

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: IRiS

Report Number: P1261723

Luminaire Tested: P3A02R709727DE010 E3LDWW1H

Issue Date: 1/29/2026

**Test Information**

Test Method: LM-79-2019  
Report Number: P1261723  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G1-2509-551-13)  
Test Lab: INNOVATION CENTER  
Issue Date: 1/29/2026  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: IRiS  
Catalog Number: P3A02R709727DE010 E3LDWW1H  
Description: 3in Adjustable LED luminaire with, R70 optic, 2700K CCT AND, 97CRI , E3LDWW1H TRIM  
Light Source: -  
Ballast/Driver: -

**Summary**

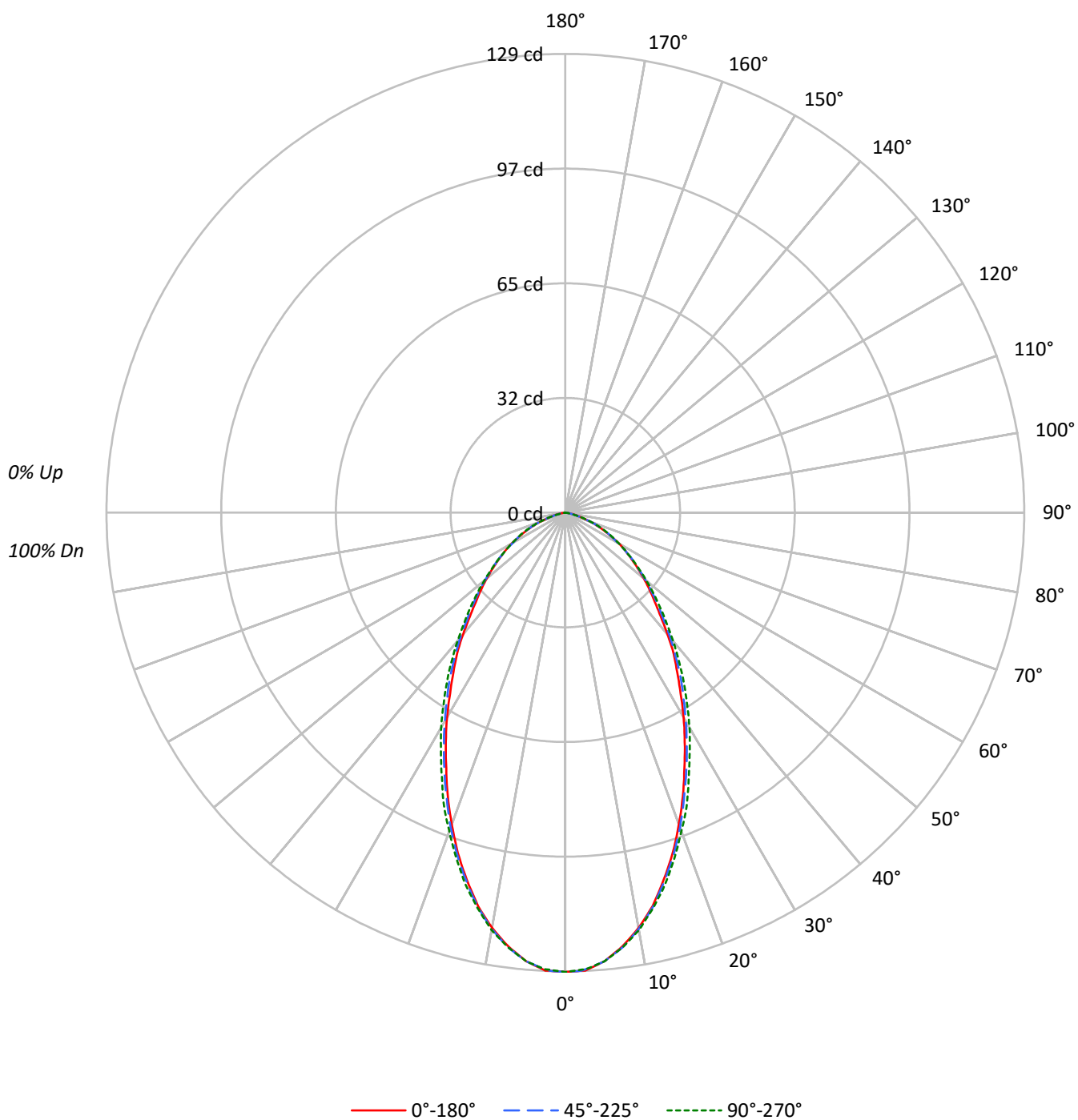
Lumens per Lamp: N/A  
Luminaire Lumens: 180.0 lumens  
Efficiency: N/A  
Efficacy: 50.0 lumens/watt  
Spacing Criteria (0/90/45): 0.87 / 0.89 / 0.97  
Luminous Opening: Circular (Dia: 0.25' x H: 0')  
CIE Type: Direct

Input Watts (W): 3.6  
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: 24 FT

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CATALOG NUMBER: P3A02R709727DE010 E3LDWW1H

### Luminous Intensity Polar Plot



TEST NUMBER: P1261723

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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   | 111 | 108 | 104 | 101 | 109 | 105 | 102 | 100 | 101 | 99  | 97  |  | 97  | 95  | 94  |  | 94  |
| 2   | 103 | 97  | 91  | 87  | 101 | 95  | 90  | 86  | 92  | 87  | 84  |  | 88  | 85  | 82  |  | 85  |
| 3   | 96  | 87  | 81  | 75  | 94  | 86  | 80  | 75  | 83  | 78  | 73  |  | 80  | 76  | 72  |  | 78  |
| 4   | 89  | 79  | 72  | 66  | 87  | 78  | 71  | 66  | 75  | 70  | 65  |  | 73  | 68  | 64  |  | 71  |
| 5   | 83  | 72  | 64  | 59  | 81  | 71  | 64  | 59  | 69  | 63  | 58  |  | 67  | 62  | 57  |  | 66  |
| 6   | 78  | 66  | 58  | 53  | 76  | 65  | 58  | 53  | 64  | 57  | 52  |  | 62  | 56  | 52  |  | 60  |
| 7   | 73  | 61  | 53  | 48  | 71  | 60  | 53  | 48  | 59  | 52  | 47  |  | 57  | 52  | 47  |  | 56  |
| 8   | 68  | 56  | 49  | 44  | 67  | 56  | 49  | 44  | 54  | 48  | 43  |  | 53  | 47  | 43  |  | 52  |
| 9   | 64  | 52  | 45  | 40  | 63  | 52  | 45  | 40  | 51  | 44  | 40  |  | 50  | 44  | 40  |  | 49  |
| 10  | 61  | 49  | 42  | 37  | 60  | 48  | 42  | 37  | 47  | 41  | 37  |  | 47  | 41  | 37  |  | 46  |

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

|     | 0°    | 45°   | 90°   |
|-----|-------|-------|-------|
| 0°  | 28331 | 28331 | 28331 |
| 5°  | 27867 | 27867 | 27867 |
| 10° | 26408 | 26475 | 26541 |
| 15° | 24268 | 24382 | 24586 |
| 20° | 21772 | 21982 | 22262 |
| 25° | 19162 | 19453 | 19864 |
| 30° | 16838 | 17142 | 17674 |
| 35° | 14670 | 15125 | 15526 |
| 40° | 12795 | 13139 | 13482 |
| 45° | 11040 | 11412 | 11691 |
| 50° | 9825  | 10030 | 10132 |
| 55° | 8678  | 8793  | 8793  |
| 60° | 7631  | 7499  | 7631  |
| 65° | 6278  | 6434  | 6590  |
| 70° | 4937  | 4937  | 5065  |
| 75° | 3219  | 2965  | 2965  |
| 80° | 1894  | 1515  | 1137  |
| 85° | 755   | 0     | 0     |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 75°

Vertical Angle: 45°

Luminance: 11691 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 11.8   | 6.6       |
| 10°-20°   | 30.0   | 16.7      |
| 20°-30°   | 37.0   | 20.6      |
| 30°-40°   | 35.3   | 19.6      |
| 40°-50°   | 28.5   | 15.8      |
| 50°-60°   | 20.6   | 11.4      |
| 60°-70°   | 12.3   | 6.8       |
| 70°-80°   | 4.1    | 2.3       |
| 80°-90°   | 0.4    | 0.2       |
| 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°    | 78.9   | 43.8      |
| 0°-40°    | 114.1  | 63.4      |
| 0°-60°    | 163.2  | 90.7      |
| 0°-90°    | 180.0  | 100.0     |
| 90°-120°  | 0.0    | 0.0       |
| 90°-150°  | 0.0    | 0.0       |
| 90°-180°  | 0.0    | 0.0       |
| 0°-180°   | 180.0  | 100.0     |

**CANDELA DISTRIBUTION:**

|     | 0°  | 22.5° | 45° | 67.5° | 90° | Flux |
|-----|-----|-------|-----|-------|-----|------|
| 0°  | 129 | 129   | 129 | 129   | 129 |      |
| 5°  | 127 | 127   | 127 | 127   | 127 | 12   |
| 15° | 107 | 107   | 107 | 108   | 108 | 30   |
| 25° | 79  | 80    | 80  | 82    | 82  | 36   |
| 35° | 55  | 55    | 56  | 58    | 58  | 34   |
| 45° | 36  | 36    | 37  | 37    | 38  | 28   |
| 55° | 23  | 23    | 23  | 23    | 23  | 20   |
| 65° | 12  | 12    | 12  | 13    | 13  | 12   |
| 75° | 4   | 4     | 4   | 4     | 4   | 4    |
| 85° | 0   | 0     | 0   | 0     | 0   | 1    |
| 90° | 0   | 0     | 0   | 0     | 0   |      |

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**CANDELA DISTRIBUTION (FULL):**

|       | 0°    | 5°    | 15°   | 25°   | 35°   | 45°   | 55°   | 65°   | 75°   | 85°   | 90°   |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 129.2 | 129.2 | 129.2 | 129.2 | 129.2 | 129.2 | 129.2 | 129.2 | 129.2 | 129.2 | 129.2 |
| 2°    | 128.9 | 128.9 | 128.9 | 128.9 | 128.9 | 128.9 | 128.9 | 128.9 | 128.9 | 128.9 | 128.6 |
| 2.5°  | 128.9 | 128.6 | 128.6 | 128.6 | 128.6 | 128.6 | 128.6 | 128.6 | 128.6 | 128.9 | 128.6 |
| 5°    | 126.6 | 126.6 | 126.6 | 126.6 | 126.6 | 126.6 | 126.6 | 126.6 | 126.9 | 126.6 | 126.6 |
| 7.5°  | 123.0 | 123.0 | 123.0 | 123.0 | 123.3 | 123.3 | 123.3 | 123.3 | 123.6 | 123.6 | 123.3 |
| 10°   | 118.6 | 118.6 | 118.6 | 118.6 | 118.9 | 118.9 | 119.2 | 118.9 | 118.9 | 119.2 | 119.2 |
| 12.5° | 113.3 | 113.0 | 113.0 | 113.0 | 113.3 | 113.6 | 113.6 | 113.6 | 113.9 | 113.9 | 113.9 |
| 15°   | 106.9 | 106.9 | 106.9 | 107.2 | 107.2 | 107.4 | 107.7 | 107.7 | 108.0 | 108.0 | 108.3 |
| 17.5° | 100.4 | 100.4 | 100.1 | 100.4 | 100.7 | 101.0 | 101.3 | 101.6 | 101.9 | 101.9 | 101.9 |
| 20°   | 93.3  | 93.0  | 93.3  | 93.6  | 93.9  | 94.2  | 94.5  | 95.1  | 95.4  | 95.4  | 95.4  |
| 22.5° | 86.3  | 86.0  | 86.3  | 86.5  | 86.8  | 87.1  | 88.0  | 88.3  | 88.6  | 88.6  | 89.2  |
| 25°   | 79.2  | 79.2  | 79.5  | 79.8  | 80.1  | 80.4  | 81.0  | 81.5  | 81.8  | 82.1  | 82.1  |
| 27.5° | 72.7  | 72.7  | 72.7  | 72.7  | 73.3  | 73.9  | 74.5  | 75.1  | 75.4  | 75.7  | 75.7  |
| 30°   | 66.5  | 66.2  | 66.2  | 66.5  | 67.1  | 67.7  | 68.3  | 68.9  | 69.2  | 69.5  | 69.8  |
| 32.5° | 60.3  | 60.3  | 60.3  | 60.6  | 60.9  | 61.8  | 62.4  | 62.7  | 63.3  | 63.6  | 63.6  |
| 35°   | 54.8  | 54.8  | 54.8  | 55.3  | 55.9  | 56.5  | 56.8  | 57.4  | 58.0  | 58.0  | 58.0  |
| 37.5° | 50.0  | 50.3  | 50.9  | 50.6  | 50.6  | 50.9  | 51.2  | 51.8  | 52.4  | 52.4  | 52.4  |
| 40°   | 44.7  | 45.0  | 45.3  | 45.0  | 45.3  | 45.9  | 46.2  | 46.5  | 46.8  | 47.1  | 47.1  |
| 42.5° | 39.7  | 39.7  | 39.7  | 40.0  | 40.6  | 40.9  | 41.5  | 41.8  | 42.1  | 42.1  | 42.1  |
| 45°   | 35.6  | 35.6  | 35.9  | 36.2  | 36.5  | 36.8  | 37.1  | 37.4  | 37.7  | 37.7  | 37.7  |
| 47.5° | 32.1  | 32.1  | 32.4  | 32.4  | 32.7  | 33.0  | 33.3  | 33.3  | 33.6  | 33.9  | 33.6  |
| 50°   | 28.8  | 28.8  | 28.8  | 29.1  | 29.1  | 29.4  | 29.4  | 29.7  | 29.7  | 29.7  | 29.7  |
| 52.5° | 25.6  | 25.6  | 25.6  | 25.6  | 25.9  | 25.9  | 25.9  | 26.2  | 26.2  | 26.2  | 26.2  |
| 55°   | 22.7  | 22.7  | 22.7  | 22.7  | 22.7  | 23.0  | 23.0  | 23.0  | 23.0  | 23.0  | 23.0  |
| 57.5° | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  | 20.0  |
| 60°   | 17.4  | 17.4  | 17.4  | 17.4  | 17.4  | 17.1  | 17.4  | 17.4  | 17.4  | 17.4  | 17.4  |
| 62.5° | 14.7  | 14.7  | 14.7  | 14.7  | 14.7  | 14.7  | 14.7  | 15.0  | 15.0  | 15.0  | 15.0  |
| 65°   | 12.1  | 12.4  | 12.4  | 12.4  | 12.4  | 12.4  | 12.4  | 12.7  | 12.7  | 12.7  | 12.7  |
| 67.5° | 9.7   | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  | 10.3  | 10.3  | 10.3  |
| 70°   | 7.7   | 7.7   | 7.7   | 7.7   | 7.7   | 7.7   | 7.7   | 7.7   | 7.7   | 7.7   | 7.9   |
| 72.5° | 5.3   | 5.3   | 5.3   | 5.3   | 5.3   | 5.3   | 5.3   | 5.3   | 5.6   | 5.6   | 5.6   |
| 75°   | 3.8   | 3.8   | 3.8   | 3.8   | 3.5   | 3.5   | 3.5   | 3.5   | 3.5   | 3.5   | 3.5   |
| 77.5° | 2.6   | 2.6   | 2.6   | 2.4   | 2.4   | 2.1   | 2.1   | 2.1   | 2.1   | 2.1   | 1.8   |
| 80°   | 1.5   | 1.5   | 1.5   | 1.5   | 1.5   | 1.2   | 1.2   | 0.9   | 0.9   | 0.9   | 0.9   |
| 82.5° | 0.9   | 0.9   | 0.9   | 0.6   | 0.6   | 0.6   | 0.6   | 0.3   | 0.3   | 0.3   | 0.3   |
| 85°   | 0.3   | 0.3   | 0.3   | 0.3   | 0.3   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 87.5° | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 90°   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 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

IRiS

Report Number: SP1-2504-409-16

Test Date: 05/14/2025

Luminaire Tested: LD3A10R129727D010 E3D1H

Data in this report applies to families of products including LD3A

### Test Information

Test Method: LM-79-2019  
 Report Number: SP1-2504-409-16  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 09/15/2025  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: IRiS  
 Catalog Number: **LD3A10R129727D010 E3D1H**  
 Description: 3in Adjustable LED luminaire with, R12 optic, 2700K CCT AND, 97CRI LEDS, E3D1H TRIM

### Spectral Parameters

CCT (K): 2723  
 CIE  $u'$ : 0.2613  
 CIE  $v'$ : 0.5282  
 Duv: 0.0009  
 CIE x: 0.4595  
 CIE y: 0.4129  
 CIE z: 0.1277  
 Peak Wavelength (nm): 717  
 Dominant Wavelength (nm): 583  
 Purity: 61.85051  
 R<sub>f</sub>: 83  
 R<sub>g</sub>: 88.7

CRI (Ra): 96.9  
 R1: 98.6  
 R2: 97.5  
 R3: 94.4  
 R4: 97.7  
 R5: 97.8  
 R6: 97.1  
 R7: 97.7  
 R8: 94.3  
 R9: 84.8  
 R10: 92.7  
 R11: 96.3  
 R12: 86.1  
 R13: 98.3  
 R14: 95.8  
 R15: 96.2



### Test Conditions

Stabilization Time: 41M  
 Operation Time: 1H 41M  
 Sphere Temperature (°C): 25.3

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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 2700K 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               | 248                                    | NR                             | 620               | 586                                    | NR                             | 750               | 874                                    | NR                             | 880               | 95                                     | NR                             |
| 365               | 0                                      | NR                             | 495               | 198                                    | NR                             | 625               | 600                                    | NR                             | 755               | 838                                    | NR                             | 885               | 84                                     | NR                             |
| 370               | 0                                      | NR                             | 500               | 176                                    | NR                             | 630               | 614                                    | NR                             | 760               | 798                                    | NR                             | 890               | 76                                     | NR                             |
| 375               | 0                                      | NR                             | 505               | 158                                    | NR                             | 635               | 625                                    | NR                             | 765               | 756                                    | NR                             | 895               | 67                                     | NR                             |
| 380               | 0                                      | NR                             | 510               | 144                                    | NR                             | 640               | 641                                    | NR                             | 770               | 714                                    | NR                             | 900               | 60                                     | NR                             |
| 385               | 0                                      | NR                             | 515               | 142                                    | NR                             | 645               | 661                                    | NR                             | 775               | 673                                    | NR                             | 905               | 54                                     | NR                             |
| 390               | 0                                      | NR                             | 520               | 157                                    | NR                             | 650               | 678                                    | NR                             | 780               | 627                                    | NR                             | 910               | 48                                     | NR                             |
| 395               | 0                                      | NR                             | 525               | 183                                    | NR                             | 655               | 703                                    | NR                             | 785               | 586                                    | NR                             | 915               | 43                                     | NR                             |
| 400               | 0                                      | NR                             | 530               | 213                                    | NR                             | 660               | 729                                    | NR                             | 790               | 544                                    | NR                             | 920               | 38                                     | NR                             |
| 405               | 0                                      | NR                             | 535               | 248                                    | NR                             | 665               | 758                                    | NR                             | 795               | 504                                    | NR                             | 925               | 34                                     | NR                             |
| 410               | 1                                      | NR                             | 540               | 286                                    | NR                             | 670               | 789                                    | NR                             | 800               | 464                                    | NR                             | 930               | 30                                     | NR                             |
| 415               | 2                                      | NR                             | 545               | 320                                    | NR                             | 675               | 818                                    | NR                             | 805               | 426                                    | NR                             | 935               | 27                                     | NR                             |
| 420               | 3                                      | NR                             | 550               | 354                                    | NR                             | 680               | 853                                    | NR                             | 810               | 390                                    | NR                             | 940               | 24                                     | NR                             |
| 425               | 5                                      | NR                             | 555               | 382                                    | NR                             | 685               | 881                                    | NR                             | 815               | 357                                    | NR                             | 945               | 22                                     | NR                             |
| 430               | 8                                      | NR                             | 560               | 405                                    | NR                             | 690               | 914                                    | NR                             | 820               | 326                                    | NR                             | 950               | 19                                     | NR                             |
| 435               | 12                                     | NR                             | 565               | 424                                    | NR                             | 695               | 941                                    | NR                             | 825               | 297                                    | NR                             | 955               | 17                                     | NR                             |
| 440               | 20                                     | NR                             | 570               | 445                                    | NR                             | 700               | 960                                    | NR                             | 830               | 270                                    | NR                             | 960               | 16                                     | NR                             |
| 445               | 31                                     | NR                             | 575               | 463                                    | NR                             | 705               | 980                                    | NR                             | 835               | 245                                    | NR                             | 965               | 14                                     | NR                             |
| 450               | 47                                     | NR                             | 580               | 481                                    | NR                             | 710               | 990                                    | NR                             | 840               | 221                                    | NR                             | 970               | 12                                     | NR                             |
| 455               | 72                                     | NR                             | 585               | 495                                    | NR                             | 715               | 996                                    | NR                             | 845               | 199                                    | NR                             | 975               | 11                                     | NR                             |
| 460               | 107                                    | NR                             | 590               | 512                                    | NR                             | 720               | 1000                                   | NR                             | 850               | 178                                    | NR                             | 980               | 10                                     | NR                             |
| 465               | 152                                    | NR                             | 595               | 526                                    | NR                             | 725               | 989                                    | NR                             | 855               | 158                                    | NR                             | 985               | 9                                      | NR                             |
| 470               | 218                                    | NR                             | 600               | 540                                    | NR                             | 730               | 980                                    | NR                             | 860               | 141                                    | NR                             | 990               | 8                                      | NR                             |
| 475               | 298                                    | NR                             | 605               | 552                                    | NR                             | 735               | 959                                    | NR                             | 865               | 128                                    | NR                             | 995               | 7                                      | NR                             |
| 480               | 344                                    | NR                             | 610               | 565                                    | NR                             | 740               | 937                                    | NR                             | 870               | 117                                    | NR                             | 1000              | 0                                      | NR                             |
| 485               | 323                                    | NR                             | 615               | 577                                    | NR                             | 745               | 909                                    | NR                             | 875               | 105                                    | NR                             |                   |                                        |                                |

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### Scotopic Flux vs. Wavelength



Scotopic Lumens: NR

S/P: 1.26

| λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) |
|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|
| 360       | 0                           | NR               | 490       | 248                         | NR               | 620       | 586                         | NR               | 750       | 874                         | NR               | 880       | 95                          | NR               |
| 365       | 0                           | NR               | 495       | 198                         | NR               | 625       | 600                         | NR               | 755       | 838                         | NR               | 885       | 84                          | NR               |
| 370       | 0                           | NR               | 500       | 176                         | NR               | 630       | 614                         | NR               | 760       | 798                         | NR               | 890       | 76                          | NR               |
| 375       | 0                           | NR               | 505       | 158                         | NR               | 635       | 625                         | NR               | 765       | 756                         | NR               | 895       | 67                          | NR               |
| 380       | 0                           | NR               | 510       | 144                         | NR               | 640       | 641                         | NR               | 770       | 714                         | NR               | 900       | 60                          | NR               |
| 385       | 0                           | NR               | 515       | 142                         | NR               | 645       | 661                         | NR               | 775       | 673                         | NR               | 905       | 54                          | NR               |
| 390       | 0                           | NR               | 520       | 157                         | NR               | 650       | 678                         | NR               | 780       | 627                         | NR               | 910       | 48                          | NR               |
| 395       | 0                           | NR               | 525       | 183                         | NR               | 655       | 703                         | NR               | 785       | 586                         | NR               | 915       | 43                          | NR               |
| 400       | 0                           | NR               | 530       | 213                         | NR               | 660       | 729                         | NR               | 790       | 544                         | NR               | 920       | 38                          | NR               |
| 405       | 0                           | NR               | 535       | 248                         | NR               | 665       | 758                         | NR               | 795       | 504                         | NR               | 925       | 34                          | NR               |
| 410       | 1                           | NR               | 540       | 286                         | NR               | 670       | 789                         | NR               | 800       | 464                         | NR               | 930       | 30                          | NR               |
| 415       | 2                           | NR               | 545       | 320                         | NR               | 675       | 818                         | NR               | 805       | 426                         | NR               | 935       | 27                          | NR               |
| 420       | 3                           | NR               | 550       | 354                         | NR               | 680       | 853                         | NR               | 810       | 390                         | NR               | 940       | 24                          | NR               |
| 425       | 5                           | NR               | 555       | 382                         | NR               | 685       | 881                         | NR               | 815       | 357                         | NR               | 945       | 22                          | NR               |
| 430       | 8                           | NR               | 560       | 405                         | NR               | 690       | 914                         | NR               | 820       | 326                         | NR               | 950       | 19                          | NR               |
| 435       | 12                          | NR               | 565       | 424                         | NR               | 695       | 941                         | NR               | 825       | 297                         | NR               | 955       | 17                          | NR               |
| 440       | 20                          | NR               | 570       | 445                         | NR               | 700       | 960                         | NR               | 830       | 270                         | NR               | 960       | 16                          | NR               |
| 445       | 31                          | NR               | 575       | 463                         | NR               | 705       | 980                         | NR               | 835       | 245                         | NR               | 965       | 14                          | NR               |
| 450       | 47                          | NR               | 580       | 481                         | NR               | 710       | 990                         | NR               | 840       | 221                         | NR               | 970       | 12                          | NR               |
| 455       | 72                          | NR               | 585       | 495                         | NR               | 715       | 996                         | NR               | 845       | 199                         | NR               | 975       | 11                          | NR               |
| 460       | 107                         | NR               | 590       | 512                         | NR               | 720       | 1000                        | NR               | 850       | 178                         | NR               | 980       | 10                          | NR               |
| 465       | 152                         | NR               | 595       | 526                         | NR               | 725       | 989                         | NR               | 855       | 158                         | NR               | 985       | 9                           | NR               |
| 470       | 218                         | NR               | 600       | 540                         | NR               | 730       | 980                         | NR               | 860       | 141                         | NR               | 990       | 8                           | NR               |
| 475       | 298                         | NR               | 605       | 552                         | NR               | 735       | 959                         | NR               | 865       | 128                         | NR               | 995       | 7                           | NR               |
| 480       | 344                         | NR               | 610       | 565                         | NR               | 740       | 937                         | NR               | 870       | 117                         | NR               | 1000      | 0                           | NR               |
| 485       | 323                         | NR               | 615       | 577                         | NR               | 745       | 909                         | NR               | 875       | 105                         | NR               |           |                             |                  |

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### Melanopic Flux vs. Wavelength


**Melanopic Lumens: NR**
**M/P: 2.51**

| $\lambda$<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               | 248                                  | NR                             | 620               | 586                                  | NR                             | 750               | 874                                  | NR                             | 880               | 95                                   | NR                             |
| 365               | 0                                    | NR                             | 495               | 198                                  | NR                             | 625               | 600                                  | NR                             | 755               | 838                                  | NR                             | 885               | 84                                   | NR                             |
| 370               | 0                                    | NR                             | 500               | 176                                  | NR                             | 630               | 614                                  | NR                             | 760               | 798                                  | NR                             | 890               | 76                                   | NR                             |
| 375               | 0                                    | NR                             | 505               | 158                                  | NR                             | 635               | 625                                  | NR                             | 765               | 756                                  | NR                             | 895               | 67                                   | NR                             |
| 380               | 0                                    | NR                             | 510               | 144                                  | NR                             | 640               | 641                                  | NR                             | 770               | 714                                  | NR                             | 900               | 60                                   | NR                             |
| 385               | 0                                    | NR                             | 515               | 142                                  | NR                             | 645               | 661                                  | NR                             | 775               | 673                                  | NR                             | 905               | 54                                   | NR                             |
| 390               | 0                                    | NR                             | 520               | 157                                  | NR                             | 650               | 678                                  | NR                             | 780               | 627                                  | NR                             | 910               | 48                                   | NR                             |
| 395               | 0                                    | NR                             | 525               | 183                                  | NR                             | 655               | 703                                  | NR                             | 785               | 586                                  | NR                             | 915               | 43                                   | NR                             |
| 400               | 0                                    | NR                             | 530               | 213                                  | NR                             | 660               | 729                                  | NR                             | 790               | 544                                  | NR                             | 920               | 38                                   | NR                             |
| 405               | 0                                    | NR                             | 535               | 248                                  | NR                             | 665               | 758                                  | NR                             | 795               | 504                                  | NR                             | 925               | 34                                   | NR                             |
| 410               | 1                                    | NR                             | 540               | 286                                  | NR                             | 670               | 789                                  | NR                             | 800               | 464                                  | NR                             | 930               | 30                                   | NR                             |
| 415               | 2                                    | NR                             | 545               | 320                                  | NR                             | 675               | 818                                  | NR                             | 805               | 426                                  | NR                             | 935               | 27                                   | NR                             |
| 420               | 3                                    | NR                             | 550               | 354                                  | NR                             | 680               | 853                                  | NR                             | 810               | 390                                  | NR                             | 940               | 24                                   | NR                             |
| 425               | 5                                    | NR                             | 555               | 382                                  | NR                             | 685               | 881                                  | NR                             | 815               | 357                                  | NR                             | 945               | 22                                   | NR                             |
| 430               | 8                                    | NR                             | 560               | 405                                  | NR                             | 690               | 914                                  | NR                             | 820               | 326                                  | NR                             | 950               | 19                                   | NR                             |
| 435               | 12                                   | NR                             | 565               | 424                                  | NR                             | 695               | 941                                  | NR                             | 825               | 297                                  | NR                             | 955               | 17                                   | NR                             |
| 440               | 20                                   | NR                             | 570               | 445                                  | NR                             | 700               | 960                                  | NR                             | 830               | 270                                  | NR                             | 960               | 16                                   | NR                             |
| 445               | 31                                   | NR                             | 575               | 463                                  | NR                             | 705               | 980                                  | NR                             | 835               | 245                                  | NR                             | 965               | 14                                   | NR                             |
| 450               | 47                                   | NR                             | 580               | 481                                  | NR                             | 710               | 990                                  | NR                             | 840               | 221                                  | NR                             | 970               | 12                                   | NR                             |
| 455               | 72                                   | NR                             | 585               | 495                                  | NR                             | 715               | 996                                  | NR                             | 845               | 199                                  | NR                             | 975               | 11                                   | NR                             |
| 460               | 107                                  | NR                             | 590               | 512                                  | NR                             | 720               | 1000                                 | NR                             | 850               | 178                                  | NR                             | 980               | 10                                   | NR                             |
| 465               | 152                                  | NR                             | 595               | 526                                  | NR                             | 725               | 989                                  | NR                             | 855               | 158                                  | NR                             | 985               | 9                                    | NR                             |
| 470               | 218                                  | NR                             | 600               | 540                                  | NR                             | 730               | 980                                  | NR                             | 860               | 141                                  | NR                             | 990               | 8                                    | NR                             |
| 475               | 298                                  | NR                             | 605               | 552                                  | NR                             | 735               | 959                                  | NR                             | 865               | 128                                  | NR                             | 995               | 7                                    | NR                             |
| 480               | 344                                  | NR                             | 610               | 565                                  | NR                             | 740               | 937                                  | NR                             | 870               | 117                                  | NR                             | 1000              | 0                                    | NR                             |
| 485               | 323                                  | NR                             | 615               | 577                                  | NR                             | 745               | 909                                  | NR                             | 875               | 105                                  | NR                             |                   |                                      |                                |

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TM-30-18

### Summary

$R_f = 83$   
 $R_g = 88.7$   
 $CIE R_a = 96.9$   
 $R_9 = 84.8$



### Color Vector Graphics



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 87 | CES26 = 88 | CES51 = 73 | CES76 = 90 |
| CES02 = 64 | CES27 = 82 | CES52 = 78 | CES77 = 91 |
| CES03 = 32 | CES28 = 94 | CES53 = 66 | CES78 = 89 |
| CES04 = 71 | CES29 = 70 | CES54 = 79 | CES79 = 92 |
| CES05 = 53 | CES30 = 62 | CES55 = 72 | CES80 = 88 |
| CES06 = 52 | CES31 = 71 | CES56 = 65 | CES81 = 84 |
| CES07 = 45 | CES32 = 81 | CES57 = 61 | CES82 = 95 |
| CES08 = 44 | CES33 = 65 | CES58 = 63 | CES83 = 86 |
| CES09 = 29 | CES34 = 89 | CES59 = 87 | CES84 = 96 |
| CES10 = 77 | CES35 = 94 | CES60 = 85 | CES85 = 87 |
| CES11 = 60 | CES36 = 73 | CES61 = 84 | CES86 = 86 |
| CES12 = 66 | CES37 = 93 | CES62 = 69 | CES87 = 89 |
| CES13 = 44 | CES38 = 57 | CES63 = 78 | CES88 = 84 |
| CES14 = 74 | CES39 = 88 | CES64 = 71 | CES89 = 85 |
| CES15 = 72 | CES40 = 81 | CES65 = 79 | CES90 = 76 |
| CES16 = 49 | CES41 = 75 | CES66 = 71 | CES91 = 77 |
| CES17 = 51 | CES42 = 81 | CES67 = 73 | CES92 = 88 |
| CES18 = 57 | CES43 = 73 | CES68 = 85 | CES93 = 91 |
| CES19 = 73 | CES44 = 98 | CES69 = 87 | CES94 = 90 |
| CES20 = 68 | CES45 = 78 | CES70 = 91 | CES95 = 91 |
| CES21 = 87 | CES46 = 75 | CES71 = 81 | CES96 = 92 |
| CES22 = 80 | CES47 = 60 | CES72 = 94 | CES97 = 76 |
| CES23 = 92 | CES48 = 60 | CES73 = 94 | CES98 = 78 |
| CES24 = 91 | CES49 = 72 | CES74 = 89 | CES99 = 84 |
| CES25 = 72 | CES50 = 75 | CES75 = 85 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)