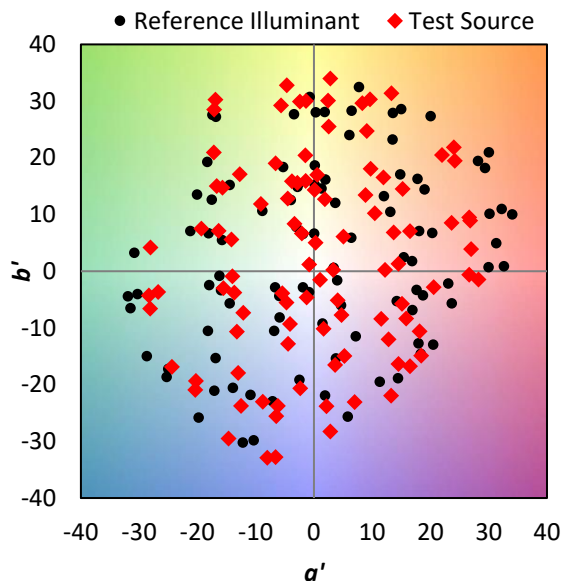
**Summary**

$R_f = 76.1$   
 $R_g = 92.5$   
 CIE  $R_a = 71.7$   
 $R_g = -37.7$

**Spectral Power Distribution Comparison**



**Color Vector Graphics**



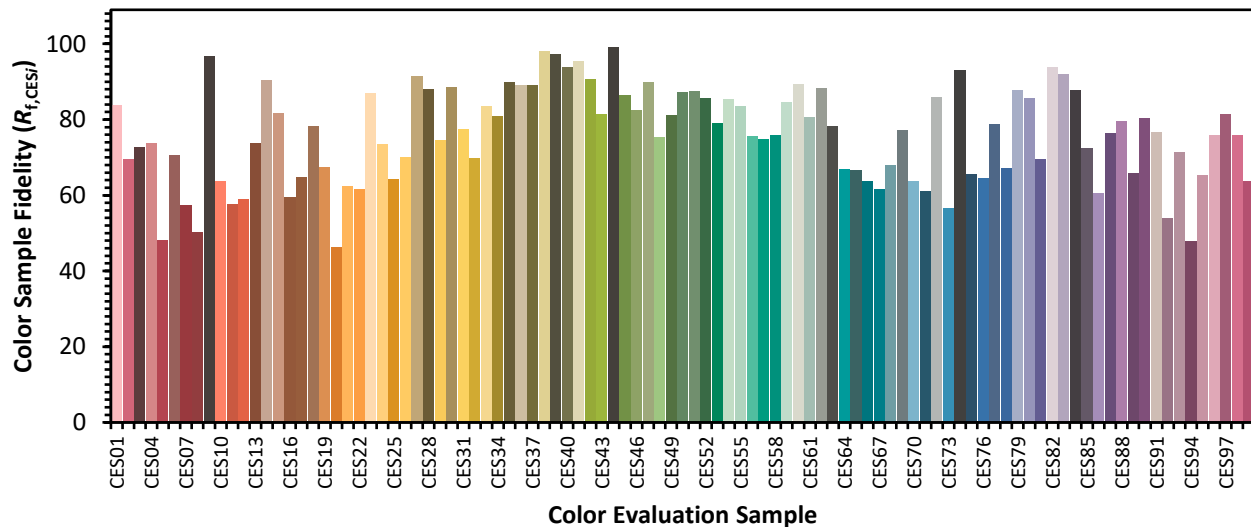


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Individual Sample Fidelity Index ( $R_{f,i}$ )

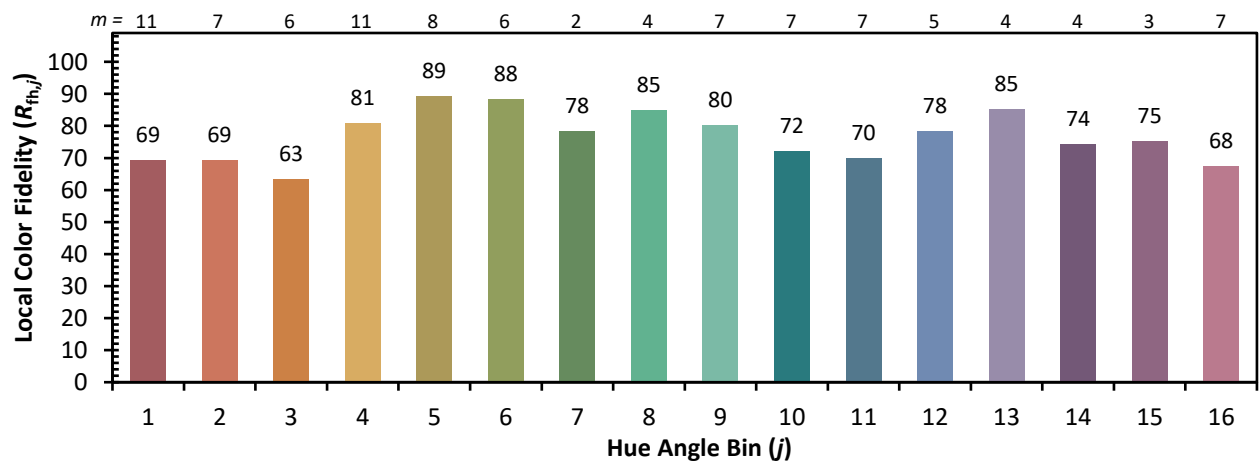
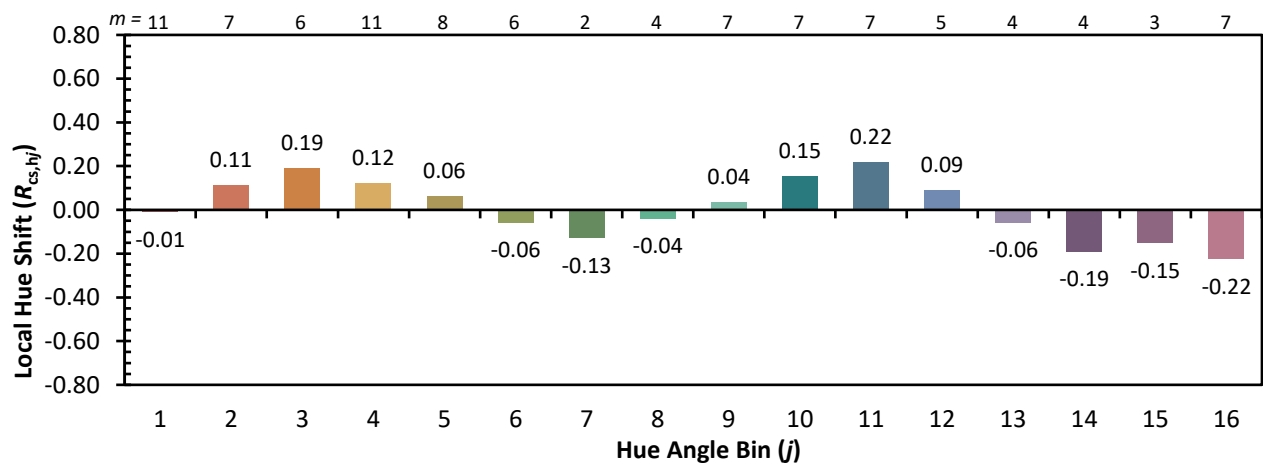
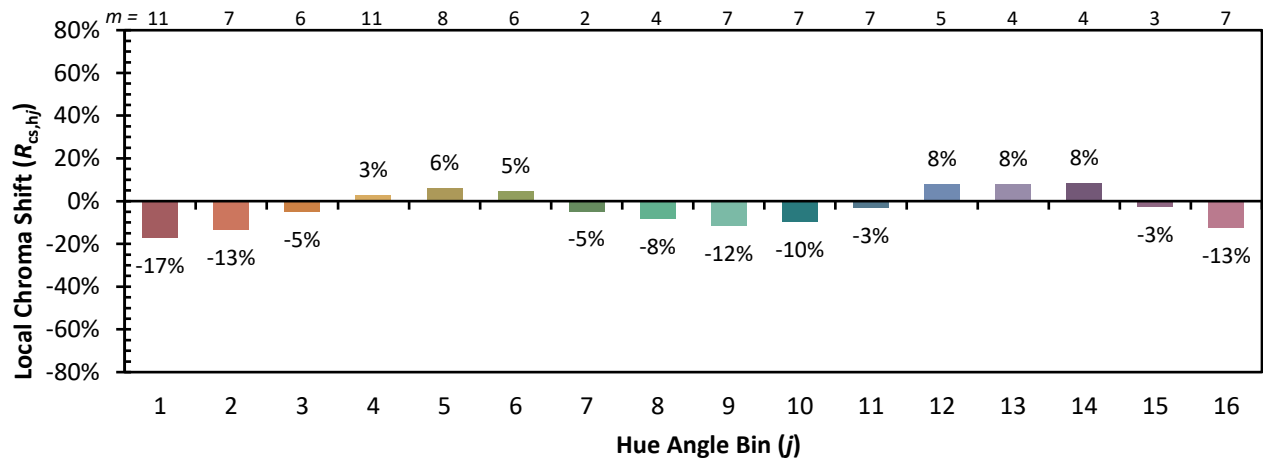
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|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 70 | CES51 = 88 | CES76 = 65 |
| CES02 = 63 | CES27 = 92 | CES52 = 86 | CES77 = 79 |
| CES03 = 31 | CES28 = 88 | CES53 = 79 | CES78 = 67 |
| CES04 = 71 | CES29 = 75 | CES54 = 85 | CES79 = 88 |
| CES05 = 49 | CES30 = 89 | CES55 = 83 | CES80 = 86 |
| CES06 = 51 | CES31 = 77 | CES56 = 76 | CES81 = 69 |
| CES07 = 41 | CES32 = 70 | CES57 = 75 | CES82 = 94 |
| CES08 = 40 | CES33 = 84 | CES58 = 76 | CES83 = 92 |
| CES09 = 29 | CES34 = 81 | CES59 = 85 | CES84 = 88 |
| CES10 = 76 | CES35 = 90 | CES60 = 89 | CES85 = 72 |
| CES11 = 59 | CES36 = 89 | CES61 = 81 | CES86 = 60 |
| CES12 = 65 | CES37 = 89 | CES62 = 88 | CES87 = 76 |
| CES13 = 43 | CES38 = 98 | CES63 = 78 | CES88 = 80 |
| CES14 = 74 | CES39 = 97 | CES64 = 67 | CES89 = 66 |
| CES15 = 71 | CES40 = 94 | CES65 = 67 | CES90 = 80 |
| CES16 = 47 | CES41 = 95 | CES66 = 64 | CES91 = 77 |
| CES17 = 50 | CES42 = 91 | CES67 = 62 | CES92 = 54 |
| CES18 = 56 | CES43 = 81 | CES68 = 68 | CES93 = 72 |
| CES19 = 73 | CES44 = 99 | CES69 = 77 | CES94 = 48 |
| CES20 = 66 | CES45 = 86 | CES70 = 64 | CES95 = 65 |
| CES21 = 87 | CES46 = 83 | CES71 = 61 | CES96 = 76 |
| CES22 = 79 | CES47 = 90 | CES72 = 86 | CES97 = 81 |
| CES23 = 92 | CES48 = 75 | CES73 = 57 | CES98 = 76 |
| CES24 = 91 | CES49 = 81 | CES74 = 93 | CES99 = 64 |
| CES25 = 73 | CES50 = 87 | CES75 = 66 |            |



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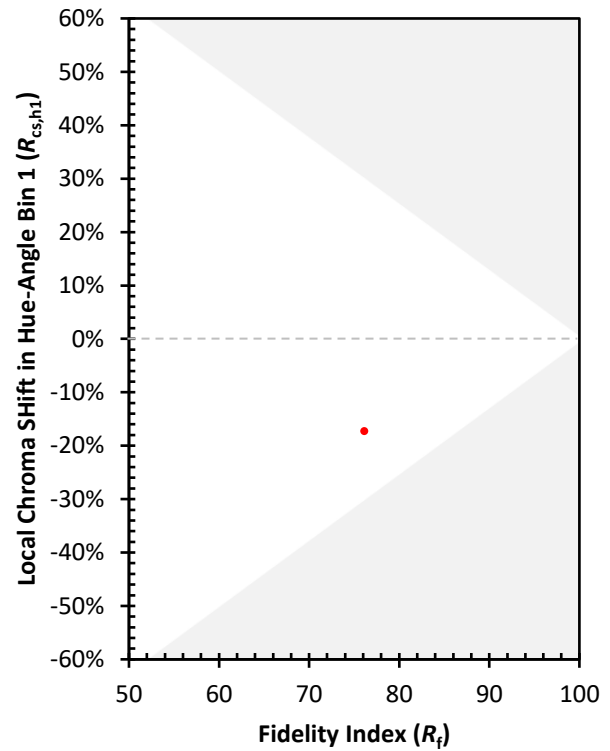
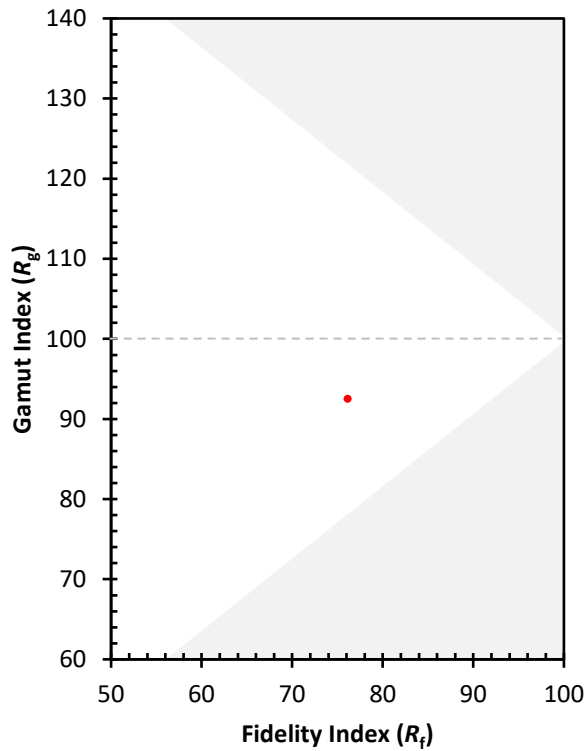
**Color Rendition by Hue-Angle Bin**



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**Measure Comparisons**



(END OF REPORT)