

Signify Classified - Internal  
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: STREETWORKS

Report Number: P348905

Luminaire Tested: **ARCH-N-PA1-19-830-24VDC-T4W-HSS**

Issue Date: 3/3/2020



**Test Information**

Test Method: LM-79-08  
Report Number: P348905  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-19)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: STREETWORKS  
Catalog Number: ARCH-N-PA1-19-830-24VDC-T4W-HSS  
Description: ARCHEON ROADWAY AND AREA LUMINAIRE  
(1) 80 CRI, 3000K, 370mA LIGHT ENGINE WITH 16 LEDS AND  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 1697 lumens  
Efficiency: N/A  
Efficacy: 89.3 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.75' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B0 - U0 - G1

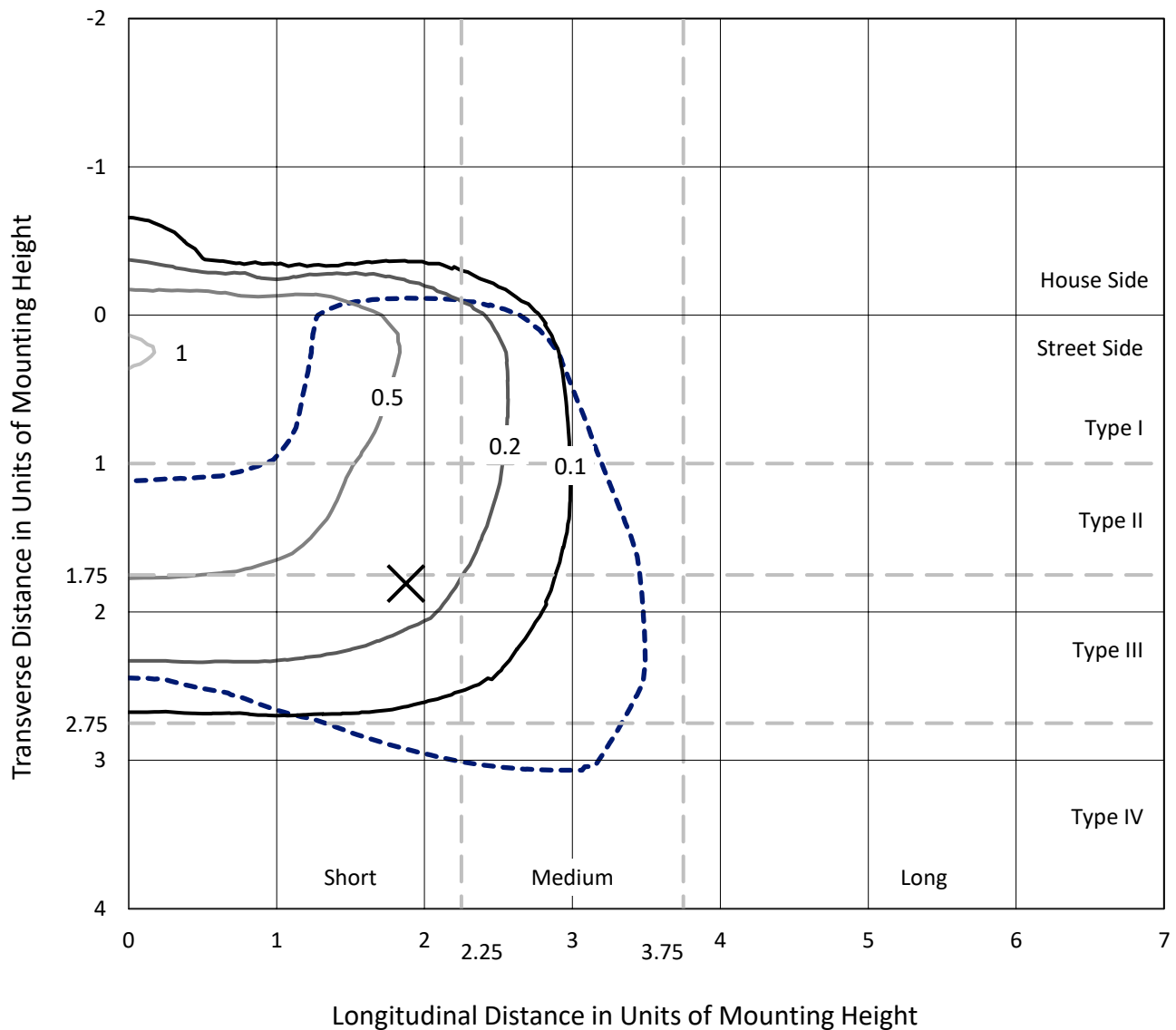
Input Watts (W): 19  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 25 FT

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## Iso-Footcandle Lines of Horizontal Illumination

✕ Max cd  
 - - - 1/2 Max cd

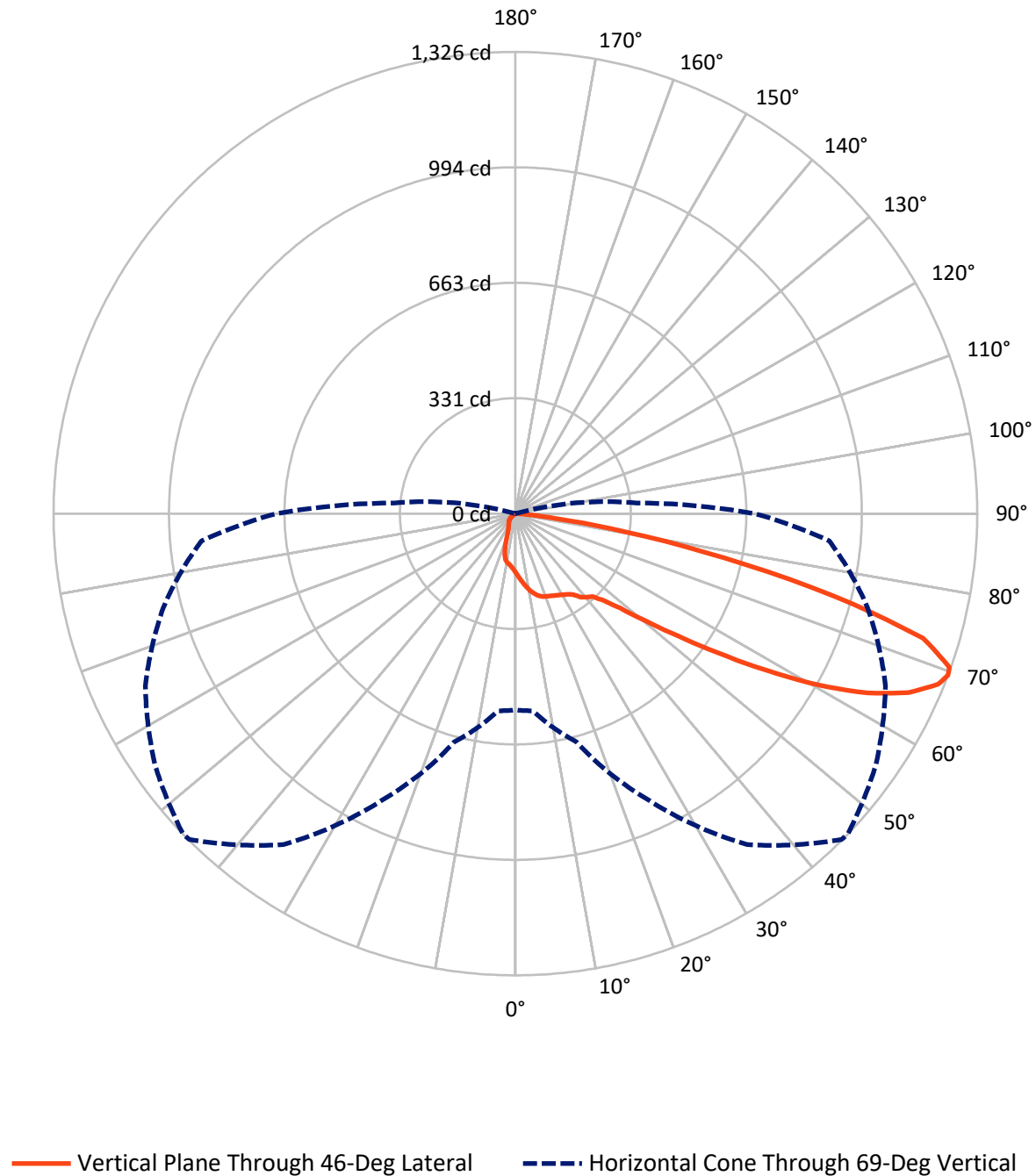


Based on 15 foot mounting height. Maximum calculated value = 1.1 fc  
 Type IV - Short - N/A

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## Luminous Intensity Polar Plot



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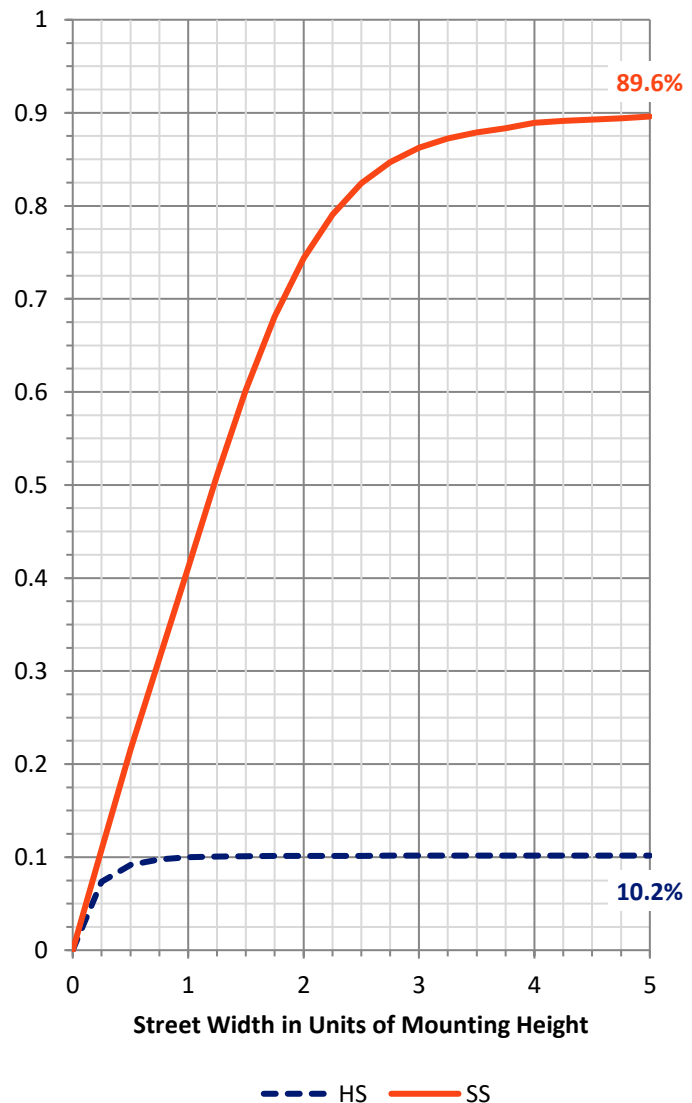
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 174.2    | 0.0    | 174.2  |
|                    | % Fixture | 10.3     | 0.0    | 10.3   |
| <b>Street Side</b> | Lumens    | 1522.8   | 0.0    | 1522.8 |
|                    | % Fixture | 89.7     | 0.0    | 89.7   |
| <b>Total</b>       | Lumens    | 1697.0   | 0.0    | 1697.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**Coefficient of Utilization**

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 16.9   | 1.0       |
| 10°-20°   | 51.3   | 3.0       |
| 20°-30°   | 80.7   | 4.8       |
| 30°-40°   | 115.8  | 6.8       |
| 40°-50°   | 200.1  | 11.8      |
| 50°-60°   | 395.4  | 23.3      |
| 60°-70°   | 552.6  | 32.6      |
| 70°-80°   | 267.0  | 15.7      |
| 80°-90°   | 17.2   | 1.0       |
| 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°-90°    | 1697.0 | 100.0     |
| 0°-180°   | 1697.0 | 100.0     |



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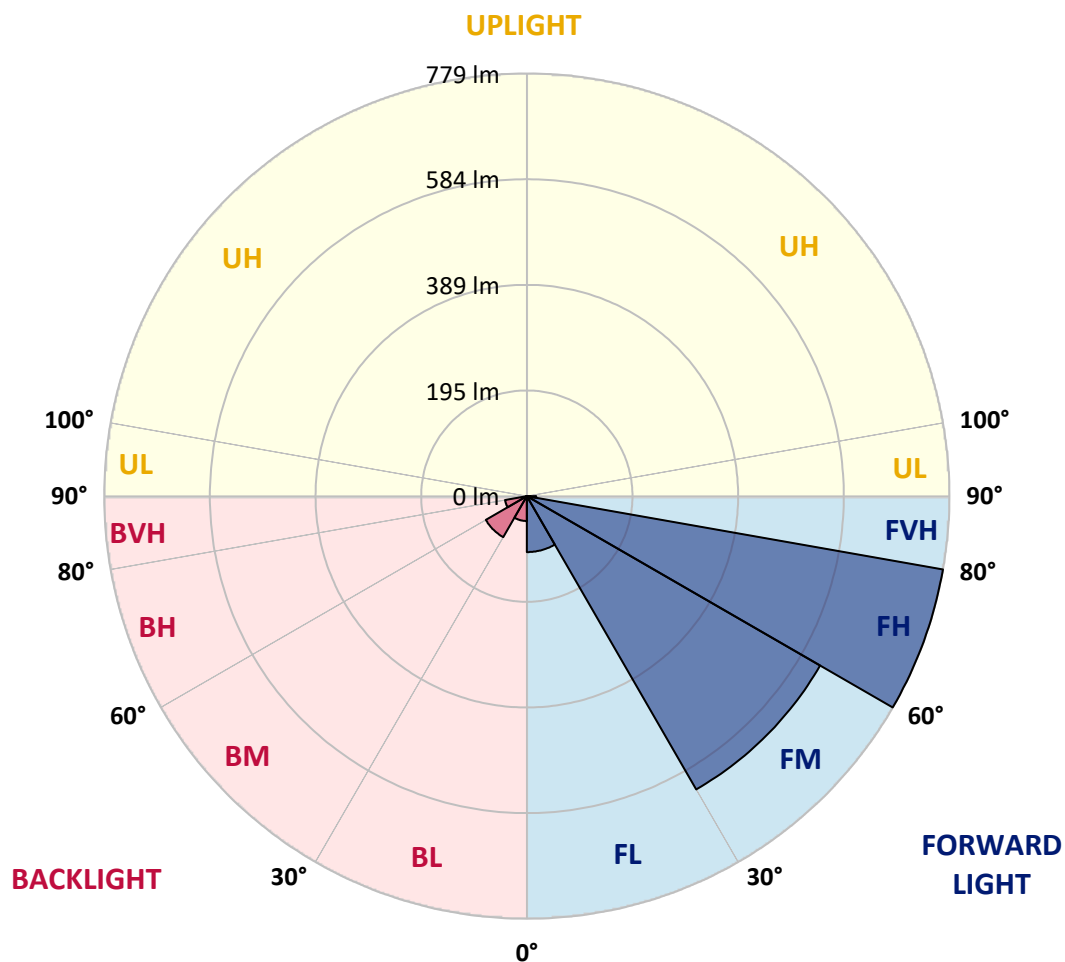
CATALOG NUMBER: ARCH-N-PA1-19-830-24VDC-T4W-HSS

**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 103.1  | 6.1       |                         |      |         |
| FM   | (30°-60°)   | 624.0  | 36.8      |                         |      |         |
| FH   | (60°-80°)   | 778.7  | 45.9      |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 17.0   | 1.0       |                         |      | G1/100  |
| BL   | (0°-30°)    | 45.9   | 2.7       | B0/110                  |      |         |
| BM   | (30°-60°)   | 87.3   | 5.1       | B0/220                  |      |         |
| BH   | (60°-80°)   | 40.8   | 2.4       | B0/110                  |      | G0/110  |
| BVH  | (80°-90°)   | 0.1    | 0.0       |                         |      | G0/10   |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B0-U0-G1**

Type IV Short





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CATALOG NUMBER: ARCH-N-PA1-19-830-24VDC-T4W-HSS

**CANDELA DISTRIBUTION (FULL):**

|       | 0°    | 5°    | 15°    | 25°    | 35°    | 45°    | 46°    | 55°    | 65°    | 75°    | 85°    |
|-------|-------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 170.0 | 170.0 | 170.0  | 170.0  | 170.0  | 170.0  | 170.0  | 170.0  | 170.0  | 170.0  | 170.0  |
| 2.5°  | 188.9 | 188.7 | 187.5  | 187.1  | 184.4  | 182.8  | 182.1  | 180.1  | 177.3  | 174.4  | 171.2  |
| 5°    | 210.4 | 210.3 | 208.2  | 206.2  | 201.1  | 196.4  | 195.5  | 190.9  | 184.4  | 178.4  | 172.3  |
| 7.5°  | 232.3 | 231.3 | 229.2  | 225.4  | 218.0  | 210.4  | 209.7  | 203.1  | 194.0  | 185.2  | 176.6  |
| 10°   | 251.0 | 250.3 | 247.6  | 241.8  | 233.1  | 224.5  | 223.6  | 215.5  | 205.2  | 194.5  | 183.4  |
| 12.5° | 265.4 | 265.0 | 261.4  | 254.1  | 244.9  | 235.9  | 234.7  | 227.6  | 216.5  | 204.5  | 191.4  |
| 15°   | 274.3 | 274.0 | 269.6  | 261.9  | 252.9  | 245.1  | 244.0  | 237.7  | 227.5  | 214.9  | 200.2  |
| 17.5° | 276.3 | 276.4 | 271.9  | 264.1  | 256.6  | 251.0  | 250.2  | 245.5  | 236.9  | 224.4  | 208.9  |
| 20°   | 271.7 | 272.7 | 268.6  | 261.9  | 257.2  | 254.3  | 253.7  | 250.8  | 243.6  | 231.8  | 215.9  |
| 22.5° | 265.2 | 265.7 | 262.9  | 258.4  | 256.4  | 257.0  | 256.7  | 255.1  | 249.0  | 238.1  | 222.9  |
| 25°   | 261.2 | 261.2 | 259.5  | 255.7  | 257.0  | 260.4  | 260.5  | 260.2  | 255.3  | 245.9  | 231.3  |
| 27.5° | 261.1 | 260.6 | 258.7  | 255.8  | 259.3  | 264.6  | 264.9  | 267.0  | 264.0  | 255.4  | 241.8  |
| 30°   | 267.4 | 266.9 | 262.8  | 259.1  | 263.5  | 269.2  | 270.0  | 274.7  | 273.2  | 265.7  | 253.5  |
| 32.5° | 282.3 | 280.3 | 271.3  | 265.2  | 268.5  | 275.3  | 276.3  | 283.8  | 286.2  | 278.3  | 264.8  |
| 35°   | 302.7 | 296.4 | 283.4  | 276.8  | 277.1  | 284.2  | 285.2  | 296.1  | 303.2  | 289.9  | 273.5  |
| 37.5° | 330.8 | 327.7 | 306.6  | 288.9  | 290.3  | 301.1  | 303.9  | 315.8  | 313.8  | 296.3  | 283.5  |
| 40°   | 392.3 | 387.5 | 365.0  | 322.8  | 303.0  | 314.8  | 315.6  | 322.0  | 322.2  | 310.7  | 304.2  |
| 42.5° | 476.2 | 474.2 | 450.6  | 384.3  | 327.9  | 323.9  | 325.5  | 336.2  | 348.3  | 341.1  | 340.8  |
| 45°   | 569.1 | 568.0 | 543.0  | 465.9  | 378.3  | 353.9  | 355.9  | 370.3  | 393.3  | 394.9  | 405.0  |
| 47.5° | 643.8 | 643.3 | 628.9  | 557.0  | 455.4  | 404.8  | 405.4  | 420.7  | 461.1  | 481.1  | 497.2  |
| 50°   | 711.9 | 714.2 | 702.8  | 655.6  | 560.4  | 484.4  | 482.9  | 493.1  | 558.0  | 590.7  | 610.8  |
| 52.5° | 806.6 | 809.8 | 777.9  | 747.6  | 670.6  | 583.2  | 582.0  | 592.7  | 674.5  | 699.0  | 702.6  |
| 55°   | 890.2 | 884.6 | 859.4  | 850.6  | 805.0  | 705.3  | 705.0  | 714.3  | 787.1  | 797.6  | 804.2  |
| 57.5° | 927.1 | 925.0 | 937.1  | 957.2  | 945.7  | 849.5  | 848.8  | 841.7  | 888.0  | 889.1  | 909.4  |
| 60°   | 950.4 | 953.0 | 990.4  | 1052.2 | 1080.7 | 1004.8 | 1000.1 | 956.5  | 984.2  | 981.8  | 1003.5 |
| 62.5° | 932.9 | 938.1 | 1005.2 | 1108.3 | 1181.8 | 1140.3 | 1133.7 | 1061.7 | 1066.5 | 1058.0 | 1078.2 |
| 65°   | 840.0 | 848.0 | 958.1  | 1097.7 | 1231.9 | 1246.2 | 1239.6 | 1154.5 | 1131.8 | 1117.8 | 1106.6 |
| 67.5° | 682.0 | 686.8 | 801.7  | 1005.6 | 1209.3 | 1309.3 | 1308.0 | 1235.9 | 1181.2 | 1107.7 | 1020.7 |
| 69°   | 563.6 | 568.3 | 678.9  | 908.7  | 1159.6 | 1322.9 | 1325.5 | 1262.0 | 1171.8 | 1046.3 | 904.3  |
| 70°   | 477.4 | 482.4 | 585.4  | 825.7  | 1101.9 | 1316.6 | 1321.3 | 1259.5 | 1144.9 | 975.2  | 802.3  |
| 72.5° | 250.4 | 254.7 | 360.4  | 568.8  | 898.3  | 1208.9 | 1223.2 | 1153.1 | 970.5  | 708.2  | 474.4  |
| 75°   | 78.7  | 81.2  | 140.8  | 297.3  | 615.0  | 940.0  | 943.3  | 904.5  | 689.1  | 389.6  | 197.6  |
| 77.5° | 30.0  | 29.3  | 46.9   | 109.6  | 310.9  | 591.9  | 611.9  | 565.2  | 361.6  | 137.7  | 45.6   |
| 80°   | 16.2  | 16.2  | 24.3   | 45.4   | 133.0  | 304.2  | 321.0  | 273.9  | 128.5  | 43.0   | 10.5   |
| 82.5° | 7.0   | 7.3   | 13.7   | 24.0   | 61.1   | 112.2  | 120.6  | 100.4  | 49.1   | 28.9   | 3.9    |
| 85°   | 1.5   | 1.7   | 6.6    | 13.0   | 24.9   | 31.5   | 33.0   | 32.5   | 31.3   | 22.4   | 1.5    |
| 87.5° | 0.0   | 0.0   | 2.9    | 4.7    | 6.3    | 7.2    | 6.3    | 8.2    | 17.3   | 15.1   | 0.8    |
| 90°   | 0.0   | 0.0   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



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CATALOG NUMBER: ARCH-N-PA1-19-830-24VDC-T4W-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°   | 95°   | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 170.0 | 170.0 | 170.0 | 170.0 | 170.0 | 170.0 | 170.0 | 170.0 | 170.0 | 170.0 | 170.0 |
| 2.5°  | 170.2 | 168.8 | 166.3 | 163.6 | 161.7 | 159.7 | 158.1 | 157.4 | 156.6 | 156.0 | 156.7 |
| 5°    | 169.9 | 167.1 | 162.3 | 157.7 | 154.4 | 151.7 | 149.4 | 148.6 | 147.7 | 147.0 | 147.0 |
| 7.5°  | 172.7 | 168.8 | 161.4 | 154.7 | 149.5 | 145.8 | 142.8 | 141.5 | 140.5 | 140.0 | 139.6 |
| 10°   | 178.0 | 173.0 | 163.2 | 154.4 | 147.7 | 141.5 | 134.9 | 129.9 | 126.7 | 125.2 | 124.6 |
| 12.5° | 184.9 | 178.6 | 166.5 | 156.0 | 146.3 | 134.4 | 120.5 | 108.6 | 100.9 | 98.3  | 96.8  |
| 15°   | 193.0 | 185.2 | 170.9 | 158.2 | 141.4 | 119.6 | 96.1  | 80.5  | 73.4  | 71.9  | 70.3  |
| 17.5° | 200.8 | 192.2 | 176.2 | 158.6 | 130.6 | 95.6  | 70.4  | 59.8  | 57.0  | 58.0  | 58.2  |
| 20°   | 207.7 | 199.2 | 181.3 | 155.1 | 110.9 | 71.7  | 54.5  | 51.9  | 52.9  | 54.7  | 55.1  |
| 22.5° | 214.6 | 205.8 | 186.1 | 145.8 | 85.8  | 54.4  | 49.1  | 49.7  | 50.8  | 52.6  | 52.9  |
| 25°   | 223.0 | 214.0 | 190.6 | 128.9 | 64.4  | 46.3  | 46.6  | 47.6  | 48.6  | 50.3  | 50.4  |
| 27.5° | 232.7 | 224.2 | 193.5 | 106.9 | 47.7  | 42.6  | 43.6  | 45.0  | 46.1  | 47.7  | 48.0  |
| 30°   | 245.6 | 237.7 | 194.5 | 84.0  | 40.0  | 39.2  | 39.7  | 41.5  | 43.0  | 44.4  | 44.6  |
| 32.5° | 257.7 | 251.1 | 191.3 | 63.4  | 37.1  | 36.1  | 36.1  | 37.2  | 38.9  | 40.3  | 40.6  |
| 35°   | 268.9 | 264.6 | 181.1 | 46.4  | 34.9  | 33.3  | 32.5  | 32.5  | 33.6  | 34.7  | 35.0  |
| 37.5° | 283.6 | 283.4 | 164.6 | 37.0  | 32.7  | 30.9  | 29.2  | 27.9  | 27.5  | 27.8  | 27.9  |
| 40°   | 308.8 | 309.0 | 143.1 | 33.2  | 30.9  | 28.4  | 25.9  | 23.6  | 21.4  | 20.7  | 20.6  |
| 42.5° | 348.2 | 344.6 | 120.6 | 31.3  | 29.3  | 25.9  | 22.0  | 18.9  | 15.6  | 14.6  | 14.5  |
| 45°   | 410.7 | 389.5 | 96.8  | 29.7  | 27.6  | 23.0  | 18.2  | 14.0  | 11.3  | 10.5  | 10.5  |
| 47.5° | 501.8 | 448.4 | 75.0  | 27.8  | 25.4  | 19.7  | 13.8  | 10.1  | 8.3   | 7.9   | 8.0   |
| 50°   | 596.0 | 506.2 | 57.4  | 25.5  | 22.7  | 16.3  | 10.2  | 7.3   | 6.3   | 6.3   | 6.4   |
| 52.5° | 679.6 | 548.5 | 44.8  | 23.1  | 19.3  | 12.8  | 7.7   | 5.7   | 5.3   | 5.2   | 5.3   |
| 55°   | 757.8 | 575.8 | 34.3  | 20.2  | 15.4  | 9.5   | 5.9   | 4.7   | 4.4   | 4.2   | 4.1   |
| 57.5° | 833.2 | 589.3 | 25.7  | 16.3  | 11.1  | 6.9   | 4.7   | 4.0   | 3.7   | 3.4   | 3.3   |
| 60°   | 883.4 | 578.4 | 17.7  | 12.0  | 7.7   | 5.0   | 3.9   | 3.4   | 3.0   | 2.8   | 2.7   |
| 62.5° | 911.7 | 548.4 | 11.4  | 8.7   | 5.5   | 3.7   | 3.1   | 2.9   | 2.3   | 2.1   | 2.1   |
| 65°   | 900.3 | 498.9 | 8.0   | 6.2   | 4.0   | 2.8   | 2.3   | 2.3   | 1.7   | 1.4   | 1.3   |
| 67.5° | 797.8 | 421.5 | 6.0   | 4.6   | 2.9   | 2.1   | 1.8   | 2.0   | 1.0   | 0.6   | 0.6   |
| 69°   | 686.4 | 349.3 | 5.2   | 3.8   | 2.4   | 1.7   | 1.5   | 1.8   | 0.7   | 0.5   | 0.4   |
| 70°   | 596.6 | 301.3 | 4.7   | 3.3   | 2.0   | 1.4   | 1.4   | 1.8   | 0.7   | 0.4   | 0.3   |
| 72.5° | 356.9 | 168.0 | 3.6   | 2.4   | 1.3   | 1.1   | 1.1   | 2.0   | 0.7   | 0.4   | 0.3   |
| 75°   | 144.3 | 59.2  | 2.6   | 1.7   | 1.0   | 1.0   | 1.4   | 2.5   | 0.6   | 0.3   | 0.2   |
| 77.5° | 32.7  | 13.0  | 1.5   | 1.0   | 0.6   | 1.0   | 1.6   | 2.0   | 0.4   | 0.2   | 0.0   |
| 80°   | 8.0   | 3.2   | 1.0   | 0.6   | 0.4   | 0.7   | 1.2   | 1.1   | 0.1   | 0.0   | 0.0   |
| 82.5° | 2.6   | 1.1   | 0.4   | 0.3   | 0.1   | 0.2   | 0.6   | 0.3   | 0.0   | 0.0   | 0.0   |
| 85°   | 1.1   | 0.6   | 0.2   | 0.1   | 0.0   | 0.0   | 0.1   | 0.0   | 0.0   | 0.0   | 0.0   |
| 87.5° | 0.7   | 0.2   | 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   |

Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

INVUE

Report Number: SP1-2104-224-6

Luminaire Tested: CCW-SA-2A-830-U-SL4

Test Date: 04/27/2021

### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2104-224-6  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 04/27/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: INVUE  
 Catalog Number: **CCW-SA-2A-830-U-SL4**  
 Description: INVUE WALL PACK ClearCurve Light Square

### Spectral Parameters

|                           |        |           |      |      |      |
|---------------------------|--------|-----------|------|------|------|
| CCT (K):                  | 2979   | CRI (Ra): | 83.1 |      |      |
| CIE u':                   | 0.2511 | R1:       | 81.3 | R9:  | 7.1  |
| CIE v':                   | 0.5225 | R2:       | 91.2 | R10: | 80.8 |
| Duv:                      | 0.0005 | R3:       | 96.2 | R11: | 82.0 |
| CIE x:                    | 0.4390 | R4:       | 81.7 | R12: | 76.3 |
| CIE y:                    | 0.4060 | R5:       | 82.0 | R13: | 83.6 |
| CIE z:                    | 0.1550 | R6:       | 90.2 | R14: | 98.4 |
| Peak Wavelength (nm):     | 603    | R7:       | 82.8 |      |      |
| Dominant Wavelength (nm): | 582    | R8:       | 58.9 |      |      |
| Purity:                   | 54     |           |      |      |      |
| Rf:                       | 86     |           |      |      |      |
| Rg:                       | 96.1   |           |      |      |      |



### Test Conditions

Stabilization Time: 78M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.0/47%  
 Sphere Temperature (°C): 24.1

REPORT NUMBER: SP1-2104-224-6

| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 1/31/2021        | 7/31/2021            |
| Power Meter                    | IN0071                | 12/1/2020        | 12/1/2021            |
| AC Power Source                | IN0063                | 12/1/2020        | 12/1/2021            |
| DC Power Source                | IN0208                | 12/1/2020        | 12/1/2021            |
| Sphere Thermometer             | IN0085                | 12/1/2020        | 12/1/2021            |
| Room Thermometer               | IN0046                | 12/1/2020        | 12/1/2021            |

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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 4-step quadrangle

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### Photopic Flux vs. Wavelength



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| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 1540             | 0.0              | 490       | 23715            | 3.4              | 620       | 85792            | 22.3             | 750       | 4198             | 0.0              | 880       | 1529             | 0.0              |
| 365       | 1274             | 0.0              | 495       | 27763            | 5.0              | 625       | 82163            | 18.1             | 755       | 3846             | 0.0              | 885       | 1863             | 0.0              |
| 370       | 1307             | 0.0              | 500       | 32023            | 7.1              | 630       | 76960            | 13.9             | 760       | 3380             | 0.0              | 890       | 2114             | 0.0              |
| 375       | 1612             | 0.0              | 505       | 35605            | 10.0             | 635       | 71512            | 10.7             | 765       | 3174             | 0.0              | 895       | 1695             | 0.0              |
| 380       | 1536             | 0.0              | 510       | 38842            | 13.3             | 640       | 65929            | 7.9              | 770       | 2898             | 0.0              | 900       | 1843             | 0.0              |
| 385       | 1342             | 0.0              | 515       | 41267            | 17.1             | 645       | 60362            | 5.8              | 775       | 2539             | 0.0              | 905       | 1730             | 0.0              |
| 390       | 1278             | 0.0              | 520       | 43140            | 20.9             | 650       | 55010            | 4.0              | 780       | 2473             | 0.0              | 910       | 1325             | 0.0              |
| 395       | 1204             | 0.0              | 525       | 44884            | 24.1             | 655       | 49154            | 2.8              | 785       | 2349             | 0.0              | 915       | 1786             | 0.0              |
| 400       | 1038             | 0.0              | 530       | 46722            | 27.5             | 660       | 44162            | 1.8              | 790       | 1939             | 0.0              | 920       | 2044             | 0.0              |
| 405       | 1061             | 0.0              | 535       | 48254            | 29.9             | 665       | 38916            | 1.2              | 795       | 1859             | 0.0              | 925       | 1947             | 0.0              |
| 410       | 1327             | 0.0              | 540       | 50064            | 32.6             | 670       | 33949            | 0.7              | 800       | 2145             | 0.0              | 930       | 1610             | 0.0              |
| 415       | 1996             | 0.0              | 545       | 52217            | 34.8             | 675       | 29528            | 0.5              | 805       | 1833             | 0.0              | 935       | 2111             | 0.0              |
| 420       | 3268             | 0.0              | 550       | 55198            | 37.5             | 680       | 25626            | 0.3              | 810       | 2023             | 0.0              | 940       | 2657             | 0.0              |
| 425       | 5667             | 0.0              | 555       | 58564            | 40.0             | 685       | 22299            | 0.2              | 815       | 1752             | 0.0              | 945       | 2238             | 0.0              |
| 430       | 9713             | 0.1              | 560       | 62385            | 42.4             | 690       | 19299            | 0.1              | 820       | 1756             | 0.0              | 950       | 2401             | 0.0              |
| 435       | 16063            | 0.2              | 565       | 66522            | 44.2             | 695       | 16488            | 0.1              | 825       | 1713             | 0.0              | 955       | 2656             | 0.0              |
| 440       | 26124            | 0.4              | 570       | 71254            | 46.3             | 700       | 14392            | 0.0              | 830       | 1766             | 0.0              | 960       | 2228             | 0.0              |
| 445       | 38102            | 0.8              | 575       | 75923            | 47.2             | 705       | 12426            | 0.0              | 835       | 1901             | 0.0              | 965       | 2517             | 0.0              |
| 450       | 42175            | 1.1              | 580       | 80516            | 47.8             | 710       | 10953            | 0.0              | 840       | 1722             | 0.0              | 970       | 2476             | 0.0              |
| 455       | 34315            | 1.1              | 585       | 84772            | 47.1             | 715       | 9724             | 0.0              | 845       | 1694             | 0.0              | 975       | 2085             | 0.0              |
| 460       | 26966            | 1.1              | 590       | 88815            | 45.9             | 720       | 8614             | 0.0              | 850       | 1717             | 0.0              | 980       | 1509             | 0.0              |
| 465       | 22504            | 1.2              | 595       | 90846            | 43.1             | 725       | 7544             | 0.0              | 855       | 1853             | 0.0              | 985       | 2241             | 0.0              |
| 470       | 18776            | 1.2              | 600       | 92683            | 39.9             | 730       | 6583             | 0.0              | 860       | 1827             | 0.0              | 990       | 1651             | 0.0              |
| 475       | 16954            | 1.3              | 605       | 93294            | 36.1             | 735       | 5796             | 0.0              | 865       | 1745             | 0.0              | 995       | 1035             | 0.0              |
| 480       | 17815            | 1.7              | 610       | 91814            | 31.5             | 740       | 5170             | 0.0              | 870       | 1690             | 0.0              | 1000      | 2009             | 0.0              |
| 485       | 20300            | 2.4              | 615       | 89370            | 27.0             | 745       | 4593             | 0.0              | 875       | 1834             | 0.0              |           |                  |                  |

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### Scotopic Flux vs. Wavelength



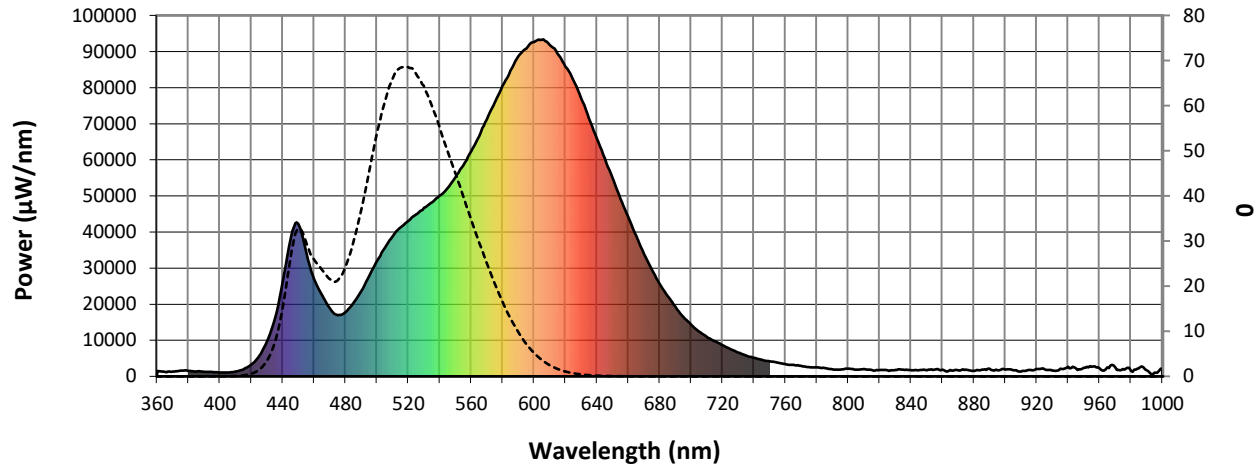
Scotopic Lumens: 6076.4

S/P: 1.34

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 1540             | 0.0              | 490       | 23715            | 36.5             | 620       | 85792            | 1.1              | 750       | 4198             | 0.0              | 880       | 1529             | 0.0              |
| 365       | 1274             | 0.0              | 495       | 27763            | 44.9             | 625       | 82163            | 0.7              | 755       | 3846             | 0.0              | 885       | 1863             | 0.0              |
| 370       | 1307             | 0.0              | 500       | 32023            | 53.6             | 630       | 76960            | 0.4              | 760       | 3380             | 0.0              | 890       | 2114             | 0.0              |
| 375       | 1612             | 0.0              | 505       | 35605            | 60.5             | 635       | 71512            | 0.3              | 765       | 3174             | 0.0              | 895       | 1695             | 0.0              |
| 380       | 1536             | 0.0              | 510       | 38842            | 65.8             | 640       | 65929            | 0.2              | 770       | 2898             | 0.0              | 900       | 1843             | 0.0              |
| 385       | 1342             | 0.0              | 515       | 41267            | 68.4             | 645       | 60362            | 0.1              | 775       | 2539             | 0.0              | 905       | 1730             | 0.0              |
| 390       | 1278             | 0.0              | 520       | 43140            | 68.6             | 650       | 55010            | 0.1              | 780       | 2473             | 0.0              | 910       | 1325             | 0.0              |
| 395       | 1204             | 0.0              | 525       | 44884            | 67.1             | 655       | 49154            | 0.0              | 785       | 2349             | 0.0              | 915       | 1786             | 0.0              |
| 400       | 1038             | 0.0              | 530       | 46722            | 64.4             | 660       | 44162            | 0.0              | 790       | 1939             | 0.0              | 920       | 2044             | 0.0              |
| 405       | 1061             | 0.0              | 535       | 48254            | 60.1             | 665       | 38916            | 0.0              | 795       | 1859             | 0.0              | 925       | 1947             | 0.0              |
| 410       | 1327             | 0.1              | 540       | 50064            | 55.3             | 670       | 33949            | 0.0              | 800       | 2145             | 0.0              | 930       | 1610             | 0.0              |
| 415       | 1996             | 0.2              | 545       | 52217            | 50.1             | 675       | 29528            | 0.0              | 805       | 1833             | 0.0              | 935       | 2111             | 0.0              |
| 420       | 3268             | 0.5              | 550       | 55198            | 45.1             | 680       | 25626            | 0.0              | 810       | 2023             | 0.0              | 940       | 2657             | 0.0              |
| 425       | 5667             | 1.4              | 555       | 58564            | 40.0             | 685       | 22299            | 0.0              | 815       | 1752             | 0.0              | 945       | 2238             | 0.0              |
| 430       | 9713             | 3.3              | 560       | 62385            | 34.9             | 690       | 19299            | 0.0              | 820       | 1756             | 0.0              | 950       | 2401             | 0.0              |
| 435       | 16063            | 7.2              | 565       | 66522            | 29.8             | 695       | 16488            | 0.0              | 825       | 1713             | 0.0              | 955       | 2656             | 0.0              |
| 440       | 26124            | 14.6             | 570       | 71254            | 25.1             | 700       | 14392            | 0.0              | 830       | 1766             | 0.0              | 960       | 2228             | 0.0              |
| 445       | 38102            | 25.5             | 575       | 75923            | 20.7             | 705       | 12426            | 0.0              | 835       | 1901             | 0.0              | 965       | 2517             | 0.0              |
| 450       | 42175            | 32.7             | 580       | 80516            | 16.6             | 710       | 10953            | 0.0              | 840       | 1722             | 0.0              | 970       | 2476             | 0.0              |
| 455       | 34315            | 30.0             | 585       | 84772            | 13.0             | 715       | 9724             | 0.0              | 845       | 1694             | 0.0              | 975       | 2085             | 0.0              |
| 460       | 26966            | 26.0             | 590       | 88815            | 9.9              | 720       | 8614             | 0.0              | 850       | 1717             | 0.0              | 980       | 1509             | 0.0              |
| 465       | 22504            | 23.8             | 595       | 90846            | 7.2              | 725       | 7544             | 0.0              | 855       | 1853             | 0.0              | 985       | 2241             | 0.0              |
| 470       | 18776            | 21.6             | 600       | 92683            | 5.2              | 730       | 6583             | 0.0              | 860       | 1827             | 0.0              | 990       | 1651             | 0.0              |
| 475       | 16954            | 21.2             | 605       | 93294            | 3.7              | 735       | 5796             | 0.0              | 865       | 1745             | 0.0              | 995       | 1035             | 0.0              |
| 480       | 17815            | 24.1             | 610       | 91814            | 2.5              | 740       | 5170             | 0.0              | 870       | 1690             | 0.0              | 1000      | 2009             | 0.0              |
| 485       | 20300            | 29.4             | 615       | 89370            | 1.7              | 745       | 4593             | 0.0              | 875       | 1834             | 0.0              |           |                  |                  |

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### Melanopic Flux vs. Wavelength



Melanopic Lumens: 2300.1

M/P: 0.51

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 1540             | 0.0              | 490       | 23715            | 19.7             | 620       | 85792            | 0.1              | 750       | 4198             | 0.0              | 880       | 1529             | 0.0              |
| 365       | 1274             | 0.0              | 495       | 27763            | 22.9             | 625       | 82163            | 0.0              | 755       | 3846             | 0.0              | 885       | 1863             | 0.0              |
| 370       | 1307             | 0.0              | 500       | 32023            | 25.7             | 630       | 76960            | 0.0              | 760       | 3380             | 0.0              | 890       | 2114             | 0.0              |
| 375       | 1612             | 0.0              | 505       | 35605            | 27.3             | 635       | 71512            | 0.0              | 765       | 3174             | 0.0              | 895       | 1695             | 0.0              |
| 380       | 1536             | 0.0              | 510       | 38842            | 27.9             | 640       | 65929            | 0.0              | 770       | 2898             | 0.0              | 900       | 1843             | 0.0              |
| 385       | 1342             | 0.0              | 515       | 41267            | 27.0             | 645       | 60362            | 0.0              | 775       | 2539             | 0.0              | 905       | 1730             | 0.0              |
| 390       | 1278             | 0.0              | 520       | 43140            | 25.1             | 650       | 55010            | 0.0              | 780       | 2473             | 0.0              | 910       | 1325             | 0.0              |
| 395       | 1204             | 0.0              | 525       | 44884            | 22.8             | 655       | 49154            | 0.0              | 785       | 2349             | 0.0              | 915       | 1786             | 0.0              |
| 400       | 1038             | 0.0              | 530       | 46722            | 20.2             | 660       | 44162            | 0.0              | 790       | 1939             | 0.0              | 920       | 2044             | 0.0              |
| 405       | 1061             | 0.0              | 535       | 48254            | 17.4             | 665       | 38916            | 0.0              | 795       | 1859             | 0.0              | 925       | 1947             | 0.0              |
| 410       | 1327             | 0.1              | 540       | 50064            | 14.7             | 670       | 33949            | 0.0              | 800       | 2145             | 0.0              | 930       | 1610             | 0.0              |
| 415       | 1996             | 0.1              | 545       | 52217            | 12.1             | 675       | 29528            | 0.0              | 805       | 1833             | 0.0              | 935       | 2111             | 0.0              |
| 420       | 3268             | 0.4              | 550       | 55198            | 9.9              | 680       | 25626            | 0.0              | 810       | 2023             | 0.0              | 940       | 2657             | 0.0              |
| 425       | 5667             | 0.9              | 555       | 58564            | 7.9              | 685       | 22299            | 0.0              | 815       | 1752             | 0.0              | 945       | 2238             | 0.0              |
| 430       | 9713             | 2.1              | 560       | 62385            | 6.2              | 690       | 19299            | 0.0              | 820       | 1756             | 0.0              | 950       | 2401             | 0.0              |
| 435       | 16063            | 4.3              | 565       | 66522            | 4.7              | 695       | 16488            | 0.0              | 825       | 1713             | 0.0              | 955       | 2656             | 0.0              |
| 440       | 26124            | 8.7              | 570       | 71254            | 3.5              | 700       | 14392            | 0.0              | 830       | 1766             | 0.0              | 960       | 2228             | 0.0              |
| 445       | 38102            | 15.0             | 575       | 75923            | 2.5              | 705       | 12426            | 0.0              | 835       | 1901             | 0.0              | 965       | 2517             | 0.0              |
| 450       | 42175            | 19.4             | 580       | 80516            | 1.8              | 710       | 10953            | 0.0              | 840       | 1722             | 0.0              | 970       | 2476             | 0.0              |
| 455       | 34315            | 18.0             | 585       | 84772            | 1.3              | 715       | 9724             | 0.0              | 845       | 1694             | 0.0              | 975       | 2085             | 0.0              |
| 460       | 26966            | 15.9             | 590       | 88815            | 0.9              | 720       | 8614             | 0.0              | 850       | 1717             | 0.0              | 980       | 1509             | 0.0              |
| 465       | 22504            | 14.7             | 595       | 90846            | 0.6              | 725       | 7544             | 0.0              | 855       | 1853             | 0.0              | 985       | 2241             | 0.0              |
| 470       | 18776            | 13.4             | 600       | 92683            | 0.4              | 730       | 6583             | 0.0              | 860       | 1827             | 0.0              | 990       | 1651             | 0.0              |
| 475       | 16954            | 12.9             | 605       | 93294            | 0.3              | 735       | 5796             | 0.0              | 865       | 1745             | 0.0              | 995       | 1035             | 0.0              |
| 480       | 17815            | 14.3             | 610       | 91814            | 0.2              | 740       | 5170             | 0.0              | 870       | 1690             | 0.0              | 1000      | 2009             | 0.0              |
| 485       | 20300            | 16.7             | 615       | 89370            | 0.1              | 745       | 4593             | 0.0              | 875       | 1834             | 0.0              |           |                  |                  |

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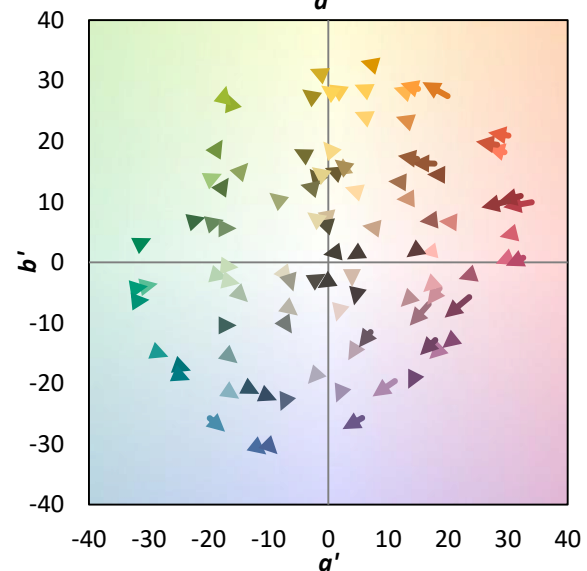
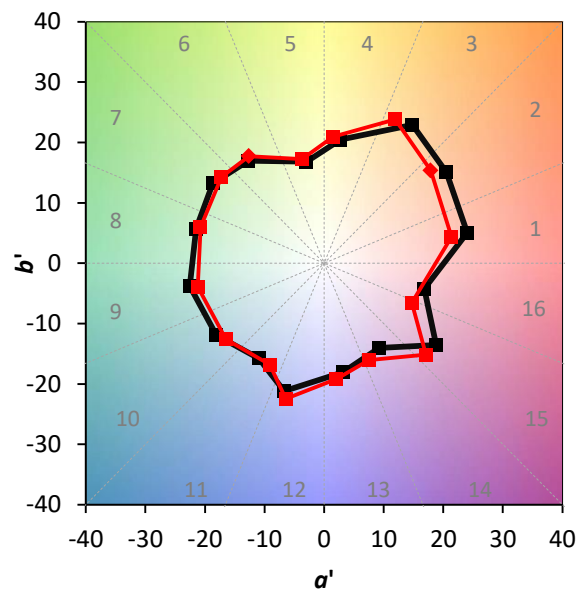
TM-30-18

### Summary

$R_f = 86$   
 $R_g = 96.1$   
 CIE  $R_a = 83.1$   
 $R_9 = 7.1$



### Color Vector Graphics



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 84 | CES51 = 96 | CES76 = 82 |
| CES02 = 63 | CES27 = 96 | CES52 = 95 | CES77 = 86 |
| CES03 = 31 | CES28 = 94 | CES53 = 90 | CES78 = 82 |
| CES04 = 70 | CES29 = 86 | CES54 = 92 | CES79 = 91 |
| CES05 = 50 | CES30 = 92 | CES55 = 92 | CES80 = 90 |
| CES06 = 51 | CES31 = 88 | CES56 = 88 | CES81 = 73 |
| CES07 = 42 | CES32 = 82 | CES57 = 88 | CES82 = 96 |
| CES08 = 41 | CES33 = 90 | CES58 = 89 | CES83 = 94 |
| CES09 = 29 | CES34 = 91 | CES59 = 92 | CES84 = 92 |
| CES10 = 76 | CES35 = 95 | CES60 = 95 | CES85 = 78 |
| CES11 = 59 | CES36 = 92 | CES61 = 90 | CES86 = 68 |
| CES12 = 65 | CES37 = 95 | CES62 = 96 | CES87 = 85 |
| CES13 = 44 | CES38 = 99 | CES63 = 88 | CES88 = 87 |
| CES14 = 74 | CES39 = 98 | CES64 = 85 | CES89 = 76 |
| CES15 = 72 | CES40 = 95 | CES65 = 81 | CES90 = 88 |
| CES16 = 48 | CES41 = 96 | CES66 = 84 | CES91 = 83 |
| CES17 = 50 | CES42 = 96 | CES67 = 83 | CES92 = 67 |
| CES18 = 57 | CES43 = 90 | CES68 = 84 | CES93 = 80 |
| CES19 = 72 | CES44 = 99 | CES69 = 89 | CES94 = 63 |
| CES20 = 67 | CES45 = 93 | CES70 = 82 | CES95 = 76 |
| CES21 = 87 | CES46 = 90 | CES71 = 81 | CES96 = 84 |
| CES22 = 79 | CES47 = 91 | CES72 = 93 | CES97 = 90 |
| CES23 = 92 | CES48 = 84 | CES73 = 77 | CES98 = 85 |
| CES24 = 91 | CES49 = 90 | CES74 = 93 | CES99 = 77 |
| CES25 = 72 | CES50 = 95 | CES75 = 82 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)