

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: P734308

Luminaire Tested: **24FCZ2-35HE-B2750-W2D-CP375-3500K**

Issue Date: 1/5/2024



**Test Information**

Test Method: LM-79-08  
Report Number: P734308  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (P272053)  
Test Lab: INNOVATION CENTER(G3)  
Issue Date: 1/5/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: FAIL-SAFE  
Catalog Number: 24FCZ2-35HE-B2750-W2D-CP375-3500K  
Description: 2X4 3500 LUMEN SEALED CRUZE TROFFER WITH BIO UP LEDS AT 3500K CCT  
AND RIBBED LENS, WITH, CP375 BOTTOM LENS  
  
Light Source: -  
Ballast/Driver: -

**Summary**

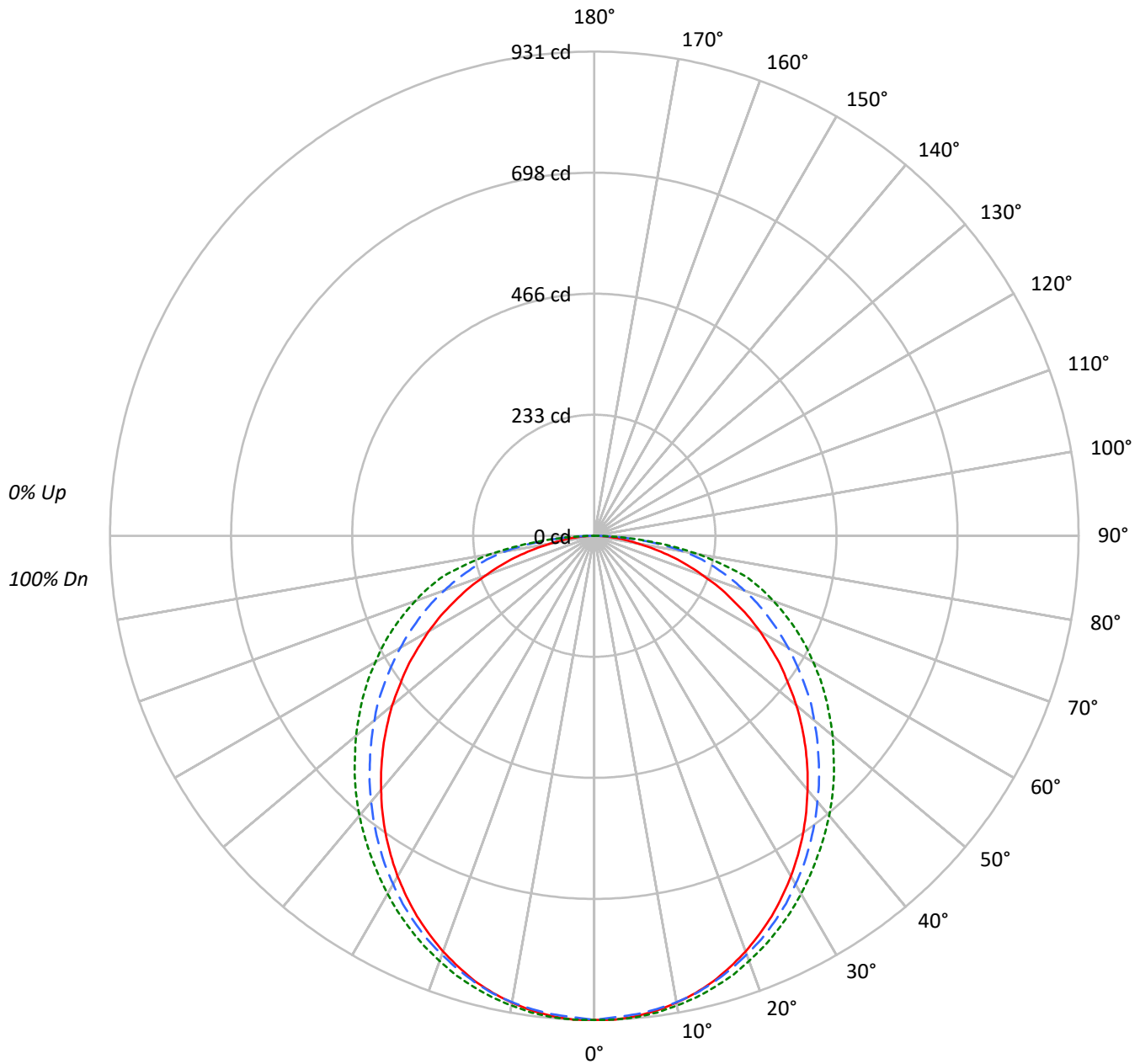
Lumens per Lamp: N/A  
Luminaire Lumens: 2773.0 lumens  
Efficiency: N/A  
Efficacy: 106.7 lumens/watt  
Spacing Criteria (0/90/45): 1.21 / 1.27 / 1.37  
Luminous Opening: Rectangular (W 1.92' x L: 3.98' x H: 0')  
CIE Type: Direct

Input Watts (W): 26  
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: P734308

CATALOG NUMBER: 24FCZ2-35HE-B2750-W2D-CP375-3500K

### Luminous Intensity Polar Plot





TEST NUMBER: P734308

CATALOG NUMBER: 24FCZ2-35HE-B2750-W2D-CP375-3500K

**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 | 98  | 94  | 105 | 100 | 96  | 92  | 96  | 93  | 89  | 92  | 89  | 87  | 89  | 86  | 84  | 82  |    |    |
| 2   | 98  | 89  | 82  | 76  | 95  | 87  | 80  | 75  | 83  | 78  | 73  | 80  | 75  | 71  | 77  | 73  | 70  | 67  |    |    |
| 3   | 89  | 78  | 69  | 62  | 86  | 76  | 68  | 62  | 73  | 66  | 61  | 70  | 64  | 60  | 68  | 63  | 58  | 56  |    |    |
| 4   | 81  | 69  | 59  | 52  | 79  | 67  | 59  | 52  | 65  | 57  | 51  | 62  | 56  | 51  | 60  | 55  | 50  | 48  |    |    |
| 5   | 74  | 61  | 52  | 45  | 72  | 60  | 51  | 45  | 58  | 50  | 44  | 56  | 49  | 44  | 54  | 48  | 43  | 41  |    |    |
| 6   | 69  | 55  | 46  | 39  | 67  | 54  | 45  | 39  | 52  | 44  | 39  | 50  | 44  | 38  | 49  | 43  | 38  | 36  |    |    |
| 7   | 64  | 50  | 41  | 35  | 62  | 49  | 40  | 34  | 47  | 40  | 34  | 46  | 39  | 34  | 45  | 38  | 34  | 32  |    |    |
| 8   | 59  | 45  | 37  | 31  | 58  | 45  | 36  | 31  | 43  | 36  | 30  | 42  | 35  | 30  | 41  | 35  | 30  | 28  |    |    |
| 9   | 55  | 42  | 33  | 28  | 54  | 41  | 33  | 28  | 40  | 33  | 27  | 39  | 32  | 27  | 38  | 32  | 27  | 25  |    |    |
| 10  | 52  | 38  | 30  | 25  | 51  | 38  | 30  | 25  | 37  | 30  | 25  | 36  | 29  | 25  | 35  | 29  | 25  | 23  |    |    |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 1314 | 1314 | 1314 |
| 5°  | 1314 | 1308 | 1316 |
| 10° | 1306 | 1305 | 1314 |
| 15° | 1295 | 1298 | 1312 |
| 20° | 1277 | 1287 | 1307 |
| 25° | 1257 | 1276 | 1301 |
| 30° | 1232 | 1261 | 1296 |
| 35° | 1205 | 1245 | 1292 |
| 40° | 1175 | 1229 | 1294 |
| 45° | 1145 | 1217 | 1300 |
| 50° | 1114 | 1211 | 1313 |
| 55° | 1079 | 1209 | 1337 |
| 60° | 1037 | 1215 | 1372 |
| 65° | 983  | 1233 | 1431 |
| 70° | 913  | 1264 | 1512 |
| 75° | 833  | 1327 | 1640 |
| 80° | 684  | 1429 | 1640 |
| 85° | 523  | 1318 | 1409 |



TEST NUMBER: P734308

CATALOG NUMBER: 24FCZ2-35HE-B2750-W2D-CP375-3500K

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 88.1   | 3.2       |
| 10°-20°   | 251.4  | 9.1       |
| 20°-30°   | 378.3  | 13.6      |
| 30°-40°   | 453.3  | 16.3      |
| 40°-50°   | 472.4  | 17.0      |
| 50°-60°   | 439.5  | 15.9      |
| 60°-70°   | 362.0  | 13.1      |
| 70°-80°   | 246.5  | 8.9       |
| 80°-90°   | 81.4   | 2.9       |
| 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       |
| <hr/>     |        |           |
| 0°-30°    | 717.7  | 25.9      |
| 0°-40°    | 1171.1 | 42.2      |
| 0°-60°    | 2083.0 | 75.1      |
| 0°-90°    | 2773.0 | 100.0     |
| 90°-120°  | 0.0    | 0.0       |
| 90°-150°  | 0.0    | 0.0       |
| 90°-180°  | 0.0    | 0.0       |
| 0°-180°   | 2773.0 | 100.0     |

**CANDELA DISTRIBUTION:**

|     | 0°  | 22.5° | 45° | 67.5° | 90° | Flux |
|-----|-----|-------|-----|-------|-----|------|
| 0°  | 931 | 931   | 931 | 931   | 931 |      |
| 5°  | 927 | 927   | 924 | 928   | 929 | 88   |
| 15° | 887 | 888   | 888 | 897   | 898 | 250  |
| 25° | 807 | 811   | 819 | 833   | 836 | 372  |
| 35° | 700 | 708   | 723 | 742   | 750 | 437  |
| 45° | 574 | 586   | 610 | 640   | 652 | 443  |
| 55° | 439 | 453   | 492 | 530   | 543 | 391  |
| 65° | 294 | 319   | 369 | 413   | 428 | 292  |
| 75° | 153 | 187   | 243 | 287   | 301 | 161  |
| 85° | 32  | 63    | 81  | 87    | 87  | 40   |
| 90° | 0   | 0     | 0   | 0     | 0   |      |



TEST NUMBER: P734308

CATALOG NUMBER: 24FCZ2-35HE-B2750-W2D-CP375-3500K

**CANDELA DISTRIBUTION (FULL):**

|       | 0°    | 22.5° | 45°   | 67.5° | 90°   |
|-------|-------|-------|-------|-------|-------|
| 0°    | 931.1 | 931.1 | 931.1 | 931.1 | 931.1 |
| 2.5°  | 931.1 | 931.1 | 926.4 | 931.1 | 931.1 |
| 5°    | 927.3 | 927.3 | 923.6 | 928.3 | 929.2 |
| 7.5°  | 920.8 | 921.8 | 918.1 | 923.6 | 924.6 |
| 10°   | 911.5 | 912.6 | 910.7 | 916.2 | 917.1 |
| 12.5° | 900.5 | 901.4 | 901.4 | 907.9 | 908.9 |
| 15°   | 886.6 | 887.6 | 888.5 | 896.8 | 897.7 |
| 17.5° | 869.0 | 871.8 | 873.6 | 883.9 | 885.7 |
| 20°   | 850.5 | 853.3 | 857.0 | 868.0 | 869.9 |
| 22.5° | 829.2 | 832.9 | 839.4 | 851.4 | 854.2 |
| 25°   | 807.0 | 810.7 | 819.1 | 832.9 | 835.7 |
| 27.5° | 782.0 | 787.6 | 797.8 | 812.6 | 816.3 |
| 30°   | 756.2 | 761.6 | 773.7 | 789.4 | 795.0 |
| 32.5° | 728.4 | 735.8 | 749.6 | 767.2 | 772.8 |
| 35°   | 699.6 | 708.0 | 722.8 | 742.2 | 749.6 |
| 37.5° | 669.2 | 678.4 | 695.9 | 717.2 | 726.5 |
| 40°   | 637.7 | 648.7 | 667.3 | 692.2 | 702.4 |
| 42.5° | 606.1 | 616.4 | 639.5 | 666.4 | 677.4 |
| 45°   | 573.8 | 585.8 | 609.9 | 640.4 | 651.5 |
| 47.5° | 540.4 | 552.5 | 581.2 | 613.6 | 623.8 |
| 50°   | 507.2 | 519.2 | 551.6 | 585.8 | 597.9 |
| 52.5° | 471.1 | 486.8 | 523.8 | 558.1 | 570.1 |
| 55°   | 438.7 | 453.4 | 491.5 | 530.3 | 543.2 |
| 57.5° | 401.7 | 419.2 | 460.9 | 501.6 | 515.5 |
| 60°   | 367.4 | 385.9 | 430.3 | 471.9 | 485.9 |
| 62.5° | 332.3 | 352.6 | 399.8 | 442.4 | 458.1 |
| 65°   | 294.3 | 319.2 | 369.2 | 412.7 | 428.4 |
| 67.5° | 260.0 | 286.0 | 338.8 | 383.2 | 397.0 |
| 70°   | 221.2 | 252.6 | 306.3 | 350.8 | 366.5 |
| 72.5° | 187.8 | 219.3 | 275.7 | 319.2 | 335.0 |
| 75°   | 152.7 | 186.9 | 243.4 | 286.9 | 300.7 |
| 77.5° | 117.6 | 155.5 | 211.9 | 245.3 | 249.9 |
| 80°   | 84.2  | 124.0 | 175.8 | 195.3 | 201.8 |
| 82.5° | 59.2  | 95.4  | 129.6 | 142.6 | 146.2 |
| 85°   | 32.3  | 62.9  | 81.4  | 87.0  | 87.0  |
| 87.5° | 13.8  | 26.9  | 32.3  | 33.4  | 34.2  |
| 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: SP1-2210-795-3

Test Date: 10/06/2022

Luminaire Tested: 9WP217084MDER4AM-3500K-315MA

Data in this report applies to families of products including 9WP217084MDER4AM-3500K.

### Test Information

Test Method: LM-79-2019  
 Report Number: SP1-2210-795-3  
 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-3500K-315MA**  
 Description: METALUX

TUNABLE BOARD, 3500K-315MA, PROGRAMMED @ 4.0Vdc.

### Spectral Parameters

|                           |         |           |      |      |      |
|---------------------------|---------|-----------|------|------|------|
| CCT (K):                  | 3506    | CRI (Ra): | 90.1 |      |      |
| CIE u':                   | 0.2401  | R1:       | 96.2 | R9:  | 75.4 |
| CIE v':                   | 0.4983  | R2:       | 91.5 | R10: | 83.5 |
| Duv:                      | -0.0097 | R3:       | 88.2 | R11: | 96.0 |
| CIE x:                    | 0.3952  | R4:       | 94.5 | R12: | 76.6 |
| CIE y:                    | 0.3646  | R5:       | 94.6 | R13: | 94.5 |
| CIE z:                    | 0.2402  | R6:       | 84.9 | R14: | 94.8 |
| Peak Wavelength (nm):     | 632     | R7:       | 86.1 |      |      |
| Dominant Wavelength (nm): | 586     | R8:       | 84.7 |      |      |
| Purity:                   | 28.3    |           |      |      |      |
| Rf:                       | 90.4    |           |      |      |      |
| Rg:                       | 97.8    |           |      |      |      |



### Test Conditions

Stabilization Time: 42M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.0/38%  
 Sphere Temperature (°C): 24.4

REPORT NUMBER: SP1-2210-795-3

| 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: SP1-2210-795-3

**CIE 1931 Chromaticity Diagram**



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



Point lies outside the range

REPORT NUMBER: SP1-2210-795-3

**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       | 1172             | NR               | 490       | 25948            | NR               | 620       | 41537            | NR               | 750       | 1967             | NR               | 880       | 2125             | NR               |
| 365       | 1124             | NR               | 495       | 24688            | NR               | 625       | 40984            | NR               | 755       | 1800             | NR               | 885       | 2057             | NR               |
| 370       | 1161             | NR               | 500       | 24010            | NR               | 630       | 70640            | NR               | 760       | 1684             | NR               | 890       | 2080             | NR               |
| 375       | 1195             | NR               | 505       | 24099            | NR               | 635       | 57718            | NR               | 765       | 1458             | NR               | 895       | 1496             | NR               |
| 380       | 1247             | NR               | 510       | 24608            | NR               | 640       | 30257            | NR               | 770       | 1312             | NR               | 900       | 1417             | NR               |
| 385       | 1197             | NR               | 515       | 25386            | NR               | 645       | 29336            | NR               | 775       | 1355             | NR               | 905       | 1054             | NR               |
| 390       | 930              | NR               | 520       | 25689            | NR               | 650       | 27279            | NR               | 780       | 1313             | NR               | 910       | 1583             | NR               |
| 395       | 934              | NR               | 525       | 25906            | NR               | 655       | 20755            | NR               | 785       | 1001             | NR               | 915       | 1866             | NR               |
| 400       | 841              | NR               | 530       | 26477            | NR               | 660       | 17587            | NR               | 790       | 1065             | NR               | 920       | 1529             | NR               |
| 405       | 808              | NR               | 535       | 27006            | NR               | 665       | 15073            | NR               | 795       | 1315             | NR               | 925       | 1671             | NR               |
| 410       | 914              | NR               | 540       | 27913            | NR               | 670       | 13454            | NR               | 800       | 1029             | NR               | 930       | 1617             | NR               |
| 415       | 1302             | NR               | 545       | 28798            | NR               | 675       | 11513            | NR               | 805       | 1267             | NR               | 935       | 1522             | NR               |
| 420       | 2088             | NR               | 550       | 29982            | NR               | 680       | 9839             | NR               | 810       | 1312             | NR               | 940       | 1792             | NR               |
| 425       | 3768             | NR               | 555       | 31264            | NR               | 685       | 8568             | NR               | 815       | 1239             | NR               | 945       | 1727             | NR               |
| 430       | 6771             | NR               | 560       | 32729            | NR               | 690       | 7487             | NR               | 820       | 1107             | NR               | 950       | 1375             | NR               |
| 435       | 12240            | NR               | 565       | 34271            | NR               | 695       | 6502             | NR               | 825       | 1209             | NR               | 955       | 2031             | NR               |
| 440       | 21697            | NR               | 570       | 35931            | NR               | 700       | 5703             | NR               | 830       | 1175             | NR               | 960       | 2155             | NR               |
| 445       | 30873            | NR               | 575       | 37457            | NR               | 705       | 4977             | NR               | 835       | 916              | NR               | 965       | 2519             | NR               |
| 450       | 30626            | NR               | 580       | 38827            | NR               | 710       | 4394             | NR               | 840       | 1171             | NR               | 970       | 2234             | NR               |
| 455       | 24859            | NR               | 585       | 40347            | NR               | 715       | 3979             | NR               | 845       | 1406             | NR               | 975       | 2064             | NR               |
| 460       | 23253            | NR               | 590       | 41126            | NR               | 720       | 3528             | NR               | 850       | 1407             | NR               | 980       | 2541             | NR               |
| 465       | 26717            | NR               | 595       | 41803            | NR               | 725       | 3206             | NR               | 855       | 1173             | NR               | 985       | 1959             | NR               |
| 470       | 33149            | NR               | 600       | 42231            | NR               | 730       | 2798             | NR               | 860       | 928              | NR               | 990       | 2532             | NR               |
| 475       | 36075            | NR               | 605       | 43629            | NR               | 735       | 2417             | NR               | 865       | 1256             | NR               | 995       | 2564             | NR               |
| 480       | 33381            | NR               | 610       | 53581            | NR               | 740       | 2135             | NR               | 870       | 1460             | NR               | 1000      | 2056             | NR               |
| 485       | 28773            | NR               | 615       | 54375            | NR               | 745       | 2151             | NR               | 875       | 1741             | NR               |           |                  |                  |

REPORT NUMBER: SP1-2210-795-3

**Scotopic Flux vs. Wavelength**



**Scotopic Lumens: 4472.9**

**S/P: 1.81**

| 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       | 1172             | NR               | 490       | 25948            | NR               | 620       | 41537            | NR               | 750       | 1967             | NR               | 880       | 2125             | NR               |
| 365       | 1124             | NR               | 495       | 24688            | NR               | 625       | 40984            | NR               | 755       | 1800             | NR               | 885       | 2057             | NR               |
| 370       | 1161             | NR               | 500       | 24010            | NR               | 630       | 70640            | NR               | 760       | 1684             | NR               | 890       | 2080             | NR               |
| 375       | 1195             | NR               | 505       | 24099            | NR               | 635       | 57718            | NR               | 765       | 1458             | NR               | 895       | 1496             | NR               |
| 380       | 1247             | NR               | 510       | 24608            | NR               | 640       | 30257            | NR               | 770       | 1312             | NR               | 900       | 1417             | NR               |
| 385       | 1197             | NR               | 515       | 25386            | NR               | 645       | 29336            | NR               | 775       | 1355             | NR               | 905       | 1054             | NR               |
| 390       | 930              | NR               | 520       | 25689            | NR               | 650       | 27279            | NR               | 780       | 1313             | NR               | 910       | 1583             | NR               |
| 395       | 934              | NR               | 525       | 25906            | NR               | 655       | 20755            | NR               | 785       | 1001             | NR               | 915       | 1866             | NR               |
| 400       | 841              | NR               | 530       | 26477            | NR               | 660       | 17587            | NR               | 790       | 1065             | NR               | 920       | 1529             | NR               |
| 405       | 808              | NR               | 535       | 27006            | NR               | 665       | 15073            | NR               | 795       | 1315             | NR               | 925       | 1671             | NR               |
| 410       | 914              | NR               | 540       | 27913            | NR               | 670       | 13454            | NR               | 800       | 1029             | NR               | 930       | 1617             | NR               |
| 415       | 1302             | NR               | 545       | 28798            | NR               | 675       | 11513            | NR               | 805       | 1267             | NR               | 935       | 1522             | NR               |
| 420       | 2088             | NR               | 550       | 29982            | NR               | 680       | 9839             | NR               | 810       | 1312             | NR               | 940       | 1792             | NR               |
| 425       | 3768             | NR               | 555       | 31264            | NR               | 685       | 8568             | NR               | 815       | 1239             | NR               | 945       | 1727             | NR               |
| 430       | 6771             | NR               | 560       | 32729            | NR               | 690       | 7487             | NR               | 820       | 1107             | NR               | 950       | 1375             | NR               |
| 435       | 12240            | NR               | 565       | 34271            | NR               | 695       | 6502             | NR               | 825       | 1209             | NR               | 955       | 2031             | NR               |
| 440       | 21697            | NR               | 570       | 35931            | NR               | 700       | 5703             | NR               | 830       | 1175             | NR               | 960       | 2155             | NR               |
| 445       | 30873            | NR               | 575       | 37457            | NR               | 705       | 4977             | NR               | 835       | 916              | NR               | 965       | 2519             | NR               |
| 450       | 30626            | NR               | 580       | 38827            | NR               | 710       | 4394             | NR               | 840       | 1171             | NR               | 970       | 2234             | NR               |
| 455       | 24859            | NR               | 585       | 40347            | NR               | 715       | 3979             | NR               | 845       | 1406             | NR               | 975       | 2064             | NR               |
| 460       | 23253            | NR               | 590       | 41126            | NR               | 720       | 3528             | NR               | 850       | 1407             | NR               | 980       | 2541             | NR               |
| 465       | 26717            | NR               | 595       | 41803            | NR               | 725       | 3206             | NR               | 855       | 1173             | NR               | 985       | 1959             | NR               |
| 470       | 33149            | NR               | 600       | 42231            | NR               | 730       | 2798             | NR               | 860       | 928              | NR               | 990       | 2532             | NR               |
| 475       | 36075            | NR               | 605       | 43629            | NR               | 735       | 2417             | NR               | 865       | 1256             | NR               | 995       | 2564             | NR               |
| 480       | 33381            | NR               | 610       | 53581            | NR               | 740       | 2135             | NR               | 870       | 1460             | NR               | 1000      | 2056             | NR               |
| 485       | 28773            | NR               | 615       | 54375            | NR               | 745       | 2151             | NR               | 875       | 1741             | NR               |           |                  |                  |

REPORT NUMBER: SP1-2210-795-3

**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 1922.8**

**S/P: 0.78**

| 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       | 1172             | NR               | 490       | 25948            | NR               | 620       | 41537            | NR               | 750       | 1967             | NR               | 880       | 2125             | NR               |
| 365       | 1124             | NR               | 495       | 24688            | NR               | 625       | 40984            | NR               | 755       | 1800             | NR               | 885       | 2057             | NR               |
| 370       | 1161             | NR               | 500       | 24010            | NR               | 630       | 70640            | NR               | 760       | 1684             | NR               | 890       | 2080             | NR               |
| 375       | 1195             | NR               | 505       | 24099            | NR               | 635       | 57718            | NR               | 765       | 1458             | NR               | 895       | 1496             | NR               |
| 380       | 1247             | NR               | 510       | 24608            | NR               | 640       | 30257            | NR               | 770       | 1312             | NR               | 900       | 1417             | NR               |
| 385       | 1197             | NR               | 515       | 25386            | NR               | 645       | 29336            | NR               | 775       | 1355             | NR               | 905       | 1054             | NR               |
| 390       | 930              | NR               | 520       | 25689            | NR               | 650       | 27279            | NR               | 780       | 1313             | NR               | 910       | 1583             | NR               |
| 395       | 934              | NR               | 525       | 25906            | NR               | 655       | 20755            | NR               | 785       | 1001             | NR               | 915       | 1866             | NR               |
| 400       | 841              | NR               | 530       | 26477            | NR               | 660       | 17587            | NR               | 790       | 1065             | NR               | 920       | 1529             | NR               |
| 405       | 808              | NR               | 535       | 27006            | NR               | 665       | 15073            | NR               | 795       | 1315             | NR               | 925       | 1671             | NR               |
| 410       | 914              | NR               | 540       | 27913            | NR               | 670       | 13454            | NR               | 800       | 1029             | NR               | 930       | 1617             | NR               |
| 415       | 1302             | NR               | 545       | 28798            | NR               | 675       | 11513            | NR               | 805       | 1267             | NR               | 935       | 1522             | NR               |
| 420       | 2088             | NR               | 550       | 29982            | NR               | 680       | 9839             | NR               | 810       | 1312             | NR               | 940       | 1792             | NR               |
| 425       | 3768             | NR               | 555       | 31264            | NR               | 685       | 8568             | NR               | 815       | 1239             | NR               | 945       | 1727             | NR               |
| 430       | 6771             | NR               | 560       | 32729            | NR               | 690       | 7487             | NR               | 820       | 1107             | NR               | 950       | 1375             | NR               |
| 435       | 12240            | NR               | 565       | 34271            | NR               | 695       | 6502             | NR               | 825       | 1209             | NR               | 955       | 2031             | NR               |
| 440       | 21697            | NR               | 570       | 35931            | NR               | 700       | 5703             | NR               | 830       | 1175             | NR               | 960       | 2155             | NR               |
| 445       | 30873            | NR               | 575       | 37457            | NR               | 705       | 4977             | NR               | 835       | 916              | NR               | 965       | 2519             | NR               |
| 450       | 30626            | NR               | 580       | 38827            | NR               | 710       | 4394             | NR               | 840       | 1171             | NR               | 970       | 2234             | NR               |
| 455       | 24859            | NR               | 585       | 40347            | NR               | 715       | 3979             | NR               | 845       | 1406             | NR               | 975       | 2064             | NR               |
| 460       | 23253            | NR               | 590       | 41126            | NR               | 720       | 3528             | NR               | 850       | 1407             | NR               | 980       | 2541             | NR               |
| 465       | 26717            | NR               | 595       | 41803            | NR               | 725       | 3206             | NR               | 855       | 1173             | NR               | 985       | 1959             | NR               |
| 470       | 33149            | NR               | 600       | 42231            | NR               | 730       | 2798             | NR               | 860       | 928              | NR               | 990       | 2532             | NR               |
| 475       | 36075            | NR               | 605       | 43629            | NR               | 735       | 2417             | NR               | 865       | 1256             | NR               | 995       | 2564             | NR               |
| 480       | 33381            | NR               | 610       | 53581            | NR               | 740       | 2135             | NR               | 870       | 1460             | NR               | 1000      | 2056             | NR               |
| 485       | 28773            | NR               | 615       | 54375            | NR               | 745       | 2151             | NR               | 875       | 1741             | NR               |           |                  |                  |

REPORT NUMBER: SP1-2210-795-3

**TM-30-18**

**Summary**

$R_f = 90.4$   
 $R_g = 97.8$   
 CIE  $R_a = 90.1$   
 $R_g = 75.4$



**Color Vector Graphics**



REPORT NUMBER: SP1-2210-795-3

TM-30-18

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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 96 | CES51 = 92 | CES76 = 90 |
| CES02 = 63 | CES27 = 88 | CES52 = 95 | CES77 = 80 |
| CES03 = 32 | CES28 = 96 | CES53 = 91 | CES78 = 90 |
| CES04 = 70 | CES29 = 91 | CES54 = 89 | CES79 = 83 |
| CES05 = 50 | CES30 = 87 | CES55 = 87 | CES80 = 84 |
| CES06 = 51 | CES31 = 92 | CES56 = 88 | CES81 = 66 |
| CES07 = 43 | CES32 = 97 | CES57 = 87 | CES82 = 94 |
| CES08 = 42 | CES33 = 92 | CES58 = 87 | CES83 = 89 |
| CES09 = 29 | CES34 = 94 | CES59 = 95 | CES84 = 96 |
| CES10 = 76 | CES35 = 96 | CES60 = 91 | CES85 = 77 |
| CES11 = 58 | CES36 = 82 | CES61 = 91 | CES86 = 75 |
| CES12 = 64 | CES37 = 96 | CES62 = 84 | CES87 = 91 |
| CES13 = 44 | CES38 = 83 | CES63 = 95 | CES88 = 92 |
| CES14 = 74 | CES39 = 97 | CES64 = 90 | CES89 = 84 |
| CES15 = 72 | CES40 = 95 | CES65 = 93 | CES90 = 91 |
| CES16 = 48 | CES41 = 93 | CES66 = 91 | CES91 = 77 |
| CES17 = 49 | CES42 = 93 | CES67 = 91 | CES92 = 78 |
| CES18 = 56 | CES43 = 91 | CES68 = 92 | CES93 = 86 |
| CES19 = 71 | CES44 = 99 | CES69 = 92 | CES94 = 77 |
| CES20 = 67 | CES45 = 94 | CES70 = 92 | CES95 = 86 |
| CES21 = 86 | CES46 = 94 | CES71 = 89 | CES96 = 94 |
| CES22 = 78 | CES47 = 86 | CES72 = 95 | CES97 = 92 |
| CES23 = 91 | CES48 = 86 | CES73 = 90 | CES98 = 91 |
| CES24 = 90 | CES49 = 95 | CES74 = 88 | CES99 = 90 |
| CES25 = 71 | CES50 = 92 | CES75 = 89 |            |



REPORT NUMBER: SP1-2210-795-3

**TM-30-18**

Color Rendition by Hue-Angle Bin



REPORT NUMBER: SP1-2210-795-3

**TM-30-18**

**Measure Comparisons**



(END OF REPORT)