

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: METALUX

Report Number: P731939

Luminaire Tested: **22CZ2-20HE-B2750-W2D-4000K**

Issue Date: 1/5/2024



**Test Information**

Test Method: LM-79-08  
Report Number: P731939  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (P271965)  
Test Lab: INNOVATION CENTER(G3)  
Issue Date: 1/5/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: METALUX  
Catalog Number: 22CZ2-20HE-B2750-W2D-4000K  
Description: 2X2 2000 LUMEN CRUZE TROFFER WITH BIO UP LEDS AT 4000K CCT AND RIBBED LENS

Light Source: -  
Ballast/Driver: -

**Summary**

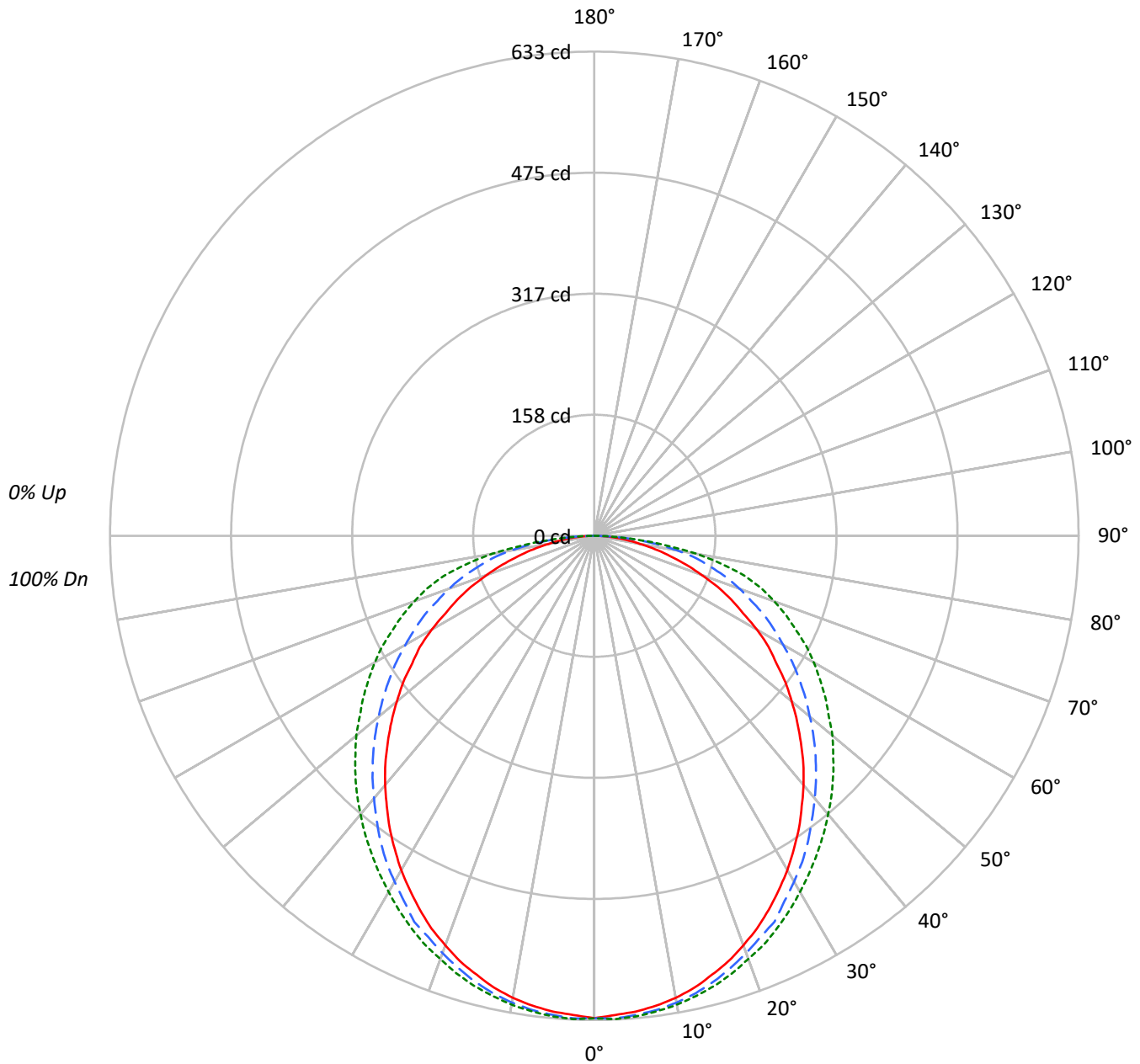
Lumens per Lamp: N/A  
Luminaire Lumens: 1855.0 lumens  
Efficiency: N/A  
Efficacy: 115.9 lumens/watt  
Spacing Criteria (0/90/45): 1.19 / 1.27 / 1.36  
Luminous Opening: Rectangular (W 1.92' x L: 1.98' x H: 0')  
CIE Type: Direct

Input Watts (W): 16  
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: P731939

CATALOG NUMBER: 22CZ2-20HE-B2750-W2D-4000K

### Luminous Intensity Polar Plot





TEST NUMBER: P731939

CATALOG NUMBER: 22CZ2-20HE-B2750-W2D-4000K

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

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |    |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|
| RF  | 20  |     |     |     | 20  |     |     |     |     | 20  |     |     |     |     | 20  |     |     |     |    | 20 |
| RC  | 80  |     |     |     | 70  |     |     |     |     | 50  |     |     |     |     | 30  |     |     |     |    | 10 |
| RW  | 70  | 50  | 30  | 10  | 70  | 50  | 30  | 10  | 50  | 30  | 10  | 50  | 30  | 10  | 50  | 30  | 10  | 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 | 101 | 96  | 93  | 96  | 93  | 90  | 92  | 90  | 87  | 89  | 86  | 84  | 82  |    |    |
| 2   | 98  | 89  | 82  | 76  | 95  | 87  | 81  | 75  | 84  | 78  | 73  | 80  | 76  | 71  | 77  | 73  | 70  | 68  |    |    |
| 3   | 89  | 78  | 69  | 63  | 86  | 76  | 68  | 62  | 73  | 66  | 61  | 70  | 65  | 60  | 68  | 63  | 59  | 56  |    |    |
| 4   | 81  | 69  | 60  | 53  | 79  | 67  | 59  | 52  | 65  | 57  | 52  | 63  | 56  | 51  | 60  | 55  | 50  | 48  |    |    |
| 5   | 75  | 61  | 52  | 45  | 72  | 60  | 52  | 45  | 58  | 50  | 44  | 56  | 49  | 44  | 54  | 48  | 44  | 41  |    |    |
| 6   | 69  | 55  | 46  | 39  | 67  | 54  | 46  | 39  | 52  | 45  | 39  | 51  | 44  | 39  | 49  | 43  | 38  | 36  |    |    |
| 7   | 64  | 50  | 41  | 35  | 62  | 49  | 41  | 35  | 48  | 40  | 34  | 46  | 39  | 34  | 45  | 39  | 34  | 32  |    |    |
| 8   | 59  | 46  | 37  | 31  | 58  | 45  | 37  | 31  | 44  | 36  | 31  | 42  | 35  | 30  | 41  | 35  | 30  | 28  |    |    |
| 9   | 56  | 42  | 34  | 28  | 54  | 41  | 33  | 28  | 40  | 33  | 28  | 39  | 32  | 27  | 38  | 32  | 27  | 25  |    |    |
| 10  | 52  | 39  | 31  | 25  | 51  | 38  | 30  | 25  | 37  | 30  | 25  | 36  | 30  | 25  | 35  | 29  | 25  | 23  |    |    |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 1790 | 1790 | 1790 |
| 5°  | 1778 | 1791 | 1796 |
| 10° | 1767 | 1786 | 1794 |
| 15° | 1746 | 1772 | 1788 |
| 20° | 1720 | 1753 | 1778 |
| 25° | 1689 | 1743 | 1772 |
| 30° | 1654 | 1711 | 1762 |
| 35° | 1616 | 1688 | 1758 |
| 40° | 1576 | 1660 | 1761 |
| 45° | 1531 | 1641 | 1772 |
| 50° | 1487 | 1624 | 1793 |
| 55° | 1436 | 1617 | 1824 |
| 60° | 1393 | 1616 | 1880 |
| 65° | 1323 | 1642 | 1949 |
| 70° | 1235 | 1673 | 2075 |
| 75° | 1131 | 1732 | 2242 |
| 80° | 985  | 1804 | 2208 |
| 85° | 863  | 1605 | 1755 |



TEST NUMBER: P731939

CATALOG NUMBER: 22CZ2-20HE-B2750-W2D-4000K

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 59.6   | 3.2       |
| 10°-20°   | 169.9  | 9.2       |
| 20°-30°   | 255.1  | 13.7      |
| 30°-40°   | 304.8  | 16.4      |
| 40°-50°   | 316.9  | 17.1      |
| 50°-60°   | 293.7  | 15.8      |
| 60°-70°   | 240.9  | 13.0      |
| 70°-80°   | 162.9  | 8.8       |
| 80°-90°   | 51.2   | 2.8       |
| 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°    | 484.6  | 26.1      |
| 0°-40°    | 789.4  | 42.6      |
| 0°-60°    | 1400.0 | 75.5      |
| 0°-90°    | 1855.0 | 100.0     |
| 90°-120°  | 0.0    | 0.0       |
| 90°-150°  | 0.0    | 0.0       |
| 90°-180°  | 0.0    | 0.0       |
| 0°-180°   | 1855.0 | 100.0     |

**CANDELA DISTRIBUTION:**

|     | 0°  | 22.5° | 45° | 67.5° | 90° | Flux |
|-----|-----|-------|-----|-------|-----|------|
| 0°  | 631 | 631   | 631 | 631   | 631 |      |
| 5°  | 624 | 625   | 629 | 630   | 631 | 59   |
| 15° | 594 | 597   | 603 | 607   | 609 | 168  |
| 25° | 539 | 544   | 557 | 563   | 566 | 248  |
| 35° | 466 | 473   | 487 | 502   | 508 | 292  |
| 45° | 382 | 389   | 409 | 433   | 442 | 295  |
| 55° | 290 | 299   | 327 | 356   | 369 | 261  |
| 65° | 197 | 208   | 245 | 276   | 290 | 195  |
| 75° | 103 | 120   | 158 | 190   | 204 | 109  |
| 85° | 26  | 36    | 49  | 55    | 54  | 30   |
| 90° | 0   | 0     | 0   | 0     | 0   |      |



TEST NUMBER: P731939

CATALOG NUMBER: 22CZ2-20HE-B2750-W2D-4000K

**CANDELA DISTRIBUTION (FULL):**

|       | 0°    | 22.5° | 45°   | 67.5° | 90°   |
|-------|-------|-------|-------|-------|-------|
| 0°    | 630.7 | 630.7 | 630.7 | 630.7 | 630.7 |
| 2.5°  | 627.1 | 628.8 | 631.6 | 632.6 | 632.6 |
| 5°    | 624.3 | 625.2 | 628.8 | 629.8 | 630.7 |
| 7.5°  | 619.7 | 621.6 | 625.2 | 626.2 | 627.1 |
| 10°   | 613.3 | 615.2 | 619.7 | 621.6 | 622.5 |
| 12.5° | 605.2 | 607.0 | 612.5 | 615.2 | 616.1 |
| 15°   | 594.2 | 596.9 | 603.3 | 607.0 | 608.8 |
| 17.5° | 583.3 | 585.9 | 592.4 | 597.8 | 599.7 |
| 20°   | 569.6 | 575.9 | 580.6 | 587.8 | 588.7 |
| 22.5° | 555.9 | 559.6 | 567.7 | 575.1 | 578.7 |
| 25°   | 539.4 | 544.0 | 556.8 | 563.2 | 565.9 |
| 27.5° | 522.2 | 528.5 | 538.5 | 548.6 | 552.2 |
| 30°   | 504.8 | 509.3 | 522.2 | 533.9 | 537.7 |
| 32.5° | 485.6 | 492.0 | 505.7 | 517.5 | 523.0 |
| 35°   | 466.4 | 472.8 | 487.4 | 502.0 | 507.5 |
| 37.5° | 445.5 | 452.7 | 467.4 | 484.6 | 492.0 |
| 40°   | 425.4 | 430.9 | 448.1 | 469.1 | 475.5 |
| 42.5° | 404.3 | 410.7 | 429.0 | 451.9 | 459.1 |
| 45°   | 381.6 | 388.8 | 409.0 | 432.6 | 441.7 |
| 47.5° | 359.6 | 366.9 | 388.8 | 412.6 | 423.5 |
| 50°   | 336.8 | 345.9 | 367.8 | 395.2 | 406.2 |
| 52.5° | 314.9 | 323.2 | 347.8 | 376.1 | 386.1 |
| 55°   | 290.3 | 299.4 | 326.8 | 355.9 | 368.7 |
| 57.5° | 270.2 | 276.5 | 306.7 | 336.8 | 349.6 |
| 60°   | 245.5 | 253.8 | 284.8 | 316.7 | 331.3 |
| 62.5° | 219.1 | 232.8 | 264.7 | 297.5 | 312.2 |
| 65°   | 197.1 | 208.1 | 244.6 | 276.5 | 290.3 |
| 67.5° | 174.3 | 186.2 | 221.8 | 255.6 | 271.1 |
| 70°   | 148.8 | 164.3 | 201.7 | 235.5 | 250.1 |
| 72.5° | 125.9 | 142.4 | 180.7 | 213.6 | 229.1 |
| 75°   | 103.2 | 120.4 | 158.0 | 189.9 | 204.5 |
| 77.5° | 81.3  | 100.4 | 136.9 | 161.6 | 170.7 |
| 80°   | 60.3  | 78.5  | 110.4 | 127.8 | 135.1 |
| 82.5° | 42.0  | 57.5  | 81.3  | 90.4  | 92.2  |
| 85°   | 26.5  | 36.5  | 49.3  | 54.8  | 53.9  |
| 87.5° | 11.9  | 14.6  | 18.3  | 20.1  | 19.1  |
| 90°   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |



Report Generated By 670246072 / DESKTOP-50001EG





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







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

Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

METALUX

Report Number: SP1-2210-795-4

Test Date: 10/06/2022

Luminaire Tested: 9WP217084MDER4AM-4000K-315MA

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

### Test Information

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

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

### Spectral Parameters

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



### Test Conditions

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

REPORT NUMBER: SP1-2210-795-4

| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | 76INCH SPHERE IN0058  | 8/8/2022         | 2/8/2023             |
| Power Meter                    | XITRON 2801 IN0071    | 11/29/2021       | 11/29/2022           |
| AC Power Source                | CHROMA 61603 IN0063   | 11/29/2021       | 11/29/2022           |
| DC Power Source                | AGILENT E3634A IN0208 | 11/29/2021       | 11/29/2022           |
| Sphere Thermometer             | ONSET IN0085          | 11/29/2021       | 11/29/2022           |
| Room Thermometer               | ONSET IN0046          | 11/29/2021       | 11/29/2022           |

REPORT NUMBER: SP1-2210-795-4

**CIE 1931 Chromaticity Diagram**



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



Point lies outside the range

REPORT NUMBER: SP1-2210-795-4

**Photopic Flux vs. Wavelength**

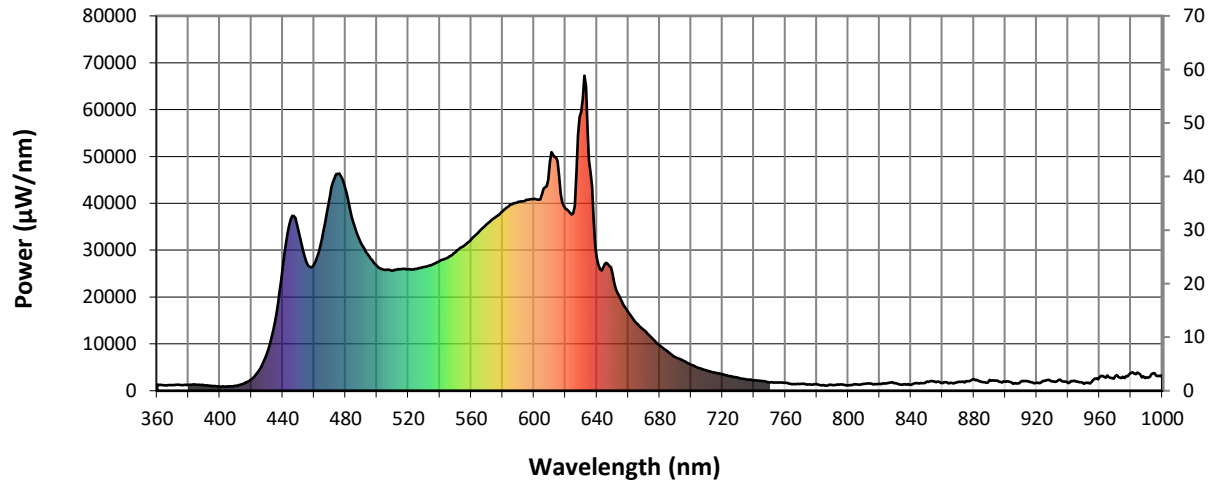


#####

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

REPORT NUMBER: SP1-2210-795-4

**Scotopic Flux vs. Wavelength**



**Scotopic Lumens: 4927.4**

**S/P: 2.02**

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

REPORT NUMBER: SP1-2210-795-4

**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 2189.1**

**S/P: 0.9**

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

REPORT NUMBER: SP1-2210-795-4

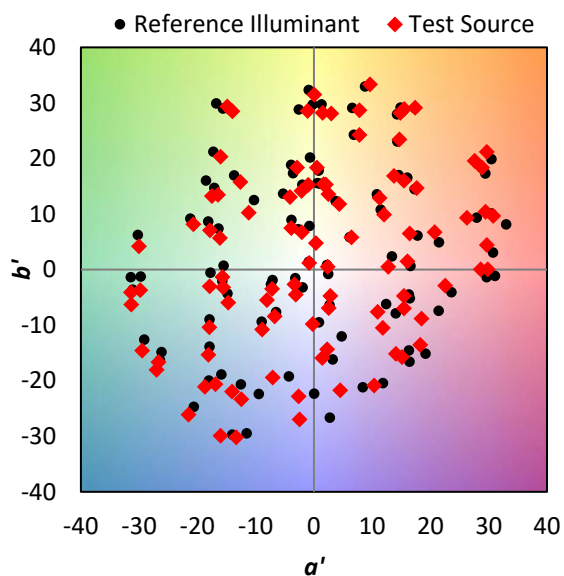
TM-30-18

### Summary

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



### Color Vector Graphics



REPORT NUMBER: SP1-2210-795-4

**TM-30-18**

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

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



REPORT NUMBER: SP1-2210-795-4

**TM-30-18**

**Color Rendition by Hue-Angle Bin**



REPORT NUMBER: SP1-2210-795-4

**TM-30-18**

**Measure Comparisons**



(END OF REPORT)