

Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



Scaled data based on original data using  
LM-79-2019 Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Test Report Prepared for  
Cooper Lighting Solutions

Brand: METALUX

Report Number: P975446

Luminaire Tested: 24EN-LD2-67-UNV-L950-CD1

Issue Date: 03/13/2025

**Test Information**

Test Method: LM-79-2019  
Report Number: P975446  
Test Lab: INNOVATION CENTER(P3)  
Issue Date: 03/13/2025  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: METALUX  
Catalog Number: 24EN-LD2-67-UNV-L950-CD1  
Description: METALUX ENCOUNTER 2x4 6700LM PACKAGE 90CRI 5000K STANDARD TROFFER  
Light Source: 5000K CCT, 90 CRI LEDS  
Ballast/Driver: -

**Summary**

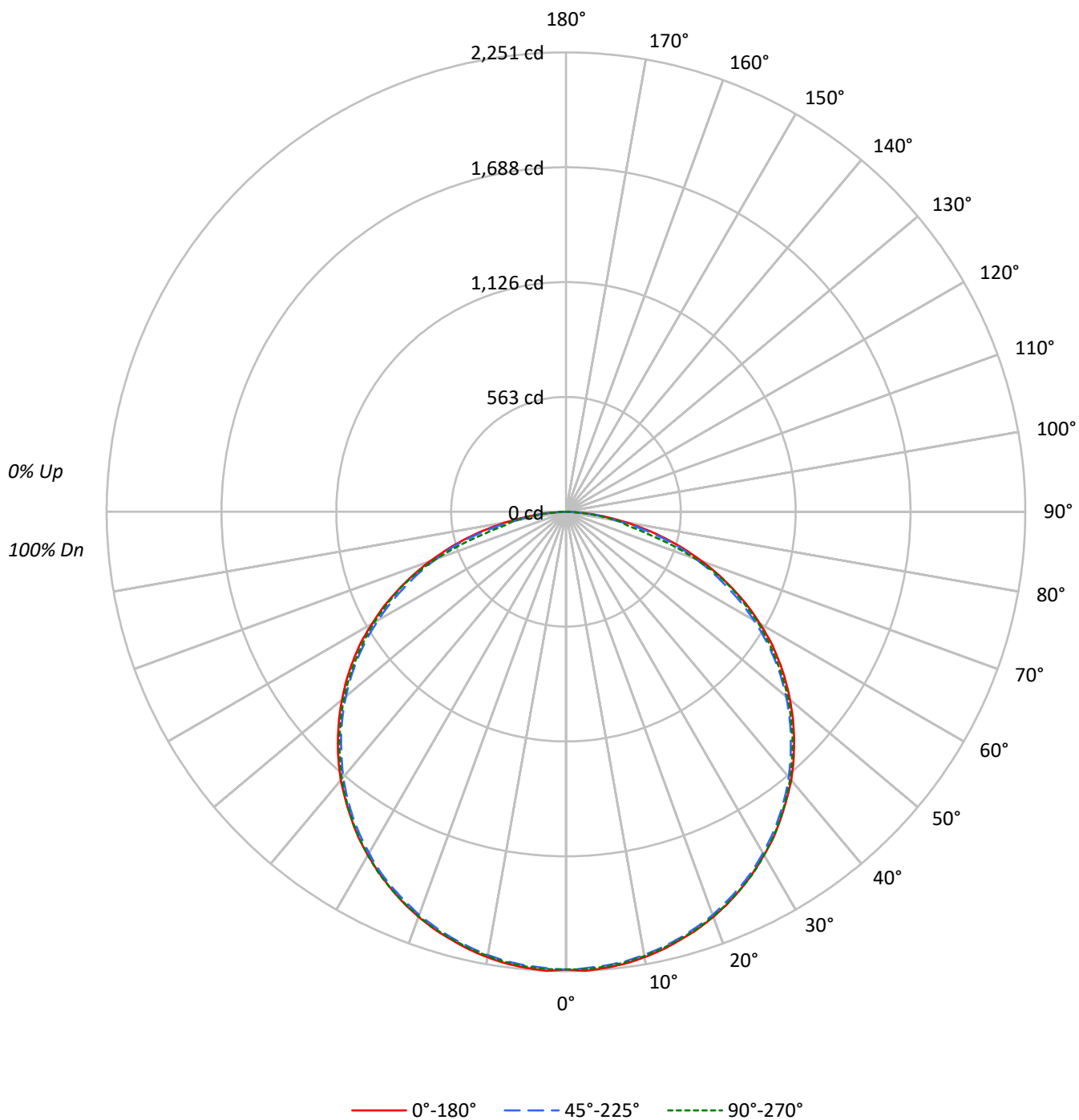
Lumens per Lamp: N/A  
Luminaire Lumens: 6730.7 lumens  
Efficiency: N/A  
Efficacy: 120.0 lumens/watt  
Spacing Criteria (0/90/45): 1.29 / 1.29 / 1.4  
Luminous Opening: Rectangular (W 1.83' x L: 3.83' x H: 0')  
CIE Type: Direct

Input Watts (W): 56.1  
Input Voltage (V): 120  
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: 28.75 FT

TEST NUMBER: P975446

CATALOG NUMBER: 24EN-LD2-67-UNV-L950-CD1

### Luminous Intensity Polar Plot



TEST NUMBER: P975446

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**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  |
| RCR |     |     |     |     |     |     |     |     |     |     |     |  |     |     |     |  |     |
| 0   | 119 | 119 | 119 | 119 | 116 | 116 | 116 | 116 | 111 | 111 | 111 |  | 106 | 106 | 106 |  | 102 |
| 1   | 109 | 104 | 99  | 95  | 106 | 101 | 97  | 94  | 97  | 94  | 91  |  | 93  | 90  | 88  |  | 90  |
| 2   | 98  | 90  | 83  | 77  | 96  | 88  | 82  | 76  | 84  | 79  | 74  |  | 81  | 77  | 73  |  | 78  |
| 3   | 90  | 79  | 70  | 64  | 87  | 77  | 69  | 63  | 74  | 67  | 62  |  | 71  | 66  | 61  |  | 69  |
| 4   | 82  | 70  | 61  | 54  | 79  | 68  | 60  | 53  | 66  | 58  | 53  |  | 63  | 57  | 52  |  | 61  |
| 5   | 75  | 62  | 53  | 46  | 73  | 61  | 52  | 46  | 59  | 51  | 45  |  | 57  | 50  | 45  |  | 55  |
| 6   | 69  | 56  | 47  | 40  | 67  | 55  | 46  | 40  | 53  | 45  | 40  |  | 51  | 44  | 39  |  | 50  |
| 7   | 64  | 50  | 42  | 35  | 62  | 50  | 41  | 35  | 48  | 40  | 35  |  | 47  | 40  | 35  |  | 45  |
| 8   | 60  | 46  | 37  | 31  | 58  | 45  | 37  | 31  | 44  | 36  | 31  |  | 43  | 36  | 31  |  | 41  |
| 9   | 56  | 42  | 34  | 28  | 54  | 42  | 34  | 28  | 40  | 33  | 28  |  | 39  | 33  | 28  |  | 38  |
| 10  | 52  | 39  | 31  | 26  | 51  | 38  | 31  | 25  | 37  | 30  | 25  |  | 36  | 30  | 25  |  | 35  |

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

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 3436 | 3436 | 3436 |
| 5°  | 3449 | 3431 | 3440 |
| 10° | 3447 | 3430 | 3438 |
| 15° | 3443 | 3427 | 3436 |
| 20° | 3443 | 3427 | 3438 |
| 25° | 3439 | 3422 | 3439 |
| 30° | 3435 | 3415 | 3435 |
| 35° | 3431 | 3408 | 3426 |
| 40° | 3433 | 3397 | 3417 |
| 45° | 3424 | 3375 | 3400 |
| 50° | 3415 | 3355 | 3385 |
| 55° | 3403 | 3320 | 3353 |
| 60° | 3360 | 3257 | 3326 |
| 65° | 3293 | 3155 | 3272 |
| 70° | 3174 | 3042 | 3035 |
| 75° | 2987 | 2855 | 2413 |
| 80° | 2629 | 2233 | 2295 |
| 85° | 2075 | 1954 | 1807 |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 3424 cd/sqm

TEST NUMBER: P975446

CATALOG NUMBER: 24EN-LD2-67-UNV-L950-CD1

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 212.5  | 3.2       |
| 10°-20°   | 611.0  | 9.1       |
| 20°-30°   | 935.0  | 13.9      |
| 30°-40°   | 1142.8 | 17.0      |
| 40°-50°   | 1207.7 | 17.9      |
| 50°-60°   | 1118.9 | 16.6      |
| 60°-70°   | 876.6  | 13.0      |
| 70°-80°   | 495.6  | 7.4       |
| 80°-90°   | 130.5  | 1.9       |
| 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       |
| 0°-30°    | 1758.5 | 26.1      |
| 0°-40°    | 2901.3 | 43.1      |
| 0°-60°    | 5228.0 | 77.7      |
| 0°-90°    | 6730.7 | 100.0     |
| 90°-120°  | 0.0    | 0.0       |
| 90°-150°  | 0.0    | 0.0       |
| 90°-180°  | 0.0    | 0.0       |
| 0°-180°   | 6730.7 | 100.0     |

**CANDELA DISTRIBUTION:**

|     | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|-----|------|-------|------|-------|------|------|
| 0°  | 2243 | 2243  | 2243 | 2243  | 2243 |      |
| 5°  | 2243 | 2236  | 2232 | 2230  | 2238 | 213  |
| 15° | 2171 | 2163  | 2162 | 2160  | 2167 | 613  |
| 25° | 2035 | 2026  | 2025 | 2025  | 2035 | 938  |
| 35° | 1835 | 1827  | 1823 | 1823  | 1832 | 1149 |
| 45° | 1581 | 1570  | 1558 | 1558  | 1570 | 1220 |
| 55° | 1274 | 1260  | 1243 | 1246  | 1256 | 1138 |
| 65° | 908  | 892   | 870  | 882   | 903  | 898  |
| 75° | 505  | 491   | 482  | 430   | 408  | 531  |
| 85° | 118  | 111   | 111  | 105   | 103  | 139  |
| 90° | 0    | 0     | 0    | 0     | 0    |      |

TEST NUMBER: P975446

CATALOG NUMBER: 24EN-LD2-67-UNV-L950-CD1

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|-------|--------|--------|--------|--------|--------|
| 0°    | 2243.0 | 2243.0 | 2243.0 | 2243.0 | 2243.0 |
| 2.5°  | 2251.4 | 2241.7 | 2238.8 | 2236.1 | 2243.0 |
| 5°    | 2243.0 | 2236.1 | 2231.7 | 2230.4 | 2237.5 |
| 7.5°  | 2233.3 | 2224.8 | 2222.0 | 2219.1 | 2226.2 |
| 10°   | 2216.4 | 2208.0 | 2205.1 | 2203.6 | 2210.7 |
| 12.5° | 2196.7 | 2186.7 | 2185.4 | 2184.1 | 2191.0 |
| 15°   | 2171.2 | 2162.8 | 2161.5 | 2160.2 | 2167.0 |
| 17.5° | 2144.7 | 2136.2 | 2133.4 | 2132.0 | 2141.8 |
| 20°   | 2112.3 | 2103.9 | 2102.4 | 2101.0 | 2109.4 |
| 22.5° | 2075.8 | 2067.4 | 2064.5 | 2065.8 | 2074.2 |
| 25°   | 2035.0 | 2026.4 | 2025.1 | 2025.1 | 2035.0 |
| 27.5° | 1989.8 | 1981.4 | 1981.4 | 1981.4 | 1992.7 |
| 30°   | 1942.2 | 1935.1 | 1930.9 | 1932.3 | 1942.2 |
| 32.5° | 1892.8 | 1881.5 | 1878.9 | 1880.2 | 1890.2 |
| 35°   | 1835.2 | 1826.8 | 1822.6 | 1822.6 | 1832.4 |
| 37.5° | 1776.1 | 1767.7 | 1762.2 | 1762.2 | 1771.9 |
| 40°   | 1717.2 | 1704.3 | 1698.8 | 1695.9 | 1708.8 |
| 42.5° | 1651.0 | 1641.2 | 1628.6 | 1628.6 | 1639.7 |
| 45°   | 1580.8 | 1569.5 | 1558.2 | 1558.2 | 1569.5 |
| 47.5° | 1509.0 | 1497.7 | 1485.1 | 1485.1 | 1496.4 |
| 50°   | 1433.0 | 1421.7 | 1407.8 | 1407.8 | 1420.4 |
| 52.5° | 1355.7 | 1343.1 | 1327.6 | 1326.0 | 1338.9 |
| 55°   | 1274.2 | 1260.0 | 1243.2 | 1246.1 | 1255.8 |
| 57.5° | 1191.2 | 1172.8 | 1155.9 | 1155.9 | 1171.4 |
| 60°   | 1097.0 | 1081.5 | 1063.1 | 1066.0 | 1085.7 |
| 62.5° | 1006.9 | 987.2  | 969.0  | 975.9  | 992.9  |
| 65°   | 908.5  | 891.7  | 870.4  | 881.7  | 902.8  |
| 67.5° | 811.5  | 793.1  | 776.3  | 790.3  | 800.2  |
| 70°   | 708.8  | 691.9  | 679.3  | 679.3  | 677.8  |
| 72.5° | 606.2  | 590.7  | 587.8  | 561.0  | 544.2  |
| 75°   | 504.8  | 490.8  | 482.4  | 430.3  | 407.8  |
| 77.5° | 399.3  | 395.1  | 368.6  | 313.6  | 306.5  |
| 80°   | 298.1  | 301.0  | 253.2  | 254.5  | 260.2  |
| 82.5° | 205.3  | 201.1  | 189.8  | 181.4  | 178.5  |
| 85°   | 118.1  | 111.2  | 111.2  | 105.4  | 102.8  |
| 87.5° | 39.4   | 43.6   | 43.6   | 43.6   | 45.0   |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

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

Report Prepared for

Cooper Lighting Solutions

Metalux

Report Number: SP1-2506-457-4

Test Date: 07/15/2025

Luminaire Tested: 14EN-LD2-51-UNV-L950-CD1-U

Data in this report applies to families of products including 14EN-LD2-51-UNV-L950-CD1-U

### Test Information

Test Method: LM-79-2019  
 Report Number: SP1-2506-457-4  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 07/15/2025  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: Metalux  
 Catalog Number: **14EN-LD2-51-UNV-L950-CD1-U**  
 Description: 1x4 ENCOUNTER 5100LM WITH LIGHTNING BOARDS

### Spectral Parameters

CCT (K): 4838  
 CIE  $u'$ : 0.2122  
 CIE  $v'$ : 0.4888  
 Duv: 0.0015  
 CIE x: 0.3502  
 CIE y: 0.3586  
 CIE z: 0.2912  
 Peak Wavelength (nm): 630  
 Dominant Wavelength (nm): 573  
 Purity: 12.68613  
 R<sub>f</sub>: 91.2  
 R<sub>g</sub>: 100.8

CRI (Ra): 93.6  
 R1: 94.4  
 R2: 94.8  
 R3: 93.6  
 R4: 94.8  
 R5: 93.3  
 R6: 91.9  
 R7: 95.9  
 R8: 89.8  
 R9: 69.6  
 R10: 86.3  
 R11: 94.3  
 R12: 70.2  
 R13: 94.4  
 R14: 96.0  
 R15: 92.2



### Test Conditions

Stabilization Time: M  
 Operation Time: 1H 0M  
 Sphere Temperature (°C): 25.0

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| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | 76INCH SPHERE IN0058  | 6/16/2025        | 12/16/2025           |
| Power Meter                    | XITRON INXT2011004    | 1/21/2025        | 1/21/2026            |
| AC Power Source                | CHROMA 61603 IN0063   | 10/22/2024       | 10/22/2025           |
| DC Power Source                | AGILENT E3634A IN0208 | 10/22/2024       | 10/22/2025           |
| Sphere Thermometer             | ONSET IN0085          | 10/22/2024       | 10/22/2025           |
| Room Thermometer               | ONSET IN0046          | 10/22/2024       | 10/22/2025           |

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**CIE 1931 Chromaticity Diagram**



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



Point lies inside the ANSI 5000K 4-step quadrangle

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### Photopic Flux vs. Wavelength



### Photopic Lumens: NR

| $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|
| 360               | 0                                    | NR                             | 490               | 223                                  | NR                             | 620               | 303                                  | NR                             | 750               | 6                                    | NR                             | 880               | 0                                    | NR                             |
| 365               | 0                                    | NR                             | 495               | 258                                  | NR                             | 625               | 305                                  | NR                             | 755               | 5                                    | NR                             | 885               | 0                                    | NR                             |
| 370               | 0                                    | NR                             | 500               | 290                                  | NR                             | 630               | 1000                                 | NR                             | 760               | 5                                    | NR                             | 890               | 0                                    | NR                             |
| 375               | 0                                    | NR                             | 505               | 311                                  | NR                             | 635               | 631                                  | NR                             | 765               | 4                                    | NR                             | 895               | 0                                    | NR                             |
| 380               | 0                                    | NR                             | 510               | 325                                  | NR                             | 640               | 194                                  | NR                             | 770               | 4                                    | NR                             | 900               | 0                                    | NR                             |
| 385               | 1                                    | NR                             | 515               | 333                                  | NR                             | 645               | 188                                  | NR                             | 775               | 3                                    | NR                             | 905               | 0                                    | NR                             |
| 390               | 2                                    | NR                             | 520               | 336                                  | NR                             | 650               | 162                                  | NR                             | 780               | 3                                    | NR                             | 910               | 0                                    | NR                             |
| 395               | 4                                    | NR                             | 525               | 340                                  | NR                             | 655               | 136                                  | NR                             | 785               | 2                                    | NR                             | 915               | 0                                    | NR                             |
| 400               | 5                                    | NR                             | 530               | 343                                  | NR                             | 660               | 115                                  | NR                             | 790               | 2                                    | NR                             | 920               | 0                                    | NR                             |
| 405               | 7                                    | NR                             | 535               | 348                                  | NR                             | 665               | 96                                   | NR                             | 795               | 2                                    | NR                             | 925               | 0                                    | NR                             |
| 410               | 10                                   | NR                             | 540               | 352                                  | NR                             | 670               | 89                                   | NR                             | 800               | 1                                    | NR                             | 930               | 0                                    | NR                             |
| 415               | 16                                   | NR                             | 545               | 356                                  | NR                             | 675               | 72                                   | NR                             | 805               | 1                                    | NR                             | 935               | 0                                    | NR                             |
| 420               | 28                                   | NR                             | 550               | 358                                  | NR                             | 680               | 62                                   | NR                             | 810               | 1                                    | NR                             | 940               | 0                                    | NR                             |
| 425               | 52                                   | NR                             | 555               | 361                                  | NR                             | 685               | 53                                   | NR                             | 815               | 1                                    | NR                             | 945               | 0                                    | NR                             |
| 430               | 89                                   | NR                             | 560               | 361                                  | NR                             | 690               | 45                                   | NR                             | 820               | 1                                    | NR                             | 950               | 0                                    | NR                             |
| 435               | 151                                  | NR                             | 565               | 359                                  | NR                             | 695               | 39                                   | NR                             | 825               | 1                                    | NR                             | 955               | 0                                    | NR                             |
| 440               | 256                                  | NR                             | 570               | 354                                  | NR                             | 700               | 33                                   | NR                             | 830               | 1                                    | NR                             | 960               | 0                                    | NR                             |
| 445               | 462                                  | NR                             | 575               | 349                                  | NR                             | 705               | 28                                   | NR                             | 835               | 1                                    | NR                             | 965               | 0                                    | NR                             |
| 450               | 643                                  | NR                             | 580               | 344                                  | NR                             | 710               | 23                                   | NR                             | 840               | 0                                    | NR                             | 970               | 0                                    | NR                             |
| 455               | 492                                  | NR                             | 585               | 339                                  | NR                             | 715               | 20                                   | NR                             | 845               | 0                                    | NR                             | 975               | 0                                    | NR                             |
| 460               | 319                                  | NR                             | 590               | 333                                  | NR                             | 720               | 16                                   | NR                             | 850               | 0                                    | NR                             | 980               | 0                                    | NR                             |
| 465               | 269                                  | NR                             | 595               | 324                                  | NR                             | 725               | 14                                   | NR                             | 855               | 0                                    | NR                             | 985               | 0                                    | NR                             |
| 470               | 207                                  | NR                             | 600               | 319                                  | NR                             | 730               | 11                                   | NR                             | 860               | 0                                    | NR                             | 990               | 0                                    | NR                             |
| 475               | 165                                  | NR                             | 605               | 314                                  | NR                             | 735               | 10                                   | NR                             | 865               | 0                                    | NR                             | 995               | 0                                    | NR                             |
| 480               | 171                                  | NR                             | 610               | 336                                  | NR                             | 740               | 8                                    | NR                             | 870               | 0                                    | NR                             | 1000              | 0                                    | NR                             |
| 485               | 194                                  | NR                             | 615               | 351                                  | NR                             | 745               | 7                                    | NR                             | 875               | 0                                    | NR                             |                   |                                      |                                |

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### Scotopic Flux vs. Wavelength



Scotopic Lumens: NR

S/P: 2.02

| $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>$(\phi/\text{nm})$ | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>$(\phi/\text{nm})$ | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>$(\phi/\text{nm})$ | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>$(\phi/\text{nm})$ | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>$(\phi/\text{nm})$ |
|-------------------|--------------------------------------|------------------------------|-------------------|--------------------------------------|------------------------------|-------------------|--------------------------------------|------------------------------|-------------------|--------------------------------------|------------------------------|-------------------|--------------------------------------|------------------------------|
| 360               | 0                                    | NR                           | 490               | 223                                  | NR                           | 620               | 303                                  | NR                           | 750               | 6                                    | NR                           | 880               | 0                                    | NR                           |
| 365               | 0                                    | NR                           | 495               | 258                                  | NR                           | 625               | 305                                  | NR                           | 755               | 5                                    | NR                           | 885               | 0                                    | NR                           |
| 370               | 0                                    | NR                           | 500               | 290                                  | NR                           | 630               | 1000                                 | NR                           | 760               | 5                                    | NR                           | 890               | 0                                    | NR                           |
| 375               | 0                                    | NR                           | 505               | 311                                  | NR                           | 635               | 631                                  | NR                           | 765               | 4                                    | NR                           | 895               | 0                                    | NR                           |
| 380               | 0                                    | NR                           | 510               | 325                                  | NR                           | 640               | 194                                  | NR                           | 770               | 4                                    | NR                           | 900               | 0                                    | NR                           |
| 385               | 1                                    | NR                           | 515               | 333                                  | NR                           | 645               | 188                                  | NR                           | 775               | 3                                    | NR                           | 905               | 0                                    | NR                           |
| 390               | 2                                    | NR                           | 520               | 336                                  | NR                           | 650               | 162                                  | NR                           | 780               | 3                                    | NR                           | 910               | 0                                    | NR                           |
| 395               | 4                                    | NR                           | 525               | 340                                  | NR                           | 655               | 136                                  | NR                           | 785               | 2                                    | NR                           | 915               | 0                                    | NR                           |
| 400               | 5                                    | NR                           | 530               | 343                                  | NR                           | 660               | 115                                  | NR                           | 790               | 2                                    | NR                           | 920               | 0                                    | NR                           |
| 405               | 7                                    | NR                           | 535               | 348                                  | NR                           | 665               | 96                                   | NR                           | 795               | 2                                    | NR                           | 925               | 0                                    | NR                           |
| 410               | 10                                   | NR                           | 540               | 352                                  | NR                           | 670               | 89                                   | NR                           | 800               | 1                                    | NR                           | 930               | 0                                    | NR                           |
| 415               | 16                                   | NR                           | 545               | 356                                  | NR                           | 675               | 72                                   | NR                           | 805               | 1                                    | NR                           | 935               | 0                                    | NR                           |
| 420               | 28                                   | NR                           | 550               | 358                                  | NR                           | 680               | 62                                   | NR                           | 810               | 1                                    | NR                           | 940               | 0                                    | NR                           |
| 425               | 52                                   | NR                           | 555               | 361                                  | NR                           | 685               | 53                                   | NR                           | 815               | 1                                    | NR                           | 945               | 0                                    | NR                           |
| 430               | 89                                   | NR                           | 560               | 361                                  | NR                           | 690               | 45                                   | NR                           | 820               | 1                                    | NR                           | 950               | 0                                    | NR                           |
| 435               | 151                                  | NR                           | 565               | 359                                  | NR                           | 695               | 39                                   | NR                           | 825               | 1                                    | NR                           | 955               | 0                                    | NR                           |
| 440               | 256                                  | NR                           | 570               | 354                                  | NR                           | 700               | 33                                   | NR                           | 830               | 1                                    | NR                           | 960               | 0                                    | NR                           |
| 445               | 462                                  | NR                           | 575               | 349                                  | NR                           | 705               | 28                                   | NR                           | 835               | 1                                    | NR                           | 965               | 0                                    | NR                           |
| 450               | 643                                  | NR                           | 580               | 344                                  | NR                           | 710               | 23                                   | NR                           | 840               | 0                                    | NR                           | 970               | 0                                    | NR                           |
| 455               | 492                                  | NR                           | 585               | 339                                  | NR                           | 715               | 20                                   | NR                           | 845               | 0                                    | NR                           | 975               | 0                                    | NR                           |
| 460               | 319                                  | NR                           | 590               | 333                                  | NR                           | 720               | 16                                   | NR                           | 850               | 0                                    | NR                           | 980               | 0                                    | NR                           |
| 465               | 269                                  | NR                           | 595               | 324                                  | NR                           | 725               | 14                                   | NR                           | 855               | 0                                    | NR                           | 985               | 0                                    | NR                           |
| 470               | 207                                  | NR                           | 600               | 319                                  | NR                           | 730               | 11                                   | NR                           | 860               | 0                                    | NR                           | 990               | 0                                    | NR                           |
| 475               | 165                                  | NR                           | 605               | 314                                  | NR                           | 735               | 10                                   | NR                           | 865               | 0                                    | NR                           | 995               | 0                                    | NR                           |
| 480               | 171                                  | NR                           | 610               | 336                                  | NR                           | 740               | 8                                    | NR                           | 870               | 0                                    | NR                           | 1000              | 0                                    | NR                           |
| 485               | 194                                  | NR                           | 615               | 351                                  | NR                           | 745               | 7                                    | NR                           | 875               | 0                                    | NR                           |                   |                                      |                              |

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### Melanopic Flux vs. Wavelength



Melanopic Lumens: NR

M/P: 4.31

| λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360    | 0                        | NR            | 490    | 223                      | NR            | 620    | 303                      | NR            | 750    | 6                        | NR            | 880    | 0                        | NR            |
| 365    | 0                        | NR            | 495    | 258                      | NR            | 625    | 305                      | NR            | 755    | 5                        | NR            | 885    | 0                        | NR            |
| 370    | 0                        | NR            | 500    | 290                      | NR            | 630    | 1000                     | NR            | 760    | 5                        | NR            | 890    | 0                        | NR            |
| 375    | 0                        | NR            | 505    | 311                      | NR            | 635    | 631                      | NR            | 765    | 4                        | NR            | 895    | 0                        | NR            |
| 380    | 0                        | NR            | 510    | 325                      | NR            | 640    | 194                      | NR            | 770    | 4                        | NR            | 900    | 0                        | NR            |
| 385    | 1                        | NR            | 515    | 333                      | NR            | 645    | 188                      | NR            | 775    | 3                        | NR            | 905    | 0                        | NR            |
| 390    | 2                        | NR            | 520    | 336                      | NR            | 650    | 162                      | NR            | 780    | 3                        | NR            | 910    | 0                        | NR            |
| 395    | 4                        | NR            | 525    | 340                      | NR            | 655    | 136                      | NR            | 785    | 2                        | NR            | 915    | 0                        | NR            |
| 400    | 5                        | NR            | 530    | 343                      | NR            | 660    | 115                      | NR            | 790    | 2                        | NR            | 920    | 0                        | NR            |
| 405    | 7                        | NR            | 535    | 348                      | NR            | 665    | 96                       | NR            | 795    | 2                        | NR            | 925    | 0                        | NR            |
| 410    | 10                       | NR            | 540    | 352                      | NR            | 670    | 89                       | NR            | 800    | 1                        | NR            | 930    | 0                        | NR            |
| 415    | 16                       | NR            | 545    | 356                      | NR            | 675    | 72                       | NR            | 805    | 1                        | NR            | 935    | 0                        | NR            |
| 420    | 28                       | NR            | 550    | 358                      | NR            | 680    | 62                       | NR            | 810    | 1                        | NR            | 940    | 0                        | NR            |
| 425    | 52                       | NR            | 555    | 361                      | NR            | 685    | 53                       | NR            | 815    | 1                        | NR            | 945    | 0                        | NR            |
| 430    | 89                       | NR            | 560    | 361                      | NR            | 690    | 45                       | NR            | 820    | 1                        | NR            | 950    | 0                        | NR            |
| 435    | 151                      | NR            | 565    | 359                      | NR            | 695    | 39                       | NR            | 825    | 1                        | NR            | 955    | 0                        | NR            |
| 440    | 256                      | NR            | 570    | 354                      | NR            | 700    | 33                       | NR            | 830    | 1                        | NR            | 960    | 0                        | NR            |
| 445    | 462                      | NR            | 575    | 349                      | NR            | 705    | 28                       | NR            | 835    | 1                        | NR            | 965    | 0                        | NR            |
| 450    | 643                      | NR            | 580    | 344                      | NR            | 710    | 23                       | NR            | 840    | 0                        | NR            | 970    | 0                        | NR            |
| 455    | 492                      | NR            | 585    | 339                      | NR            | 715    | 20                       | NR            | 845    | 0                        | NR            | 975    | 0                        | NR            |
| 460    | 319                      | NR            | 590    | 333                      | NR            | 720    | 16                       | NR            | 850    | 0                        | NR            | 980    | 0                        | NR            |
| 465    | 269                      | NR            | 595    | 324                      | NR            | 725    | 14                       | NR            | 855    | 0                        | NR            | 985    | 0                        | NR            |
| 470    | 207                      | NR            | 600    | 319                      | NR            | 730    | 11                       | NR            | 860    | 0                        | NR            | 990    | 0                        | NR            |
| 475    | 165                      | NR            | 605    | 314                      | NR            | 735    | 10                       | NR            | 865    | 0                        | NR            | 995    | 0                        | NR            |
| 480    | 171                      | NR            | 610    | 336                      | NR            | 740    | 8                        | NR            | 870    | 0                        | NR            | 1000   | 0                        | NR            |
| 485    | 194                      | NR            | 615    | 351                      | NR            | 745    | 7                        | NR            | 875    | 0                        | NR            |        |                          |               |

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TM-30-18

### Summary

$R_f = 91.2$   
 $R_g = 100.8$   
 $CIE R_a = 93.6$   
 $R_9 = 69.6$



### Color Vector Graphics



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 90 | CES51 = 99 | CES76 = 83 |
| CES02 = 61 | CES27 = 93 | CES52 = 98 | CES77 = 88 |
| CES03 = 31 | CES28 = 94 | CES53 = 96 | CES78 = 80 |
| CES04 = 69 | CES29 = 92 | CES54 = 96 | CES79 = 95 |
| CES05 = 48 | CES30 = 98 | CES55 = 94 | CES80 = 92 |
| CES06 = 50 | CES31 = 93 | CES56 = 95 | CES81 = 84 |
| CES07 = 41 | CES32 = 86 | CES57 = 94 | CES82 = 96 |
| CES08 = 40 | CES33 = 96 | CES58 = 95 | CES83 = 96 |
| CES09 = 29 | CES34 = 90 | CES59 = 98 | CES84 = 93 |
| CES10 = 73 | CES35 = 94 | CES60 = 94 | CES85 = 84 |
| CES11 = 56 | CES36 = 84 | CES61 = 93 | CES86 = 87 |
| CES12 = 62 | CES37 = 93 | CES62 = 90 | CES87 = 90 |
| CES13 = 42 | CES38 = 92 | CES63 = 93 | CES88 = 97 |
| CES14 = 74 | CES39 = 98 | CES64 = 91 | CES89 = 86 |
| CES15 = 71 | CES40 = 96 | CES65 = 89 | CES90 = 98 |
| CES16 = 47 | CES41 = 98 | CES66 = 88 | CES91 = 75 |
| CES17 = 48 | CES42 = 91 | CES67 = 87 | CES92 = 79 |
| CES18 = 56 | CES43 = 91 | CES68 = 88 | CES93 = 88 |
| CES19 = 70 | CES44 = 99 | CES69 = 89 | CES94 = 78 |
| CES20 = 65 | CES45 = 94 | CES70 = 84 | CES95 = 83 |
| CES21 = 85 | CES46 = 95 | CES71 = 80 | CES96 = 92 |
| CES22 = 77 | CES47 = 94 | CES72 = 93 | CES97 = 93 |
| CES23 = 91 | CES48 = 95 | CES73 = 78 | CES98 = 93 |
| CES24 = 90 | CES49 = 94 | CES74 = 93 | CES99 = 94 |
| CES25 = 70 | CES50 = 99 | CES75 = 81 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)