

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



Scaled data based on original data using  
LM-79-08 Approved Method: Electrical and Photometric Measurements of Solid-State  
Lighting Products

Test Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

Brand: NEO-RAY

Report Number: P78204

Luminaire Tested: **DFN2DIP-RG3F0-060D090US930-FLL-OOB-1DUDD-W**

Issue Date: 02/20/2024

### Test Information

Test Method: LM-79-08  
 Report Number: P78204  
 TEST IS SCALED FROM IESNA LM-79-08 TEST DATA  
 Test Lab: INNOVATION CENTER(G3)  
 Issue Date: 02/20/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: NEO-RAY  
 Catalog Number: DFN2DIP-RG3F0-060D090US930-FLL-OOB-1DUDD-W  
 Description: Define Geo Ring 3ft Diameter Direct/Indirect Fixture w/ Frosted Lens  
 for Downlight and Bat-Wing Lens for UPLIGHT  
 Light Source: 3000K CCT, 90 CRI LEDS  
 Ballast/Driver: ELECTRONIC DRIVER

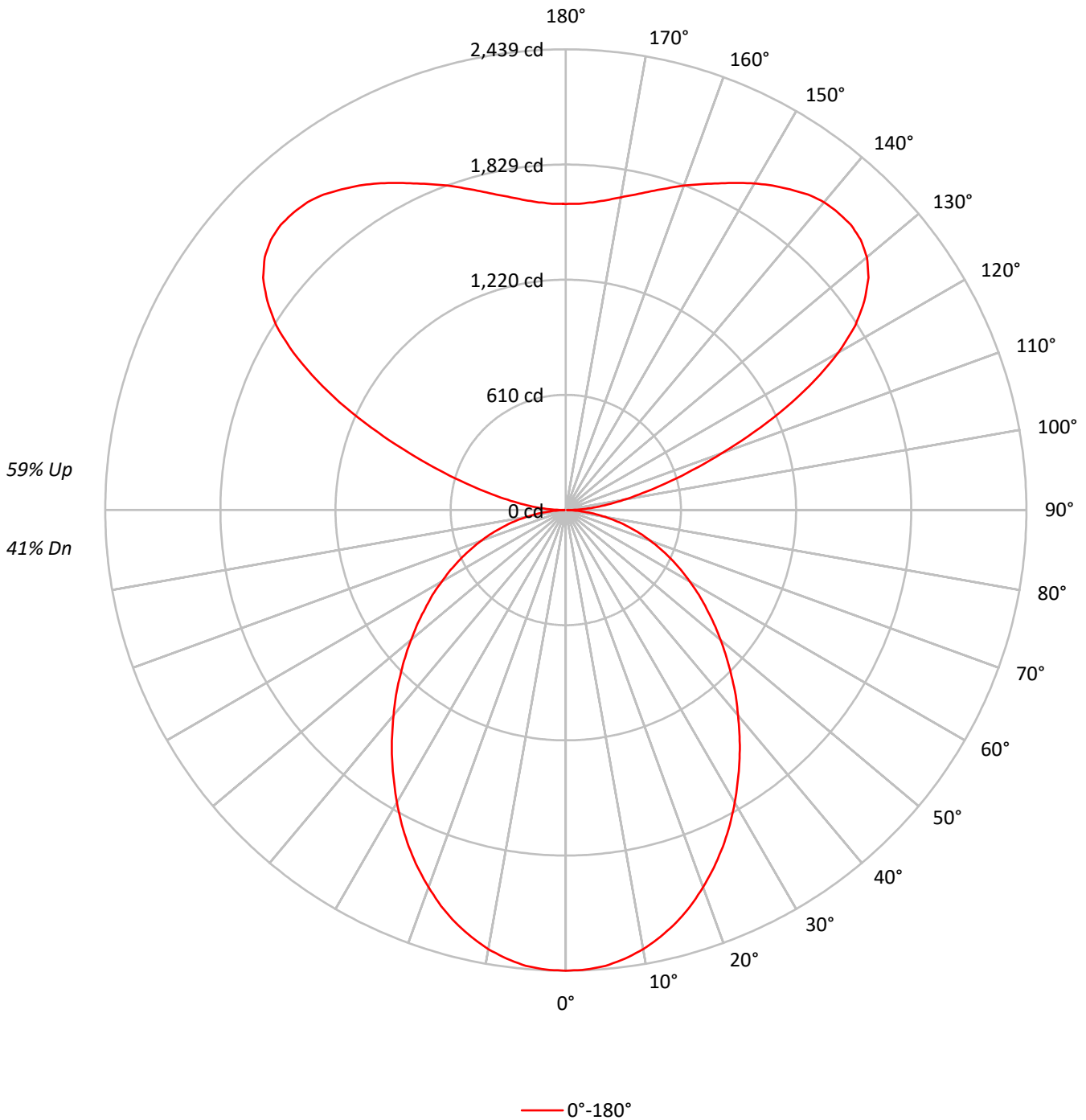
### Summary

Lumens per Lamp: N/A  
 Luminaire Lumens: 13847.3 lumens  
 Efficiency: N/A  
 Efficacy: 70.0 lumens/watt  
 Spacing Criteria (0/90/45): 1.11 / 1.11 / 1.21  
 Luminous Opening: Circular (Dia: 3' x H: 0')  
 CIE Type: General Diffuse

Input Watts (W): 197.7  
 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: 25 FT

TEST NUMBER: P78204  
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### Luminous Intensity Polar Plot



Cooper Lighting Solutions Photometric Lab  
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**COEFFICIENT OF UTILIZATION - ZONAL CAVITY METHOD:**

|     |     |     |     |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|-----|-----|-----|-----|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| RF  | 20  |     |     |     | 20 |    |    |    | 20 |    |    |    | 20 |    |    |    | 20 |    |
| RC  | 80  |     |     |     | 70 |    |    |    | 50 |    |    |    | 30 |    |    |    | 10 | 0  |
| RW  | 70  | 50  | 30  | 10  | 70 | 50 | 30 | 10 | 50 | 30 | 10 | 50 | 30 | 10 | 50 | 30 | 10 | 0  |
| RCR |     |     |     |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 0   | 105 | 105 | 105 | 105 | 96 | 96 | 96 | 96 | 78 | 78 | 78 | 62 | 62 | 62 | 47 | 47 | 47 | 41 |
| 1   | 96  | 91  | 88  | 84  | 87 | 83 | 80 | 77 | 68 | 66 | 64 | 55 | 53 | 52 | 42 | 41 | 40 | 34 |
| 2   | 87  | 80  | 74  | 69  | 79 | 73 | 68 | 64 | 60 | 56 | 53 | 48 | 46 | 43 | 37 | 35 | 34 | 29 |
| 3   | 80  | 70  | 63  | 58  | 72 | 64 | 58 | 53 | 53 | 49 | 45 | 43 | 40 | 37 | 33 | 31 | 29 | 25 |
| 4   | 73  | 62  | 55  | 49  | 66 | 57 | 50 | 45 | 47 | 42 | 38 | 38 | 35 | 32 | 30 | 27 | 25 | 21 |
| 5   | 67  | 56  | 48  | 42  | 61 | 51 | 44 | 39 | 42 | 37 | 33 | 34 | 30 | 27 | 27 | 24 | 22 | 19 |
| 6   | 62  | 50  | 42  | 36  | 56 | 46 | 39 | 34 | 38 | 33 | 29 | 31 | 27 | 24 | 24 | 22 | 19 | 16 |
| 7   | 57  | 45  | 37  | 32  | 52 | 41 | 35 | 30 | 35 | 29 | 25 | 28 | 24 | 21 | 22 | 19 | 17 | 15 |
| 8   | 53  | 41  | 33  | 28  | 48 | 38 | 31 | 26 | 32 | 26 | 23 | 26 | 22 | 19 | 20 | 18 | 16 | 13 |
| 9   | 49  | 37  | 30  | 25  | 45 | 34 | 28 | 23 | 29 | 24 | 20 | 24 | 20 | 17 | 19 | 16 | 14 | 12 |
| 10  | 46  | 34  | 27  | 22  | 42 | 32 | 25 | 21 | 27 | 22 | 18 | 22 | 18 | 16 | 18 | 15 | 13 | 11 |

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

|     |      |
|-----|------|
|     | 0°   |
| 0°  | 3714 |
| 5°  | 3703 |
| 10° | 3651 |
| 15° | 3564 |
| 20° | 3444 |
| 25° | 3305 |
| 30° | 3145 |
| 35° | 2983 |
| 40° | 2820 |
| 45° | 2670 |
| 50° | 2532 |
| 55° | 2414 |
| 60° | 2310 |
| 65° | 2217 |
| 70° | 2127 |
| 75° | 2013 |
| 80° | 1875 |
| 85° | 1462 |



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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 229.2   | 1.7       |
| 10°-20°   | 635.5   | 4.6       |
| 20°-30°   | 904.1   | 6.5       |
| 30°-40°   | 1002.9  | 7.2       |
| 40°-50°   | 958.4   | 6.9       |
| 50°-60°   | 815.7   | 5.9       |
| 60°-70°   | 610.7   | 4.4       |
| 70°-80°   | 363.3   | 2.6       |
| 80°-90°   | 101.9   | 0.7       |
| 90°-100°  | 163.7   | 1.2       |
| 100°-110° | 596.7   | 4.3       |
| 110°-120° | 1266.9  | 9.1       |
| 120°-130° | 1710.7  | 12.4      |
| 130°-140° | 1643.9  | 11.9      |
| 140°-150° | 1301.6  | 9.4       |
| 150°-160° | 886.3   | 6.4       |
| 160°-170° | 498.1   | 3.6       |
| 170°-180° | 157.5   | 1.1       |
| 0°-30°    | 1768.8  | 12.8      |
| 0°-40°    | 2771.8  | 20.0      |
| 0°-60°    | 4545.9  | 32.8      |
| 0°-90°    | 5621.8  | 40.6      |
| 90°-120°  | 2027.4  | 14.6      |
| 90°-150°  | 6683.6  | 48.3      |
| 90°-180°  | 8226.0  | 59.4      |
| 0°-180°   | 13847.3 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | Flux |
|------|------|------|
| 0°   | 2439 |      |
| 5°   | 2422 | 229  |
| 15°  | 2261 | 636  |
| 25°  | 1967 | 904  |
| 35°  | 1604 | 1003 |
| 45°  | 1240 | 958  |
| 55°  | 909  | 816  |
| 65°  | 615  | 611  |
| 75°  | 342  | 363  |
| 85°  | 84   | 97   |
| 90°  | 7    | 16   |
| 95°  | 146  | 153  |
| 105° | 549  | 597  |
| 115° | 1288 | 1267 |
| 125° | 1930 | 1711 |
| 135° | 2135 | 1644 |
| 145° | 2072 | 1302 |
| 155° | 1908 | 886  |
| 165° | 1747 | 498  |
| 175° | 1635 | 158  |
| 180° | 1620 |      |



TEST NUMBER: P78204

CATALOG NUMBER: DFN2DIP-RG3F0-060D090US930-FLL-OOB-1DUDD-W

**CANDELA DISTRIBUTION (FULL):**

| 0°     |        |
|--------|--------|
| 0°     | 2439.2 |
| 2.5°   | 2435.5 |
| 5°     | 2422.5 |
| 7.5°   | 2396.4 |
| 10°    | 2361.1 |
| 12.5°  | 2314.6 |
| 15°    | 2260.7 |
| 17.5°  | 2197.5 |
| 20°    | 2125.0 |
| 22.5°  | 2048.8 |
| 25°    | 1967.0 |
| 27.5°  | 1879.6 |
| 30°    | 1788.5 |
| 32.5°  | 1695.5 |
| 35°    | 1604.4 |
| 37.5°  | 1511.5 |
| 40°    | 1418.5 |
| 42.5°  | 1331.1 |
| 45°    | 1240.0 |
| 47.5°  | 1154.5 |
| 50°    | 1069.0 |
| 52.5°  | 989.1  |
| 55°    | 909.1  |
| 57.5°  | 836.6  |
| 60°    | 758.5  |
| 62.5°  | 687.9  |
| 65°    | 615.4  |
| 67.5°  | 546.6  |
| 70°    | 477.8  |
| 72.5°  | 410.9  |
| 75°    | 342.1  |
| 77.5°  | 278.9  |
| 80°    | 213.8  |
| 82.5°  | 148.7  |
| 85°    | 83.7   |
| 87.5°  | 31.6   |
| 90°    | 7.3    |
| 92.5°  | 73.2   |
| 95°    | 146.4  |
| 97.5°  | 222.1  |
| 100°   | 312.4  |
| 102.5° | 417.3  |
| 105°   | 549.1  |
| 107.5° | 702.8  |
| 110°   | 878.5  |



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CATALOG NUMBER: DFN2DIP-RG3F0-060D090US930-FLL-OOB-1DUDD-W

**CANDELA DISTRIBUTION (continued):**

|        | 0°     |
|--------|--------|
| 112.5° | 1078.6 |
| 115°   | 1288.5 |
| 117.5° | 1486.1 |
| 120°   | 1666.7 |
| 122.5° | 1818.0 |
| 125°   | 1930.2 |
| 127.5° | 2020.5 |
| 130°   | 2081.5 |
| 132.5° | 2118.1 |
| 135°   | 2135.2 |
| 137.5° | 2135.2 |
| 140°   | 2127.9 |
| 142.5° | 2105.9 |
| 145°   | 2071.8 |
| 147.5° | 2037.6 |
| 150°   | 1996.1 |
| 152.5° | 1952.2 |
| 155°   | 1908.3 |
| 157.5° | 1866.8 |
| 160°   | 1827.7 |
| 162.5° | 1786.3 |
| 165°   | 1747.2 |
| 167.5° | 1710.6 |
| 170°   | 1681.3 |
| 172.5° | 1654.5 |
| 175°   | 1635.0 |
| 177.5° | 1622.8 |
| 180°   | 1620.3 |

Signify Classified - Internal  
Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



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

Report Prepared for

Cooper Lighting Solutions

NEO-RAY

Report Number: SP1-2401-290-2

Test Date: 01/18/2024

Luminaire Tested: RNG2DIP-RG2F0-020D020US930-FLL-FLL-1-D-UDD-W

Data in this report applies to families of products including RNG2DIP-RG2F0-020D020US930-FLL-FLL-1-D-UDD-W.



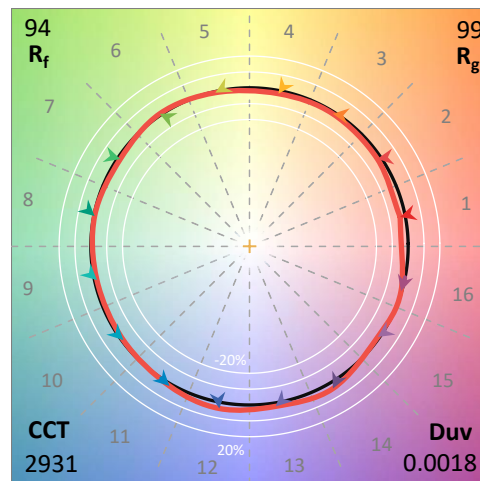
**Test Information**

Test Method: LM-79-2019  
 Report Number: SP1-2401-290-2  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry: 4π  
 Issue Date: 01/19/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: NEO-RAY  
 Catalog Number: **RNG2DIP-RG2F0-020D020US930-FLL-FLL-1-D-UDD-W**  
 Description: 2' RING DIRECT/INDIRECT FIXTURE WITH FROSTED LIGHT LEVEL 1

**Spectral Parameters**

CCT (K): 2931  
 CIE u': 0.2524  
 CIE v': 0.5253  
 Duv: 0.0018  
 CIE x: 0.4446  
 CIE y: 0.4112  
 CIE z: 0.1443  
 Peak Wavelength (nm): 629  
 Dominant Wavelength (nm): 582  
 Purity: 57.1  
 Rf: 93.8  
 Rg: 99.3

|           |      |      |      |
|-----------|------|------|------|
| CRI (Ra): | 94.7 |      |      |
| R1:       | 95.1 | R9:  | 72.1 |
| R2:       | 96.3 | R10: | 90.5 |
| R3:       | 96.3 | R11: | 96.7 |
| R4:       | 95.9 | R12: | 82.6 |
| R5:       | 94.4 | R13: | 95.3 |
| R6:       | 95.6 | R14: | 97.1 |
| R7:       | 95.7 |      |      |
| R8:       | 88.4 |      |      |



**Test Conditions**  
 Stabilization Time: 28M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.6/15%  
 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  | 8/9/2023         | 2/9/2024             |
| Power Meter                    | XITRON 2801 IN0071    | 10/23/2023       | 10/23/2024           |
| AC Power Source                | CHROMA 61603 IN0063   | 10/24/2023       | 10/24/2024           |
| DC Power Source                | AGILENT E3634A IN0208 | 10/24/2023       | 10/24/2024           |
| Sphere Thermometer             | ONSET IN0085          | 10/24/2023       | 10/24/2024           |
| Room Thermometer               | ONSET IN0046          | 10/24/2023       | 10/24/2024           |

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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 3000K 7-step quadrangle

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**Photopic Flux vs. Wavelength**



#####

| $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|
| 360               | 1461                                 | NR                             | 490               | 21821                                | NR                             | 620               | 77901                                | NR                             | 750               | 8179                                 | NR                             | 880               | 1643                                 | NR                             |
| 365               | 1400                                 | NR                             | 495               | 25627                                | NR                             | 625               | 79163                                | NR                             | 755               | 7299                                 | NR                             | 885               | 1703                                 | NR                             |
| 370               | 1570                                 | NR                             | 500               | 29501                                | NR                             | 630               | 79015                                | NR                             | 760               | 6398                                 | NR                             | 890               | 1343                                 | NR                             |
| 375               | 1768                                 | NR                             | 505               | 32566                                | NR                             | 635               | 78215                                | NR                             | 765               | 5779                                 | NR                             | 895               | 1272                                 | NR                             |
| 380               | 1653                                 | NR                             | 510               | 34919                                | NR                             | 640               | 77002                                | NR                             | 770               | 4957                                 | NR                             | 900               | 1388                                 | NR                             |
| 385               | 1519                                 | NR                             | 515               | 37015                                | NR                             | 645               | 74220                                | NR                             | 775               | 4366                                 | NR                             | 905               | 1205                                 | NR                             |
| 390               | 1495                                 | NR                             | 520               | 39034                                | NR                             | 650               | 71542                                | NR                             | 780               | 3858                                 | NR                             | 910               | 1298                                 | NR                             |
| 395               | 1377                                 | NR                             | 525               | 40568                                | NR                             | 655               | 67792                                | NR                             | 785               | 3408                                 | NR                             | 915               | 1337                                 | NR                             |
| 400               | 1116                                 | NR                             | 530               | 42614                                | NR                             | 660               | 63857                                | NR                             | 790               | 3251                                 | NR                             | 920               | 1680                                 | NR                             |
| 405               | 1027                                 | NR                             | 535               | 44347                                | NR                             | 665               | 59357                                | NR                             | 795               | 3012                                 | NR                             | 925               | 1293                                 | NR                             |
| 410               | 1056                                 | NR                             | 540               | 46106                                | NR                             | 670               | 54656                                | NR                             | 800               | 2808                                 | NR                             | 930               | 1369                                 | NR                             |
| 415               | 1393                                 | NR                             | 545               | 48203                                | NR                             | 675               | 49862                                | NR                             | 805               | 2550                                 | NR                             | 935               | 1382                                 | NR                             |
| 420               | 2045                                 | NR                             | 550               | 50008                                | NR                             | 680               | 45198                                | NR                             | 810               | 2478                                 | NR                             | 940               | 1295                                 | NR                             |
| 425               | 3225                                 | NR                             | 555               | 51782                                | NR                             | 685               | 40716                                | NR                             | 815               | 2341                                 | NR                             | 945               | 1425                                 | NR                             |
| 430               | 5118                                 | NR                             | 560               | 53082                                | NR                             | 690               | 36247                                | NR                             | 820               | 2409                                 | NR                             | 950               | 1783                                 | NR                             |
| 435               | 8200                                 | NR                             | 565               | 54447                                | NR                             | 695               | 32175                                | NR                             | 825               | 2301                                 | NR                             | 955               | 1148                                 | NR                             |
| 440               | 13442                                | NR                             | 570               | 56050                                | NR                             | 700               | 28460                                | NR                             | 830               | 2205                                 | NR                             | 960               | 1184                                 | NR                             |
| 445               | 23157                                | NR                             | 575               | 57513                                | NR                             | 705               | 25105                                | NR                             | 835               | 1768                                 | NR                             | 965               | 1637                                 | NR                             |
| 450               | 33968                                | NR                             | 580               | 59394                                | NR                             | 710               | 22282                                | NR                             | 840               | 1774                                 | NR                             | 970               | 1795                                 | NR                             |
| 455               | 31939                                | NR                             | 585               | 61139                                | NR                             | 715               | 19778                                | NR                             | 845               | 1483                                 | NR                             | 975               | 2363                                 | NR                             |
| 460               | 23216                                | NR                             | 590               | 63214                                | NR                             | 720               | 17396                                | NR                             | 850               | 1630                                 | NR                             | 980               | 1601                                 | NR                             |
| 465               | 19706                                | NR                             | 595               | 66121                                | NR                             | 725               | 15186                                | NR                             | 855               | 1763                                 | NR                             | 985               | 1282                                 | NR                             |
| 470               | 17657                                | NR                             | 600               | 68559                                | NR                             | 730               | 13540                                | NR                             | 860               | 1852                                 | NR                             | 990               | 2177                                 | NR                             |
| 475               | 15359                                | NR                             | 605               | 71420                                | NR                             | 735               | 11700                                | NR                             | 865               | 1735                                 | NR                             | 995               | 970                                  | NR                             |
| 480               | 15859                                | NR                             | 610               | 74391                                | NR                             | 740               | 10401                                | NR                             | 870               | 2047                                 | NR                             | 1000              | 2032                                 | NR                             |
| 485               | 18528                                | NR                             | 615               | 76685                                | NR                             | 745               | 9147                                 | NR                             | 875               | 1930                                 | NR                             |                   |                                      |                                |

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Scotopic Flux vs. Wavelength



Scotopic Lumens: 5310.4

S/P: 1.38

| λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) |
|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|
| 360    | 1461          | NR            | 490    | 21821         | NR            | 620    | 77901         | NR            | 750    | 8179          | NR            | 880    | 1643          | NR            |
| 365    | 1400          | NR            | 495    | 25627         | NR            | 625    | 79163         | NR            | 755    | 7299          | NR            | 885    | 1703          | NR            |
| 370    | 1570          | NR            | 500    | 29501         | NR            | 630    | 79015         | NR            | 760    | 6398          | NR            | 890    | 1343          | NR            |
| 375    | 1768          | NR            | 505    | 32566         | NR            | 635    | 78215         | NR            | 765    | 5779          | NR            | 895    | 1272          | NR            |
| 380    | 1653          | NR            | 510    | 34919         | NR            | 640    | 77002         | NR            | 770    | 4957          | NR            | 900    | 1388          | NR            |
| 385    | 1519          | NR            | 515    | 37015         | NR            | 645    | 74220         | NR            | 775    | 4366          | NR            | 905    | 1205          | NR            |
| 390    | 1495          | NR            | 520    | 39034         | NR            | 650    | 71542         | NR            | 780    | 3858          | NR            | 910    | 1298          | NR            |
| 395    | 1377          | NR            | 525    | 40568         | NR            | 655    | 67792         | NR            | 785    | 3408          | NR            | 915    | 1337          | NR            |
| 400    | 1116          | NR            | 530    | 42614         | NR            | 660    | 63857         | NR            | 790    | 3251          | NR            | 920    | 1680          | NR            |
| 405    | 1027          | NR            | 535    | 44347         | NR            | 665    | 59357         | NR            | 795    | 3012          | NR            | 925    | 1293          | NR            |
| 410    | 1056          | NR            | 540    | 46106         | NR            | 670    | 54656         | NR            | 800    | 2808          | NR            | 930    | 1369          | NR            |
| 415    | 1393          | NR            | 545    | 48203         | NR            | 675    | 49862         | NR            | 805    | 2550          | NR            | 935    | 1382          | NR            |
| 420    | 2045          | NR            | 550    | 50008         | NR            | 680    | 45198         | NR            | 810    | 2478          | NR            | 940    | 1295          | NR            |
| 425    | 3225          | NR            | 555    | 51782         | NR            | 685    | 40716         | NR            | 815    | 2341          | NR            | 945    | 1425          | NR            |
| 430    | 5118          | NR            | 560    | 53082         | NR            | 690    | 36247         | NR            | 820    | 2409          | NR            | 950    | 1783          | NR            |
| 435    | 8200          | NR            | 565    | 54447         | NR            | 695    | 32175         | NR            | 825    | 2301          | NR            | 955    | 1148          | NR            |
| 440    | 13442         | NR            | 570    | 56050         | NR            | 700    | 28460         | NR            | 830    | 2205          | NR            | 960    | 1184          | NR            |
| 445    | 23157         | NR            | 575    | 57513         | NR            | 705    | 25105         | NR            | 835    | 1768          | NR            | 965    | 1637          | NR            |
| 450    | 33968         | NR            | 580    | 59394         | NR            | 710    | 22282         | NR            | 840    | 1774          | NR            | 970    | 1795          | NR            |
| 455    | 31939         | NR            | 585    | 61139         | NR            | 715    | 19778         | NR            | 845    | 1483          | NR            | 975    | 2363          | NR            |
| 460    | 23216         | NR            | 590    | 63214         | NR            | 720    | 17396         | NR            | 850    | 1630          | NR            | 980    | 1601          | NR            |
| 465    | 19706         | NR            | 595    | 66121         | NR            | 725    | 15186         | NR            | 855    | 1763          | NR            | 985    | 1282          | NR            |
| 470    | 17657         | NR            | 600    | 68559         | NR            | 730    | 13540         | NR            | 860    | 1852          | NR            | 990    | 2177          | NR            |
| 475    | 15359         | NR            | 605    | 71420         | NR            | 735    | 11700         | NR            | 865    | 1735          | NR            | 995    | 970           | NR            |
| 480    | 15859         | NR            | 610    | 74391         | NR            | 740    | 10401         | NR            | 870    | 2047          | NR            | 1000   | 2032          | NR            |
| 485    | 18528         | NR            | 615    | 76685         | NR            | 745    | 9147          | NR            | 875    | 1930          | NR            |        |               |               |

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**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 2012.9**

**M/P: 0.52**

| λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) |
|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|
| 360    | 1461          | NR            | 490    | 21821         | NR            | 620    | 77901         | NR            | 750    | 8179          | NR            | 880    | 1643          | NR            |
| 365    | 1400          | NR            | 495    | 25627         | NR            | 625    | 79163         | NR            | 755    | 7299          | NR            | 885    | 1703          | NR            |
| 370    | 1570          | NR            | 500    | 29501         | NR            | 630    | 79015         | NR            | 760    | 6398          | NR            | 890    | 1343          | NR            |
| 375    | 1768          | NR            | 505    | 32566         | NR            | 635    | 78215         | NR            | 765    | 5779          | NR            | 895    | 1272          | NR            |
| 380    | 1653          | NR            | 510    | 34919         | NR            | 640    | 77002         | NR            | 770    | 4957          | NR            | 900    | 1388          | NR            |
| 385    | 1519          | NR            | 515    | 37015         | NR            | 645    | 74220         | NR            | 775    | 4366          | NR            | 905    | 1205          | NR            |
| 390    | 1495          | NR            | 520    | 39034         | NR            | 650    | 71542         | NR            | 780    | 3858          | NR            | 910    | 1298          | NR            |
| 395    | 1377          | NR            | 525    | 40568         | NR            | 655    | 67792         | NR            | 785    | 3408          | NR            | 915    | 1337          | NR            |
| 400    | 1116          | NR            | 530    | 42614         | NR            | 660    | 63857         | NR            | 790    | 3251          | NR            | 920    | 1680          | NR            |
| 405    | 1027          | NR            | 535    | 44347         | NR            | 665    | 59357         | NR            | 795    | 3012          | NR            | 925    | 1293          | NR            |
| 410    | 1056          | NR            | 540    | 46106         | NR            | 670    | 54656         | NR            | 800    | 2808          | NR            | 930    | 1369          | NR            |
| 415    | 1393          | NR            | 545    | 48203         | NR            | 675    | 49862         | NR            | 805    | 2550          | NR            | 935    | 1382          | NR            |
| 420    | 2045          | NR            | 550    | 50008         | NR            | 680    | 45198         | NR            | 810    | 2478          | NR            | 940    | 1295          | NR            |
| 425    | 3225          | NR            | 555    | 51782         | NR            | 685    | 40716         | NR            | 815    | 2341          | NR            | 945    | 1425          | NR            |
| 430    | 5118          | NR            | 560    | 53082         | NR            | 690    | 36247         | NR            | 820    | 2409          | NR            | 950    | 1783          | NR            |
| 435    | 8200          | NR            | 565    | 54447         | NR            | 695    | 32175         | NR            | 825    | 2301          | NR            | 955    | 1148          | NR            |
| 440    | 13442         | NR            | 570    | 56050         | NR            | 700    | 28460         | NR            | 830    | 2205          | NR            | 960    | 1184          | NR            |
| 445    | 23157         | NR            | 575    | 57513         | NR            | 705    | 25105         | NR            | 835    | 1768          | NR            | 965    | 1637          | NR            |
| 450    | 33968         | NR            | 580    | 59394         | NR            | 710    | 22282         | NR            | 840    | 1774          | NR            | 970    | 1795          | NR            |
| 455    | 31939         | NR            | 585    | 61139         | NR            | 715    | 19778         | NR            | 845    | 1483          | NR            | 975    | 2363          | NR            |
| 460    | 23216         | NR            | 590    | 63214         | NR            | 720    | 17396         | NR            | 850    | 1630          | NR            | 980    | 1601          | NR            |
| 465    | 19706         | NR            | 595    | 66121         | NR            | 725    | 15186         | NR            | 855    | 1763          | NR            | 985    | 1282          | NR            |
| 470    | 17657         | NR            | 600    | 68559         | NR            | 730    | 13540         | NR            | 860    | 1852          | NR            | 990    | 2177          | NR            |
| 475    | 15359         | NR            | 605    | 71420         | NR            | 735    | 11700         | NR            | 865    | 1735          | NR            | 995    | 970           | NR            |
| 480    | 15859         | NR            | 610    | 74391         | NR            | 740    | 10401         | NR            | 870    | 2047          | NR            | 1000   | 2032          | NR            |
| 485    | 18528         | NR            | 615    | 76685         | NR            | 745    | 9147          | NR            | 875    | 1930          | NR            |        |               |               |

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**Summary**

$R_f = 93.8$   
 $R_g = 99.3$   
 CIE  $R_a = 94.7$   
 $R_9 = 72.1$



**Color Vector Graphics**



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

|            |            |             |            |
|------------|------------|-------------|------------|
| CES01 = 86 | CES26 = 96 | CES51 = 98  | CES76 = 91 |
| CES02 = 63 | CES27 = 93 | CES52 = 100 | CES77 = 92 |
| CES03 = 32 | CES28 = 97 | CES53 = 98  | CES78 = 88 |
| CES04 = 70 | CES29 = 97 | CES54 = 95  | CES79 = 96 |
| CES05 = 51 | CES30 = 94 | CES55 = 94  | CES80 = 95 |
| CES06 = 51 | CES31 = 97 | CES56 = 96  | CES81 = 87 |
| CES07 = 44 | CES32 = 93 | CES57 = 95  | CES82 = 98 |
| CES08 = 43 | CES33 = 99 | CES58 = 96  | CES83 = 97 |
| CES09 = 29 | CES34 = 96 | CES59 = 98  | CES84 = 96 |
| CES10 = 76 | CES35 = 98 | CES60 = 95  | CES85 = 86 |
| CES11 = 59 | CES36 = 86 | CES61 = 94  | CES86 = 89 |
| CES12 = 65 | CES37 = 95 | CES62 = 91  | CES87 = 94 |
| CES13 = 44 | CES38 = 90 | CES63 = 95  | CES88 = 97 |
| CES14 = 74 | CES39 = 99 | CES64 = 93  | CES89 = 89 |
| CES15 = 72 | CES40 = 98 | CES65 = 92  | CES90 = 97 |
| CES16 = 48 | CES41 = 98 | CES66 = 91  | CES91 = 81 |
| CES17 = 50 | CES42 = 96 | CES67 = 91  | CES92 = 85 |
| CES18 = 57 | CES43 = 97 | CES68 = 91  | CES93 = 91 |
| CES19 = 72 | CES44 = 99 | CES69 = 92  | CES94 = 84 |
| CES20 = 67 | CES45 = 99 | CES70 = 90  | CES95 = 88 |
| CES21 = 86 | CES46 = 98 | CES71 = 87  | CES96 = 94 |
| CES22 = 79 | CES47 = 95 | CES72 = 96  | CES97 = 96 |
| CES23 = 92 | CES48 = 94 | CES73 = 86  | CES98 = 96 |
| CES24 = 91 | CES49 = 97 | CES74 = 92  | CES99 = 94 |
| CES25 = 72 | CES50 = 99 | CES75 = 88  |            |





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Color Rendition by Hue-Angle Bin



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Measure Comparisons



(END OF REPORT)