

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: G3-2107-318-6

Luminaire Tested: **TT-D1-AMB-U-DL**

Test Date: 8/10/2021

**Test Information**

Test Method: LM-79-08  
Report Number: G3-2107-318-6  
Test Lab: COOPER LIGHTING SOLUTIONS  
Test Date: 8/10/2021  
Issue Date: 8/10/2021  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: TT-D1-AMB-U-DL  
Description: TOPTIER LED PARKING GARAGE LUMINAIRE. NARROW BAND AMBER LEDS AND  
DRIVE LANE DISTRIBUTION  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 808.6 lumens  
Efficiency: N/A  
Efficacy: 26.9 lumens/watt  
Luminous Opening: Circular (Dia: 1.25' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B0 - U0 - G1

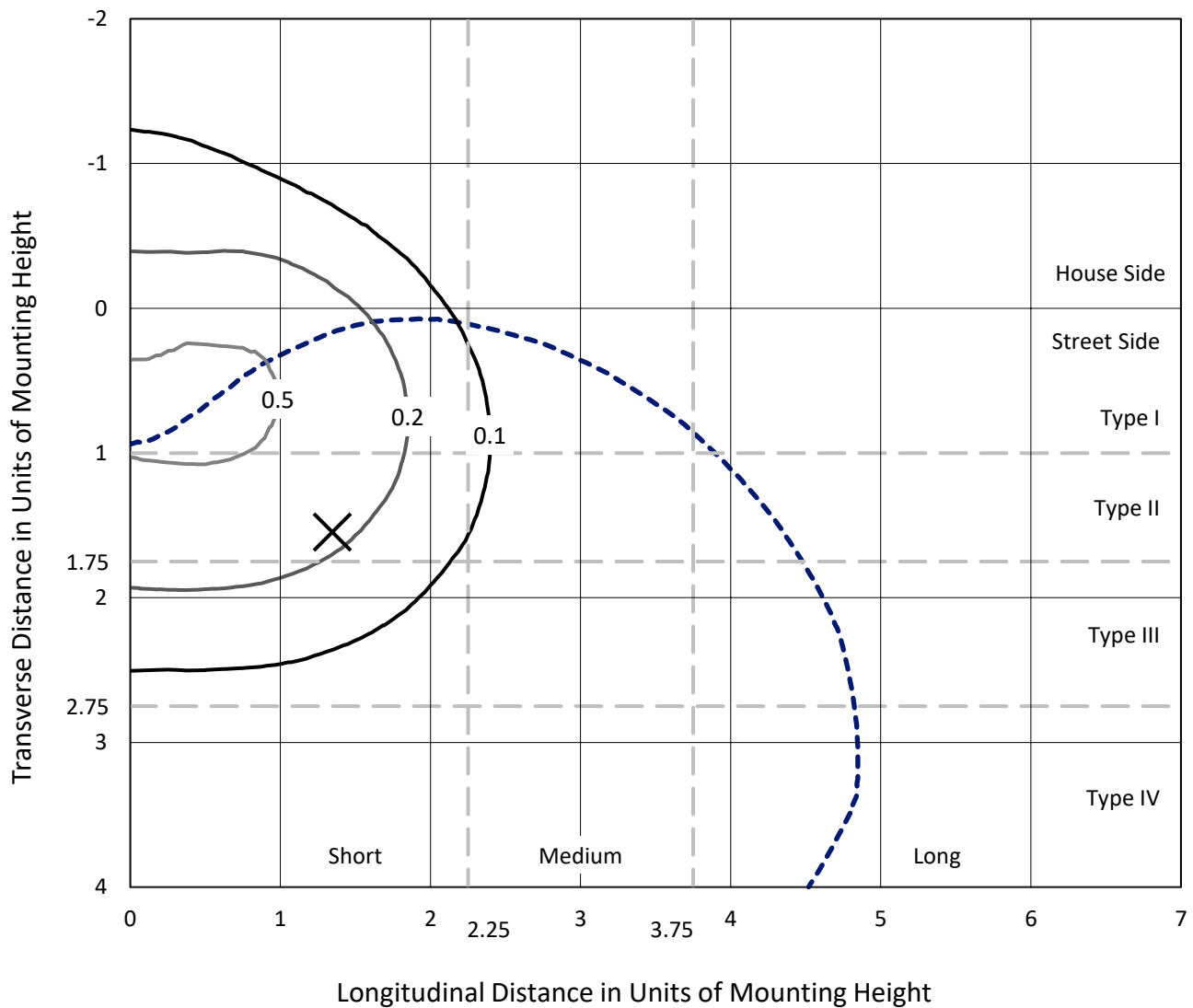
Input Watts (W): 30.1  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT



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## Iso-Footcandle Lines of Horizontal Illumination

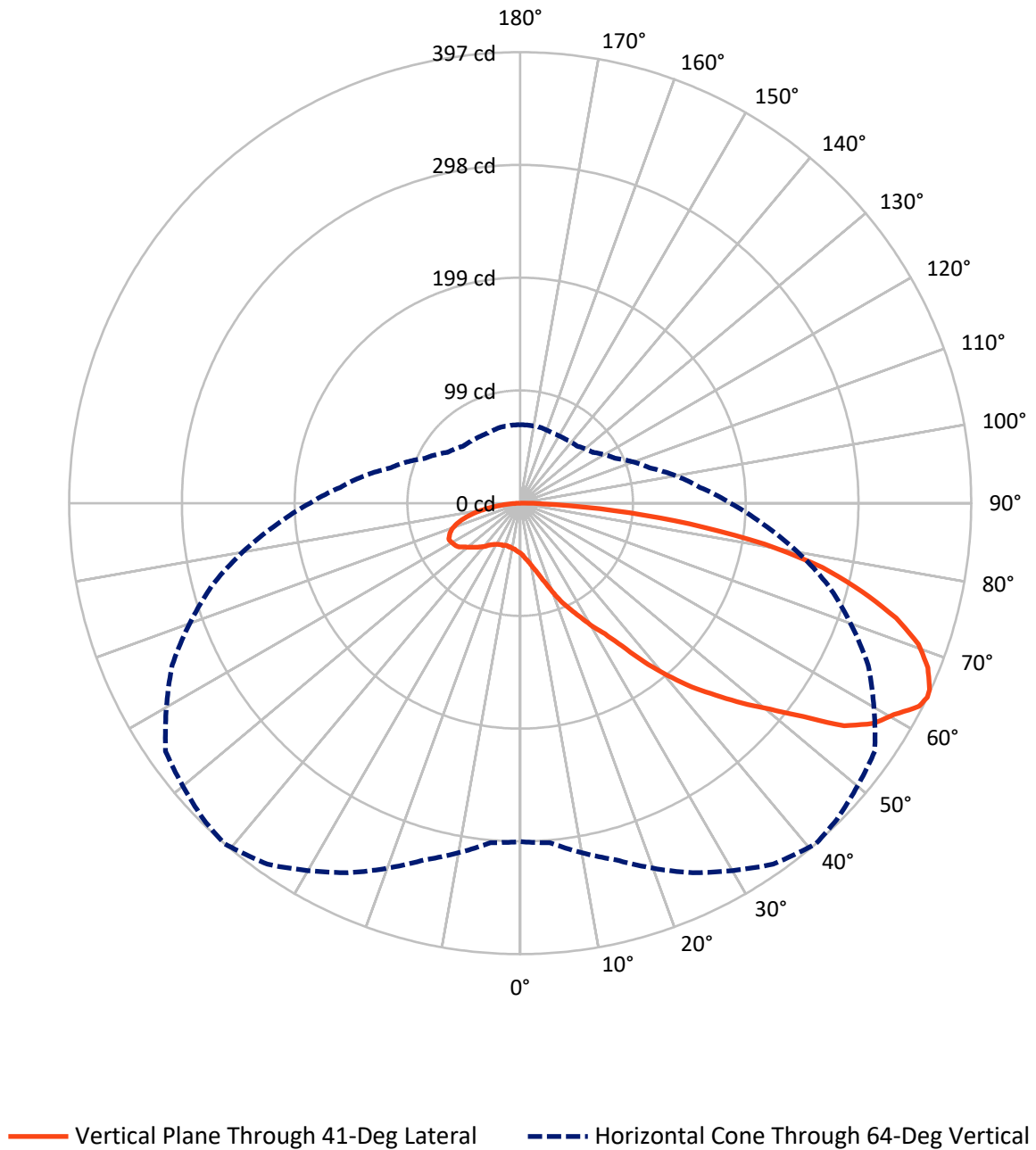
✕ Max cd  
 - - - 1/2 Max cd



Based on 12 foot mounting height. Maximum calculated value = 0.6 fc  
 Type IV - Short - N/A

REPORT NUMBER: G3-2107-318-6  
CATALOG NUMBER: TT-D1-AMB-U-DL

## Luminous Intensity Polar Plot



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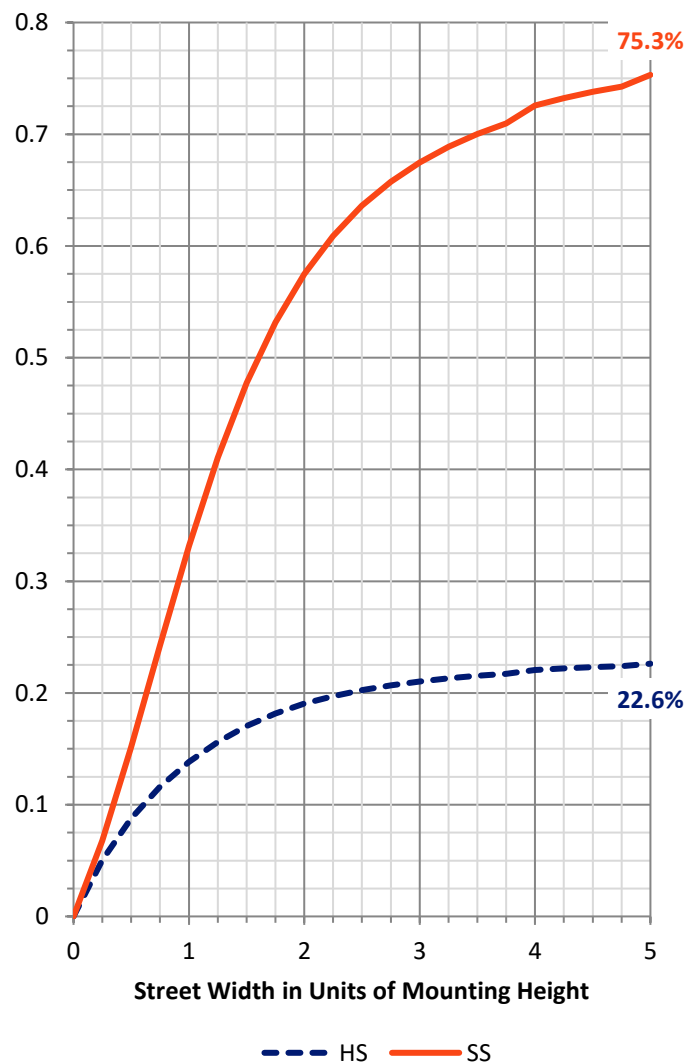
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total |
|--------------------|-----------|----------|--------|-------|
| <b>House Side</b>  | Lumens    | 186.1    | 0.0    | 186.1 |
|                    | % Fixture | 23.0     | 0.0    | 23.0  |
| <b>Street Side</b> | Lumens    | 622.5    | 0.0    | 622.5 |
|                    | % Fixture | 77.0     | 0.0    | 77.0  |
| <b>Total</b>       | Lumens    | 808.6    | 0.0    | 808.6 |
|                    | % Fixture | 100.0    | 0.0    | 100.0 |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 4.4    | 0.5       |
| 10°-20°   | 15.5   | 1.9       |
| 20°-30°   | 33.4   | 4.1       |
| 30°-40°   | 61.9   | 7.7       |
| 40°-50°   | 108.6  | 13.4      |
| 50°-60°   | 166.9  | 20.6      |
| 60°-70°   | 203.6  | 25.2      |
| 70°-80°   | 165.6  | 20.5      |
| 80°-90°   | 48.9   | 6.0       |
| 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°    | 808.6  | 100.0     |
| 0°-180°   | 808.6  | 100.0     |

**Coefficient of Utilization**



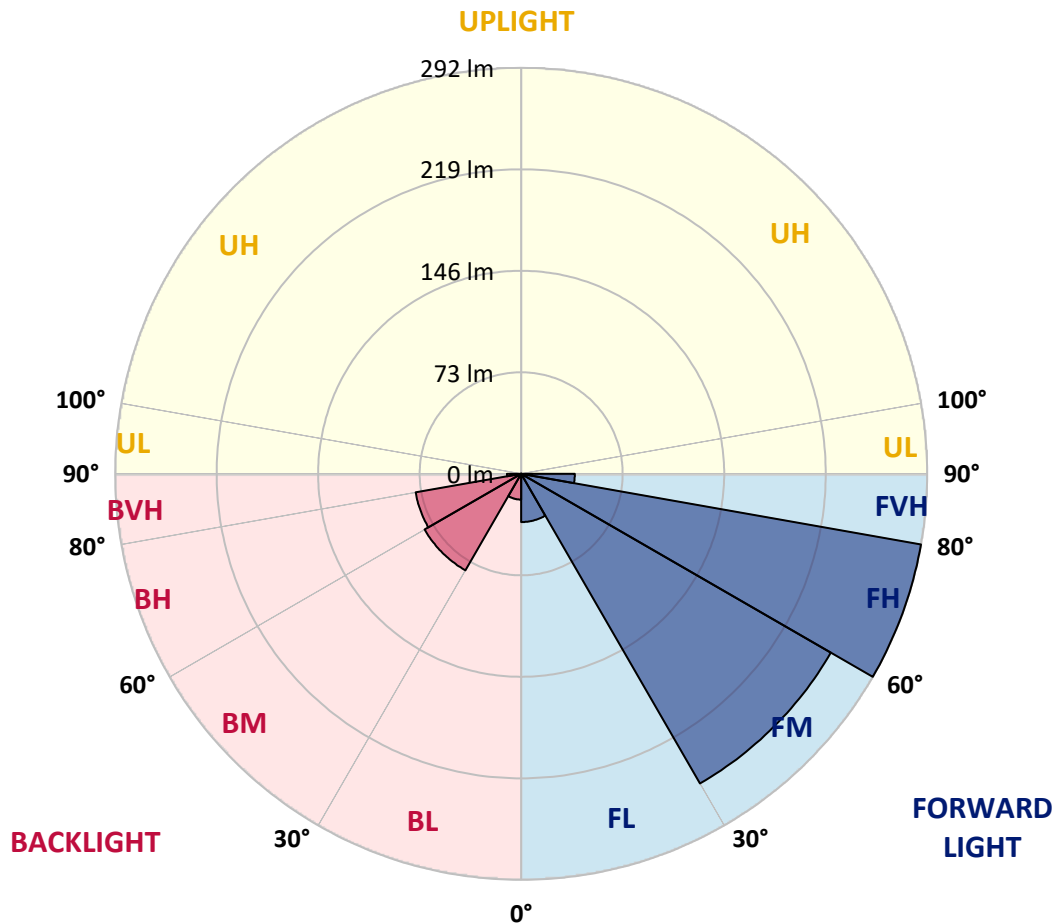
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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |        |
|------|-------------|--------|-----------|-------------------------|------|--------|
|      |             |        |           | B                       | U    | G      |
| FL   | (0°-30°)    | 34.7   | 4.3       |                         |      |        |
| FM   | (30°-60°)   | 257.2  | 31.8      |                         |      |        |
| FH   | (60°-80°)   | 292.0  | 36.1      |                         |      | G0/660 |
| FVH  | (80°-90°)   | 38.6   | 4.8       |                         |      | G1/100 |
| BL   | (0°-30°)    | 18.5   | 2.3       | B0/110                  |      |        |
| BM   | (30°-60°)   | 80.2   | 9.9       | B0/220                  |      |        |
| BH   | (60°-80°)   | 77.1   | 9.5       | B0/110                  |      | G0/110 |
| BVH  | (80°-90°)   | 10.3   | 1.3       |                         |      | G1/100 |
| 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



REPORT NUMBER: G3-2107-318-6

CATALOG NUMBER: TT-D1-AMB-U-DL

**CANDELA DISTRIBUTION (FULL):**

|       | 0°  | 5°  | 15° | 25° | 35° | 41° | 45° | 55° | 65° | 75° | 85° |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0°    | 44  | 44  | 44  | 44  | 44  | 44  | 44  | 44  | 44  | 44  | 44  |
| 2.5°  | 47  | 47  | 47  | 47  | 46  | 46  | 46  | 46  | 46  | 45  | 45  |
| 5°    | 51  | 51  | 51  | 50  | 50  | 49  | 49  | 49  | 48  | 47  | 46  |
| 7.5°  | 55  | 54  | 54  | 53  | 53  | 52  | 52  | 51  | 50  | 49  | 47  |
| 10°   | 58  | 58  | 58  | 58  | 57  | 56  | 56  | 54  | 53  | 51  | 49  |
| 12.5° | 64  | 63  | 64  | 63  | 62  | 61  | 61  | 59  | 57  | 54  | 52  |
| 15°   | 70  | 69  | 70  | 69  | 68  | 67  | 66  | 65  | 62  | 58  | 55  |
| 17.5° | 78  | 78  | 77  | 77  | 77  | 75  | 75  | 72  | 68  | 63  | 59  |
| 20°   | 88  | 87  | 86  | 87  | 87  | 85  | 84  | 82  | 76  | 70  | 64  |
| 22.5° | 96  | 96  | 96  | 95  | 96  | 95  | 94  | 91  | 85  | 78  | 69  |
| 25°   | 105 | 105 | 106 | 106 | 105 | 104 | 103 | 99  | 93  | 85  | 75  |
| 27.5° | 114 | 115 | 114 | 115 | 115 | 114 | 112 | 109 | 100 | 91  | 81  |
| 30°   | 124 | 124 | 125 | 126 | 126 | 126 | 124 | 120 | 110 | 99  | 87  |
| 32.5° | 134 | 135 | 135 | 139 | 138 | 137 | 136 | 131 | 122 | 108 | 94  |
| 35°   | 146 | 147 | 149 | 153 | 154 | 154 | 152 | 146 | 135 | 119 | 102 |
| 37.5° | 160 | 161 | 165 | 173 | 176 | 177 | 175 | 168 | 153 | 133 | 112 |
| 40°   | 180 | 179 | 185 | 195 | 199 | 199 | 198 | 190 | 174 | 150 | 125 |
| 42.5° | 195 | 194 | 203 | 213 | 219 | 221 | 219 | 210 | 192 | 166 | 136 |
| 45°   | 208 | 211 | 220 | 231 | 238 | 241 | 241 | 229 | 210 | 181 | 148 |
| 47.5° | 224 | 226 | 235 | 249 | 261 | 263 | 264 | 251 | 227 | 195 | 158 |
| 50°   | 239 | 242 | 254 | 271 | 282 | 285 | 283 | 273 | 248 | 210 | 170 |
| 52.5° | 257 | 258 | 273 | 293 | 308 | 312 | 311 | 298 | 270 | 228 | 182 |
| 55°   | 274 | 274 | 294 | 316 | 339 | 346 | 346 | 330 | 294 | 249 | 195 |
| 57.5° | 288 | 289 | 308 | 337 | 359 | 366 | 363 | 351 | 314 | 262 | 205 |
| 60°   | 292 | 299 | 317 | 350 | 371 | 378 | 377 | 362 | 328 | 270 | 212 |
| 62.5° | 295 | 302 | 324 | 354 | 384 | 394 | 393 | 377 | 333 | 278 | 216 |
| 64°   | 298 | 300 | 325 | 359 | 388 | 397 | 394 | 381 | 338 | 281 | 215 |
| 65°   | 298 | 295 | 323 | 360 | 387 | 396 | 393 | 381 | 339 | 279 | 212 |
| 67.5° | 289 | 287 | 311 | 352 | 379 | 387 | 386 | 374 | 333 | 271 | 206 |
| 70°   | 267 | 272 | 297 | 334 | 363 | 372 | 370 | 360 | 317 | 258 | 198 |
| 72.5° | 245 | 249 | 274 | 310 | 337 | 346 | 344 | 335 | 296 | 239 | 182 |
| 75°   | 217 | 221 | 242 | 277 | 301 | 311 | 312 | 300 | 267 | 214 | 162 |
| 77.5° | 181 | 184 | 207 | 234 | 262 | 272 | 271 | 261 | 226 | 182 | 137 |
| 80°   | 137 | 143 | 163 | 188 | 211 | 218 | 214 | 207 | 182 | 148 | 110 |
| 82.5° | 91  | 95  | 116 | 133 | 148 | 150 | 156 | 149 | 130 | 103 | 76  |
| 85°   | 43  | 45  | 58  | 70  | 82  | 83  | 83  | 80  | 72  | 56  | 38  |
| 87.5° | 6   | 4   | 5   | 11  | 13  | 19  | 16  | 15  | 10  | 9   | 5   |
| 90°   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   |

REPORT NUMBER: G3-2107-318-6

CATALOG NUMBER: TT-D1-AMB-U-DL

**CANDELA DISTRIBUTION (continued):**

|       | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|-------|-----|-----|------|------|------|------|------|------|------|------|------|
| 0°    | 44  | 44  | 44   | 44   | 44   | 44   | 44   | 44   | 44   | 44   | 44   |
| 2.5°  | 45  | 45  | 44   | 44   | 43   | 43   | 43   | 43   | 43   | 43   | 43   |
| 5°    | 46  | 45  | 44   | 44   | 43   | 42   | 42   | 41   | 41   | 41   | 41   |
| 7.5°  | 47  | 46  | 45   | 43   | 42   | 41   | 40   | 40   | 40   | 39   | 39   |
| 10°   | 48  | 47  | 45   | 43   | 42   | 41   | 40   | 39   | 38   | 38   | 38   |
| 12.5° | 50  | 49  | 46   | 44   | 42   | 40   | 39   | 38   | 38   | 37   | 37   |
| 15°   | 53  | 51  | 48   | 45   | 42   | 40   | 39   | 38   | 37   | 37   | 37   |
| 17.5° | 57  | 54  | 49   | 46   | 42   | 40   | 38   | 37   | 36   | 36   | 36   |
| 20°   | 61  | 58  | 52   | 47   | 43   | 40   | 38   | 37   | 36   | 36   | 36   |
| 22.5° | 66  | 62  | 55   | 49   | 44   | 41   | 39   | 37   | 36   | 36   | 35   |
| 25°   | 70  | 66  | 58   | 50   | 45   | 41   | 39   | 37   | 36   | 36   | 35   |
| 27.5° | 76  | 70  | 60   | 52   | 46   | 42   | 39   | 37   | 36   | 36   | 36   |
| 30°   | 81  | 75  | 63   | 54   | 48   | 43   | 40   | 38   | 37   | 36   | 36   |
| 32.5° | 87  | 80  | 67   | 57   | 49   | 44   | 41   | 39   | 38   | 37   | 37   |
| 35°   | 93  | 86  | 71   | 60   | 51   | 46   | 42   | 40   | 39   | 39   | 39   |
| 37.5° | 102 | 93  | 76   | 63   | 54   | 48   | 44   | 43   | 41   | 41   | 41   |
| 40°   | 113 | 101 | 82   | 67   | 57   | 51   | 47   | 45   | 45   | 44   | 44   |
| 42.5° | 122 | 108 | 87   | 71   | 60   | 53   | 50   | 48   | 47   | 47   | 47   |
| 45°   | 131 | 116 | 92   | 74   | 62   | 56   | 52   | 50   | 50   | 50   | 50   |
| 47.5° | 139 | 124 | 97   | 78   | 65   | 58   | 55   | 53   | 53   | 53   | 53   |
| 50°   | 149 | 131 | 102  | 81   | 68   | 61   | 58   | 56   | 56   | 56   | 56   |
| 52.5° | 160 | 139 | 107  | 85   | 71   | 64   | 60   | 59   | 59   | 59   | 60   |
| 55°   | 171 | 147 | 113  | 89   | 75   | 68   | 64   | 63   | 64   | 63   | 64   |
| 57.5° | 179 | 154 | 117  | 92   | 77   | 69   | 67   | 66   | 66   | 66   | 66   |
| 60°   | 181 | 158 | 119  | 94   | 78   | 70   | 68   | 68   | 68   | 68   | 68   |
| 62.5° | 183 | 160 | 120  | 93   | 78   | 71   | 69   | 68   | 69   | 70   | 69   |
| 64°   | 185 | 159 | 119  | 93   | 78   | 71   | 69   | 68   | 69   | 69   | 69   |
| 65°   | 185 | 157 | 118  | 92   | 78   | 70   | 68   | 68   | 69   | 69   | 69   |
| 67.5° | 180 | 150 | 112  | 89   | 74   | 68   | 66   | 66   | 66   | 67   | 68   |
| 70°   | 168 | 143 | 105  | 84   | 70   | 64   | 63   | 63   | 64   | 64   | 64   |
| 72.5° | 153 | 131 | 96   | 76   | 64   | 59   | 58   | 58   | 59   | 60   | 60   |
| 75°   | 137 | 115 | 85   | 66   | 57   | 52   | 52   | 52   | 53   | 54   | 54   |
| 77.5° | 115 | 97  | 71   | 55   | 48   | 44   | 44   | 44   | 46   | 46   | 46   |
| 80°   | 88  | 75  | 55   | 43   | 38   | 35   | 35   | 36   | 37   | 38   | 37   |
| 82.5° | 61  | 52  | 38   | 30   | 26   | 25   | 26   | 26   | 28   | 28   | 27   |
| 85°   | 31  | 28  | 20   | 16   | 15   | 14   | 15   | 16   | 16   | 18   | 16   |
| 87.5° | 6   | 5   | 4    | 4    | 5    | 4    | 5    | 5    | 6    | 6    | 6    |
| 90°   | 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: SP1-2407-176-1

Test Date: 09/23/2024

Luminaire Tested: MEM2-HTN-VA-60-AMB-U-WQ

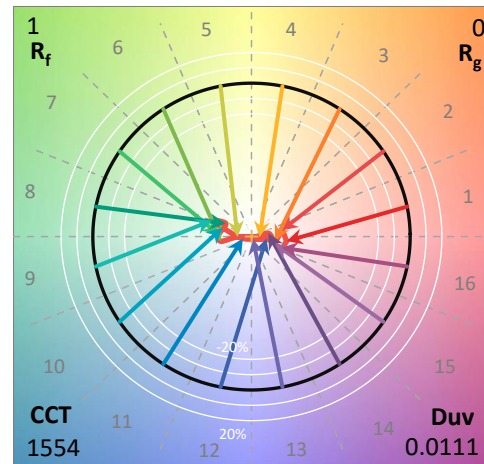
Data in this report applies to families of products including MEM2-HTN-VA-60-AMB-U-WQ

### Test Information

Test Method: LM-79-2019  
 Report Number: SP1-2407-176-1  
 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-60-AMB-U-WQ**  
 Description: EPIC MODERN VISUAL COMFORT 60W AMBER WAVESTREAM WIDE

### Spectral Parameters

|                           |          |           |        |      |        |
|---------------------------|----------|-----------|--------|------|--------|
| CCT (K):                  | 1554     | CRI (Ra): | -22.5  |      |        |
| CIE u':                   | 0.3509   | R1:       | -35.4  | R9:  | -390.1 |
| CIE v':                   | 0.5472   | R2:       | 51.6   | R10: | 27.7   |
| Duv:                      | 0.0111   | R3:       | 17.0   | R11: | -96.9  |
| CIE x:                    | 0.5903   | R4:       | -69.3  | R12: | -12.7  |
| CIE y:                    | 0.4091   | R5:       | -41.7  | R13: | -16.6  |
| CIE z:                    | 0.0006   | R6:       | 40.2   | R14: | 45.8   |
| Peak Wavelength (nm):     | 596      | R7:       | -7.3   | R15: | -68.6  |
| Dominant Wavelength (nm): | 592      | R8:       | -135.2 |      |        |
| Purity:                   | 99.98723 |           |        |      |        |
| Rf:                       | 1.1      |           |        |      |        |
| Rg:                       | 0        |           |        |      |        |



### Test Conditions

Stabilization Time: 98M  
 Operation Time: 2H 38M  
 Sphere Temperature (°C): 25.2

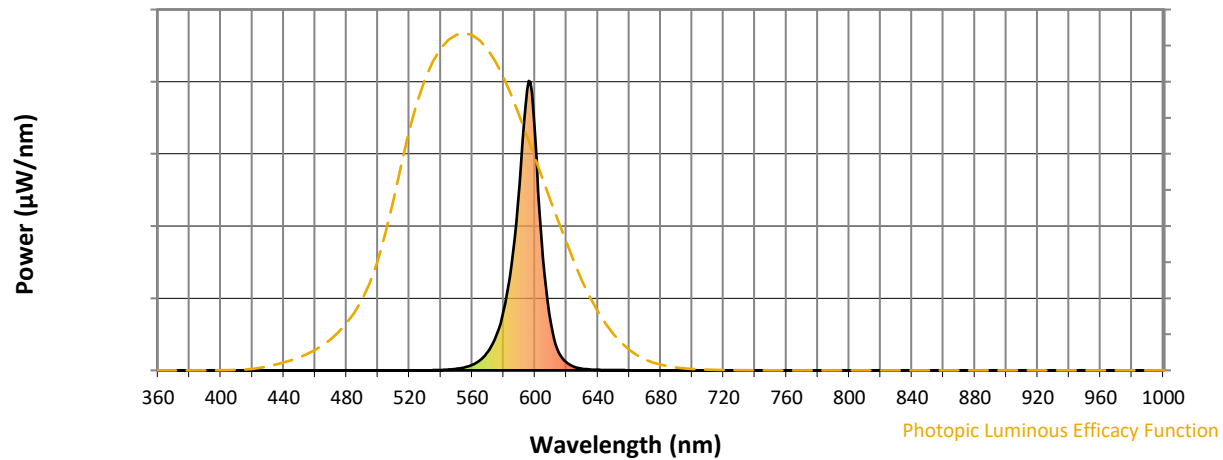
REPORT NUMBER: SP1-2407-176-1

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



REPORT NUMBER: SP1-2407-176-1

### Photopic Flux vs. Wavelength

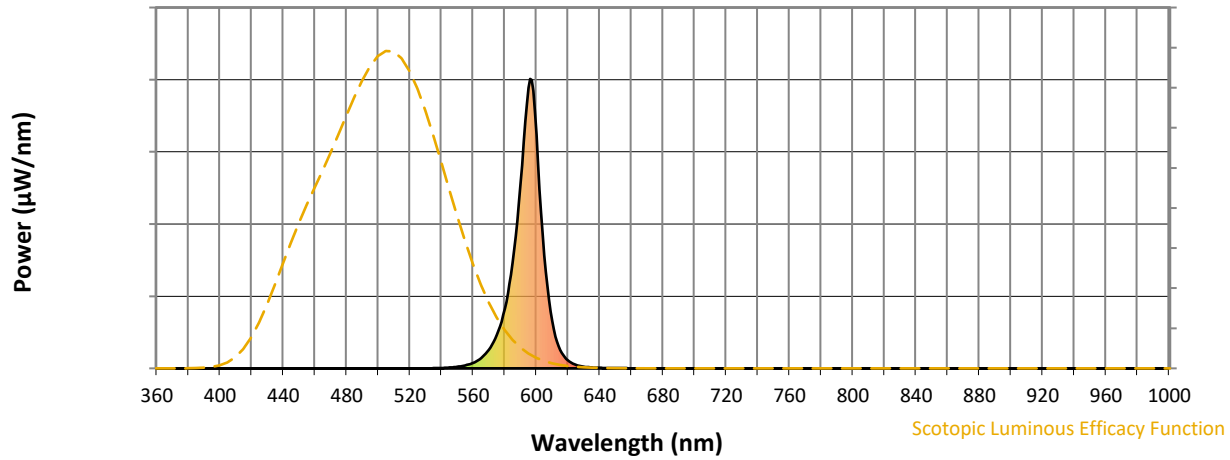


### Photopic Lumens: NR

| $\lambda$<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               | 0                                      | NR                             | 620               | 27                                     | NR                             | 750               | 0                                      | NR                             | 880               | 0                                      | NR                             |
| 365               | 0                                      | NR                             | 495               | 0                                      | NR                             | 625               | 12                                     | NR                             | 755               | 0                                      | NR                             | 885               | 0                                      | NR                             |
| 370               | 0                                      | NR                             | 500               | 0                                      | NR                             | 630               | 6                                      | NR                             | 760               | 0                                      | NR                             | 890               | 0                                      | NR                             |
| 375               | 0                                      | NR                             | 505               | 0                                      | NR                             | 635               | 3                                      | NR                             | 765               | 0                                      | NR                             | 895               | 0                                      | NR                             |
| 380               | 0                                      | NR                             | 510               | 0                                      | NR                             | 640               | 2                                      | NR                             | 770               | 0                                      | NR                             | 900               | 0                                      | NR                             |
| 385               | 0                                      | NR                             | 515               | 0                                      | NR                             | 645               | 1                                      | NR                             | 775               | 0                                      | NR                             | 905               | 0                                      | NR                             |
| 390               | 0                                      | NR                             | 520               | 0                                      | NR                             | 650               | 1                                      | NR                             | 780               | 0                                      | NR                             | 910               | 0                                      | NR                             |
| 395               | 0                                      | NR                             | 525               | 0                                      | NR                             | 655               | 1                                      | NR                             | 785               | 0                                      | NR                             | 915               | 0                                      | NR                             |
| 400               | 0                                      | NR                             | 530               | 0                                      | NR                             | 660               | 1                                      | NR                             | 790               | 0                                      | NR                             | 920               | 0                                      | NR                             |
| 405               | 0                                      | NR                             | 535               | 1                                      | NR                             | 665               | 0                                      | NR                             | 795               | 0                                      | NR                             | 925               | 0                                      | NR                             |
| 410               | 0                                      | NR                             | 540               | 1                                      | NR                             | 670               | 0                                      | NR                             | 800               | 0                                      | NR                             | 930               | 0                                      | NR                             |
| 415               | 0                                      | NR                             | 545               | 3                                      | NR                             | 675               | 0                                      | NR                             | 805               | 0                                      | NR                             | 935               | 0                                      | NR                             |
| 420               | 0                                      | NR                             | 550               | 5                                      | NR                             | 680               | 0                                      | NR                             | 810               | 0                                      | NR                             | 940               | 0                                      | NR                             |
| 425               | 0                                      | NR                             | 555               | 10                                     | NR                             | 685               | 0                                      | NR                             | 815               | 0                                      | NR                             | 945               | 0                                      | NR                             |
| 430               | 0                                      | NR                             | 560               | 19                                     | NR                             | 690               | 0                                      | NR                             | 820               | 0                                      | NR                             | 950               | 0                                      | NR                             |
| 435               | 0                                      | NR                             | 565               | 35                                     | NR                             | 695               | 0                                      | NR                             | 825               | 0                                      | NR                             | 955               | 0                                      | NR                             |
| 440               | 0                                      | NR                             | 570               | 64                                     | NR                             | 700               | 0                                      | NR                             | 830               | 0                                      | NR                             | 960               | 0                                      | NR                             |
| 445               | 0                                      | NR                             | 575               | 116                                    | NR                             | 705               | 0                                      | NR                             | 835               | 0                                      | NR                             | 965               | 0                                      | NR                             |
| 450               | 0                                      | NR                             | 580               | 206                                    | NR                             | 710               | 0                                      | NR                             | 840               | 0                                      | NR                             | 970               | 0                                      | NR                             |
| 455               | 0                                      | NR                             | 585               | 364                                    | NR                             | 715               | 0                                      | NR                             | 845               | 0                                      | NR                             | 975               | 0                                      | NR                             |
| 460               | 0                                      | NR                             | 590               | 639                                    | NR                             | 720               | 0                                      | NR                             | 850               | 0                                      | NR                             | 980               | 0                                      | NR                             |
| 465               | 0                                      | NR                             | 595               | 970                                    | NR                             | 725               | 0                                      | NR                             | 855               | 0                                      | NR                             | 985               | 0                                      | NR                             |
| 470               | 0                                      | NR                             | 600               | 808                                    | NR                             | 730               | 0                                      | NR                             | 860               | 0                                      | NR                             | 990               | 0                                      | NR                             |
| 475               | 0                                      | NR                             | 605               | 391                                    | NR                             | 735               | 0                                      | NR                             | 865               | 0                                      | NR                             | 995               | 0                                      | NR                             |
| 480               | 0                                      | NR                             | 610               | 164                                    | NR                             | 740               | 0                                      | NR                             | 870               | 0                                      | NR                             | 1000              | 0                                      | NR                             |
| 485               | 0                                      | NR                             | 615               | 63                                     | NR                             | 745               | 0                                      | NR                             | 875               | 0                                      | NR                             |                   |                                        |                                |

REPORT NUMBER: SP1-2407-176-1

### Scotopic Flux vs. Wavelength

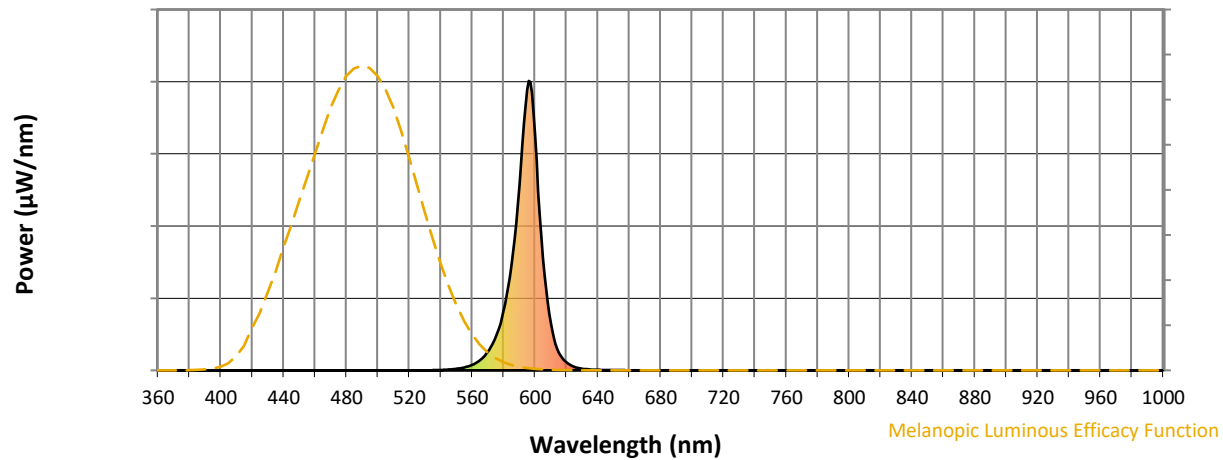


Scotopic Lumens: NR

S/P: 0.22

| 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    | 0                        | NR            | 620    | 27                       | NR            | 750    | 0                        | NR            | 880    | 0                        | NR            |
| 365    | 0                        | NR            | 495    | 0                        | NR            | 625    | 12                       | NR            | 755    | 0                        | NR            | 885    | 0                        | NR            |
| 370    | 0                        | NR            | 500    | 0                        | NR            | 630    | 6                        | NR            | 760    | 0                        | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 0                        | NR            | 635    | 3                        | NR            | 765    | 0                        | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 0                        | NR            | 640    | 2                        | NR            | 770    | 0                        | NR            | 900    | 0                        | NR            |
| 385    | 0                        | NR            | 515    | 0                        | NR            | 645    | 1                        | NR            | 775    | 0                        | NR            | 905    | 0                        | NR            |
| 390    | 0                        | NR            | 520    | 0                        | NR            | 650    | 1                        | NR            | 780    | 0                        | NR            | 910    | 0                        | NR            |
| 395    | 0                        | NR            | 525    | 0                        | NR            | 655    | 1                        | NR            | 785    | 0                        | NR            | 915    | 0                        | NR            |
| 400    | 0                        | NR            | 530    | 0                        | NR            | 660    | 1                        | NR            | 790    | 0                        | NR            | 920    | 0                        | NR            |
| 405    | 0                        | NR            | 535    | 1                        | NR            | 665    | 0                        | NR            | 795    | 0                        | NR            | 925    | 0                        | NR            |
| 410    | 0                        | NR            | 540    | 1                        | NR            | 670    | 0                        | NR            | 800    | 0                        | NR            | 930    | 0                        | NR            |
| 415    | 0                        | NR            | 545    | 3                        | NR            | 675    | 0                        | NR            | 805    | 0                        | NR            | 935    | 0                        | NR            |
| 420    | 0                        | NR            | 550    | 5                        | NR            | 680    | 0                        | NR            | 810    | 0                        | NR            | 940    | 0                        | NR            |
| 425    | 0                        | NR            | 555    | 10                       | NR            | 685    | 0                        | NR            | 815    | 0                        | NR            | 945    | 0                        | NR            |
| 430    | 0                        | NR            | 560    | 19                       | NR            | 690    | 0                        | NR            | 820    | 0                        | NR            | 950    | 0                        | NR            |
| 435    | 0                        | NR            | 565    | 35                       | NR            | 695    | 0                        | NR            | 825    | 0                        | NR            | 955    | 0                        | NR            |
| 440    | 0                        | NR            | 570    | 64                       | NR            | 700    | 0                        | NR            | 830    | 0                        | NR            | 960    | 0                        | NR            |
| 445    | 0                        | NR            | 575    | 116                      | NR            | 705    | 0                        | NR            | 835    | 0                        | NR            | 965    | 0                        | NR            |
| 450    | 0                        | NR            | 580    | 206                      | NR            | 710    | 0                        | NR            | 840    | 0                        | NR            | 970    | 0                        | NR            |
| 455    | 0                        | NR            | 585    | 364                      | NR            | 715    | 0                        | NR            | 845    | 0                        | NR            | 975    | 0                        | NR            |
| 460    | 0                        | NR            | 590    | 639                      | NR            | 720    | 0                        | NR            | 850    | 0                        | NR            | 980    | 0                        | NR            |
| 465    | 0                        | NR            | 595    | 970                      | NR            | 725    | 0                        | NR            | 855    | 0                        | NR            | 985    | 0                        | NR            |
| 470    | 0                        | NR            | 600    | 808                      | NR            | 730    | 0                        | NR            | 860    | 0                        | NR            | 990    | 0                        | NR            |
| 475    | 0                        | NR            | 605    | 391                      | NR            | 735    | 0                        | NR            | 865    | 0                        | NR            | 995    | 0                        | NR            |
| 480    | 0                        | NR            | 610    | 164                      | NR            | 740    | 0                        | NR            | 870    | 0                        | NR            | 1000   | 0                        | NR            |
| 485    | 0                        | NR            | 615    | 63                       | NR            | 745    | 0                        | NR            | 875    | 0                        | NR            |        |                          |               |

REPORT NUMBER: SP1-2407-176-1

**Melanopic Flux vs. Wavelength**

**Melanopic Lumens: NR**
**M/P: 0.12**

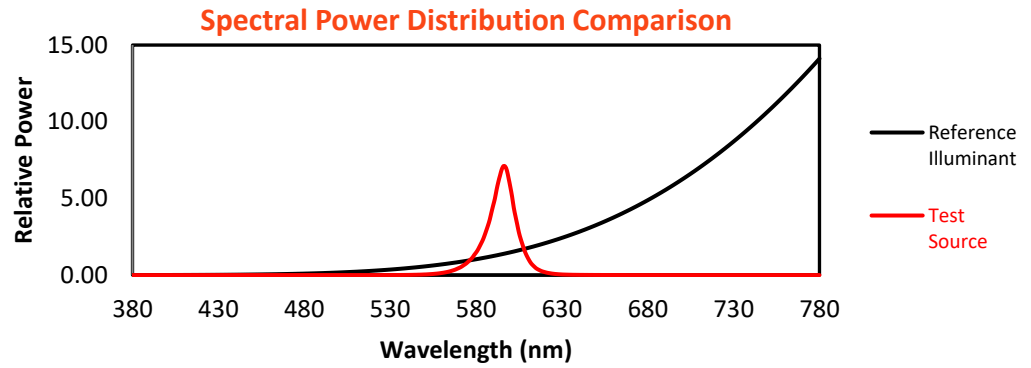
| $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | 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               | 0                                      | NR                             | 620               | 27                                     | NR                             | 750               | 0                                      | NR                             | 880               | 0                                      | NR                             |
| 365               | 0                                      | NR                             | 495               | 0                                      | NR                             | 625               | 12                                     | NR                             | 755               | 0                                      | NR                             | 885               | 0                                      | NR                             |
| 370               | 0                                      | NR                             | 500               | 0                                      | NR                             | 630               | 6                                      | NR                             | 760               | 0                                      | NR                             | 890               | 0                                      | NR                             |
| 375               | 0                                      | NR                             | 505               | 0                                      | NR                             | 635               | 3                                      | NR                             | 765               | 0                                      | NR                             | 895               | 0                                      | NR                             |
| 380               | 0                                      | NR                             | 510               | 0                                      | NR                             | 640               | 2                                      | NR                             | 770               | 0                                      | NR                             | 900               | 0                                      | NR                             |
| 385               | 0                                      | NR                             | 515               | 0                                      | NR                             | 645               | 1                                      | NR                             | 775               | 0                                      | NR                             | 905               | 0                                      | NR                             |
| 390               | 0                                      | NR                             | 520               | 0                                      | NR                             | 650               | 1                                      | NR                             | 780               | 0                                      | NR                             | 910               | 0                                      | NR                             |
| 395               | 0                                      | NR                             | 525               | 0                                      | NR                             | 655               | 1                                      | NR                             | 785               | 0                                      | NR                             | 915               | 0                                      | NR                             |
| 400               | 0                                      | NR                             | 530               | 0                                      | NR                             | 660               | 1                                      | NR                             | 790               | 0                                      | NR                             | 920               | 0                                      | NR                             |
| 405               | 0                                      | NR                             | 535               | 1                                      | NR                             | 665               | 0                                      | NR                             | 795               | 0                                      | NR                             | 925               | 0                                      | NR                             |
| 410               | 0                                      | NR                             | 540               | 1                                      | NR                             | 670               | 0                                      | NR                             | 800               | 0                                      | NR                             | 930               | 0                                      | NR                             |
| 415               | 0                                      | NR                             | 545               | 3                                      | NR                             | 675               | 0                                      | NR                             | 805               | 0                                      | NR                             | 935               | 0                                      | NR                             |
| 420               | 0                                      | NR                             | 550               | 5                                      | NR                             | 680               | 0                                      | NR                             | 810               | 0                                      | NR                             | 940               | 0                                      | NR                             |
| 425               | 0                                      | NR                             | 555               | 10                                     | NR                             | 685               | 0                                      | NR                             | 815               | 0                                      | NR                             | 945               | 0                                      | NR                             |
| 430               | 0                                      | NR                             | 560               | 19                                     | NR                             | 690               | 0                                      | NR                             | 820               | 0                                      | NR                             | 950               | 0                                      | NR                             |
| 435               | 0                                      | NR                             | 565               | 35                                     | NR                             | 695               | 0                                      | NR                             | 825               | 0                                      | NR                             | 955               | 0                                      | NR                             |
| 440               | 0                                      | NR                             | 570               | 64                                     | NR                             | 700               | 0                                      | NR                             | 830               | 0                                      | NR                             | 960               | 0                                      | NR                             |
| 445               | 0                                      | NR                             | 575               | 116                                    | NR                             | 705               | 0                                      | NR                             | 835               | 0                                      | NR                             | 965               | 0                                      | NR                             |
| 450               | 0                                      | NR                             | 580               | 206                                    | NR                             | 710               | 0                                      | NR                             | 840               | 0                                      | NR                             | 970               | 0                                      | NR                             |
| 455               | 0                                      | NR                             | 585               | 364                                    | NR                             | 715               | 0                                      | NR                             | 845               | 0                                      | NR                             | 975               | 0                                      | NR                             |
| 460               | 0                                      | NR                             | 590               | 639                                    | NR                             | 720               | 0                                      | NR                             | 850               | 0                                      | NR                             | 980               | 0                                      | NR                             |
| 465               | 0                                      | NR                             | 595               | 970                                    | NR                             | 725               | 0                                      | NR                             | 855               | 0                                      | NR                             | 985               | 0                                      | NR                             |
| 470               | 0                                      | NR                             | 600               | 808                                    | NR                             | 730               | 0                                      | NR                             | 860               | 0                                      | NR                             | 990               | 0                                      | NR                             |
| 475               | 0                                      | NR                             | 605               | 391                                    | NR                             | 735               | 0                                      | NR                             | 865               | 0                                      | NR                             | 995               | 0                                      | NR                             |
| 480               | 0                                      | NR                             | 610               | 164                                    | NR                             | 740               | 0                                      | NR                             | 870               | 0                                      | NR                             | 1000              | 0                                      | NR                             |
| 485               | 0                                      | NR                             | 615               | 63                                     | NR                             | 745               | 0                                      | NR                             | 875               | 0                                      | NR                             |                   |                                        |                                |

REPORT NUMBER: SP1-2407-176-1

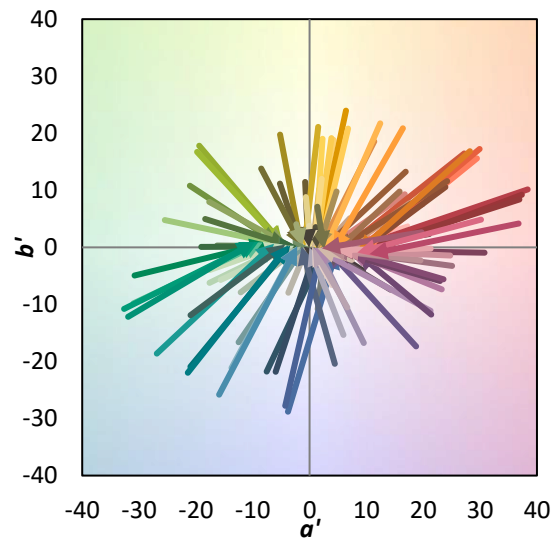
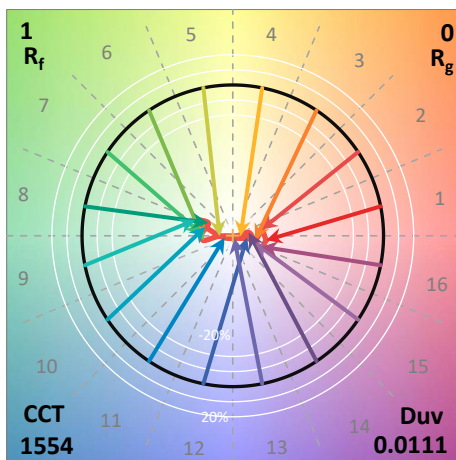
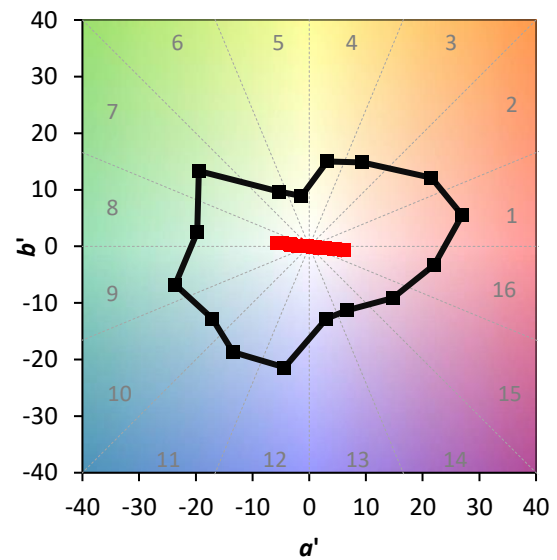
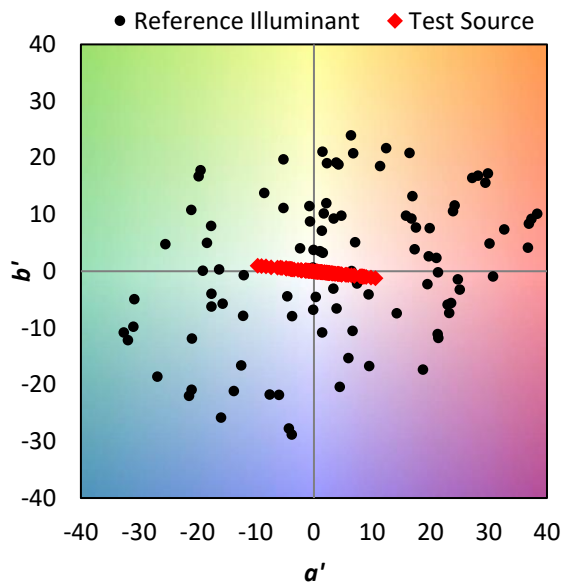
TM-30-18

### Summary

$R_f = 1.1$   
 $R_g = 0$   
 $CIE\ R_a = -22.5$   
 $R_g = -390.1$

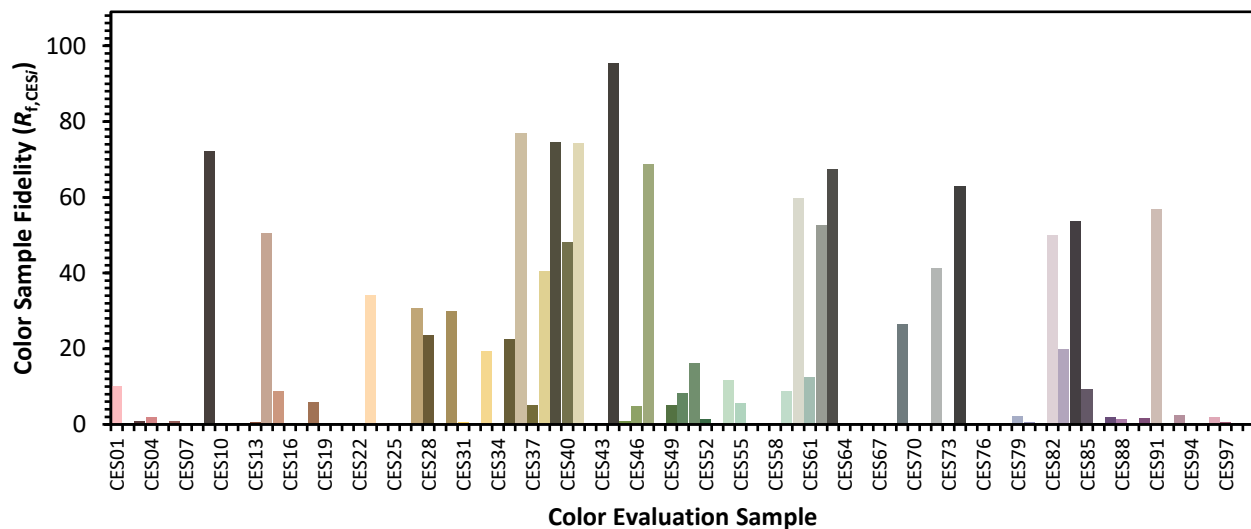


### Color Vector Graphics

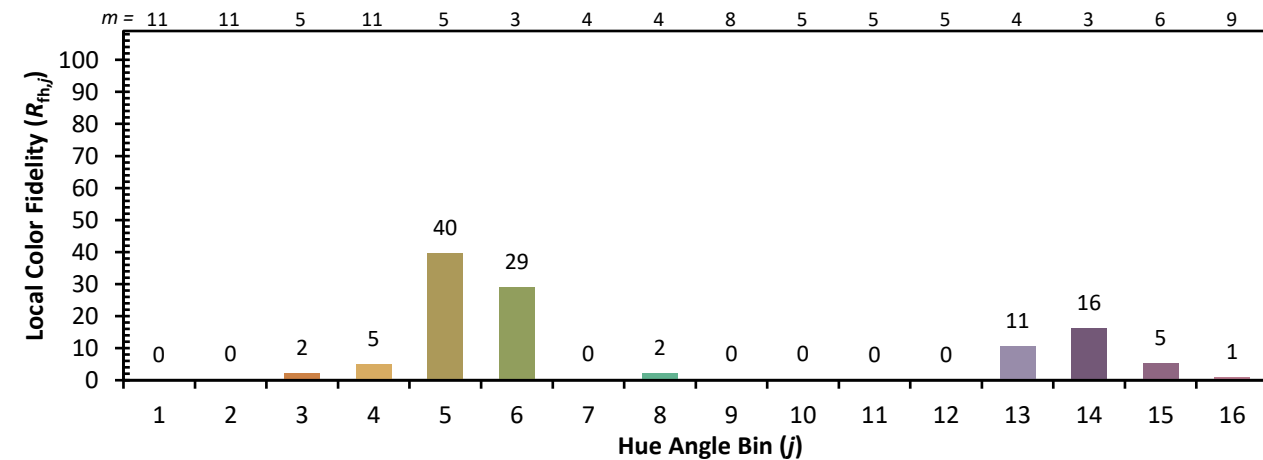
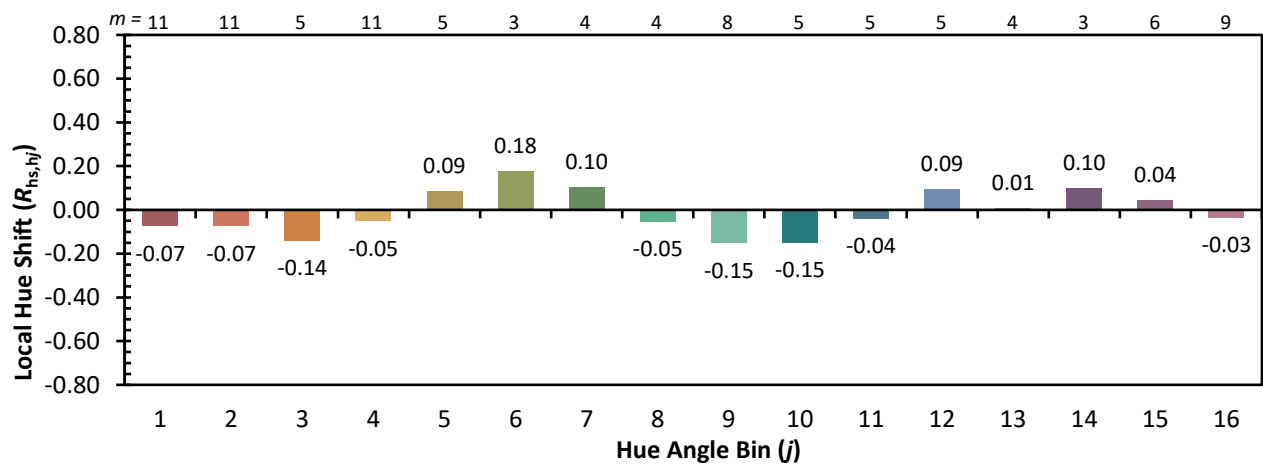
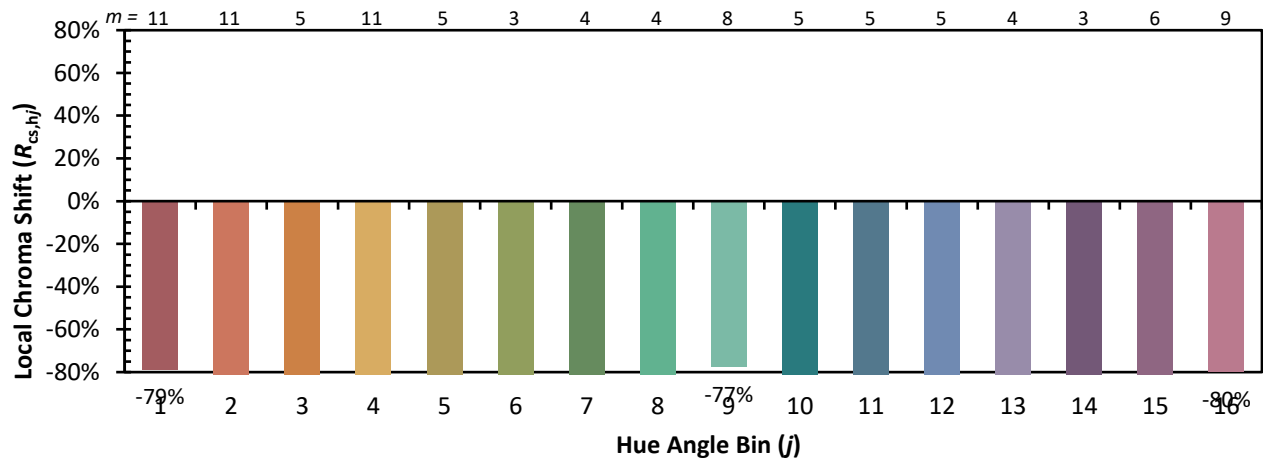


**Individual Sample Fidelity Index ( $R_{fi}$ )**

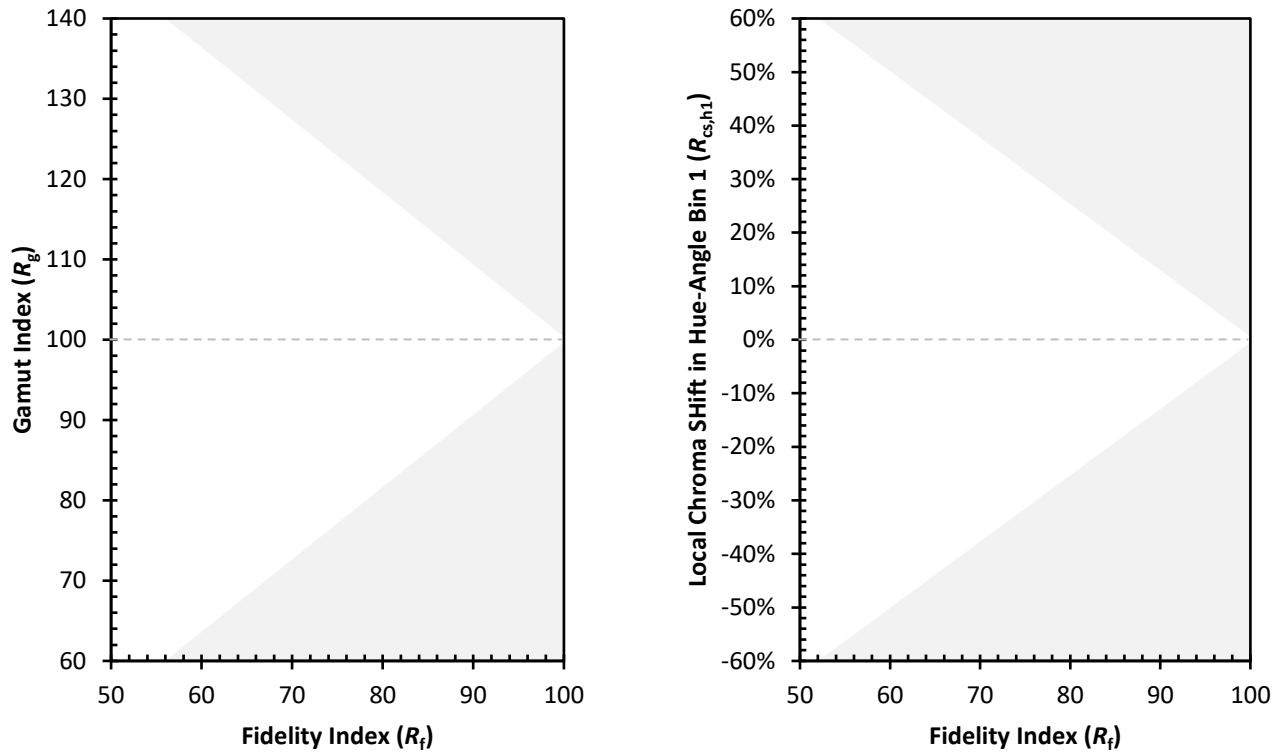
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 90 | CES26 = 0  | CES51 = 16 | CES76 = 0  |
| CES02 = 69 | CES27 = 31 | CES52 = 2  | CES77 = 0  |
| CES03 = 31 | CES28 = 24 | CES53 = 0  | CES78 = 0  |
| CES04 = 77 | CES29 = 0  | CES54 = 12 | CES79 = 2  |
| CES05 = 52 | CES30 = 30 | CES55 = 6  | CES80 = 1  |
| CES06 = 56 | CES31 = 1  | CES56 = 0  | CES81 = 0  |
| CES07 = 41 | CES32 = 0  | CES57 = 0  | CES82 = 50 |
| CES08 = 38 | CES33 = 19 | CES58 = 0  | CES83 = 20 |
| CES09 = 29 | CES34 = 0  | CES59 = 9  | CES84 = 54 |
| CES10 = 87 | CES35 = 22 | CES60 = 60 | CES85 = 9  |
| CES11 = 70 | CES36 = 77 | CES61 = 12 | CES86 = 0  |
| CES12 = 75 | CES37 = 5  | CES62 = 53 | CES87 = 2  |
| CES13 = 47 | CES38 = 40 | CES63 = 67 | CES88 = 1  |
| CES14 = 76 | CES39 = 75 | CES64 = 0  | CES89 = 0  |
| CES15 = 74 | CES40 = 48 | CES65 = 0  | CES90 = 2  |
| CES16 = 49 | CES41 = 74 | CES66 = 0  | CES91 = 57 |
| CES17 = 56 | CES42 = 0  | CES67 = 0  | CES92 = 0  |
| CES18 = 59 | CES43 = 0  | CES68 = 0  | CES93 = 2  |
| CES19 = 80 | CES44 = 95 | CES69 = 26 | CES94 = 0  |
| CES20 = 71 | CES45 = 1  | CES70 = 0  | CES95 = 0  |
| CES21 = 94 | CES46 = 5  | CES71 = 0  | CES96 = 2  |
| CES22 = 87 | CES47 = 69 | CES72 = 41 | CES97 = 1  |
| CES23 = 94 | CES48 = 0  | CES73 = 0  | CES98 = 0  |
| CES24 = 95 | CES49 = 5  | CES74 = 63 | CES99 = 0  |
| CES25 = 79 | CES50 = 8  | CES75 = 0  |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)