

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: FAIL-SAFE

Report Number: P732614

Luminaire Tested: **14FCZ2-25-S-B2750-W2D-CA08-4000K**

Issue Date: 1/5/2024



**Test Information**

Test Method: LM-79-08  
Report Number: P732614  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (P275670)  
Test Lab: INNOVATION CENTER(G3)  
Issue Date: 1/5/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: FAIL-SAFE  
Catalog Number: 14FCZ2-25-S-B2750-W2D-CA08-4000K  
Description: 1X4 2500 LUMEN SEALED CRUZE TROFFER WITH BIO UP LEDS AT 4000K CCT  
AND SMOOTH LENS, WITH, CA08 BOTTOM LENS  
  
Light Source: -  
Ballast/Driver: -

**Summary**

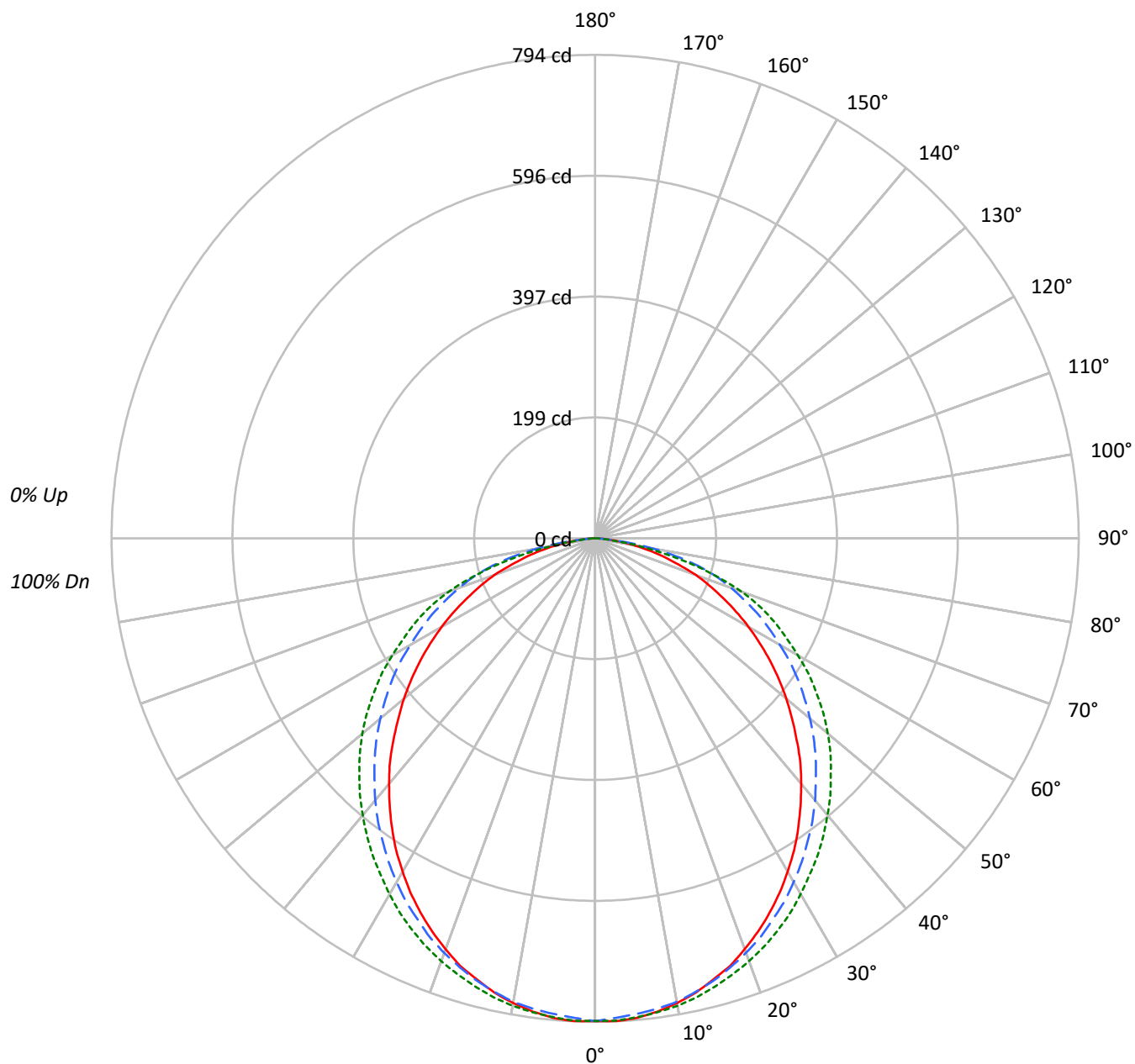
Lumens per Lamp: N/A  
Luminaire Lumens: 2221.0 lumens  
Efficiency: N/A  
Efficacy: 116.9 lumens/watt  
Spacing Criteria (0/90/45): 1.19 / 1.26 / 1.36  
Luminous Opening: Rectangular (W 0.96' x L: 3.98' x H: 0')  
CIE Type: Direct

Input Watts (W): 19  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 25 FT

TEST NUMBER: P732614

CATALOG NUMBER: 14FCZ2-25-S-B2750-W2D-CA08-4000K

### Luminous Intensity Polar Plot





TEST NUMBER: P732614

CATALOG NUMBER: 14FCZ2-25-S-B2750-W2D-CA08-4000K

**COEFFICIENT OF UTILIZATION - ZONAL CAVITY METHOD:**

|     |     |     |     |     |     |     |     |     |  |     |     |     |  |     |     |     |  |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|-----|-----|-----|--|-----|-----|-----|--|-----|-----|-----|
| RF  | 20  |     |     |     | 20  |     |     |     |  | 20  |     |     |  |     | 20  |     |  |     |     | 20  |
| RC  | 80  |     |     |     | 70  |     |     |     |  | 50  |     |     |  |     | 30  |     |  |     |     | 10  |
| RW  | 70  | 50  | 30  | 10  | 70  | 50  | 30  | 10  |  | 50  | 30  | 10  |  | 50  | 30  | 10  |  | 50  | 30  | 10  |
| RCR |     |     |     |     |     |     |     |     |  |     |     |     |  |     |     |     |  |     |     |     |
| 0   | 119 | 119 | 119 | 119 | 116 | 116 | 116 | 116 |  | 111 | 111 | 111 |  | 106 | 106 | 106 |  | 102 | 102 | 102 |
| 1   | 109 | 104 | 100 | 96  | 106 | 102 | 98  | 94  |  | 97  | 94  | 91  |  | 94  | 91  | 89  |  | 90  | 88  | 86  |
| 2   | 99  | 90  | 84  | 78  | 96  | 89  | 82  | 77  |  | 85  | 80  | 75  |  | 82  | 77  | 73  |  | 79  | 75  | 72  |
| 3   | 90  | 79  | 71  | 65  | 87  | 78  | 70  | 64  |  | 75  | 68  | 63  |  | 72  | 66  | 62  |  | 69  | 65  | 61  |
| 4   | 82  | 70  | 61  | 55  | 80  | 69  | 61  | 54  |  | 66  | 59  | 53  |  | 64  | 58  | 53  |  | 62  | 56  | 52  |
| 5   | 76  | 63  | 54  | 47  | 74  | 62  | 53  | 47  |  | 59  | 52  | 46  |  | 57  | 51  | 46  |  | 56  | 50  | 45  |
| 6   | 70  | 56  | 47  | 41  | 68  | 55  | 47  | 41  |  | 54  | 46  | 40  |  | 52  | 45  | 40  |  | 50  | 44  | 40  |
| 7   | 65  | 51  | 42  | 36  | 63  | 50  | 42  | 36  |  | 49  | 41  | 36  |  | 47  | 41  | 35  |  | 46  | 40  | 35  |
| 8   | 60  | 47  | 38  | 32  | 59  | 46  | 38  | 32  |  | 45  | 37  | 32  |  | 43  | 37  | 32  |  | 42  | 36  | 32  |
| 9   | 56  | 43  | 35  | 29  | 55  | 42  | 34  | 29  |  | 41  | 34  | 29  |  | 40  | 33  | 29  |  | 39  | 33  | 28  |
| 10  | 53  | 40  | 32  | 26  | 52  | 39  | 31  | 26  |  | 38  | 31  | 26  |  | 37  | 31  | 26  |  | 36  | 30  | 26  |

**AVERAGE LUMINANCE (cd/sqm):**

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2238 | 2238 | 2238 |
| 5°  | 2240 | 2222 | 2237 |
| 10° | 2222 | 2216 | 2235 |
| 15° | 2192 | 2198 | 2227 |
| 20° | 2157 | 2177 | 2220 |
| 25° | 2113 | 2151 | 2212 |
| 30° | 2060 | 2125 | 2200 |
| 35° | 2003 | 2095 | 2193 |
| 40° | 1940 | 2069 | 2187 |
| 45° | 1868 | 2044 | 2185 |
| 50° | 1799 | 2021 | 2190 |
| 55° | 1723 | 2005 | 2184 |
| 60° | 1642 | 1977 | 2170 |
| 65° | 1545 | 1971 | 2170 |
| 70° | 1454 | 1954 | 2108 |
| 75° | 1261 | 1910 | 1802 |
| 80° | 1019 | 1539 | 1200 |
| 85° | 677  | 534  | 359  |



TEST NUMBER: P732614

CATALOG NUMBER: 14FCZ2-25-S-B2750-W2D-CA08-4000K

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 74.9   | 3.4       |
| 10°-20°   | 213.0  | 9.6       |
| 20°-30°   | 319.6  | 14.4      |
| 30°-40°   | 381.2  | 17.2      |
| 40°-50°   | 394.1  | 17.7      |
| 50°-60°   | 359.8  | 16.2      |
| 60°-70°   | 283.2  | 12.7      |
| 70°-80°   | 164.8  | 7.4       |
| 80°-90°   | 30.4   | 1.4       |
| 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°-30°    | 607.5  | 27.4      |
| 0°-40°    | 988.7  | 44.5      |
| 0°-60°    | 1742.7 | 78.5      |
| 0°-90°    | 2221.0 | 100.0     |
| 90°-120°  | 0.0    | 0.0       |
| 90°-150°  | 0.0    | 0.0       |
| 90°-180°  | 0.0    | 0.0       |
| 0°-180°   | 2221.0 | 100.0     |

**CANDELA DISTRIBUTION:**

|     | 0°  | 22.5° | 45° | 67.5° | 90° | Flux |
|-----|-----|-------|-----|-------|-----|------|
| 0°  | 793 | 793   | 793 | 793   | 793 |      |
| 5°  | 791 | 788   | 784 | 791   | 790 | 75   |
| 15° | 750 | 751   | 752 | 762   | 762 | 212  |
| 25° | 678 | 682   | 690 | 707   | 710 | 312  |
| 35° | 581 | 589   | 608 | 631   | 636 | 363  |
| 45° | 468 | 484   | 512 | 541   | 547 | 361  |
| 55° | 350 | 369   | 408 | 437   | 444 | 313  |
| 65° | 231 | 255   | 295 | 318   | 325 | 230  |
| 75° | 116 | 143   | 175 | 172   | 165 | 123  |
| 85° | 21  | 30    | 16  | 13    | 11  | 27   |
| 90° | 0   | 0     | 0   | 0     | 0   |      |



TEST NUMBER: P732614

CATALOG NUMBER: 14FCZ2-25-S-B2750-W2D-CA08-4000K

**CANDELA DISTRIBUTION (FULL):**

|       | 0°    | 22.5° | 45°   | 67.5° | 90°   |
|-------|-------|-------|-------|-------|-------|
| 0°    | 792.9 | 792.9 | 792.9 | 792.9 | 792.9 |
| 2.5°  | 793.9 | 791.8 | 788.4 | 793.9 | 792.9 |
| 5°    | 790.7 | 788.4 | 784.1 | 790.7 | 789.5 |
| 7.5°  | 784.1 | 781.8 | 779.6 | 786.3 | 785.2 |
| 10°   | 775.2 | 774.1 | 773.0 | 780.7 | 779.6 |
| 12.5° | 764.3 | 764.3 | 763.2 | 772.0 | 772.0 |
| 15°   | 750.0 | 751.0 | 752.1 | 762.0 | 762.0 |
| 17.5° | 736.7 | 735.7 | 738.9 | 750.0 | 751.0 |
| 20°   | 718.0 | 720.1 | 724.6 | 737.8 | 738.9 |
| 22.5° | 699.2 | 701.5 | 709.2 | 722.4 | 725.7 |
| 25°   | 678.3 | 681.7 | 690.5 | 706.9 | 710.3 |
| 27.5° | 656.3 | 660.8 | 672.8 | 690.5 | 693.7 |
| 30°   | 632.0 | 638.6 | 651.9 | 671.7 | 675.1 |
| 32.5° | 607.9 | 614.5 | 630.9 | 650.8 | 655.2 |
| 35°   | 581.4 | 589.1 | 607.9 | 630.9 | 636.5 |
| 37.5° | 553.9 | 563.8 | 585.9 | 609.0 | 615.6 |
| 40°   | 526.4 | 537.4 | 561.6 | 585.9 | 593.6 |
| 42.5° | 498.8 | 509.9 | 536.2 | 563.8 | 571.6 |
| 45°   | 467.9 | 483.5 | 512.1 | 540.7 | 547.3 |
| 47.5° | 438.3 | 454.9 | 486.7 | 515.3 | 524.2 |
| 50°   | 409.7 | 426.1 | 460.3 | 490.1 | 498.8 |
| 52.5° | 380.0 | 397.5 | 433.8 | 464.7 | 472.4 |
| 55°   | 350.2 | 368.9 | 407.5 | 437.2 | 443.8 |
| 57.5° | 320.5 | 340.3 | 380.0 | 408.6 | 416.3 |
| 60°   | 290.8 | 311.7 | 350.2 | 378.8 | 384.3 |
| 62.5° | 261.0 | 283.0 | 322.6 | 348.0 | 353.5 |
| 65°   | 231.3 | 255.4 | 295.1 | 318.3 | 324.9 |
| 67.5° | 202.7 | 226.8 | 265.4 | 287.4 | 292.9 |
| 70°   | 176.2 | 198.2 | 236.8 | 253.3 | 255.4 |
| 72.5° | 143.2 | 170.7 | 208.1 | 217.0 | 211.4 |
| 75°   | 115.6 | 143.2 | 175.1 | 171.8 | 165.2 |
| 77.5° | 88.1  | 115.6 | 136.6 | 125.5 | 116.7 |
| 80°   | 62.7  | 90.3  | 94.7  | 78.1  | 73.8  |
| 82.5° | 40.7  | 62.7  | 52.9  | 40.7  | 33.1  |
| 85°   | 20.9  | 29.7  | 16.5  | 13.2  | 11.1  |
| 87.5° | 6.6   | 4.5   | 2.2   | 2.2   | 1.1   |
| 90°   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |



Report Generated By 670246072 / DESKTOP-50001EG





— 0°-180°    - - 45°-225°    - - - 90°-270°







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

Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

METALUX

Report Number: SP1-2210-795-4

Test Date: 10/06/2022

Luminaire Tested: 9WP217084MDER4AM-4000K-315MA

Data in this report applies to families of products including 9WP217084MDER4AM-4000K.

### Test Information

Test Method: LM-79-2019  
 Report Number: SP1-2210-795-4  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 10/06/2022  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: METALUX  
 Catalog Number: **9WP217084MDER4AM-4000K-315MA**  
 Description: METALUX

TUNABLE BOARD, 4000K-315MA, PROGRAMMED @ 5.0Vdc.

### Spectral Parameters

|                           |         |           |      |      |      |
|---------------------------|---------|-----------|------|------|------|
| CCT (K):                  | 4009    | CRI (Ra): | 87.8 |      |      |
| CIE u':                   | 0.2311  | R1:       | 94.2 | R9:  | 79.5 |
| CIE v':                   | 0.4879  | R2:       | 88.6 | R10: | 77.2 |
| Duv:                      | -0.0109 | R3:       | 84.5 | R11: | 92.9 |
| CIE x:                    | 0.3728  | R4:       | 91.1 | R12: | 72.5 |
| CIE y:                    | 0.3498  | R5:       | 92.1 | R13: | 92.1 |
| CIE z:                    | 0.2775  | R6:       | 82.3 | R14: | 92.6 |
| Peak Wavelength (nm):     | 632     | R7:       | 84.3 |      |      |
| Dominant Wavelength (nm): | 588     | R8:       | 84.9 |      |      |
| Purity:                   | 17.1    |           |      |      |      |
| Rf:                       | 88      |           |      |      |      |
| Rg:                       | 96.2    |           |      |      |      |



### Test Conditions

Stabilization Time: 44M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.0/38%  
 Sphere Temperature (°C): 24.4

REPORT NUMBER: SP1-2210-795-4

| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | 76INCH SPHERE IN0058  | 8/8/2022         | 2/8/2023             |
| 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           |

REPORT NUMBER: SP1-2210-795-4

**CIE 1931 Chromaticity Diagram**



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



Point lies outside the range

REPORT NUMBER: SP1-2210-795-4

**Photopic Flux vs. Wavelength**

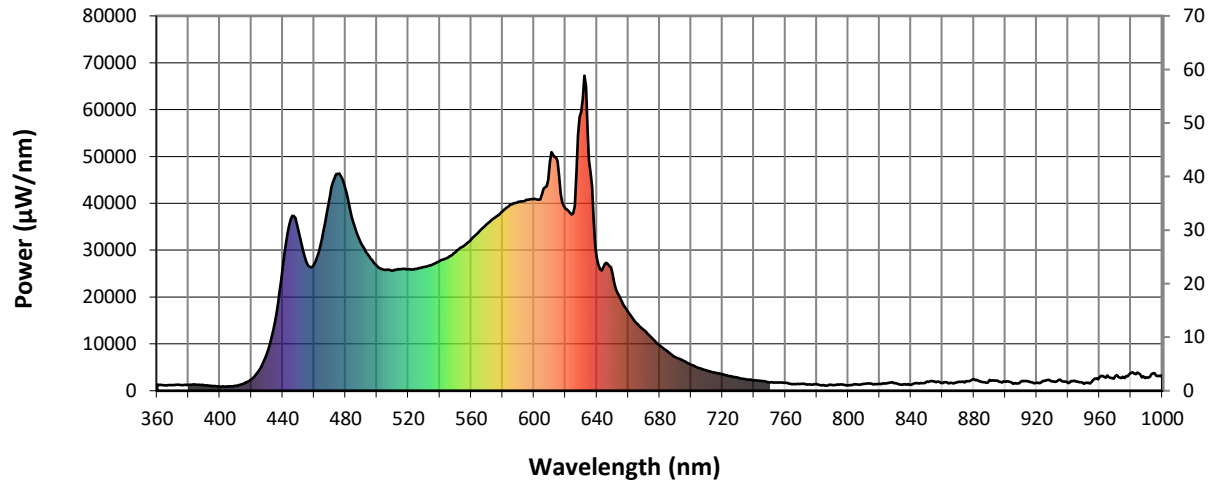


#####

| 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       | 1347             | NR               | 490       | 31353            | NR               | 620       | 38840            | NR               | 750       | 1762             | NR               | 880       | 2493             | NR               |
| 365       | 1168             | NR               | 495       | 28718            | NR               | 625       | 37861            | NR               | 755       | 1752             | NR               | 885       | 1913             | NR               |
| 370       | 1204             | NR               | 500       | 26605            | NR               | 630       | 59547            | NR               | 760       | 1690             | NR               | 890       | 2275             | NR               |
| 375       | 1232             | NR               | 505       | 25784            | NR               | 635       | 49312            | NR               | 765       | 1395             | NR               | 895       | 2173             | NR               |
| 380       | 1249             | NR               | 510       | 25614            | NR               | 640       | 28168            | NR               | 770       | 1452             | NR               | 900       | 1923             | NR               |
| 385       | 1285             | NR               | 515       | 25941            | NR               | 645       | 27115            | NR               | 775       | 1370             | NR               | 905       | 1511             | NR               |
| 390       | 1154             | NR               | 520       | 25900            | NR               | 650       | 24916            | NR               | 780       | 1429             | NR               | 910       | 1971             | NR               |
| 395       | 1036             | NR               | 525       | 26015            | NR               | 655       | 19572            | NR               | 785       | 1112             | NR               | 915       | 1957             | NR               |
| 400       | 873              | NR               | 530       | 26424            | NR               | 660       | 16766            | NR               | 790       | 1222             | NR               | 920       | 1699             | NR               |
| 405       | 908              | NR               | 535       | 26869            | NR               | 665       | 14487            | NR               | 795       | 1347             | NR               | 925       | 2123             | NR               |
| 410       | 1056             | NR               | 540       | 27684            | NR               | 670       | 12943            | NR               | 800       | 1132             | NR               | 930       | 2029             | NR               |
| 415       | 1492             | NR               | 545       | 28407            | NR               | 675       | 11228            | NR               | 805       | 1360             | NR               | 935       | 2371             | NR               |
| 420       | 2426             | NR               | 550       | 29571            | NR               | 680       | 9665             | NR               | 810       | 1451             | NR               | 940       | 1649             | NR               |
| 425       | 4409             | NR               | 555       | 30862            | NR               | 685       | 8389             | NR               | 815       | 1507             | NR               | 945       | 1984             | NR               |
| 430       | 7984             | NR               | 560       | 32297            | NR               | 690       | 7170             | NR               | 820       | 1466             | NR               | 950       | 1495             | NR               |
| 435       | 14687            | NR               | 565       | 33979            | NR               | 695       | 6398             | NR               | 825       | 1609             | NR               | 955       | 1862             | NR               |
| 440       | 26286            | NR               | 570       | 35579            | NR               | 700       | 5544             | NR               | 830       | 1642             | NR               | 960       | 2951             | NR               |
| 445       | 36513            | NR               | 575       | 36922            | NR               | 705       | 4845             | NR               | 835       | 1363             | NR               | 965       | 3240             | NR               |
| 450       | 34274            | NR               | 580       | 38319            | NR               | 710       | 4309             | NR               | 840       | 1294             | NR               | 970       | 3119             | NR               |
| 455       | 27519            | NR               | 585       | 39771            | NR               | 715       | 3879             | NR               | 845       | 1584             | NR               | 975       | 3020             | NR               |
| 460       | 26986            | NR               | 590       | 40329            | NR               | 720       | 3504             | NR               | 850       | 1930             | NR               | 980       | 3800             | NR               |
| 465       | 32511            | NR               | 595       | 40738            | NR               | 725       | 3094             | NR               | 855       | 1952             | NR               | 985       | 3748             | NR               |
| 470       | 41588            | NR               | 600       | 40944            | NR               | 730       | 2758             | NR               | 860       | 1631             | NR               | 990       | 2878             | NR               |
| 475       | 46297            | NR               | 605       | 41826            | NR               | 735       | 2441             | NR               | 865       | 1714             | NR               | 995       | 3708             | NR               |
| 480       | 42885            | NR               | 610       | 48714            | NR               | 740       | 2221             | NR               | 870       | 1878             | NR               | 1000      | 3359             | NR               |
| 485       | 35895            | NR               | 615       | 48984            | NR               | 745       | 2091             | NR               | 875       | 2024             | NR               |           |                  |                  |

REPORT NUMBER: SP1-2210-795-4

**Scotopic Flux vs. Wavelength**



**Scotopic Lumens: 4927.4**

**S/P: 2.02**

| $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W/nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|
| 360               | 1347                          | NR                             | 490               | 31353                         | NR                             | 620               | 38840                         | NR                             | 750               | 1762                          | NR                             | 880               | 2493                          | NR                             |
| 365               | 1168                          | NR                             | 495               | 28718                         | NR                             | 625               | 37861                         | NR                             | 755               | 1752                          | NR                             | 885               | 1913                          | NR                             |
| 370               | 1204                          | NR                             | 500               | 26605                         | NR                             | 630               | 59547                         | NR                             | 760               | 1690                          | NR                             | 890               | 2275                          | NR                             |
| 375               | 1232                          | NR                             | 505               | 25784                         | NR                             | 635               | 49312                         | NR                             | 765               | 1395                          | NR                             | 895               | 2173                          | NR                             |
| 380               | 1249                          | NR                             | 510               | 25614                         | NR                             | 640               | 28168                         | NR                             | 770               | 1452                          | NR                             | 900               | 1923                          | NR                             |
| 385               | 1285                          | NR                             | 515               | 25941                         | NR                             | 645               | 27115                         | NR                             | 775               | 1370                          | NR                             | 905               | 1511                          | NR                             |
| 390               | 1154                          | NR                             | 520               | 25900                         | NR                             | 650               | 24916                         | NR                             | 780               | 1429                          | NR                             | 910               | 1971                          | NR                             |
| 395               | 1036                          | NR                             | 525               | 26015                         | NR                             | 655               | 19572                         | NR                             | 785               | 1112                          | NR                             | 915               | 1957                          | NR                             |
| 400               | 873                           | NR                             | 530               | 26424                         | NR                             | 660               | 16766                         | NR                             | 790               | 1222                          | NR                             | 920               | 1699                          | NR                             |
| 405               | 908                           | NR                             | 535               | 26869                         | NR                             | 665               | 14487                         | NR                             | 795               | 1347                          | NR                             | 925               | 2123                          | NR                             |
| 410               | 1056                          | NR                             | 540               | 27684                         | NR                             | 670               | 12943                         | NR                             | 800               | 1132                          | NR                             | 930               | 2029                          | NR                             |
| 415               | 1492                          | NR                             | 545               | 28407                         | NR                             | 675               | 11228                         | NR                             | 805               | 1360                          | NR                             | 935               | 2371                          | NR                             |
| 420               | 2426                          | NR                             | 550               | 29571                         | NR                             | 680               | 9665                          | NR                             | 810               | 1451                          | NR                             | 940               | 1649                          | NR                             |
| 425               | 4409                          | NR                             | 555               | 30862                         | NR                             | 685               | 8389                          | NR                             | 815               | 1507                          | NR                             | 945               | 1984                          | NR                             |
| 430               | 7984                          | NR                             | 560               | 32297                         | NR                             | 690               | 7170                          | NR                             | 820               | 1466                          | NR                             | 950               | 1495                          | NR                             |
| 435               | 14687                         | NR                             | 565               | 33979                         | NR                             | 695               | 6398                          | NR                             | 825               | 1609                          | NR                             | 955               | 1862                          | NR                             |
| 440               | 26286                         | NR                             | 570               | 35579                         | NR                             | 700               | 5544                          | NR                             | 830               | 1642                          | NR                             | 960               | 2951                          | NR                             |
| 445               | 36513                         | NR                             | 575               | 36922                         | NR                             | 705               | 4845                          | NR                             | 835               | 1363                          | NR                             | 965               | 3240                          | NR                             |
| 450               | 34274                         | NR                             | 580               | 38319                         | NR                             | 710               | 4309                          | NR                             | 840               | 1294                          | NR                             | 970               | 3119                          | NR                             |
| 455               | 27519                         | NR                             | 585               | 39771                         | NR                             | 715               | 3879                          | NR                             | 845               | 1584                          | NR                             | 975               | 3020                          | NR                             |
| 460               | 26986                         | NR                             | 590               | 40329                         | NR                             | 720               | 3504                          | NR                             | 850               | 1930                          | NR                             | 980               | 3800                          | NR                             |
| 465               | 32511                         | NR                             | 595               | 40738                         | NR                             | 725               | 3094                          | NR                             | 855               | 1952                          | NR                             | 985               | 3748                          | NR                             |
| 470               | 41588                         | NR                             | 600               | 40944                         | NR                             | 730               | 2758                          | NR                             | 860               | 1631                          | NR                             | 990               | 2878                          | NR                             |
| 475               | 46297                         | NR                             | 605               | 41826                         | NR                             | 735               | 2441                          | NR                             | 865               | 1714                          | NR                             | 995               | 3708                          | NR                             |
| 480               | 42885                         | NR                             | 610               | 48714                         | NR                             | 740               | 2221                          | NR                             | 870               | 1878                          | NR                             | 1000              | 3359                          | NR                             |
| 485               | 35895                         | NR                             | 615               | 48984                         | NR                             | 745               | 2091                          | NR                             | 875               | 2024                          | NR                             |                   |                               |                                |

REPORT NUMBER: SP1-2210-795-4

**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 2189.1**

**S/P: 0.9**

| 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       | 1347             | NR               | 490       | 31353            | NR               | 620       | 38840            | NR               | 750       | 1762             | NR               | 880       | 2493             | NR               |
| 365       | 1168             | NR               | 495       | 28718            | NR               | 625       | 37861            | NR               | 755       | 1752             | NR               | 885       | 1913             | NR               |
| 370       | 1204             | NR               | 500       | 26605            | NR               | 630       | 59547            | NR               | 760       | 1690             | NR               | 890       | 2275             | NR               |
| 375       | 1232             | NR               | 505       | 25784            | NR               | 635       | 49312            | NR               | 765       | 1395             | NR               | 895       | 2173             | NR               |
| 380       | 1249             | NR               | 510       | 25614            | NR               | 640       | 28168            | NR               | 770       | 1452             | NR               | 900       | 1923             | NR               |
| 385       | 1285             | NR               | 515       | 25941            | NR               | 645       | 27115            | NR               | 775       | 1370             | NR               | 905       | 1511             | NR               |
| 390       | 1154             | NR               | 520       | 25900            | NR               | 650       | 24916            | NR               | 780       | 1429             | NR               | 910       | 1971             | NR               |
| 395       | 1036             | NR               | 525       | 26015            | NR               | 655       | 19572            | NR               | 785       | 1112             | NR               | 915       | 1957             | NR               |
| 400       | 873              | NR               | 530       | 26424            | NR               | 660       | 16766            | NR               | 790       | 1222             | NR               | 920       | 1699             | NR               |
| 405       | 908              | NR               | 535       | 26869            | NR               | 665       | 14487            | NR               | 795       | 1347             | NR               | 925       | 2123             | NR               |
| 410       | 1056             | NR               | 540       | 27684            | NR               | 670       | 12943            | NR               | 800       | 1132             | NR               | 930       | 2029             | NR               |
| 415       | 1492             | NR               | 545       | 28407            | NR               | 675       | 11228            | NR               | 805       | 1360             | NR               | 935       | 2371             | NR               |
| 420       | 2426             | NR               | 550       | 29571            | NR               | 680       | 9665             | NR               | 810       | 1451             | NR               | 940       | 1649             | NR               |
| 425       | 4409             | NR               | 555       | 30862            | NR               | 685       | 8389             | NR               | 815       | 1507             | NR               | 945       | 1984             | NR               |
| 430       | 7984             | NR               | 560       | 32297            | NR               | 690       | 7170             | NR               | 820       | 1466             | NR               | 950       | 1495             | NR               |
| 435       | 14687            | NR               | 565       | 33979            | NR               | 695       | 6398             | NR               | 825       | 1609             | NR               | 955       | 1862             | NR               |
| 440       | 26286            | NR               | 570       | 35579            | NR               | 700       | 5544             | NR               | 830       | 1642             | NR               | 960       | 2951             | NR               |
| 445       | 36513            | NR               | 575       | 36922            | NR               | 705       | 4845             | NR               | 835       | 1363             | NR               | 965       | 3240             | NR               |
| 450       | 34274            | NR               | 580       | 38319            | NR               | 710       | 4309             | NR               | 840       | 1294             | NR               | 970       | 3119             | NR               |
| 455       | 27519            | NR               | 585       | 39771            | NR               | 715       | 3879             | NR               | 845       | 1584             | NR               | 975       | 3020             | NR               |
| 460       | 26986            | NR               | 590       | 40329            | NR               | 720       | 3504             | NR               | 850       | 1930             | NR               | 980       | 3800             | NR               |
| 465       | 32511            | NR               | 595       | 40738            | NR               | 725       | 3094             | NR               | 855       | 1952             | NR               | 985       | 3748             | NR               |
| 470       | 41588            | NR               | 600       | 40944            | NR               | 730       | 2758             | NR               | 860       | 1631             | NR               | 990       | 2878             | NR               |
| 475       | 46297            | NR               | 605       | 41826            | NR               | 735       | 2441             | NR               | 865       | 1714             | NR               | 995       | 3708             | NR               |
| 480       | 42885            | NR               | 610       | 48714            | NR               | 740       | 2221             | NR               | 870       | 1878             | NR               | 1000      | 3359             | NR               |
| 485       | 35895            | NR               | 615       | 48984            | NR               | 745       | 2091             | NR               | 875       | 2024             | NR               |           |                  |                  |

REPORT NUMBER: SP1-2210-795-4

TM-30-18

### Summary

$R_f = 88$   
 $R_g = 96.2$   
 CIE  $R_a = 87.8$   
 $R_g = 79.5$



### Color Vector Graphics



REPORT NUMBER: SP1-2210-795-4

**TM-30-18**

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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 91 | CES51 = 88 | CES76 = 86 |
| CES02 = 62 | CES27 = 85 | CES52 = 91 | CES77 = 79 |
| CES03 = 31 | CES28 = 93 | CES53 = 85 | CES78 = 87 |
| CES04 = 70 | CES29 = 84 | CES54 = 86 | CES79 = 81 |
| CES05 = 49 | CES30 = 81 | CES55 = 84 | CES80 = 82 |
| CES06 = 51 | CES31 = 85 | CES56 = 83 | CES81 = 65 |
| CES07 = 42 | CES32 = 92 | CES57 = 81 | CES82 = 93 |
| CES08 = 41 | CES33 = 86 | CES58 = 82 | CES83 = 87 |
| CES09 = 29 | CES34 = 90 | CES59 = 93 | CES84 = 96 |
| CES10 = 75 | CES35 = 94 | CES60 = 90 | CES85 = 77 |
| CES11 = 58 | CES36 = 78 | CES61 = 89 | CES86 = 74 |
| CES12 = 64 | CES37 = 92 | CES62 = 80 | CES87 = 89 |
| CES13 = 43 | CES38 = 77 | CES63 = 92 | CES88 = 89 |
| CES14 = 74 | CES39 = 95 | CES64 = 86 | CES89 = 84 |
| CES15 = 71 | CES40 = 91 | CES65 = 91 | CES90 = 87 |
| CES16 = 47 | CES41 = 90 | CES66 = 87 | CES91 = 74 |
| CES17 = 49 | CES42 = 87 | CES67 = 88 | CES92 = 77 |
| CES18 = 56 | CES43 = 86 | CES68 = 90 | CES93 = 86 |
| CES19 = 71 | CES44 = 99 | CES69 = 91 | CES94 = 78 |
| CES20 = 66 | CES45 = 89 | CES70 = 91 | CES95 = 86 |
| CES21 = 85 | CES46 = 90 | CES71 = 86 | CES96 = 94 |
| CES22 = 78 | CES47 = 84 | CES72 = 95 | CES97 = 88 |
| CES23 = 91 | CES48 = 80 | CES73 = 89 | CES98 = 87 |
| CES24 = 90 | CES49 = 90 | CES74 = 88 | CES99 = 88 |
| CES25 = 71 | CES50 = 89 | CES75 = 86 |            |



REPORT NUMBER: SP1-2210-795-4

**TM-30-18**

**Color Rendition by Hue-Angle Bin**



REPORT NUMBER: SP1-2210-795-4

**TM-30-18**

**Measure Comparisons**



(END OF REPORT)