

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: P734001

Luminaire Tested: **24FCZ2-30-S-B2750-W2D-CP250-2700K**

Issue Date: 1/5/2024



**Test Information**

Test Method: LM-79-08  
Report Number: P734001  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (P272125)  
Test Lab: INNOVATION CENTER(G3)  
Issue Date: 1/5/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: FAIL-SAFE  
Catalog Number: 24FCZ2-30-S-B2750-W2D-CP250-2700K  
Description: 2X4 3000 LUMEN SEALED CRUZE TROFFER WITH BIO UP LEDS AT 2700K CCT  
AND SMOOTH LENS, WITH, CP250 BOTTOM LENS  
  
Light Source: -  
Ballast/Driver: -

**Summary**

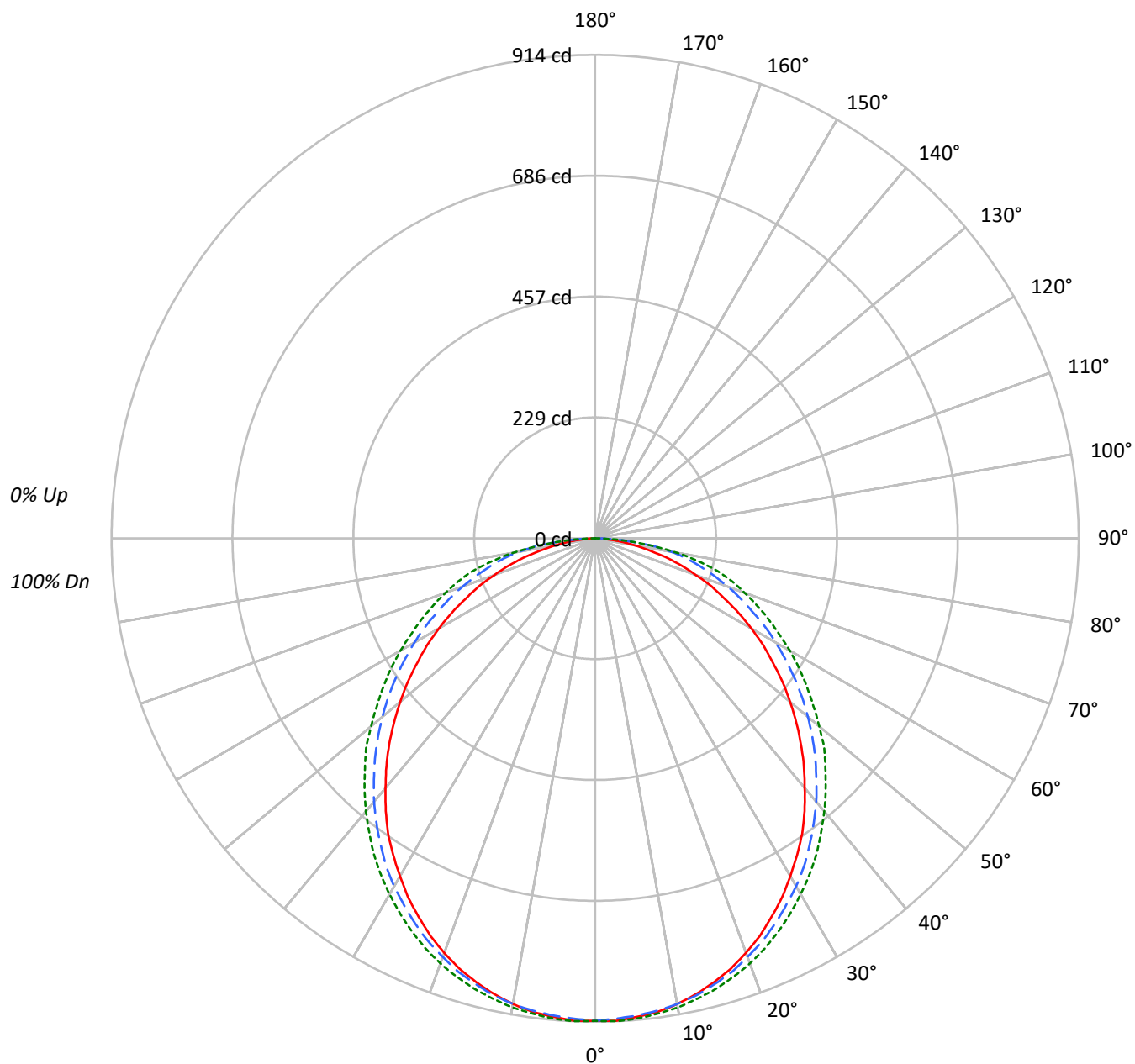
Lumens per Lamp: N/A  
Luminaire Lumens: 2597.0 lumens  
Efficiency: N/A  
Efficacy: 112.9 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.26 / 1.35  
Luminous Opening: Rectangular (W 1.92' x L: 3.98' x H: 0')  
CIE Type: Direct

Input Watts (W): 23  
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: P734001

CATALOG NUMBER: 24FCZ2-30-S-B2750-W2D-CP250-2700K

### Luminous Intensity Polar Plot





TEST NUMBER: P734001

CATALOG NUMBER: 24FCZ2-30-S-B2750-W2D-CP250-2700K

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

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |    |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|
| RF  | 20  |     |     |     | 20  |     |     |     |     | 20  |     |     |     |     | 20  |     |     |     |    | 20 |
| RC  | 80  |     |     |     | 70  |     |     |     |     | 50  |     |     |     |     | 30  |     |     |     |    | 0  |
| RW  | 70  | 50  | 30  | 10  | 70  | 50  | 30  | 10  | 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 | 100 |    |    |
| 1   | 108 | 103 | 99  | 95  | 106 | 101 | 97  | 93  | 97  | 93  | 90  | 93  | 90  | 88  | 89  | 87  | 85  | 83  |    |    |
| 2   | 98  | 90  | 83  | 77  | 96  | 88  | 81  | 76  | 84  | 79  | 74  | 81  | 76  | 72  | 78  | 74  | 71  | 69  |    |    |
| 3   | 89  | 79  | 70  | 64  | 87  | 77  | 69  | 63  | 74  | 67  | 62  | 71  | 66  | 61  | 69  | 64  | 60  | 58  |    |    |
| 4   | 82  | 70  | 61  | 54  | 80  | 68  | 60  | 54  | 66  | 59  | 53  | 63  | 57  | 52  | 61  | 56  | 51  | 49  |    |    |
| 5   | 75  | 62  | 53  | 46  | 73  | 61  | 53  | 46  | 59  | 51  | 46  | 57  | 50  | 45  | 55  | 49  | 45  | 42  |    |    |
| 6   | 70  | 56  | 47  | 40  | 68  | 55  | 47  | 40  | 53  | 46  | 40  | 52  | 45  | 40  | 50  | 44  | 39  | 37  |    |    |
| 7   | 64  | 51  | 42  | 36  | 63  | 50  | 42  | 36  | 48  | 41  | 35  | 47  | 40  | 35  | 46  | 39  | 35  | 33  |    |    |
| 8   | 60  | 46  | 38  | 32  | 58  | 46  | 37  | 32  | 44  | 37  | 32  | 43  | 36  | 31  | 42  | 36  | 31  | 29  |    |    |
| 9   | 56  | 43  | 34  | 29  | 55  | 42  | 34  | 29  | 41  | 34  | 28  | 40  | 33  | 28  | 39  | 33  | 28  | 26  |    |    |
| 10  | 53  | 39  | 31  | 26  | 51  | 39  | 31  | 26  | 38  | 31  | 26  | 37  | 30  | 26  | 36  | 30  | 26  | 24  |    |    |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 1288 | 1288 | 1288 |
| 5°  | 1287 | 1283 | 1291 |
| 10° | 1281 | 1281 | 1291 |
| 15° | 1269 | 1275 | 1289 |
| 20° | 1253 | 1265 | 1285 |
| 25° | 1229 | 1252 | 1277 |
| 30° | 1202 | 1238 | 1266 |
| 35° | 1175 | 1218 | 1256 |
| 40° | 1135 | 1198 | 1242 |
| 45° | 1098 | 1174 | 1228 |
| 50° | 1056 | 1152 | 1214 |
| 55° | 1009 | 1131 | 1202 |
| 60° | 962  | 1113 | 1199 |
| 65° | 901  | 1094 | 1207 |
| 70° | 834  | 1100 | 1239 |
| 75° | 747  | 1120 | 1309 |
| 80° | 603  | 1187 | 1280 |
| 85° | 453  | 1041 | 1015 |



TEST NUMBER: P734001

CATALOG NUMBER: 24FCZ2-30-S-B2750-W2D-CP250-2700K

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 86.4   | 3.3       |
| 10°-20°   | 246.8  | 9.5       |
| 20°-30°   | 371.0  | 14.3      |
| 30°-40°   | 441.9  | 17.0      |
| 40°-50°   | 452.3  | 17.4      |
| 50°-60°   | 407.2  | 15.7      |
| 60°-70°   | 319.8  | 12.3      |
| 70°-80°   | 207.5  | 8.0       |
| 80°-90°   | 64.2   | 2.5       |
| 90°-100°  | 0.0    | 0.0       |
| 100°-110° | 0.0    | 0.0       |
| 110°-120° | 0.0    | 0.0       |
| 120°-130° | 0.0    | 0.0       |
| 130°-140° | 0.0    | 0.0       |
| 140°-150° | 0.0    | 0.0       |
| 150°-160° | 0.0    | 0.0       |
| 160°-170° | 0.0    | 0.0       |
| 170°-180° | 0.0    | 0.0       |
| 0°-30°    | 704.2  | 27.1      |
| 0°-40°    | 1146.1 | 44.1      |
| 0°-60°    | 2005.5 | 77.2      |
| 0°-90°    | 2597.0 | 100.0     |
| 90°-120°  | 0.0    | 0.0       |
| 90°-150°  | 0.0    | 0.0       |
| 90°-180°  | 0.0    | 0.0       |
| 0°-180°   | 2597.0 | 100.0     |

**CANDELA DISTRIBUTION:**

|     | 0°  | 22.5° | 45° | 67.5° | 90° | Flux |
|-----|-----|-------|-----|-------|-----|------|
| 0°  | 912 | 912   | 912 | 912   | 912 |      |
| 5°  | 908 | 910   | 906 | 911   | 912 | 86   |
| 15° | 869 | 871   | 873 | 880   | 882 | 245  |
| 25° | 789 | 796   | 804 | 818   | 820 | 364  |
| 35° | 682 | 690   | 707 | 724   | 729 | 426  |
| 45° | 550 | 563   | 588 | 610   | 615 | 424  |
| 55° | 410 | 428   | 460 | 483   | 488 | 368  |
| 65° | 270 | 290   | 328 | 355   | 361 | 269  |
| 75° | 137 | 163   | 205 | 234   | 240 | 145  |
| 85° | 28  | 52    | 64  | 63    | 63  | 34   |
| 90° | 0   | 0     | 0   | 0     | 0   |      |



TEST NUMBER: P734001

CATALOG NUMBER: 24FCZ2-30-S-B2750-W2D-CP250-2700K

**CANDELA DISTRIBUTION (FULL):**

|       | 0°    | 22.5° | 45°   | 67.5° | 90°   |
|-------|-------|-------|-------|-------|-------|
| 0°    | 912.4 | 912.4 | 912.4 | 912.4 | 912.4 |
| 2.5°  | 913.2 | 913.2 | 909.0 | 913.2 | 914.0 |
| 5°    | 908.2 | 909.9 | 905.7 | 910.7 | 911.5 |
| 7.5°  | 903.2 | 903.2 | 900.8 | 905.7 | 906.6 |
| 10°   | 894.2 | 895.0 | 894.2 | 900.0 | 900.8 |
| 12.5° | 882.7 | 884.3 | 885.2 | 890.9 | 891.7 |
| 15°   | 868.7 | 871.1 | 872.7 | 880.2 | 881.9 |
| 17.5° | 853.0 | 855.4 | 859.5 | 867.8 | 869.4 |
| 20°   | 834.0 | 837.2 | 842.2 | 853.0 | 855.4 |
| 22.5° | 813.4 | 816.7 | 824.9 | 834.8 | 838.9 |
| 25°   | 789.4 | 796.0 | 804.3 | 817.5 | 820.0 |
| 27.5° | 765.5 | 771.3 | 782.0 | 796.0 | 799.4 |
| 30°   | 737.5 | 746.5 | 759.7 | 773.7 | 777.0 |
| 32.5° | 710.2 | 719.3 | 735.0 | 749.9 | 754.0 |
| 35°   | 682.2 | 690.5 | 706.9 | 724.2 | 729.2 |
| 37.5° | 650.0 | 660.7 | 678.9 | 696.2 | 701.2 |
| 40°   | 616.2 | 629.4 | 650.0 | 668.2 | 674.0 |
| 42.5° | 584.0 | 598.0 | 618.7 | 638.5 | 645.0 |
| 45°   | 550.2 | 563.4 | 588.2 | 610.4 | 615.4 |
| 47.5° | 515.5 | 530.4 | 556.8 | 579.0 | 587.3 |
| 50°   | 480.9 | 496.6 | 524.7 | 547.7 | 552.7 |
| 52.5° | 446.3 | 462.8 | 492.5 | 517.2 | 519.7 |
| 55°   | 410.0 | 428.2 | 459.5 | 483.4 | 488.4 |
| 57.5° | 377.0 | 392.7 | 426.5 | 451.2 | 457.0 |
| 60°   | 340.7 | 358.0 | 394.3 | 417.4 | 424.8 |
| 62.5° | 306.0 | 324.2 | 362.2 | 385.2 | 391.8 |
| 65°   | 269.7 | 290.4 | 327.5 | 354.7 | 361.3 |
| 67.5° | 238.4 | 258.2 | 297.8 | 324.2 | 330.8 |
| 70°   | 202.1 | 224.4 | 266.5 | 293.7 | 300.3 |
| 72.5° | 170.7 | 193.8 | 235.9 | 262.3 | 272.2 |
| 75°   | 137.0 | 163.3 | 205.4 | 233.5 | 240.0 |
| 77.5° | 104.0 | 134.5 | 177.3 | 198.8 | 198.8 |
| 80°   | 74.2  | 106.4 | 146.0 | 155.9 | 157.5 |
| 82.5° | 48.7  | 80.0  | 108.0 | 107.2 | 107.2 |
| 85°   | 28.0  | 52.0  | 64.3  | 62.7  | 62.7  |
| 87.5° | 10.7  | 21.5  | 23.1  | 23.1  | 22.3  |
| 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: SP1-2210-795-1

Test Date: 10/06/2022

Luminaire Tested: 9WP217084MDER4AM-2700K-315MA

Data in this report applies to families of products including 9WP217084MDER4AM-2700K.

### Test Information

Test Method: LM-79-2019  
 Report Number: SP1-2210-795-1  
 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-2700K-315MA**  
 Description: METALUX

TUNABLE BOARD, 2700K-315MA, PROGRAMMED @0Vdc

### Spectral Parameters

|                           |         |           |      |      |      |
|---------------------------|---------|-----------|------|------|------|
| CCT (K):                  | 2666    | CRI (Ra): | 94.1 |      |      |
| CIE u':                   | 0.2643  | R1:       | 96.2 | R9:  | 58.8 |
| CIE v':                   | 0.5262  | R2:       | 97.9 | R10: | 93.6 |
| Duv:                      | -0.0012 | R3:       | 98.1 | R11: | 96.6 |
| CIE x:                    | 0.4604  | R4:       | 96.1 | R12: | 90.2 |
| CIE y:                    | 0.4075  | R5:       | 96.2 | R13: | 96.8 |
| CIE z:                    | 0.1321  | R6:       | 96.5 | R14: | 97.5 |
| Peak Wavelength (nm):     | 632     | R7:       | 90.7 |      |      |
| Dominant Wavelength (nm): | 584     | R8:       | 81.4 |      |      |
| Purity:                   | 61      |           |      |      |      |

Rf: 91.5  
 Rg: 101.3



### Test Conditions

Stabilization Time: 146M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.0/38%  
 Sphere Temperature (°C): 24.4

REPORT NUMBER: SP1-2210-795-1

| 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           |

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CIE 1931 Chromaticity Diagram



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



Point lies inside the ANSI 2700K 4-step quadrangle

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**Photopic Flux vs. Wavelength**



#####

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 960              | NR               | 490       | 11655            | NR               | 620       | 48137            | NR               | 750       | 2159             | NR               | 880       | 1428             | NR               |
| 365       | 835              | NR               | 495       | 14187            | NR               | 625       | 48484            | NR               | 755       | 2025             | NR               | 885       | 1524             | NR               |
| 370       | 889              | NR               | 500       | 17034            | NR               | 630       | 97268            | NR               | 760       | 1802             | NR               | 890       | 1952             | NR               |
| 375       | 919              | NR               | 505       | 19485            | NR               | 635       | 78475            | NR               | 765       | 1584             | NR               | 895       | 1011             | NR               |
| 380       | 1009             | NR               | 510       | 21619            | NR               | 640       | 35314            | NR               | 770       | 1353             | NR               | 900       | 1014             | NR               |
| 385       | 1040             | NR               | 515       | 23444            | NR               | 645       | 34925            | NR               | 775       | 1274             | NR               | 905       | 955              | NR               |
| 390       | 939              | NR               | 520       | 24555            | NR               | 650       | 32851            | NR               | 780       | 1257             | NR               | 910       | 1509             | NR               |
| 395       | 813              | NR               | 525       | 25491            | NR               | 655       | 23599            | NR               | 785       | 1107             | NR               | 915       | 1506             | NR               |
| 400       | 710              | NR               | 530       | 26360            | NR               | 660       | 19532            | NR               | 790       | 1143             | NR               | 920       | 1068             | NR               |
| 405       | 620              | NR               | 535       | 27190            | NR               | 665       | 16486            | NR               | 795       | 1531             | NR               | 925       | 638              | NR               |
| 410       | 774              | NR               | 540       | 28277            | NR               | 670       | 14655            | NR               | 800       | 1331             | NR               | 930       | 1536             | NR               |
| 415       | 979              | NR               | 545       | 29229            | NR               | 675       | 12412            | NR               | 805       | 1467             | NR               | 935       | 842              | NR               |
| 420       | 1333             | NR               | 550       | 30350            | NR               | 680       | 10584            | NR               | 810       | 1194             | NR               | 940       | 1826             | NR               |
| 425       | 2180             | NR               | 555       | 31650            | NR               | 685       | 9145             | NR               | 815       | 1068             | NR               | 945       | 1708             | NR               |
| 430       | 3664             | NR               | 560       | 33070            | NR               | 690       | 7913             | NR               | 820       | 903              | NR               | 950       | 1541             | NR               |
| 435       | 5835             | NR               | 565       | 34723            | NR               | 695       | 6836             | NR               | 825       | 1155             | NR               | 955       | 1365             | NR               |
| 440       | 9472             | NR               | 570       | 36375            | NR               | 700       | 6062             | NR               | 830       | 1254             | NR               | 960       | 2795             | NR               |
| 445       | 15693            | NR               | 575       | 38067            | NR               | 705       | 5352             | NR               | 835       | 969              | NR               | 965       | 2273             | NR               |
| 450       | 21182            | NR               | 580       | 39619            | NR               | 710       | 4621             | NR               | 840       | 885              | NR               | 970       | 2269             | NR               |
| 455       | 18329            | NR               | 585       | 41308            | NR               | 715       | 4197             | NR               | 845       | 1169             | NR               | 975       | 2026             | NR               |
| 460       | 13472            | NR               | 590       | 42407            | NR               | 720       | 3736             | NR               | 850       | 1432             | NR               | 980       | 3840             | NR               |
| 465       | 11611            | NR               | 595       | 43552            | NR               | 725       | 3370             | NR               | 855       | 1474             | NR               | 985       | 2004             | NR               |
| 470       | 9668             | NR               | 600       | 44708            | NR               | 730       | 2929             | NR               | 860       | 1037             | NR               | 990       | 2889             | NR               |
| 475       | 8254             | NR               | 605       | 47912            | NR               | 735       | 2599             | NR               | 865       | 1441             | NR               | 995       | 2268             | NR               |
| 480       | 8432             | NR               | 610       | 64799            | NR               | 740       | 2366             | NR               | 870       | 1316             | NR               | 1000      | 2322             | NR               |
| 485       | 9747             | NR               | 615       | 67855            | NR               | 745       | 2257             | NR               | 875       | 1515             | NR               |           |                  |                  |

REPORT NUMBER: SP1-2210-795-1

**Scotopic Flux vs. Wavelength**



**Scotopic Lumens: 3229.5**

**S/P: 1.28**

| 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       | 960              | NR               | 490       | 11655            | NR               | 620       | 48137            | NR               | 750       | 2159             | NR               | 880       | 1428             | NR               |
| 365       | 835              | NR               | 495       | 14187            | NR               | 625       | 48484            | NR               | 755       | 2025             | NR               | 885       | 1524             | NR               |
| 370       | 889              | NR               | 500       | 17034            | NR               | 630       | 97268            | NR               | 760       | 1802             | NR               | 890       | 1952             | NR               |
| 375       | 919              | NR               | 505       | 19485            | NR               | 635       | 78475            | NR               | 765       | 1584             | NR               | 895       | 1011             | NR               |
| 380       | 1009             | NR               | 510       | 21619            | NR               | 640       | 35314            | NR               | 770       | 1353             | NR               | 900       | 1014             | NR               |
| 385       | 1040             | NR               | 515       | 23444            | NR               | 645       | 34925            | NR               | 775       | 1274             | NR               | 905       | 955              | NR               |
| 390       | 939              | NR               | 520       | 24555            | NR               | 650       | 32851            | NR               | 780       | 1257             | NR               | 910       | 1509             | NR               |
| 395       | 813              | NR               | 525       | 25491            | NR               | 655       | 23599            | NR               | 785       | 1107             | NR               | 915       | 1506             | NR               |
| 400       | 710              | NR               | 530       | 26360            | NR               | 660       | 19532            | NR               | 790       | 1143             | NR               | 920       | 1068             | NR               |
| 405       | 620              | NR               | 535       | 27190            | NR               | 665       | 16486            | NR               | 795       | 1531             | NR               | 925       | 638              | NR               |
| 410       | 774              | NR               | 540       | 28277            | NR               | 670       | 14655            | NR               | 800       | 1331             | NR               | 930       | 1536             | NR               |
| 415       | 979              | NR               | 545       | 29229            | NR               | 675       | 12412            | NR               | 805       | 1467             | NR               | 935       | 842              | NR               |
| 420       | 1333             | NR               | 550       | 30350            | NR               | 680       | 10584            | NR               | 810       | 1194             | NR               | 940       | 1826             | NR               |
| 425       | 2180             | NR               | 555       | 31650            | NR               | 685       | 9145             | NR               | 815       | 1068             | NR               | 945       | 1708             | NR               |
| 430       | 3664             | NR               | 560       | 33070            | NR               | 690       | 7913             | NR               | 820       | 903              | NR               | 950       | 1541             | NR               |
| 435       | 5835             | NR               | 565       | 34723            | NR               | 695       | 6836             | NR               | 825       | 1155             | NR               | 955       | 1365             | NR               |
| 440       | 9472             | NR               | 570       | 36375            | NR               | 700       | 6062             | NR               | 830       | 1254             | NR               | 960       | 2795             | NR               |
| 445       | 15693            | NR               | 575       | 38067            | NR               | 705       | 5352             | NR               | 835       | 969              | NR               | 965       | 2273             | NR               |
| 450       | 21182            | NR               | 580       | 39619            | NR               | 710       | 4621             | NR               | 840       | 885              | NR               | 970       | 2269             | NR               |
| 455       | 18329            | NR               | 585       | 41308            | NR               | 715       | 4197             | NR               | 845       | 1169             | NR               | 975       | 2026             | NR               |
| 460       | 13472            | NR               | 590       | 42407            | NR               | 720       | 3736             | NR               | 850       | 1432             | NR               | 980       | 3840             | NR               |
| 465       | 11611            | NR               | 595       | 43552            | NR               | 725       | 3370             | NR               | 855       | 1474             | NR               | 985       | 2004             | NR               |
| 470       | 9668             | NR               | 600       | 44708            | NR               | 730       | 2929             | NR               | 860       | 1037             | NR               | 990       | 2889             | NR               |
| 475       | 8254             | NR               | 605       | 47912            | NR               | 735       | 2599             | NR               | 865       | 1441             | NR               | 995       | 2268             | NR               |
| 480       | 8432             | NR               | 610       | 64799            | NR               | 740       | 2366             | NR               | 870       | 1316             | NR               | 1000      | 2322             | NR               |
| 485       | 9747             | NR               | 615       | 67855            | NR               | 745       | 2257             | NR               | 875       | 1515             | NR               |           |                  |                  |

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**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 1204.8**

**S/P: 0.48**

| 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       | 960              | NR               | 490       | 11655            | NR               | 620       | 48137            | NR               | 750       | 2159             | NR               | 880       | 1428             | NR               |
| 365       | 835              | NR               | 495       | 14187            | NR               | 625       | 48484            | NR               | 755       | 2025             | NR               | 885       | 1524             | NR               |
| 370       | 889              | NR               | 500       | 17034            | NR               | 630       | 97268            | NR               | 760       | 1802             | NR               | 890       | 1952             | NR               |
| 375       | 919              | NR               | 505       | 19485            | NR               | 635       | 78475            | NR               | 765       | 1584             | NR               | 895       | 1011             | NR               |
| 380       | 1009             | NR               | 510       | 21619            | NR               | 640       | 35314            | NR               | 770       | 1353             | NR               | 900       | 1014             | NR               |
| 385       | 1040             | NR               | 515       | 23444            | NR               | 645       | 34925            | NR               | 775       | 1274             | NR               | 905       | 955              | NR               |
| 390       | 939              | NR               | 520       | 24555            | NR               | 650       | 32851            | NR               | 780       | 1257             | NR               | 910       | 1509             | NR               |
| 395       | 813              | NR               | 525       | 25491            | NR               | 655       | 23599            | NR               | 785       | 1107             | NR               | 915       | 1506             | NR               |
| 400       | 710              | NR               | 530       | 26360            | NR               | 660       | 19532            | NR               | 790       | 1143             | NR               | 920       | 1068             | NR               |
| 405       | 620              | NR               | 535       | 27190            | NR               | 665       | 16486            | NR               | 795       | 1531             | NR               | 925       | 638              | NR               |
| 410       | 774              | NR               | 540       | 28277            | NR               | 670       | 14655            | NR               | 800       | 1331             | NR               | 930       | 1536             | NR               |
| 415       | 979              | NR               | 545       | 29229            | NR               | 675       | 12412            | NR               | 805       | 1467             | NR               | 935       | 842              | NR               |
| 420       | 1333             | NR               | 550       | 30350            | NR               | 680       | 10584            | NR               | 810       | 1194             | NR               | 940       | 1826             | NR               |
| 425       | 2180             | NR               | 555       | 31650            | NR               | 685       | 9145             | NR               | 815       | 1068             | NR               | 945       | 1708             | NR               |
| 430       | 3664             | NR               | 560       | 33070            | NR               | 690       | 7913             | NR               | 820       | 903              | NR               | 950       | 1541             | NR               |
| 435       | 5835             | NR               | 565       | 34723            | NR               | 695       | 6836             | NR               | 825       | 1155             | NR               | 955       | 1365             | NR               |
| 440       | 9472             | NR               | 570       | 36375            | NR               | 700       | 6062             | NR               | 830       | 1254             | NR               | 960       | 2795             | NR               |
| 445       | 15693            | NR               | 575       | 38067            | NR               | 705       | 5352             | NR               | 835       | 969              | NR               | 965       | 2273             | NR               |
| 450       | 21182            | NR               | 580       | 39619            | NR               | 710       | 4621             | NR               | 840       | 885              | NR               | 970       | 2269             | NR               |
| 455       | 18329            | NR               | 585       | 41308            | NR               | 715       | 4197             | NR               | 845       | 1169             | NR               | 975       | 2026             | NR               |
| 460       | 13472            | NR               | 590       | 42407            | NR               | 720       | 3736             | NR               | 850       | 1432             | NR               | 980       | 3840             | NR               |
| 465       | 11611            | NR               | 595       | 43552            | NR               | 725       | 3370             | NR               | 855       | 1474             | NR               | 985       | 2004             | NR               |
| 470       | 9668             | NR               | 600       | 44708            | NR               | 730       | 2929             | NR               | 860       | 1037             | NR               | 990       | 2889             | NR               |
| 475       | 8254             | NR               | 605       | 47912            | NR               | 735       | 2599             | NR               | 865       | 1441             | NR               | 995       | 2268             | NR               |
| 480       | 8432             | NR               | 610       | 64799            | NR               | 740       | 2366             | NR               | 870       | 1316             | NR               | 1000      | 2322             | NR               |
| 485       | 9747             | NR               | 615       | 67855            | NR               | 745       | 2257             | NR               | 875       | 1515             | NR               |           |                  |                  |

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**Summary**

$R_f = 91.5$   
 $R_g = 101.3$   
 CIE  $R_a = 94.1$   
 $R_g = 58.8$



**Color Vector Graphics**



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 92 | CES51 = 96 | CES76 = 91 |
| CES02 = 64 | CES27 = 97 | CES52 = 95 | CES77 = 83 |
| CES03 = 32 | CES28 = 97 | CES53 = 93 | CES78 = 88 |
| CES04 = 71 | CES29 = 91 | CES54 = 98 | CES79 = 87 |
| CES05 = 51 | CES30 = 96 | CES55 = 99 | CES80 = 90 |
| CES06 = 51 | CES31 = 91 | CES56 = 95 | CES81 = 67 |
| CES07 = 44 | CES32 = 84 | CES57 = 95 | CES82 = 95 |
| CES08 = 43 | CES33 = 92 | CES58 = 95 | CES83 = 92 |
| CES09 = 29 | CES34 = 94 | CES59 = 99 | CES84 = 96 |
| CES10 = 77 | CES35 = 97 | CES60 = 97 | CES85 = 79 |
| CES11 = 59 | CES36 = 91 | CES61 = 97 | CES86 = 75 |
| CES12 = 66 | CES37 = 94 | CES62 = 94 | CES87 = 92 |
| CES13 = 45 | CES38 = 99 | CES63 = 94 | CES88 = 96 |
| CES14 = 74 | CES39 = 97 | CES64 = 97 | CES89 = 81 |
| CES15 = 72 | CES40 = 94 | CES65 = 92 | CES90 = 97 |
| CES16 = 48 | CES41 = 94 | CES66 = 95 | CES91 = 86 |
| CES17 = 50 | CES42 = 92 | CES67 = 95 | CES92 = 78 |
| CES18 = 57 | CES43 = 90 | CES68 = 94 | CES93 = 87 |
| CES19 = 72 | CES44 = 99 | CES69 = 95 | CES94 = 72 |
| CES20 = 68 | CES45 = 94 | CES70 = 92 | CES95 = 86 |
| CES21 = 87 | CES46 = 93 | CES71 = 92 | CES96 = 92 |
| CES22 = 79 | CES47 = 84 | CES72 = 97 | CES97 = 93 |
| CES23 = 92 | CES48 = 94 | CES73 = 88 | CES98 = 93 |
| CES24 = 91 | CES49 = 91 | CES74 = 88 | CES99 = 92 |
| CES25 = 72 | CES50 = 96 | CES75 = 92 |            |



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Color Rendition by Hue-Angle Bin



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**Measure Comparisons**



(END OF REPORT)