

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: P77968

Luminaire Tested: **DFN2DS-RG3F0-090-DS930-FLL-1DUDD-W**

Issue Date: 02/20/2024

### **Test Information**

Test Method: LM-79-08  
 Report Number: P77968  
 TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G3-2401-290-22)  
 Test Lab: INNOVATION CENTER(G3)  
 Issue Date: 02/20/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: NEO-RAY  
 Catalog Number: DFN2DS-RG3F0-090-DS930-FLL-1DUDD-W  
 Description: Define Geo Ring 3ft Diameter Direct Light Only Fixture with Frosted Lens  
 Light Source: 3000K CCT, 90 CRI LEDS  
 Ballast/Driver: ELECTRONIC DRIVER

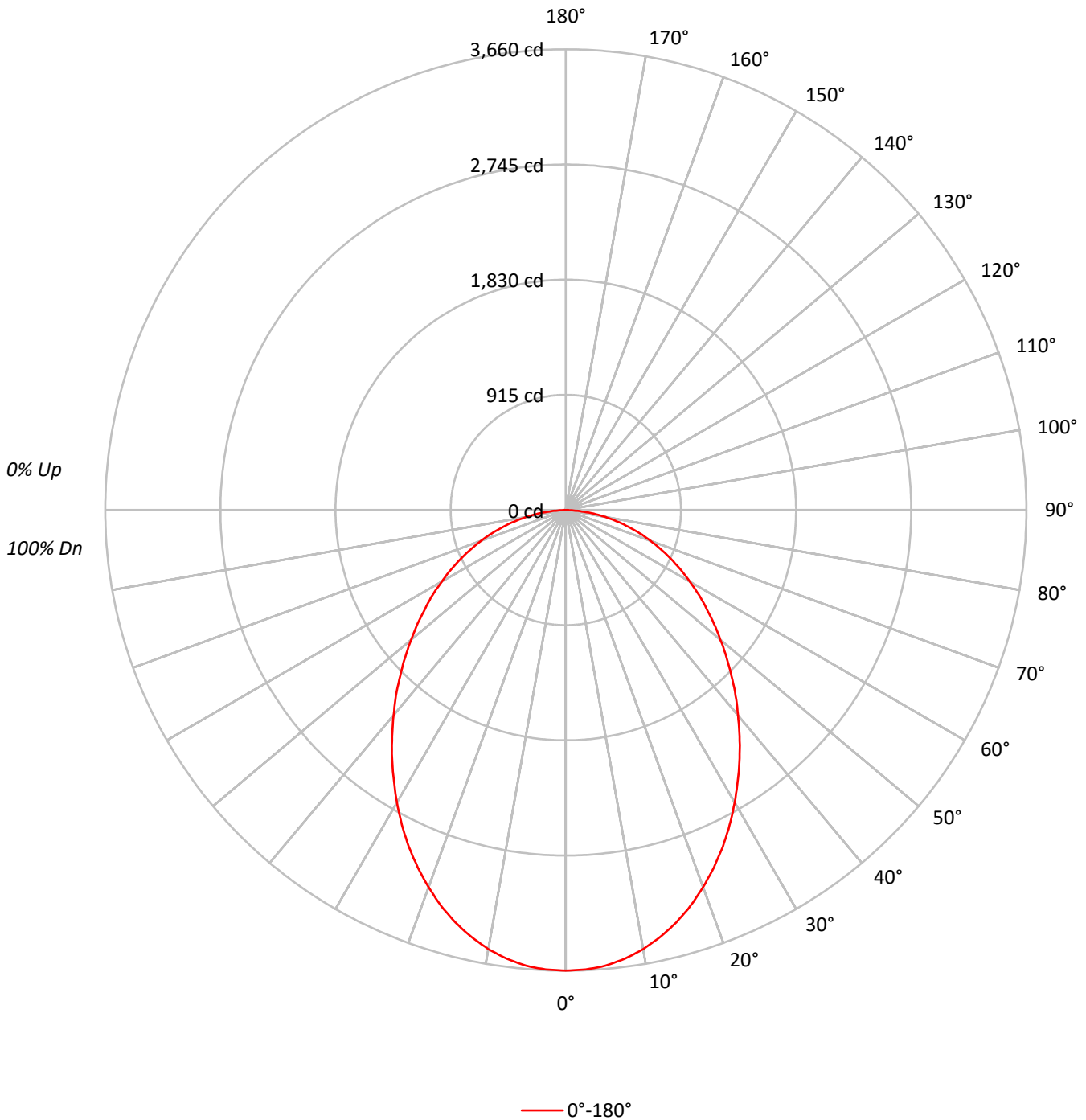
### **Summary**

Lumens per Lamp: N/A  
 Luminaire Lumens: 8433.1 lumens  
 Efficiency: N/A  
 Efficacy: 63.4 lumens/watt  
 Spacing Criteria (0/90/45): 1.11 / 1.11 / 1.21  
 Luminous Opening: Circular (Dia: 3' x H: 0')  
 CIE Type: Direct

Input Watts (W): 133  
 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

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### Luminous Intensity Polar Plot



Cooper Lighting Solutions Photometric Lab  
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TEST NUMBER: P77968

CATALOG NUMBER: DFN2DS-RG3F0-090-DS930-FLL-1DUDD-W

**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  | 50  | 30 | 10 | 0   |
| RCR |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |    |     |
| 0   | 119 | 119 | 119 | 119 | 116 | 116 | 116 | 116 | 111 | 111 | 111 | 106 | 106 | 106 | 102 | 102 | 102 | 100 |    |    | 100 |
| 1   | 109 | 105 | 100 | 97  | 106 | 102 | 98  | 95  | 98  | 95  | 92  | 94  | 92  | 89  | 91  | 88  | 87  | 85  |    |    | 85  |
| 2   | 100 | 92  | 85  | 80  | 97  | 90  | 84  | 79  | 86  | 81  | 77  | 83  | 79  | 75  | 80  | 76  | 73  | 71  |    |    | 71  |
| 3   | 91  | 81  | 73  | 67  | 89  | 79  | 72  | 66  | 76  | 70  | 65  | 74  | 68  | 64  | 71  | 67  | 63  | 61  |    |    | 61  |
| 4   | 84  | 72  | 64  | 57  | 82  | 71  | 63  | 57  | 68  | 61  | 56  | 66  | 60  | 55  | 64  | 59  | 54  | 52  |    |    | 52  |
| 5   | 77  | 65  | 56  | 50  | 75  | 64  | 56  | 49  | 62  | 54  | 49  | 60  | 53  | 48  | 58  | 52  | 48  | 46  |    |    | 46  |
| 6   | 72  | 59  | 50  | 44  | 70  | 58  | 50  | 44  | 56  | 49  | 43  | 54  | 48  | 43  | 53  | 47  | 42  | 40  |    |    | 40  |
| 7   | 67  | 53  | 45  | 39  | 65  | 53  | 45  | 39  | 51  | 44  | 39  | 50  | 43  | 38  | 48  | 42  | 38  | 36  |    |    | 36  |
| 8   | 62  | 49  | 41  | 35  | 61  | 48  | 40  | 35  | 47  | 40  | 35  | 46  | 39  | 34  | 45  | 39  | 34  | 32  |    |    | 32  |
| 9   | 58  | 45  | 37  | 32  | 57  | 45  | 37  | 32  | 43  | 36  | 31  | 42  | 36  | 31  | 41  | 35  | 31  | 29  |    |    | 29  |
| 10  | 55  | 42  | 34  | 29  | 53  | 41  | 34  | 29  | 40  | 33  | 29  | 39  | 33  | 29  | 38  | 33  | 28  | 27  |    |    | 27  |

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

|     |      |
|-----|------|
|     | 0°   |
| 0°  | 5573 |
| 5°  | 5556 |
| 10° | 5478 |
| 15° | 5347 |
| 20° | 5167 |
| 25° | 4958 |
| 30° | 4718 |
| 35° | 4475 |
| 40° | 4231 |
| 45° | 4007 |
| 50° | 3800 |
| 55° | 3621 |
| 60° | 3466 |
| 65° | 3327 |
| 70° | 3192 |
| 75° | 3019 |
| 80° | 2813 |
| 85° | 2193 |



TEST NUMBER: P77968  
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**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 343.9  | 4.1       |
| 10°-20°   | 953.5  | 11.3      |
| 20°-30°   | 1356.4 | 16.1      |
| 30°-40°   | 1504.8 | 17.8      |
| 40°-50°   | 1438.0 | 17.1      |
| 50°-60°   | 1223.8 | 14.5      |
| 60°-70°   | 916.2  | 10.9      |
| 70°-80°   | 545.1  | 6.5       |
| 80°-90°   | 151.3  | 1.8       |
| 90°-100°  | 0.0    | 0.0       |
| 100°-110° | 0.0    | 0.0       |
| 110°-120° | 0.0    | 0.0       |
| 120°-130° | 0.0    | 0.0       |
| 130°-140° | 0.0    | 0.0       |
| 140°-150° | 0.0    | 0.0       |
| 150°-160° | 0.0    | 0.0       |
| 160°-170° | 0.0    | 0.0       |
| 170°-180° | 0.0    | 0.0       |
| 0°-30°    | 2653.8 | 31.5      |
| 0°-40°    | 4158.6 | 49.3      |
| 0°-60°    | 6820.4 | 80.9      |
| 0°-90°    | 8433.1 | 100.0     |
| 90°-120°  | 0.0    | 0.0       |
| 90°-150°  | 0.0    | 0.0       |
| 90°-180°  | 0.0    | 0.0       |
| 0°-180°   | 8433.1 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | Flux |
|------|------|------|
| 0°   | 3660 |      |
| 5°   | 3634 | 344  |
| 15°  | 3392 | 954  |
| 25°  | 2951 | 1356 |
| 35°  | 2407 | 1505 |
| 45°  | 1860 | 1438 |
| 55°  | 1364 | 1224 |
| 65°  | 923  | 916  |
| 75°  | 513  | 545  |
| 85°  | 126  | 145  |
| 90°  | 0    | 6    |
| 95°  | 0    | 0    |
| 105° | 0    | 0    |
| 115° | 0    | 0    |
| 125° | 0    | 0    |
| 135° | 0    | 0    |
| 145° | 0    | 0    |
| 155° | 0    | 0    |
| 165° | 0    | 0    |
| 175° | 0    | 0    |
| 180° | 0    | 0    |



TEST NUMBER: P77968

CATALOG NUMBER: DFN2DS-RG3F0-090-DS930-FLL-1DUDD-W

**CANDELA DISTRIBUTION (FULL):**

| 0°     |        |
|--------|--------|
| 0°     | 3659.6 |
| 2.5°   | 3654.0 |
| 5°     | 3634.5 |
| 7.5°   | 3595.5 |
| 10°    | 3542.5 |
| 12.5°  | 3472.7 |
| 15°    | 3391.8 |
| 17.5°  | 3297.0 |
| 20°    | 3188.2 |
| 22.5°  | 3073.9 |
| 25°    | 2951.1 |
| 27.5°  | 2820.0 |
| 30°    | 2683.3 |
| 32.5°  | 2543.9 |
| 35°    | 2407.2 |
| 37.5°  | 2267.7 |
| 40°    | 2128.3 |
| 42.5°  | 1997.2 |
| 45°    | 1860.5 |
| 47.5°  | 1732.2 |
| 50°    | 1603.9 |
| 52.5°  | 1483.9 |
| 55°    | 1364.0 |
| 57.5°  | 1255.2 |
| 60°    | 1138.1 |
| 62.5°  | 1032.1 |
| 65°    | 923.3  |
| 67.5°  | 820.1  |
| 70°    | 716.9  |
| 72.5°  | 616.4  |
| 75°    | 513.2  |
| 77.5°  | 418.4  |
| 80°    | 320.8  |
| 82.5°  | 223.1  |
| 85°    | 125.5  |
| 87.5°  | 47.4   |
| 90°    | 0.0    |
| 92.5°  | 0.0    |
| 95°    | 0.0    |
| 97.5°  | 0.0    |
| 100°   | 0.0    |
| 102.5° | 0.0    |
| 105°   | 0.0    |
| 107.5° | 0.0    |
| 110°   | 0.0    |



TEST NUMBER: P77968  
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**CANDELA DISTRIBUTION (continued):**

|        | 0°  |
|--------|-----|
| 112.5° | 0.0 |
| 115°   | 0.0 |
| 117.5° | 0.0 |
| 120°   | 0.0 |
| 122.5° | 0.0 |
| 125°   | 0.0 |
| 127.5° | 0.0 |
| 130°   | 0.0 |
| 132.5° | 0.0 |
| 135°   | 0.0 |
| 137.5° | 0.0 |
| 140°   | 0.0 |
| 142.5° | 0.0 |
| 145°   | 0.0 |
| 147.5° | 0.0 |
| 150°   | 0.0 |
| 152.5° | 0.0 |
| 155°   | 0.0 |
| 157.5° | 0.0 |
| 160°   | 0.0 |
| 162.5° | 0.0 |
| 165°   | 0.0 |
| 167.5° | 0.0 |
| 170°   | 0.0 |
| 172.5° | 0.0 |
| 175°   | 0.0 |
| 177.5° | 0.0 |
| 180°   | 0.0 |

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

|           |      |      |      |
|-----------|------|------|------|
| 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 |      |      |

Rf: 93.8  
 Rg: 99.3



**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)