

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: G2-2108-353-10

Luminaire Tested: **LXS-VA1-AMB-U-ASW-S**

Test Date: 9/27/2021

**Test Information**

Test Method: LM-79-08  
Report Number: G2-2108-353-10  
Test Lab: COOPER LIGHTING SOLUTIONS  
Test Date: 9/27/2021  
Issue Date: 9/27/2021  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: INVUE  
Catalog Number: LXS-VA1-AMB-U-ASW-S  
Description: LUXESCAPE OUTDOOR ARCHITECTURAL LUMINAIRE  
NARROW BAND AMBER LEDS AND TYPE III OPTIC, SPIDER MOUNT  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 844.8 lumens  
Efficiency: N/A  
Efficacy: 24.8 lumens/watt  
Luminous Opening: Circular (Dia: 1.67' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B0 - U0 - G1

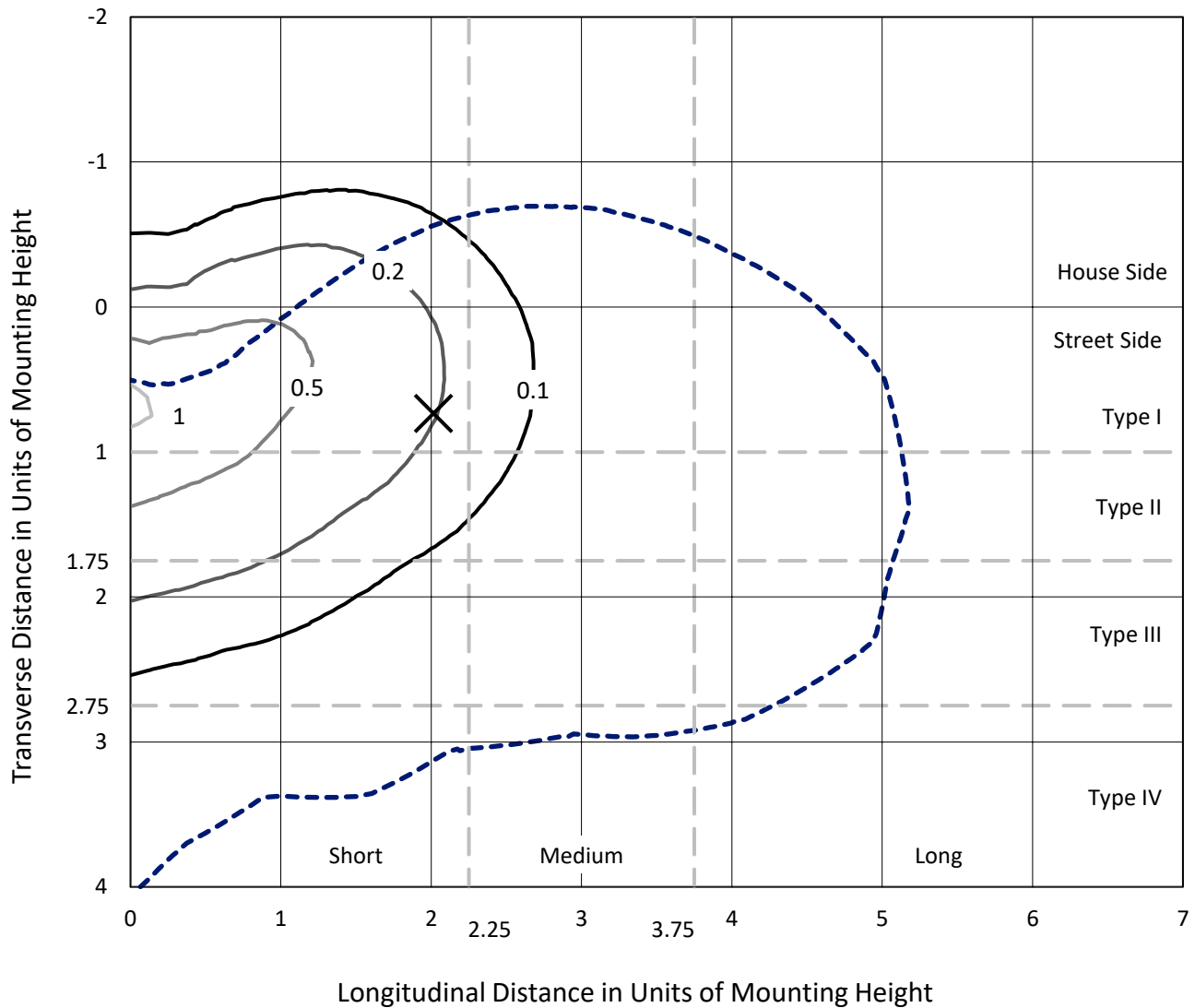
Input Watts (W): 34  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT



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## Iso-Footcandle Lines of Horizontal Illumination

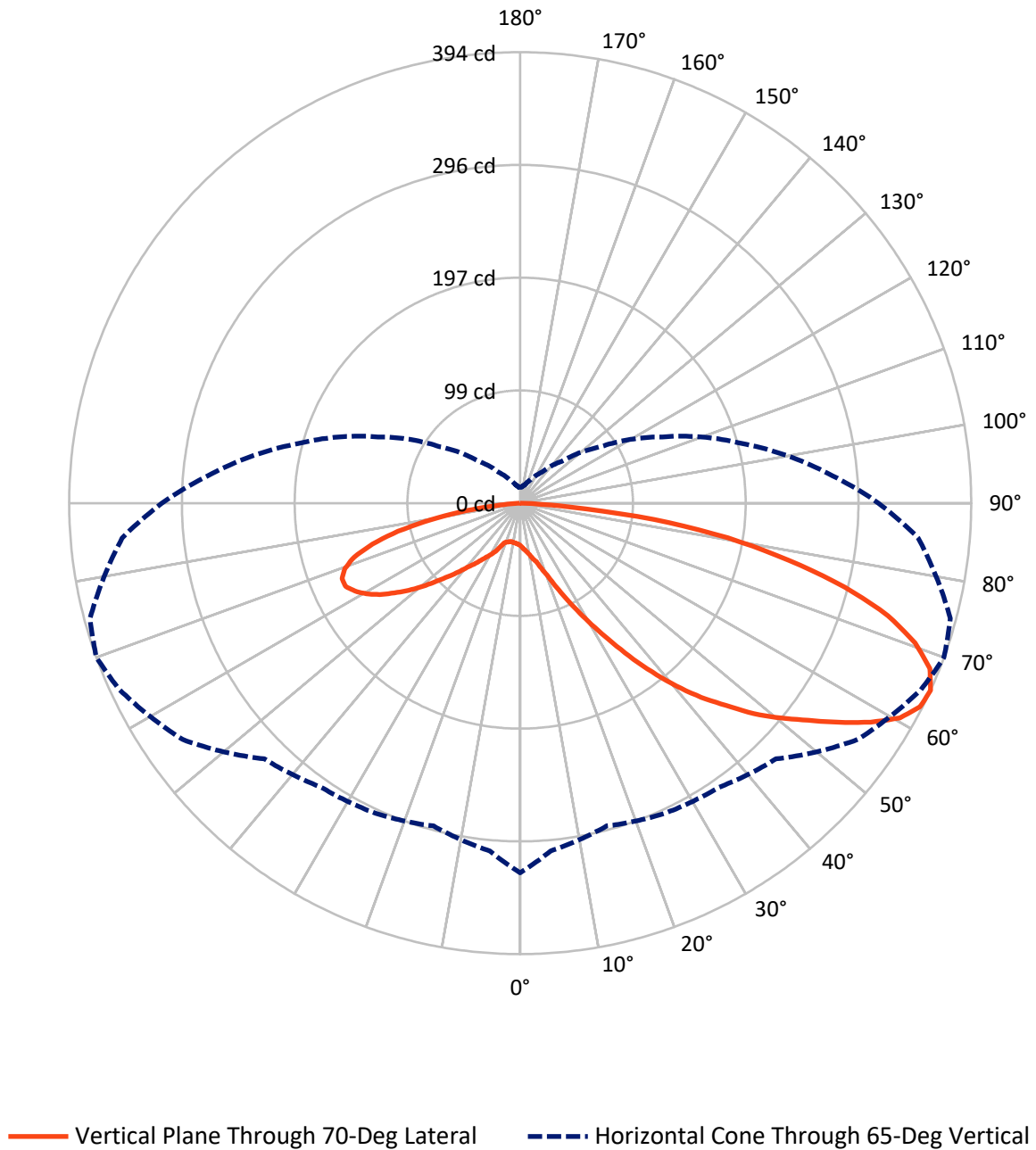
✕ Max cd  
 - - - 1/2 Max cd



Based on 12 foot mounting height. Maximum calculated value = 1.1 fc  
 Type IV - Short - N/A

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## Luminous Intensity Polar Plot



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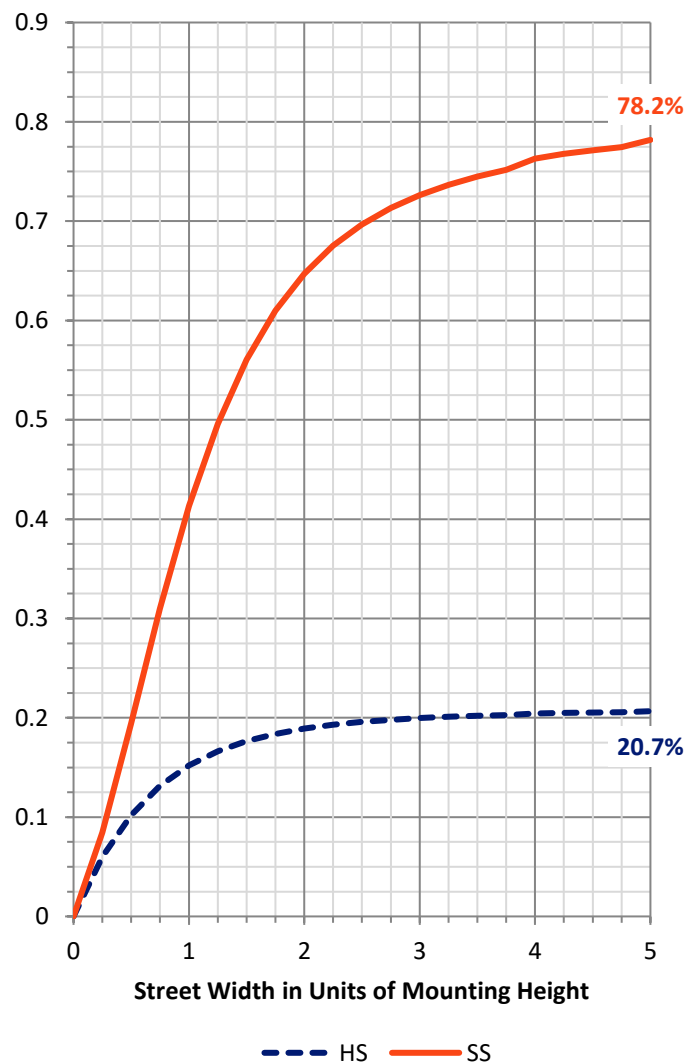
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total |
|--------------------|-----------|----------|--------|-------|
| <b>House Side</b>  | Lumens    | 176.1    | 0.0    | 176.1 |
|                    | % Fixture | 20.8     | 0.0    | 20.8  |
| <b>Street Side</b> | Lumens    | 668.7    | 0.0    | 668.7 |
|                    | % Fixture | 79.2     | 0.0    | 79.2  |
| <b>Total</b>       | Lumens    | 844.8    | 0.0    | 844.8 |
|                    | % Fixture | 100.0    | 0.0    | 100.0 |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 3.8    | 0.5       |
| 10°-20°   | 14.7   | 1.7       |
| 20°-30°   | 37.8   | 4.5       |
| 30°-40°   | 77.4   | 9.2       |
| 40°-50°   | 126.2  | 14.9      |
| 50°-60°   | 179.5  | 21.3      |
| 60°-70°   | 208.3  | 24.7      |
| 70°-80°   | 159.0  | 18.8      |
| 80°-90°   | 38.0   | 4.5       |
| 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°    | 844.8  | 100.0     |
| 0°-180°   | 844.8  | 100.0     |

**Coefficient of Utilization**



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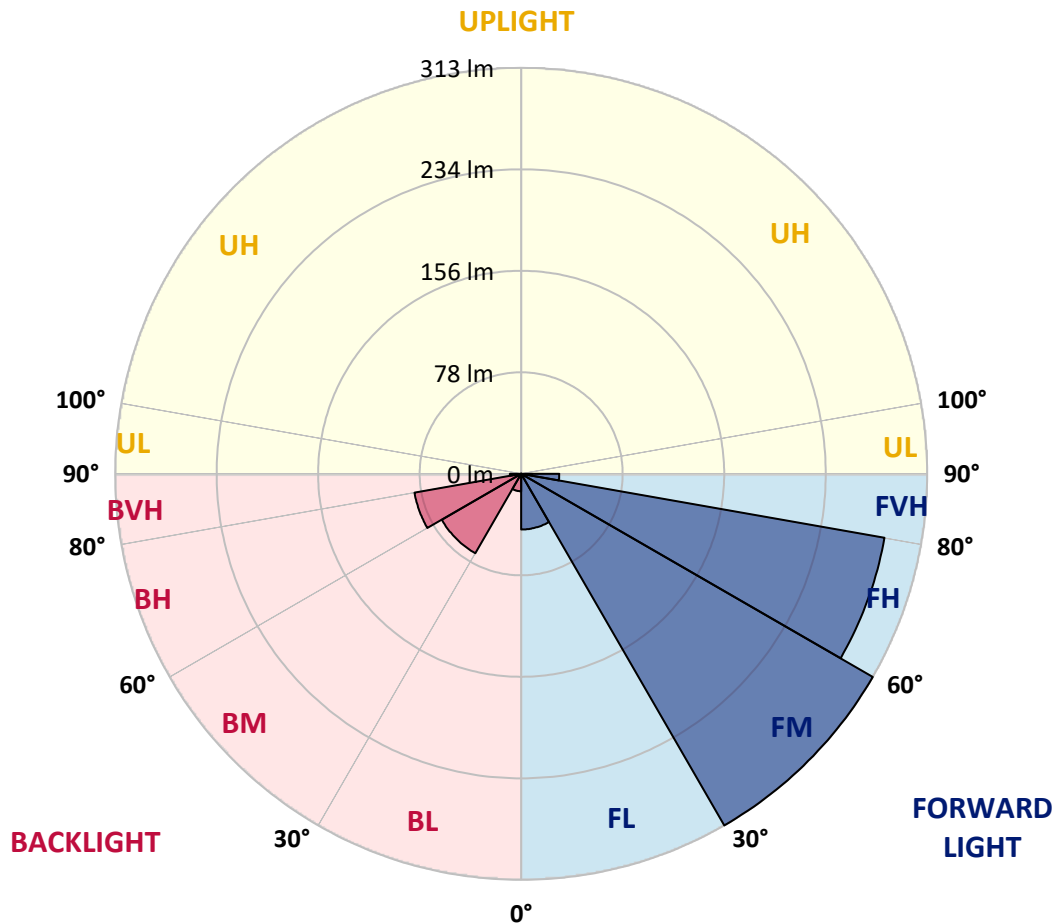
CATALOG NUMBER: LXS-VA1-AMB-U-ASW-S

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |        |
|------|-------------|--------|-----------|-------------------------|------|--------|
|      |             |        |           | B                       | U    | G      |
| FL   | (0°-30°)    | 42.9   | 5.1       |                         |      |        |
| FM   | (30°-60°)   | 312.5  | 37.0      |                         |      |        |
| FH   | (60°-80°)   | 284.0  | 33.6      |                         |      | G0/660 |
| FVH  | (80°-90°)   | 29.4   | 3.5       |                         |      | G1/100 |
| BL   | (0°-30°)    | 13.4   | 1.6       | B0/110                  |      |        |
| BM   | (30°-60°)   | 70.6   | 8.4       | B0/220                  |      |        |
| BH   | (60°-80°)   | 83.4   | 9.9       | B0/110                  |      | G0/110 |
| BVH  | (80°-90°)   | 8.7    | 1.0       |                         |      | G0/10  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |        |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |        |

**BUG Rating: B0-U0-G1**

Type IV Short



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°  | 5°  | 15° | 25° | 35° | 45° | 55° | 65° | 70° | 75° | 85° |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0°    | 37  | 37  | 37  | 37  | 37  | 37  | 37  | 37  | 37  | 37  | 37  |
| 2.5°  | 43  | 42  | 42  | 42  | 42  | 41  | 40  | 40  | 39  | 39  | 38  |
| 5°    | 48  | 48  | 47  | 47  | 46  | 45  | 43  | 42  | 41  | 41  | 39  |
| 7.5°  | 55  | 55  | 54  | 52  | 50  | 48  | 46  | 44  | 43  | 43  | 40  |
| 10°   | 64  | 64  | 62  | 59  | 56  | 53  | 50  | 47  | 46  | 45  | 42  |
| 12.5° | 75  | 75  | 72  | 67  | 62  | 59  | 55  | 52  | 50  | 48  | 44  |
| 15°   | 93  | 91  | 84  | 77  | 72  | 67  | 62  | 56  | 53  | 50  | 45  |
| 17.5° | 121 | 119 | 108 | 96  | 89  | 81  | 73  | 64  | 60  | 56  | 48  |
| 20°   | 143 | 141 | 130 | 120 | 110 | 100 | 86  | 73  | 67  | 62  | 53  |
| 22.5° | 159 | 157 | 147 | 140 | 131 | 120 | 103 | 85  | 78  | 70  | 59  |
| 25°   | 179 | 175 | 164 | 158 | 149 | 140 | 121 | 99  | 91  | 81  | 68  |
| 27.5° | 203 | 199 | 181 | 174 | 167 | 158 | 140 | 115 | 106 | 95  | 78  |
| 30°   | 230 | 222 | 202 | 191 | 185 | 175 | 156 | 133 | 123 | 110 | 89  |
| 32.5° | 264 | 255 | 228 | 210 | 204 | 192 | 174 | 152 | 142 | 129 | 102 |
| 35°   | 294 | 283 | 259 | 233 | 226 | 209 | 192 | 174 | 164 | 148 | 118 |
| 37.5° | 309 | 298 | 281 | 255 | 245 | 226 | 210 | 195 | 187 | 169 | 136 |
| 40°   | 318 | 308 | 291 | 273 | 263 | 243 | 227 | 217 | 210 | 192 | 156 |
| 42.5° | 323 | 312 | 296 | 282 | 277 | 258 | 242 | 238 | 232 | 215 | 177 |
| 45°   | 325 | 314 | 299 | 287 | 287 | 272 | 257 | 257 | 252 | 238 | 198 |
| 47.5° | 326 | 314 | 302 | 294 | 295 | 283 | 274 | 278 | 275 | 260 | 219 |
| 50°   | 339 | 326 | 309 | 303 | 305 | 296 | 290 | 298 | 295 | 284 | 240 |
| 52.5° | 344 | 330 | 314 | 309 | 316 | 310 | 310 | 319 | 315 | 305 | 262 |
| 55°   | 361 | 345 | 325 | 317 | 324 | 321 | 330 | 342 | 338 | 328 | 285 |
| 57.5° | 362 | 345 | 327 | 323 | 329 | 328 | 348 | 362 | 361 | 351 | 306 |
| 60°   | 354 | 337 | 321 | 320 | 326 | 330 | 359 | 378 | 381 | 371 | 325 |
| 62.5° | 340 | 322 | 309 | 311 | 318 | 326 | 364 | 386 | 392 | 385 | 341 |
| 65°   | 323 | 305 | 292 | 299 | 303 | 316 | 360 | 386 | 394 | 389 | 349 |
| 67.5° | 302 | 284 | 269 | 281 | 284 | 300 | 349 | 377 | 386 | 383 | 347 |
| 70°   | 276 | 256 | 243 | 255 | 259 | 276 | 328 | 359 | 366 | 366 | 334 |
| 72.5° | 244 | 226 | 215 | 227 | 229 | 249 | 300 | 330 | 336 | 337 | 309 |
| 75°   | 213 | 197 | 184 | 196 | 196 | 218 | 263 | 292 | 293 | 297 | 271 |
| 77.5° | 178 | 163 | 152 | 161 | 163 | 182 | 219 | 244 | 240 | 243 | 224 |
| 80°   | 135 | 126 | 116 | 123 | 124 | 140 | 169 | 188 | 184 | 183 | 168 |
| 82.5° | 96  | 86  | 78  | 82  | 83  | 95  | 114 | 125 | 118 | 115 | 104 |
| 85°   | 42  | 41  | 36  | 39  | 40  | 47  | 51  | 52  | 43  | 44  | 40  |
| 87.5° | 1   | 1   | 1   | 1   | 2   | 2   | 2   | 2   | 2   | 2   | 1   |
| 90°   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   |

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CATALOG NUMBER: LXS-VA1-AMB-U-ASW-S

**CANDELA DISTRIBUTION (continued):**

|       | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|-------|-----|-----|------|------|------|------|------|------|------|------|------|
| 0°    | 37  | 37  | 37   | 37   | 37   | 37   | 37   | 37   | 37   | 37   | 37   |
| 2.5°  | 38  | 37  | 36   | 36   | 35   | 34   | 34   | 34   | 33   | 33   | 33   |
| 5°    | 38  | 37  | 36   | 35   | 34   | 33   | 32   | 32   | 31   | 31   | 31   |
| 7.5°  | 39  | 38  | 36   | 34   | 33   | 32   | 31   | 30   | 29   | 29   | 29   |
| 10°   | 40  | 39  | 36   | 34   | 32   | 31   | 29   | 28   | 28   | 27   | 27   |
| 12.5° | 42  | 40  | 36   | 33   | 31   | 30   | 28   | 27   | 26   | 26   | 26   |
| 15°   | 43  | 41  | 36   | 33   | 31   | 28   | 27   | 26   | 25   | 25   | 25   |
| 17.5° | 45  | 42  | 37   | 34   | 30   | 28   | 26   | 25   | 24   | 24   | 24   |
| 20°   | 49  | 45  | 38   | 34   | 30   | 28   | 26   | 24   | 23   | 23   | 23   |
| 22.5° | 54  | 49  | 41   | 34   | 30   | 27   | 25   | 23   | 22   | 22   | 22   |
| 25°   | 61  | 56  | 46   | 38   | 31   | 27   | 25   | 23   | 21   | 21   | 21   |
| 27.5° | 70  | 62  | 52   | 42   | 34   | 28   | 24   | 22   | 21   | 20   | 20   |
| 30°   | 79  | 70  | 57   | 46   | 37   | 29   | 24   | 21   | 20   | 19   | 19   |
| 32.5° | 90  | 79  | 62   | 49   | 39   | 30   | 24   | 21   | 19   | 19   | 19   |
| 35°   | 104 | 90  | 68   | 53   | 42   | 32   | 24   | 20   | 19   | 18   | 18   |
| 37.5° | 119 | 102 | 76   | 57   | 44   | 33   | 25   | 20   | 19   | 18   | 18   |
| 40°   | 136 | 116 | 84   | 61   | 46   | 35   | 26   | 20   | 18   | 18   | 18   |
| 42.5° | 155 | 132 | 95   | 67   | 49   | 37   | 28   | 21   | 18   | 18   | 18   |
| 45°   | 174 | 150 | 106  | 74   | 53   | 39   | 29   | 21   | 18   | 17   | 17   |
| 47.5° | 194 | 168 | 119  | 81   | 57   | 41   | 30   | 22   | 18   | 17   | 17   |
| 50°   | 213 | 186 | 134  | 90   | 61   | 43   | 31   | 23   | 18   | 17   | 17   |
| 52.5° | 233 | 204 | 148  | 99   | 66   | 45   | 32   | 23   | 18   | 17   | 17   |
| 55°   | 252 | 221 | 161  | 109  | 71   | 47   | 33   | 24   | 18   | 16   | 16   |
| 57.5° | 272 | 237 | 175  | 118  | 75   | 49   | 33   | 24   | 18   | 16   | 16   |
| 60°   | 291 | 253 | 186  | 126  | 80   | 51   | 33   | 24   | 18   | 15   | 15   |
| 62.5° | 305 | 267 | 195  | 132  | 84   | 52   | 33   | 23   | 18   | 15   | 14   |
| 65°   | 313 | 274 | 201  | 137  | 86   | 52   | 33   | 23   | 17   | 14   | 14   |
| 67.5° | 312 | 274 | 201  | 137  | 86   | 51   | 32   | 21   | 16   | 13   | 13   |
| 70°   | 302 | 264 | 194  | 133  | 83   | 49   | 30   | 20   | 15   | 12   | 11   |
| 72.5° | 278 | 244 | 180  | 125  | 78   | 46   | 27   | 18   | 14   | 11   | 11   |
| 75°   | 244 | 213 | 157  | 111  | 70   | 41   | 24   | 16   | 12   | 10   | 10   |
| 77.5° | 200 | 176 | 128  | 91   | 58   | 34   | 20   | 14   | 11   | 9    | 9    |
| 80°   | 145 | 128 | 92   | 67   | 44   | 26   | 16   | 11   | 9    | 7    | 7    |
| 82.5° | 87  | 76  | 55   | 41   | 28   | 18   | 11   | 8    | 7    | 6    | 6    |
| 85°   | 31  | 25  | 19   | 16   | 12   | 8    | 6    | 5    | 5    | 4    | 4    |
| 87.5° | 1   | 1   | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    |
| 90°   | 0   | 0   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |



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



LM-79-08: Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

INVUE

Report Number: SP1-2201-507-1

Luminaire Tested: ARB-B1-LED-D1-T2-AMB

Test Date: 01/21/2022

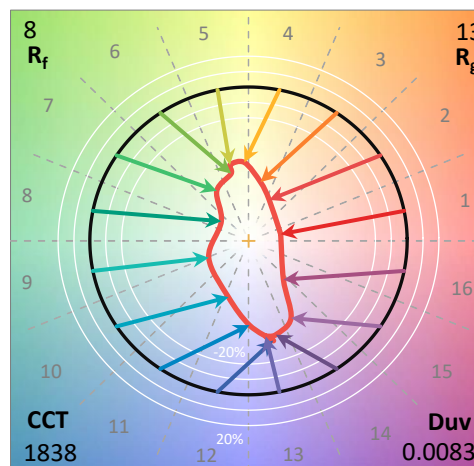
### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2201-507-1  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 01/21/2022  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: INVUE  
 Catalog Number: **ARB-B1-LED-D1-T2-AMB**  
 Description: INVUE ARBOR AMBER

TESTED IN SITU. ARBOR OUTDOOR ARCHITECTURAL POST TOP. NARROW BAND AMBER LEDS AND TYPE II OPTIC, GRAPHITE METALLIC PAINTED FINISH. EACH LED BOARD AT 500MA.

### Spectral Parameters

|                           |        |           |        |      |        |
|---------------------------|--------|-----------|--------|------|--------|
| CCT (K):                  | 1838   | CRI (Ra): | -25.2  |      |        |
| CIE u':                   | 0.3190 | R1:       | -44.1  | R9:  | -415.1 |
| CIE v':                   | 0.5510 | R2:       | 45.5   | R10: | 16.1   |
| Duv:                      | 0.0083 | R3:       | 23.9   | R11: | -105.6 |
| CIE x:                    | 0.5632 | R4:       | -72.5  | R12: | -27.5  |
| CIE y:                    | 0.4323 | R5:       | -46.4  | R13: | -25.8  |
| CIE z:                    | 0.0045 | R6:       | 27.4   | R14: | 48.6   |
| Peak Wavelength (nm):     | 591    | R7:       | -2.2   |      |        |
| Dominant Wavelength (nm): | 588    | R8:       | -133.0 |      |        |
| Purity:                   | 99.4   |           |        |      |        |
| Rf:                       | 8      |           |        |      |        |
| Rg:                       | 12.7   |           |        |      |        |



### Test Conditions

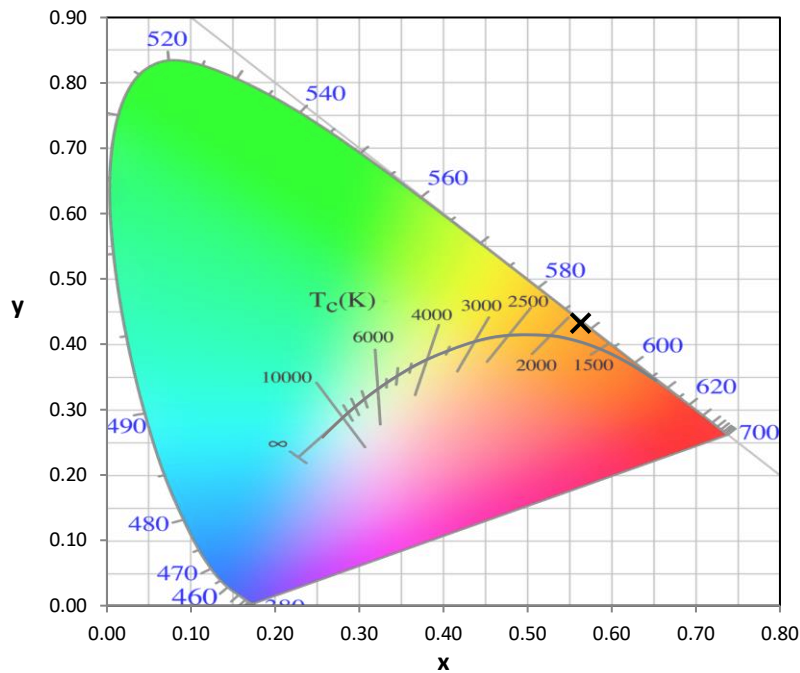
Stabilization Time: 164M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.2/26%  
 Sphere Temperature (°C): 24.6

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CATALOG NUMBER: ARB-B1-LED-D1-T2-AMB

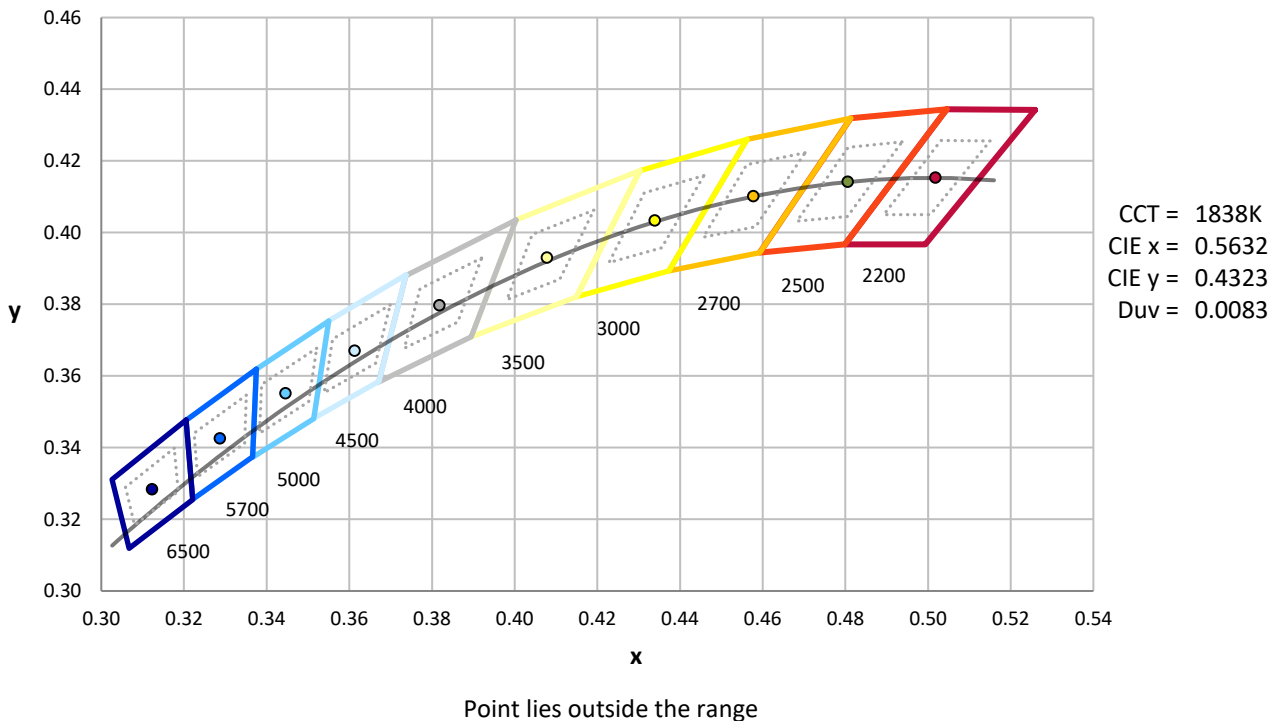
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | 76INCH SPHERE IN0058  | 8/3/2021         | 2/3/2022             |
| 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**

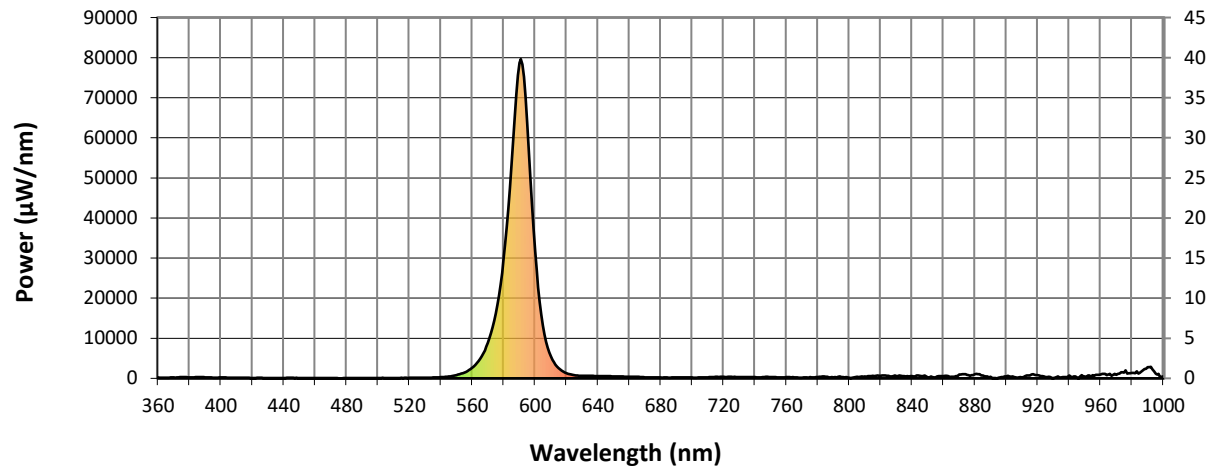


**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



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**Photopic Flux vs. Wavelength**

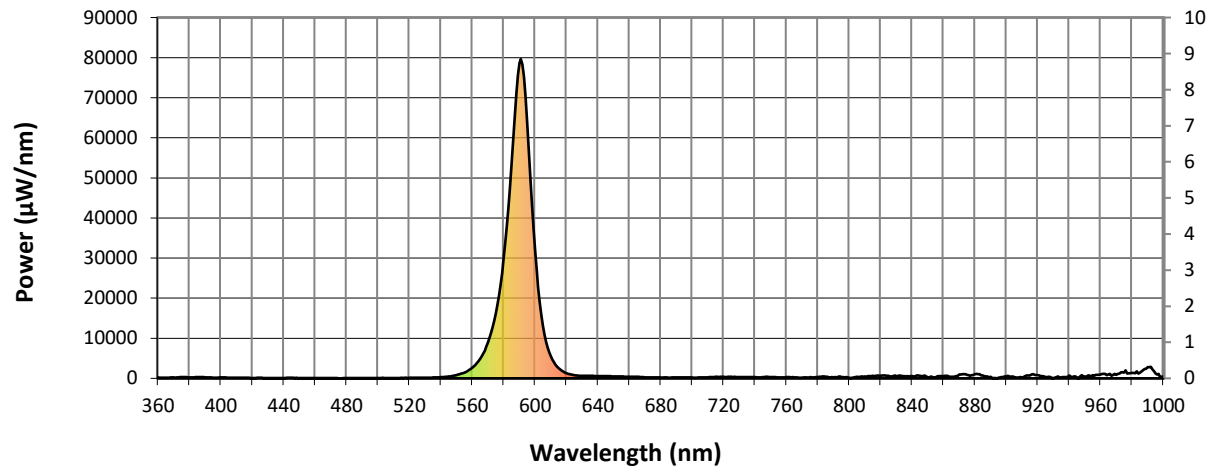


#####

| 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       | 232              | NR               | 490       | 102              | NR               | 620       | 1285             | NR               | 750       | 361              | NR               | 880       | 1054             | NR               |
| 365       | 141              | NR               | 495       | 91               | NR               | 625       | 794              | NR               | 755       | 226              | NR               | 885       | 743              | NR               |
| 370       | 221              | NR               | 500       | 109              | NR               | 630       | 604              | NR               | 760       | 303              | NR               | 890       | 375              | NR               |
| 375       | 314              | NR               | 505       | 95               | NR               | 635       | 625              | NR               | 765       | 277              | NR               | 895       | 132              | NR               |
| 380       | 237              | NR               | 510       | 92               | NR               | 640       | 568              | NR               | 770       | 149              | NR               | 900       | 509              | NR               |
| 385       | 296              | NR               | 515       | 131              | NR               | 645       | 573              | NR               | 775       | 286              | NR               | 905       | 284              | NR               |
| 390       | 260              | NR               | 520       | 132              | NR               | 650       | 495              | NR               | 780       | 359              | NR               | 910       | 225              | NR               |
| 395       | 190              | NR               | 525       | 133              | NR               | 655       | 464              | NR               | 785       | 390              | NR               | 915       | 726              | NR               |
| 400       | 227              | NR               | 530       | 175              | NR               | 660       | 397              | NR               | 790       | 276              | NR               | 920       | 800              | NR               |
| 405       | 169              | NR               | 535       | 205              | NR               | 665       | 409              | NR               | 795       | 342              | NR               | 925       | 345              | NR               |
| 410       | 152              | NR               | 540       | 294              | NR               | 670       | 281              | NR               | 800       | 177              | NR               | 930       | 77               | NR               |
| 415       | 171              | NR               | 545       | 475              | NR               | 675       | 262              | NR               | 805       | 373              | NR               | 935       | 233              | NR               |
| 420       | 121              | NR               | 550       | 833              | NR               | 680       | 208              | NR               | 810       | 500              | NR               | 940       | 730              | NR               |
| 425       | 135              | NR               | 555       | 1466             | NR               | 685       | 193              | NR               | 815       | 602              | NR               | 945       | 259              | NR               |
| 430       | 90               | NR               | 560       | 2623             | NR               | 690       | 213              | NR               | 820       | 681              | NR               | 950       | 510              | NR               |
| 435       | 92               | NR               | 565       | 4872             | NR               | 695       | 267              | NR               | 825       | 615              | NR               | 955       | 800              | NR               |
| 440       | 87               | NR               | 570       | 8896             | NR               | 700       | 218              | NR               | 830       | 529              | NR               | 960       | 959              | NR               |
| 445       | 129              | NR               | 575       | 16191            | NR               | 705       | 234              | NR               | 835       | 526              | NR               | 965       | 925              | NR               |
| 450       | 75               | NR               | 580       | 29728            | NR               | 710       | 280              | NR               | 840       | 531              | NR               | 970       | 863              | NR               |
| 455       | 88               | NR               | 585       | 53245            | NR               | 715       | 393              | NR               | 845       | 627              | NR               | 975       | 1444             | NR               |
| 460       | 76               | NR               | 590       | 78694            | NR               | 720       | 370              | NR               | 850       | 248              | NR               | 980       | 1342             | NR               |
| 465       | 74               | NR               | 595       | 63659            | NR               | 725       | 376              | NR               | 855       | 262              | NR               | 985       | 1396             | NR               |
| 470       | 87               | NR               | 600       | 31696            | NR               | 730       | 324              | NR               | 860       | 579              | NR               | 990       | 2816             | NR               |
| 475       | 37               | NR               | 605       | 13208            | NR               | 735       | 359              | NR               | 865       | 439              | NR               | 995       | 1223             | NR               |
| 480       | 77               | NR               | 610       | 5473             | NR               | 740       | 294              | NR               | 870       | 923              | NR               | 1000      | 487              | NR               |
| 485       | 97               | NR               | 615       | 2571             | NR               | 745       | 300              | NR               | 875       | 874              | NR               |           |                  |                  |

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**Scotopic Flux vs. Wavelength**



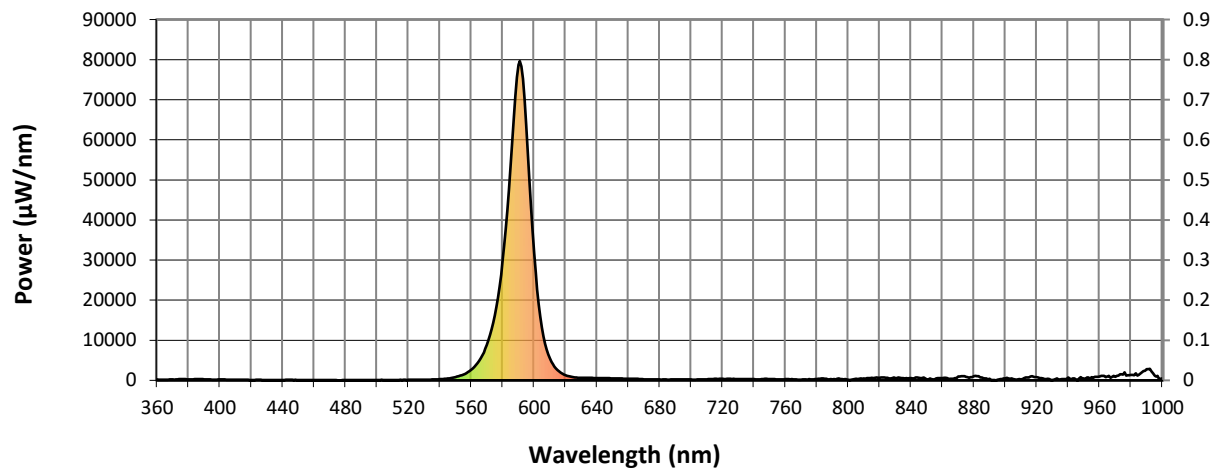
**Scotopic Lumens: 236**

**S/P: 0.29**

| 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       | 232              | NR               | 490       | 102              | NR               | 620       | 1285             | NR               | 750       | 361              | NR               | 880       | 1054             | NR               |
| 365       | 141              | NR               | 495       | 91               | NR               | 625       | 794              | NR               | 755       | 226              | NR               | 885       | 743              | NR               |
| 370       | 221              | NR               | 500       | 109              | NR               | 630       | 604              | NR               | 760       | 303              | NR               | 890       | 375              | NR               |
| 375       | 314              | NR               | 505       | 95               | NR               | 635       | 625              | NR               | 765       | 277              | NR               | 895       | 132              | NR               |
| 380       | 237              | NR               | 510       | 92               | NR               | 640       | 568              | NR               | 770       | 149              | NR               | 900       | 509              | NR               |
| 385       | 296              | NR               | 515       | 131              | NR               | 645       | 573              | NR               | 775       | 286              | NR               | 905       | 284              | NR               |
| 390       | 260              | NR               | 520       | 132              | NR               | 650       | 495              | NR               | 780       | 359              | NR               | 910       | 225              | NR               |
| 395       | 190              | NR               | 525       | 133              | NR               | 655       | 464              | NR               | 785       | 390              | NR               | 915       | 726              | NR               |
| 400       | 227              | NR               | 530       | 175              | NR               | 660       | 397              | NR               | 790       | 276              | NR               | 920       | 800              | NR               |
| 405       | 169              | NR               | 535       | 205              | NR               | 665       | 409              | NR               | 795       | 342              | NR               | 925       | 345              | NR               |
| 410       | 152              | NR               | 540       | 294              | NR               | 670       | 281              | NR               | 800       | 177              | NR               | 930       | 77               | NR               |
| 415       | 171              | NR               | 545       | 475              | NR               | 675       | 262              | NR               | 805       | 373              | NR               | 935       | 233              | NR               |
| 420       | 121              | NR               | 550       | 833              | NR               | 680       | 208              | NR               | 810       | 500              | NR               | 940       | 730              | NR               |
| 425       | 135              | NR               | 555       | 1466             | NR               | 685       | 193              | NR               | 815       | 602              | NR               | 945       | 259              | NR               |
| 430       | 90               | NR               | 560       | 2623             | NR               | 690       | 213              | NR               | 820       | 681              | NR               | 950       | 510              | NR               |
| 435       | 92               | NR               | 565       | 4872             | NR               | 695       | 267              | NR               | 825       | 615              | NR               | 955       | 800              | NR               |
| 440       | 87               | NR               | 570       | 8896             | NR               | 700       | 218              | NR               | 830       | 529              | NR               | 960       | 959              | NR               |
| 445       | 129              | NR               | 575       | 16191            | NR               | 705       | 234              | NR               | 835       | 526              | NR               | 965       | 925              | NR               |
| 450       | 75               | NR               | 580       | 29728            | NR               | 710       | 280              | NR               | 840       | 531              | NR               | 970       | 863              | NR               |
| 455       | 88               | NR               | 585       | 53245            | NR               | 715       | 393              | NR               | 845       | 627              | NR               | 975       | 1444             | NR               |
| 460       | 76               | NR               | 590       | 78694            | NR               | 720       | 370              | NR               | 850       | 248              | NR               | 980       | 1342             | NR               |
| 465       | 74               | NR               | 595       | 63659            | NR               | 725       | 376              | NR               | 855       | 262              | NR               | 985       | 1396             | NR               |
| 470       | 87               | NR               | 600       | 31696            | NR               | 730       | 324              | NR               | 860       | 579              | NR               | 990       | 2816             | NR               |
| 475       | 37               | NR               | 605       | 13208            | NR               | 735       | 359              | NR               | 865       | 439              | NR               | 995       | 1223             | NR               |
| 480       | 77               | NR               | 610       | 5473             | NR               | 740       | 294              | NR               | 870       | 923              | NR               | 1000      | 487              | NR               |
| 485       | 97               | NR               | 615       | 2571             | NR               | 745       | 300              | NR               | 875       | 874              | NR               |           |                  |                  |

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**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 31.6**

**S/P: 0.04**

| 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       | 232              | NR               | 490       | 102              | NR               | 620       | 1285             | NR               | 750       | 361              | NR               | 880       | 1054             | NR               |
| 365       | 141              | NR               | 495       | 91               | NR               | 625       | 794              | NR               | 755       | 226              | NR               | 885       | 743              | NR               |
| 370       | 221              | NR               | 500       | 109              | NR               | 630       | 604              | NR               | 760       | 303              | NR               | 890       | 375              | NR               |
| 375       | 314              | NR               | 505       | 95               | NR               | 635       | 625              | NR               | 765       | 277              | NR               | 895       | 132              | NR               |
| 380       | 237              | NR               | 510       | 92               | NR               | 640       | 568              | NR               | 770       | 149              | NR               | 900       | 509              | NR               |
| 385       | 296              | NR               | 515       | 131              | NR               | 645       | 573              | NR               | 775       | 286              | NR               | 905       | 284              | NR               |
| 390       | 260              | NR               | 520       | 132              | NR               | 650       | 495              | NR               | 780       | 359              | NR               | 910       | 225              | NR               |
| 395       | 190              | NR               | 525       | 133              | NR               | 655       | 464              | NR               | 785       | 390              | NR               | 915       | 726              | NR               |
| 400       | 227              | NR               | 530       | 175              | NR               | 660       | 397              | NR               | 790       | 276              | NR               | 920       | 800              | NR               |
| 405       | 169              | NR               | 535       | 205              | NR               | 665       | 409              | NR               | 795       | 342              | NR               | 925       | 345              | NR               |
| 410       | 152              | NR               | 540       | 294              | NR               | 670       | 281              | NR               | 800       | 177              | NR               | 930       | 77               | NR               |
| 415       | 171              | NR               | 545       | 475              | NR               | 675       | 262              | NR               | 805       | 373              | NR               | 935       | 233              | NR               |
| 420       | 121              | NR               | 550       | 833              | NR               | 680       | 208              | NR               | 810       | 500              | NR               | 940       | 730              | NR               |
| 425       | 135              | NR               | 555       | 1466             | NR               | 685       | 193              | NR               | 815       | 602              | NR               | 945       | 259              | NR               |
| 430       | 90               | NR               | 560       | 2623             | NR               | 690       | 213              | NR               | 820       | 681              | NR               | 950       | 510              | NR               |
| 435       | 92               | NR               | 565       | 4872             | NR               | 695       | 267              | NR               | 825       | 615              | NR               | 955       | 800              | NR               |
| 440       | 87               | NR               | 570       | 8896             | NR               | 700       | 218              | NR               | 830       | 529              | NR               | 960       | 959              | NR               |
| 445       | 129              | NR               | 575       | 16191            | NR               | 705       | 234              | NR               | 835       | 526              | NR               | 965       | 925              | NR               |
| 450       | 75               | NR               | 580       | 29728            | NR               | 710       | 280              | NR               | 840       | 531              | NR               | 970       | 863              | NR               |
| 455       | 88               | NR               | 585       | 53245            | NR               | 715       | 393              | NR               | 845       | 627              | NR               | 975       | 1444             | NR               |
| 460       | 76               | NR               | 590       | 78694            | NR               | 720       | 370              | NR               | 850       | 248              | NR               | 980       | 1342             | NR               |
| 465       | 74               | NR               | 595       | 63659            | NR               | 725       | 376              | NR               | 855       | 262              | NR               | 985       | 1396             | NR               |
| 470       | 87               | NR               | 600       | 31696            | NR               | 730       | 324              | NR               | 860       | 579              | NR               | 990       | 2816             | NR               |
| 475       | 37               | NR               | 605       | 13208            | NR               | 735       | 359              | NR               | 865       | 439              | NR               | 995       | 1223             | NR               |
| 480       | 77               | NR               | 610       | 5473             | NR               | 740       | 294              | NR               | 870       | 923              | NR               | 1000      | 487              | NR               |
| 485       | 97               | NR               | 615       | 2571             | NR               | 745       | 300              | NR               | 875       | 874              | NR               |           |                  |                  |

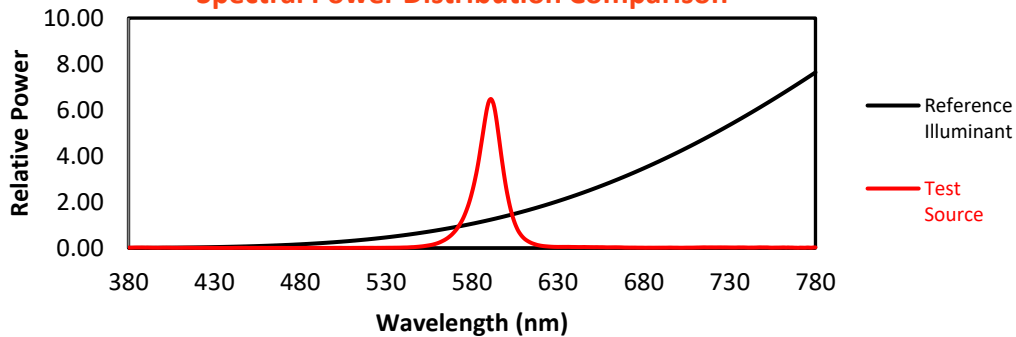
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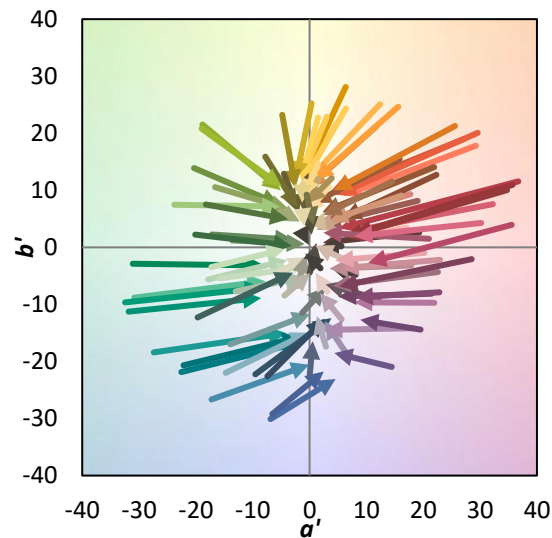
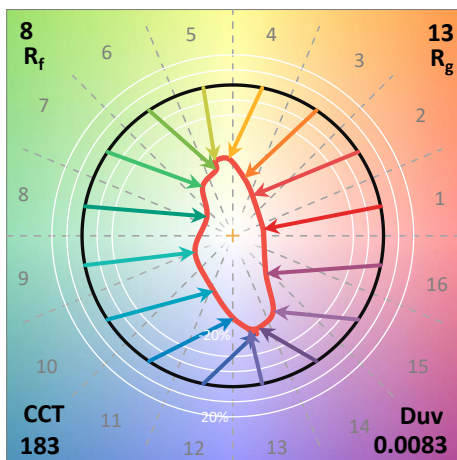
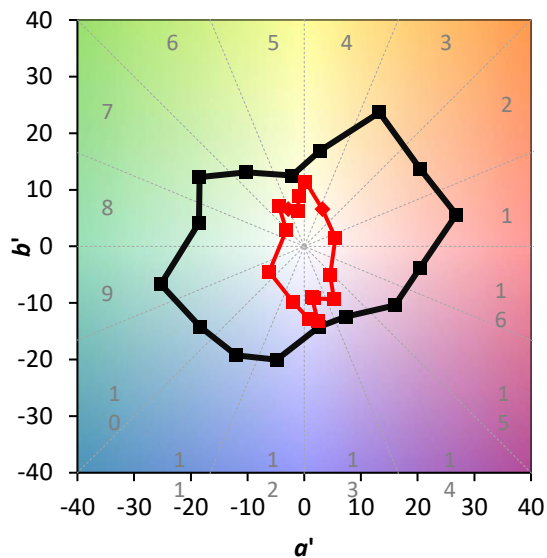
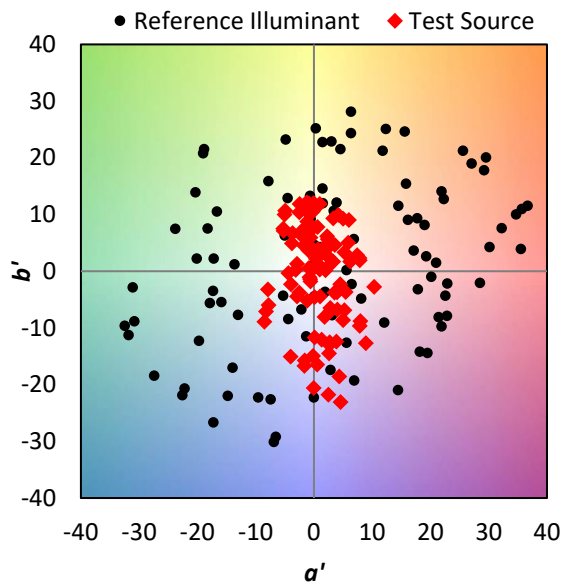
**Summary**

$R_f = 8$   
 $R_g = 12.7$   
 $CIE R_a = -25.2$   
 $R_g = -415.1$

**Spectral Power Distribution Comparison**



**Color Vector Graphics**



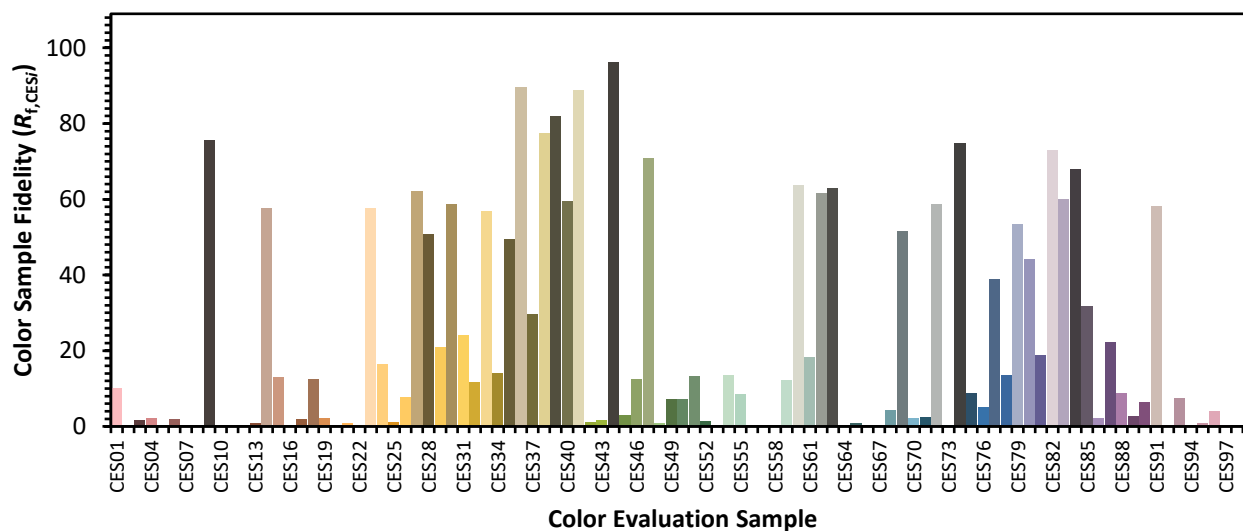


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**Individual Sample Fidelity Index ( $R_{f,i}$ )**

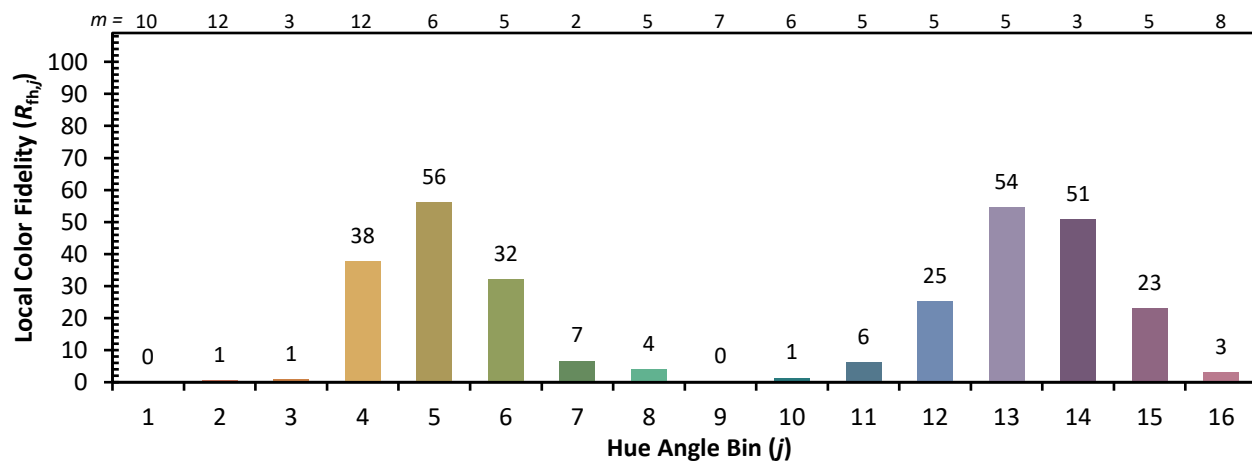
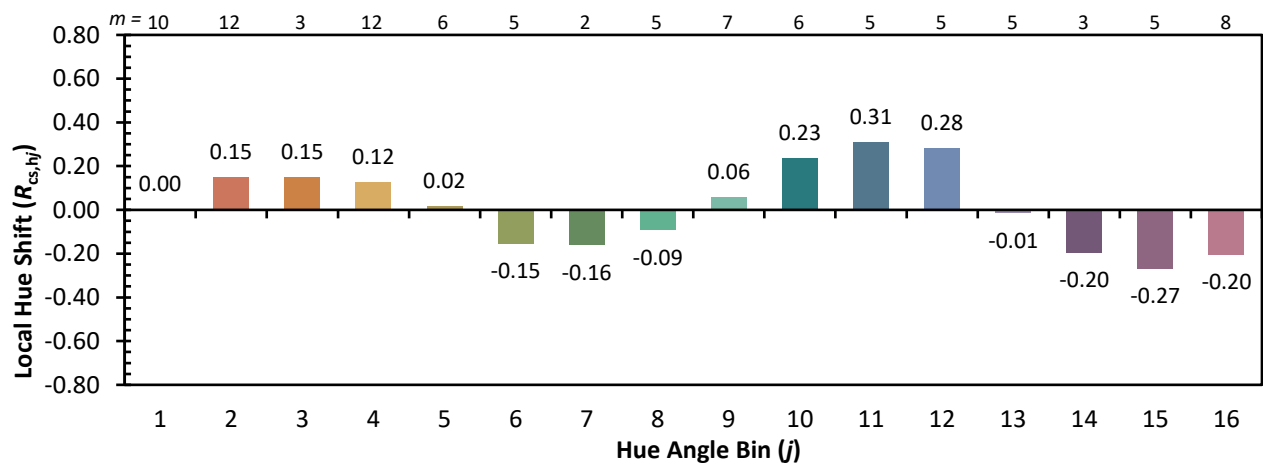
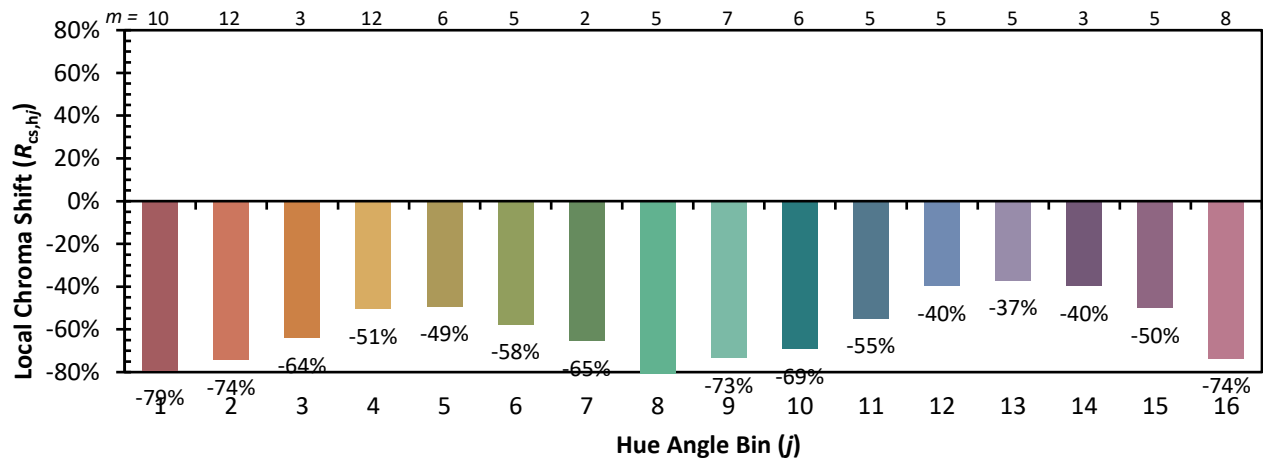
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 89 | CES26 = 8  | CES51 = 13 | CES76 = 5  |
| CES02 = 66 | CES27 = 62 | CES52 = 1  | CES77 = 39 |
| CES03 = 30 | CES28 = 51 | CES53 = 0  | CES78 = 14 |
| CES04 = 76 | CES29 = 21 | CES54 = 14 | CES79 = 53 |
| CES05 = 50 | CES30 = 59 | CES55 = 9  | CES80 = 44 |
| CES06 = 55 | CES31 = 24 | CES56 = 0  | CES81 = 19 |
| CES07 = 37 | CES32 = 12 | CES57 = 0  | CES82 = 73 |
| CES08 = 36 | CES33 = 57 | CES58 = 0  | CES83 = 60 |
| CES09 = 29 | CES34 = 14 | CES59 = 12 | CES84 = 68 |
| CES10 = 84 | CES35 = 49 | CES60 = 64 | CES85 = 32 |
| CES11 = 68 | CES36 = 90 | CES61 = 18 | CES86 = 2  |
| CES12 = 72 | CES37 = 30 | CES62 = 62 | CES87 = 22 |
| CES13 = 43 | CES38 = 78 | CES63 = 63 | CES88 = 9  |
| CES14 = 76 | CES39 = 82 | CES64 = 0  | CES89 = 3  |
| CES15 = 72 | CES40 = 60 | CES65 = 1  | CES90 = 7  |
| CES16 = 47 | CES41 = 89 | CES66 = 0  | CES91 = 58 |
| CES17 = 55 | CES42 = 1  | CES67 = 0  | CES92 = 0  |
| CES18 = 58 | CES43 = 2  | CES68 = 4  | CES93 = 7  |
| CES19 = 79 | CES44 = 96 | CES69 = 52 | CES94 = 0  |
| CES20 = 68 | CES45 = 3  | CES70 = 2  | CES95 = 1  |
| CES21 = 93 | CES46 = 13 | CES71 = 2  | CES96 = 4  |
| CES22 = 85 | CES47 = 71 | CES72 = 59 | CES97 = 0  |
| CES23 = 93 | CES48 = 1  | CES73 = 0  | CES98 = 0  |
| CES24 = 95 | CES49 = 7  | CES74 = 75 | CES99 = 0  |
| CES25 = 78 | CES50 = 7  | CES75 = 9  |            |



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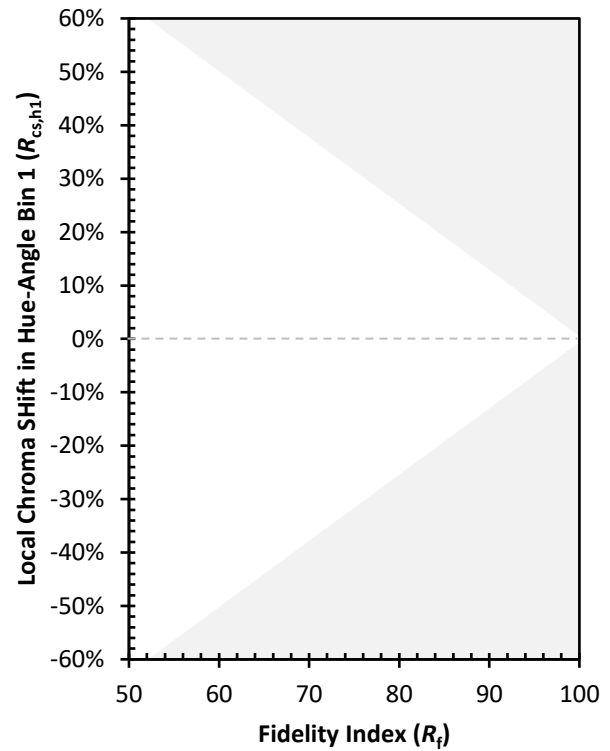
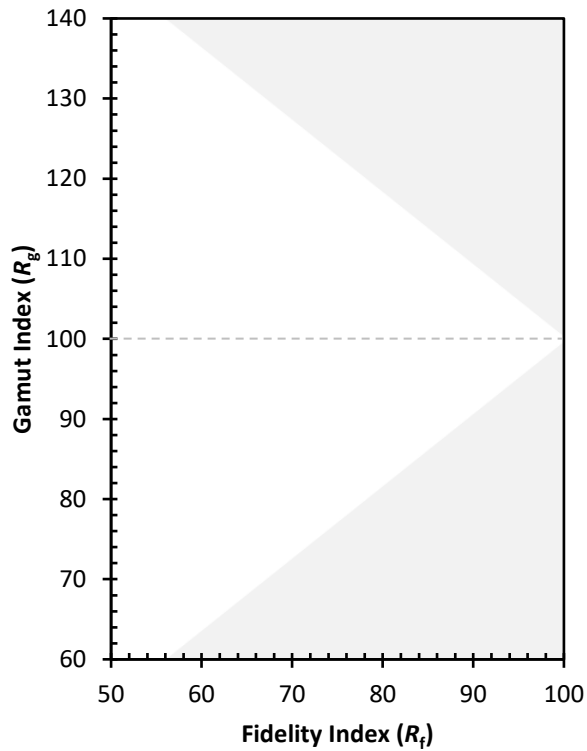
**Color Rendition by Hue-Angle Bin**



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**Measure Comparisons**



(END OF REPORT)