

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: P735742

Luminaire Tested: **24APR-67-B2750-W2D-CP125-5000K**

Issue Date: 1/5/2024



**Test Information**

Test Method: LM-79-08  
Report Number: P735742  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (P708973)  
Test Lab: INNOVATION CENTER(G2)  
Issue Date: 1/5/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: FAIL-SAFE  
Catalog Number: 24APR-67-B2750-W2D-CP125-5000K  
Description: 2X4 6700 AMBIENT LUMEN OUTPUT APR TROFFER WITH BIO UP LEDS AT 5000K CCT, AND CP125 LENS

Light Source: -  
Ballast/Driver: -

**Summary**

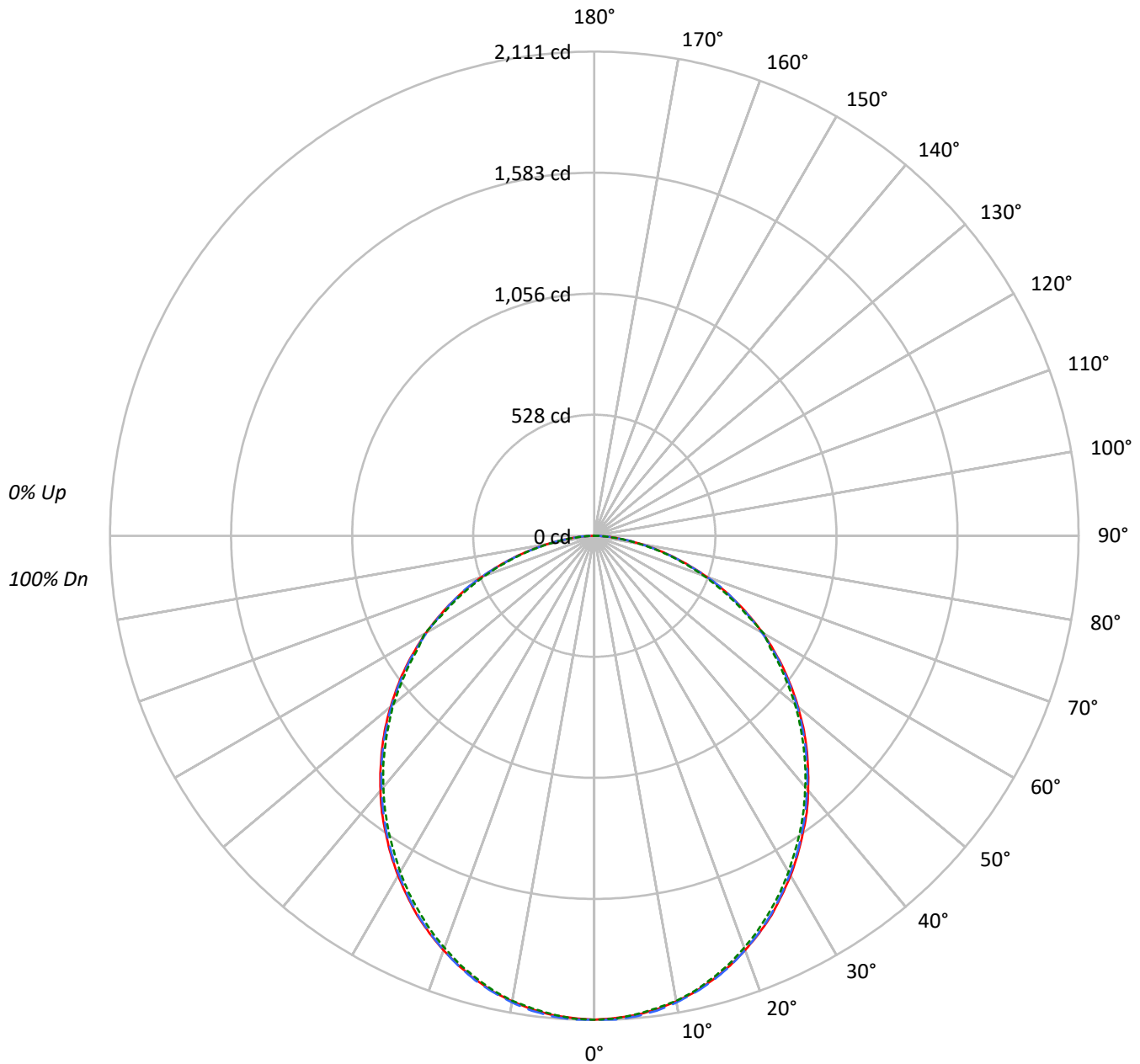
Lumens per Lamp: N/A  
Luminaire Lumens: 5620.0 lumens  
Efficiency: N/A  
Efficacy: 85.2 lumens/watt  
Spacing Criteria (0/90/45): 1.21 / 1.2 / 1.32  
Luminous Opening: Rectangular (W 2' x L: 4' x H: 0')  
CIE Type: Direct

Input Watts (W): 66  
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: P735742

CATALOG NUMBER: 24APR-67-B2750-W2D-CP125-5000K

### Luminous Intensity Polar Plot





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CATALOG NUMBER: 24APR-67-B2750-W2D-CP125-5000K

**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  | 50  | 30 | 10 |
| RCR |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |    |
| 0   | 119 | 119 | 119 | 119 | 116 | 116 | 116 | 116 | 111 | 111 | 111 | 106 | 106 | 106 | 102 | 102 | 102 | 100 |    |    |
| 1   | 109 | 104 | 100 | 96  | 106 | 102 | 98  | 95  | 98  | 95  | 92  | 94  | 91  | 89  | 90  | 88  | 86  | 84  |    |    |
| 2   | 99  | 91  | 84  | 79  | 97  | 89  | 83  | 78  | 86  | 80  | 76  | 82  | 78  | 74  | 79  | 76  | 72  | 70  |    |    |
| 3   | 90  | 80  | 72  | 65  | 88  | 78  | 71  | 65  | 75  | 69  | 64  | 73  | 67  | 63  | 70  | 65  | 61  | 59  |    |    |
| 4   | 83  | 71  | 62  | 56  | 81  | 70  | 61  | 55  | 67  | 60  | 54  | 65  | 59  | 54  | 63  | 57  | 53  | 51  |    |    |
| 5   | 76  | 63  | 55  | 48  | 74  | 62  | 54  | 48  | 60  | 53  | 47  | 58  | 52  | 47  | 56  | 51  | 46  | 44  |    |    |
| 6   | 70  | 57  | 48  | 42  | 69  | 56  | 48  | 42  | 54  | 47  | 41  | 53  | 46  | 41  | 51  | 45  | 41  | 39  |    |    |
| 7   | 65  | 52  | 43  | 37  | 64  | 51  | 43  | 37  | 50  | 42  | 37  | 48  | 41  | 36  | 47  | 41  | 36  | 34  |    |    |
| 8   | 61  | 47  | 39  | 33  | 59  | 47  | 39  | 33  | 45  | 38  | 33  | 44  | 37  | 33  | 43  | 37  | 32  | 30  |    |    |
| 9   | 57  | 44  | 35  | 30  | 55  | 43  | 35  | 30  | 42  | 35  | 30  | 41  | 34  | 29  | 40  | 34  | 29  | 27  |    |    |
| 10  | 53  | 40  | 32  | 27  | 52  | 40  | 32  | 27  | 39  | 32  | 27  | 38  | 31  | 27  | 37  | 31  | 27  | 25  |    |    |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 2839 | 2839 | 2839 |
| 5°  | 2833 | 2841 | 2829 |
| 10° | 2817 | 2823 | 2813 |
| 15° | 2790 | 2795 | 2779 |
| 20° | 2753 | 2752 | 2737 |
| 25° | 2711 | 2705 | 2684 |
| 30° | 2658 | 2649 | 2629 |
| 35° | 2602 | 2593 | 2572 |
| 40° | 2547 | 2534 | 2512 |
| 45° | 2489 | 2476 | 2450 |
| 50° | 2425 | 2415 | 2391 |
| 55° | 2359 | 2346 | 2316 |
| 60° | 2280 | 2265 | 2296 |
| 65° | 2176 | 2169 | 2128 |
| 70° | 2041 | 2044 | 1988 |
| 75° | 1853 | 1839 | 1797 |
| 80° | 1592 | 1571 | 1530 |
| 85° | 1216 | 1206 | 1113 |



TEST NUMBER: P735742

CATALOG NUMBER: 24APR-67-B2750-W2D-CP125-5000K

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 199.3  | 3.5       |
| 10°-20°   | 564.6  | 10.0      |
| 20°-30°   | 838.0  | 14.9      |
| 30°-40°   | 986.4  | 17.6      |
| 40°-50°   | 1002.4 | 17.8      |
| 50°-60°   | 891.1  | 15.9      |
| 60°-70°   | 672.2  | 12.0      |
| 70°-80°   | 373.3  | 6.6       |
| 80°-90°   | 92.8   | 1.7       |
| 90°-100°  | 0.0    | 0.0       |
| 100°-110° | 0.0    | 0.0       |
| 110°-120° | 0.0    | 0.0       |
| 120°-130° | 0.0    | 0.0       |
| 130°-140° | 0.0    | 0.0       |
| 140°-150° | 0.0    | 0.0       |
| 150°-160° | 0.0    | 0.0       |
| 160°-170° | 0.0    | 0.0       |
| 170°-180° | 0.0    | 0.0       |
| 0°-30°    | 1601.8 | 28.5      |
| 0°-40°    | 2588.2 | 46.1      |
| 0°-60°    | 4481.7 | 79.7      |
| 0°-90°    | 5620.0 | 100.0     |
| 90°-120°  | 0.0    | 0.0       |
| 90°-150°  | 0.0    | 0.0       |
| 90°-180°  | 0.0    | 0.0       |
| 0°-180°   | 5620.0 | 100.0     |

**CANDELA DISTRIBUTION:**

|     | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|-----|------|-------|------|-------|------|------|
| 0°  | 2110 | 2110  | 2110 | 2110  | 2110 |      |
| 5°  | 2097 | 2100  | 2103 | 2100  | 2094 | 199  |
| 15° | 2003 | 2005  | 2006 | 2002  | 1995 | 565  |
| 25° | 1826 | 1825  | 1822 | 1814  | 1808 | 840  |
| 35° | 1584 | 1585  | 1579 | 1570  | 1566 | 992  |
| 45° | 1308 | 1308  | 1301 | 1290  | 1288 | 1009 |
| 55° | 1006 | 998   | 1000 | 989   | 987  | 898  |
| 65° | 683  | 679   | 681  | 673   | 668  | 677  |
| 75° | 356  | 352   | 354  | 351   | 346  | 378  |
| 85° | 79   | 77    | 78   | 75    | 72   | 95   |
| 90° | 0    | 0     | 0    | 0     | 0    |      |



TEST NUMBER: P735742

CATALOG NUMBER: 24APR-67-B2750-W2D-CP125-5000K

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|-------|--------|--------|--------|--------|--------|
| 0°    | 2110.0 | 2110.0 | 2110.0 | 2110.0 | 2110.0 |
| 2.5°  | 2104.6 | 2108.6 | 2111.3 | 2108.0 | 2107.3 |
| 5°    | 2097.2 | 2100.5 | 2103.2 | 2099.9 | 2094.5 |
| 7.5°  | 2082.3 | 2086.4 | 2088.4 | 2085.0 | 2077.6 |
| 10°   | 2061.5 | 2065.6 | 2066.1 | 2062.9 | 2058.8 |
| 12.5° | 2035.9 | 2038.6 | 2038.6 | 2035.9 | 2031.2 |
| 15°   | 2002.8 | 2004.9 | 2006.2 | 2001.5 | 1995.4 |
| 17.5° | 1965.2 | 1968.4 | 1967.2 | 1959.8 | 1957.1 |
| 20°   | 1922.7 | 1925.4 | 1922.0 | 1917.3 | 1911.2 |
| 22.5° | 1876.1 | 1876.8 | 1874.1 | 1868.7 | 1862.6 |
| 25°   | 1826.3 | 1825.0 | 1822.3 | 1814.2 | 1808.1 |
| 27.5° | 1768.3 | 1771.0 | 1764.2 | 1756.8 | 1752.9 |
| 30°   | 1711.1 | 1711.7 | 1705.0 | 1695.5 | 1692.2 |
| 32.5° | 1649.8 | 1648.3 | 1643.7 | 1633.6 | 1628.2 |
| 35°   | 1584.3 | 1585.0 | 1578.9 | 1569.5 | 1566.1 |
| 37.5° | 1521.0 | 1517.0 | 1512.3 | 1501.5 | 1499.4 |
| 40°   | 1450.2 | 1449.5 | 1442.8 | 1433.3 | 1430.1 |
| 42.5° | 1379.5 | 1378.8 | 1373.4 | 1364.0 | 1361.3 |
| 45°   | 1308.1 | 1308.1 | 1301.3 | 1290.5 | 1287.8 |
| 47.5° | 1235.2 | 1232.5 | 1227.8 | 1218.5 | 1215.1 |
| 50°   | 1158.4 | 1156.4 | 1153.7 | 1142.9 | 1142.2 |
| 52.5° | 1083.0 | 1081.6 | 1076.9 | 1067.5 | 1062.1 |
| 55°   | 1005.5 | 998.1  | 1000.1 | 989.3  | 987.3  |
| 57.5° | 925.9  | 918.5  | 922.5  | 913.1  | 909.2  |
| 60°   | 847.1  | 839.7  | 841.7  | 835.6  | 853.2  |
| 62.5° | 766.3  | 761.5  | 761.5  | 775.7  | 750.1  |
| 65°   | 683.4  | 679.3  | 681.4  | 672.6  | 668.5  |
| 67.5° | 601.8  | 595.7  | 608.5  | 592.3  | 585.7  |
| 70°   | 518.9  | 514.8  | 519.6  | 510.1  | 505.4  |
| 72.5° | 436.7  | 433.3  | 432.0  | 428.6  | 424.6  |
| 75°   | 356.5  | 351.8  | 353.8  | 351.1  | 345.7  |
| 77.5° | 278.3  | 276.9  | 276.3  | 272.9  | 268.8  |
| 80°   | 205.5  | 204.2  | 202.8  | 200.1  | 197.4  |
| 82.5° | 137.5  | 136.2  | 135.5  | 134.1  | 133.5  |
| 85°   | 78.8   | 76.8   | 78.1   | 74.8   | 72.1   |
| 87.5° | 29.7   | 29.0   | 30.4   | 27.7   | 25.6   |
| 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: SP1-2210-795-5

Test Date: 10/06/2022

Luminaire Tested: 9WP217084MDER4AM-5000K-315MA

Data in this report applies to families of products including 9WP217084MDER4AM-5000K.

### Test Information

Test Method: LM-79-2019  
 Report Number: SP1-2210-795-5  
 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-5000K-315MA**  
 Description: METALUX

TUNABLE BOARD, 5000K-315MA, PROGRAMMED @ 6.5Vdc.

### Spectral Parameters

|                           |         |           |      |      |      |
|---------------------------|---------|-----------|------|------|------|
| CCT (K):                  | 5031    | CRI (Ra): | 84.5 |      |      |
| CIE u':                   | 0.2182  | R1:       | 91.8 | R9:  | 77.5 |
| CIE v':                   | 0.4734  | R2:       | 85.4 | R10: | 70.0 |
| Duv:                      | -0.0101 | R3:       | 79.8 | R11: | 87.5 |
| CIE x:                    | 0.3424  | R4:       | 86.6 | R12: | 69.3 |
| CIE y:                    | 0.3302  | R5:       | 89.4 | R13: | 89.5 |
| CIE z:                    | 0.3273  | R6:       | 79.4 | R14: | 89.8 |
| Peak Wavelength (nm):     | 476     | R7:       | 81.5 |      |      |
| Dominant Wavelength (nm): | 495     | R8:       | 82.5 |      |      |
| Purity:                   | 3.1     |           |      |      |      |
| Rf:                       | 85.9    |           |      |      |      |
| Rg:                       | 94.8    |           |      |      |      |



### Test Conditions

Stabilization Time: 58M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.0/38%  
 Sphere Temperature (°C): 24.4

REPORT NUMBER: SP1-2210-795-5

| 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 outside the range

REPORT NUMBER: SP1-2210-795-5

**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       | 1378             | NR               | 490       | 39050            | NR               | 620       | 34698            | NR               | 750       | 1822             | NR               | 880       | 2439             | NR               |
| 365       | 1331             | NR               | 495       | 34202            | NR               | 625       | 33140            | NR               | 755       | 1777             | NR               | 885       | 2149             | NR               |
| 370       | 1335             | NR               | 500       | 30309            | NR               | 630       | 42721            | NR               | 760       | 1599             | NR               | 890       | 2769             | NR               |
| 375       | 1253             | NR               | 505       | 28003            | NR               | 635       | 36567            | NR               | 765       | 1448             | NR               | 895       | 1685             | NR               |
| 380       | 1292             | NR               | 510       | 26874            | NR               | 640       | 25112            | NR               | 770       | 1318             | NR               | 900       | 2065             | NR               |
| 385       | 1298             | NR               | 515       | 26736            | NR               | 645       | 23382            | NR               | 775       | 1208             | NR               | 905       | 1550             | NR               |
| 390       | 1143             | NR               | 520       | 26353            | NR               | 650       | 21346            | NR               | 780       | 1268             | NR               | 910       | 2207             | NR               |
| 395       | 1012             | NR               | 525       | 26016            | NR               | 655       | 17849            | NR               | 785       | 1072             | NR               | 915       | 1905             | NR               |
| 400       | 913              | NR               | 530       | 26219            | NR               | 660       | 15701            | NR               | 790       | 1151             | NR               | 920       | 1492             | NR               |
| 405       | 948              | NR               | 535       | 26516            | NR               | 665       | 13709            | NR               | 795       | 1361             | NR               | 925       | 1709             | NR               |
| 410       | 1112             | NR               | 540       | 27283            | NR               | 670       | 12105            | NR               | 800       | 1152             | NR               | 930       | 2138             | NR               |
| 415       | 1681             | NR               | 545       | 27836            | NR               | 675       | 10522            | NR               | 805       | 1330             | NR               | 935       | 2497             | NR               |
| 420       | 2833             | NR               | 550       | 28917            | NR               | 680       | 9121             | NR               | 810       | 1205             | NR               | 940       | 2581             | NR               |
| 425       | 5230             | NR               | 555       | 30224            | NR               | 685       | 7915             | NR               | 815       | 1233             | NR               | 945       | 2662             | NR               |
| 430       | 9705             | NR               | 560       | 31691            | NR               | 690       | 6967             | NR               | 820       | 960              | NR               | 950       | 1809             | NR               |
| 435       | 17926            | NR               | 565       | 33290            | NR               | 695       | 6106             | NR               | 825       | 1423             | NR               | 955       | 1977             | NR               |
| 440       | 32347            | NR               | 570       | 34911            | NR               | 700       | 5390             | NR               | 830       | 1655             | NR               | 960       | 2906             | NR               |
| 445       | 44160            | NR               | 575       | 36327            | NR               | 705       | 4734             | NR               | 835       | 1541             | NR               | 965       | 2456             | NR               |
| 450       | 39460            | NR               | 580       | 37455            | NR               | 710       | 4108             | NR               | 840       | 1555             | NR               | 970       | 2874             | NR               |
| 455       | 31448            | NR               | 585       | 38519            | NR               | 715       | 3797             | NR               | 845       | 1414             | NR               | 975       | 3194             | NR               |
| 460       | 32233            | NR               | 590       | 38974            | NR               | 720       | 3287             | NR               | 850       | 1598             | NR               | 980       | 3237             | NR               |
| 465       | 40342            | NR               | 595       | 39274            | NR               | 725       | 2926             | NR               | 855       | 1852             | NR               | 985       | 1591             | NR               |
| 470       | 53556            | NR               | 600       | 39138            | NR               | 730       | 2611             | NR               | 860       | 1463             | NR               | 990       | 2611             | NR               |
| 475       | 60829            | NR               | 605       | 38865            | NR               | 735       | 2376             | NR               | 865       | 1656             | NR               | 995       | 3556             | NR               |
| 480       | 56377            | NR               | 610       | 41532            | NR               | 740       | 2107             | NR               | 870       | 1883             | NR               | 1000      | 3556             | NR               |
| 485       | 46320            | NR               | 615       | 40776            | NR               | 745       | 2023             | NR               | 875       | 1818             | NR               |           |                  |                  |

REPORT NUMBER: SP1-2210-795-5

**Scotopic Flux vs. Wavelength**



**Scotopic Lumens: 5560**

**S/P: 2.33**

| 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       | 1378             | NR               | 490       | 39050            | NR               | 620       | 34698            | NR               | 750       | 1822             | NR               | 880       | 2439             | NR               |
| 365       | 1331             | NR               | 495       | 34202            | NR               | 625       | 33140            | NR               | 755       | 1777             | NR               | 885       | 2149             | NR               |
| 370       | 1335             | NR               | 500       | 30309            | NR               | 630       | 42721            | NR               | 760       | 1599             | NR               | 890       | 2769             | NR               |
| 375       | 1253             | NR               | 505       | 28003            | NR               | 635       | 36567            | NR               | 765       | 1448             | NR               | 895       | 1685             | NR               |
| 380       | 1292             | NR               | 510       | 26874            | NR               | 640       | 25112            | NR               | 770       | 1318             | NR               | 900       | 2065             | NR               |
| 385       | 1298             | NR               | 515       | 26736            | NR               | 645       | 23382            | NR               | 775       | 1208             | NR               | 905       | 1550             | NR               |
| 390       | 1143             | NR               | 520       | 26353            | NR               | 650       | 21346            | NR               | 780       | 1268             | NR               | 910       | 2207             | NR               |
| 395       | 1012             | NR               | 525       | 26016            | NR               | 655       | 17849            | NR               | 785       | 1072             | NR               | 915       | 1905             | NR               |
| 400       | 913              | NR               | 530       | 26219            | NR               | 660       | 15701            | NR               | 790       | 1151             | NR               | 920       | 1492             | NR               |
| 405       | 948              | NR               | 535       | 26516            | NR               | 665       | 13709            | NR               | 795       | 1361             | NR               | 925       | 1709             | NR               |
| 410       | 1112             | NR               | 540       | 27283            | NR               | 670       | 12105            | NR               | 800       | 1152             | NR               | 930       | 2138             | NR               |
| 415       | 1681             | NR               | 545       | 27836            | NR               | 675       | 10522            | NR               | 805       | 1330             | NR               | 935       | 2497             | NR               |
| 420       | 2833             | NR               | 550       | 28917            | NR               | 680       | 9121             | NR               | 810       | 1205             | NR               | 940       | 2581             | NR               |
| 425       | 5230             | NR               | 555       | 30224            | NR               | 685       | 7915             | NR               | 815       | 1233             | NR               | 945       | 2662             | NR               |
| 430       | 9705             | NR               | 560       | 31691            | NR               | 690       | 6967             | NR               | 820       | 960              | NR               | 950       | 1809             | NR               |
| 435       | 17926            | NR               | 565       | 33290            | NR               | 695       | 6106             | NR               | 825       | 1423             | NR               | 955       | 1977             | NR               |
| 440       | 32347            | NR               | 570       | 34911            | NR               | 700       | 5390             | NR               | 830       | 1655             | NR               | 960       | 2906             | NR               |
| 445       | 44160            | NR               | 575       | 36327            | NR               | 705       | 4734             | NR               | 835       | 1541             | NR               | 965       | 2456             | NR               |
| 450       | 39460            | NR               | 580       | 37455            | NR               | 710       | 4108             | NR               | 840       | 1555             | NR               | 970       | 2874             | NR               |
| 455       | 31448            | NR               | 585       | 38519            | NR               | 715       | 3797             | NR               | 845       | 1414             | NR               | 975       | 3194             | NR               |
| 460       | 32233            | NR               | 590       | 38974            | NR               | 720       | 3287             | NR               | 850       | 1598             | NR               | 980       | 3237             | NR               |
| 465       | 40342            | NR               | 595       | 39274            | NR               | 725       | 2926             | NR               | 855       | 1852             | NR               | 985       | 1591             | NR               |
| 470       | 53556            | NR               | 600       | 39138            | NR               | 730       | 2611             | NR               | 860       | 1463             | NR               | 990       | 2611             | NR               |
| 475       | 60829            | NR               | 605       | 38865            | NR               | 735       | 2376             | NR               | 865       | 1656             | NR               | 995       | 3556             | NR               |
| 480       | 56377            | NR               | 610       | 41532            | NR               | 740       | 2107             | NR               | 870       | 1883             | NR               | 1000      | 3556             | NR               |
| 485       | 46320            | NR               | 615       | 40776            | NR               | 745       | 2023             | NR               | 875       | 1818             | NR               |           |                  |                  |

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**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 2561.9**

**S/P: 1.07**

| 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       | 1378             | NR               | 490       | 39050            | NR               | 620       | 34698            | NR               | 750       | 1822             | NR               | 880       | 2439             | NR               |
| 365       | 1331             | NR               | 495       | 34202            | NR               | 625       | 33140            | NR               | 755       | 1777             | NR               | 885       | 2149             | NR               |
| 370       | 1335             | NR               | 500       | 30309            | NR               | 630       | 42721            | NR               | 760       | 1599             | NR               | 890       | 2769             | NR               |
| 375       | 1253             | NR               | 505       | 28003            | NR               | 635       | 36567            | NR               | 765       | 1448             | NR               | 895       | 1685             | NR               |
| 380       | 1292             | NR               | 510       | 26874            | NR               | 640       | 25112            | NR               | 770       | 1318             | NR               | 900       | 2065             | NR               |
| 385       | 1298             | NR               | 515       | 26736            | NR               | 645       | 23382            | NR               | 775       | 1208             | NR               | 905       | 1550             | NR               |
| 390       | 1143             | NR               | 520       | 26353            | NR               | 650       | 21346            | NR               | 780       | 1268             | NR               | 910       | 2207             | NR               |
| 395       | 1012             | NR               | 525       | 26016            | NR               | 655       | 17849            | NR               | 785       | 1072             | NR               | 915       | 1905             | NR               |
| 400       | 913              | NR               | 530       | 26219            | NR               | 660       | 15701            | NR               | 790       | 1151             | NR               | 920       | 1492             | NR               |
| 405       | 948              | NR               | 535       | 26516            | NR               | 665       | 13709            | NR               | 795       | 1361             | NR               | 925       | 1709             | NR               |
| 410       | 1112             | NR               | 540       | 27283            | NR               | 670       | 12105            | NR               | 800       | 1152             | NR               | 930       | 2138             | NR               |
| 415       | 1681             | NR               | 545       | 27836            | NR               | 675       | 10522            | NR               | 805       | 1330             | NR               | 935       | 2497             | NR               |
| 420       | 2833             | NR               | 550       | 28917            | NR               | 680       | 9121             | NR               | 810       | 1205             | NR               | 940       | 2581             | NR               |
| 425       | 5230             | NR               | 555       | 30224            | NR               | 685       | 7915             | NR               | 815       | 1233             | NR               | 945       | 2662             | NR               |
| 430       | 9705             | NR               | 560       | 31691            | NR               | 690       | 6967             | NR               | 820       | 960              | NR               | 950       | 1809             | NR               |
| 435       | 17926            | NR               | 565       | 33290            | NR               | 695       | 6106             | NR               | 825       | 1423             | NR               | 955       | 1977             | NR               |
| 440       | 32347            | NR               | 570       | 34911            | NR               | 700       | 5390             | NR               | 830       | 1655             | NR               | 960       | 2906             | NR               |
| 445       | 44160            | NR               | 575       | 36327            | NR               | 705       | 4734             | NR               | 835       | 1541             | NR               | 965       | 2456             | NR               |
| 450       | 39460            | NR               | 580       | 37455            | NR               | 710       | 4108             | NR               | 840       | 1555             | NR               | 970       | 2874             | NR               |
| 455       | 31448            | NR               | 585       | 38519            | NR               | 715       | 3797             | NR               | 845       | 1414             | NR               | 975       | 3194             | NR               |
| 460       | 32233            | NR               | 590       | 38974            | NR               | 720       | 3287             | NR               | 850       | 1598             | NR               | 980       | 3237             | NR               |
| 465       | 40342            | NR               | 595       | 39274            | NR               | 725       | 2926             | NR               | 855       | 1852             | NR               | 985       | 1591             | NR               |
| 470       | 53556            | NR               | 600       | 39138            | NR               | 730       | 2611             | NR               | 860       | 1463             | NR               | 990       | 2611             | NR               |
| 475       | 60829            | NR               | 605       | 38865            | NR               | 735       | 2376             | NR               | 865       | 1656             | NR               | 995       | 3556             | NR               |
| 480       | 56377            | NR               | 610       | 41532            | NR               | 740       | 2107             | NR               | 870       | 1883             | NR               | 1000      | 3556             | NR               |
| 485       | 46320            | NR               | 615       | 40776            | NR               | 745       | 2023             | NR               | 875       | 1818             | NR               |           |                  |                  |

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**Summary**

$R_f = 85.9$   
 $R_g = 94.8$   
 $CIE R_a = 84.5$   
 $R_g = 77.5$



**Color Vector Graphics**



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 88 | CES51 = 85 | CES76 = 81 |
| CES02 = 61 | CES27 = 83 | CES52 = 87 | CES77 = 77 |
| CES03 = 31 | CES28 = 90 | CES53 = 79 | CES78 = 83 |
| CES04 = 69 | CES29 = 81 | CES54 = 85 | CES79 = 80 |
| CES05 = 48 | CES30 = 81 | CES55 = 82 | CES80 = 78 |
| CES06 = 50 | CES31 = 81 | CES56 = 79 | CES81 = 63 |
| CES07 = 41 | CES32 = 87 | CES57 = 77 | CES82 = 92 |
| CES08 = 40 | CES33 = 84 | CES58 = 77 | CES83 = 86 |
| CES09 = 29 | CES34 = 85 | CES59 = 91 | CES84 = 96 |
| CES10 = 74 | CES35 = 91 | CES60 = 89 | CES85 = 77 |
| CES11 = 57 | CES36 = 80 | CES61 = 87 | CES86 = 70 |
| CES12 = 63 | CES37 = 89 | CES62 = 81 | CES87 = 85 |
| CES13 = 43 | CES38 = 76 | CES63 = 92 | CES88 = 86 |
| CES14 = 74 | CES39 = 93 | CES64 = 83 | CES89 = 82 |
| CES15 = 71 | CES40 = 87 | CES65 = 90 | CES90 = 85 |
| CES16 = 47 | CES41 = 89 | CES66 = 85 | CES91 = 76 |
| CES17 = 49 | CES42 = 81 | CES67 = 86 | CES92 = 75 |
| CES18 = 56 | CES43 = 80 | CES68 = 89 | CES93 = 85 |
| CES19 = 71 | CES44 = 99 | CES69 = 90 | CES94 = 77 |
| CES20 = 66 | CES45 = 84 | CES70 = 89 | CES95 = 85 |
| CES21 = 85 | CES46 = 86 | CES71 = 86 | CES96 = 92 |
| CES22 = 77 | CES47 = 83 | CES72 = 94 | CES97 = 82 |
| CES23 = 91 | CES48 = 79 | CES73 = 87 | CES98 = 83 |
| CES24 = 89 | CES49 = 87 | CES74 = 89 | CES99 = 86 |
| CES25 = 70 | CES50 = 85 | CES75 = 84 |            |



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**Color Rendition by Hue-Angle Bin**



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**Measure Comparisons**



(END OF REPORT)