

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: McGRAW-EDISON

Report Number: P385601

Luminaire Tested: **GWC-SA1A-830-U-SL2**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P385601  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-20)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GWC-SA1A-830-U-SL2  
Description: GALLEON WALL LUMINAIRE  
(1) 80 CRI, 3000K, 615mA LIGHTSQUARE WITH 16 LEDS AND TYPE II SPILL LIGHT  
ELIMINATOR OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 3873 lumens  
Efficiency: N/A  
Efficacy: 113.9 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.5' x H: 0')  
IES Classification: Type III - Medium  
BUG Rating: B1 - U0 - G2

Input Watts (W): 34  
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: 28.75 FT



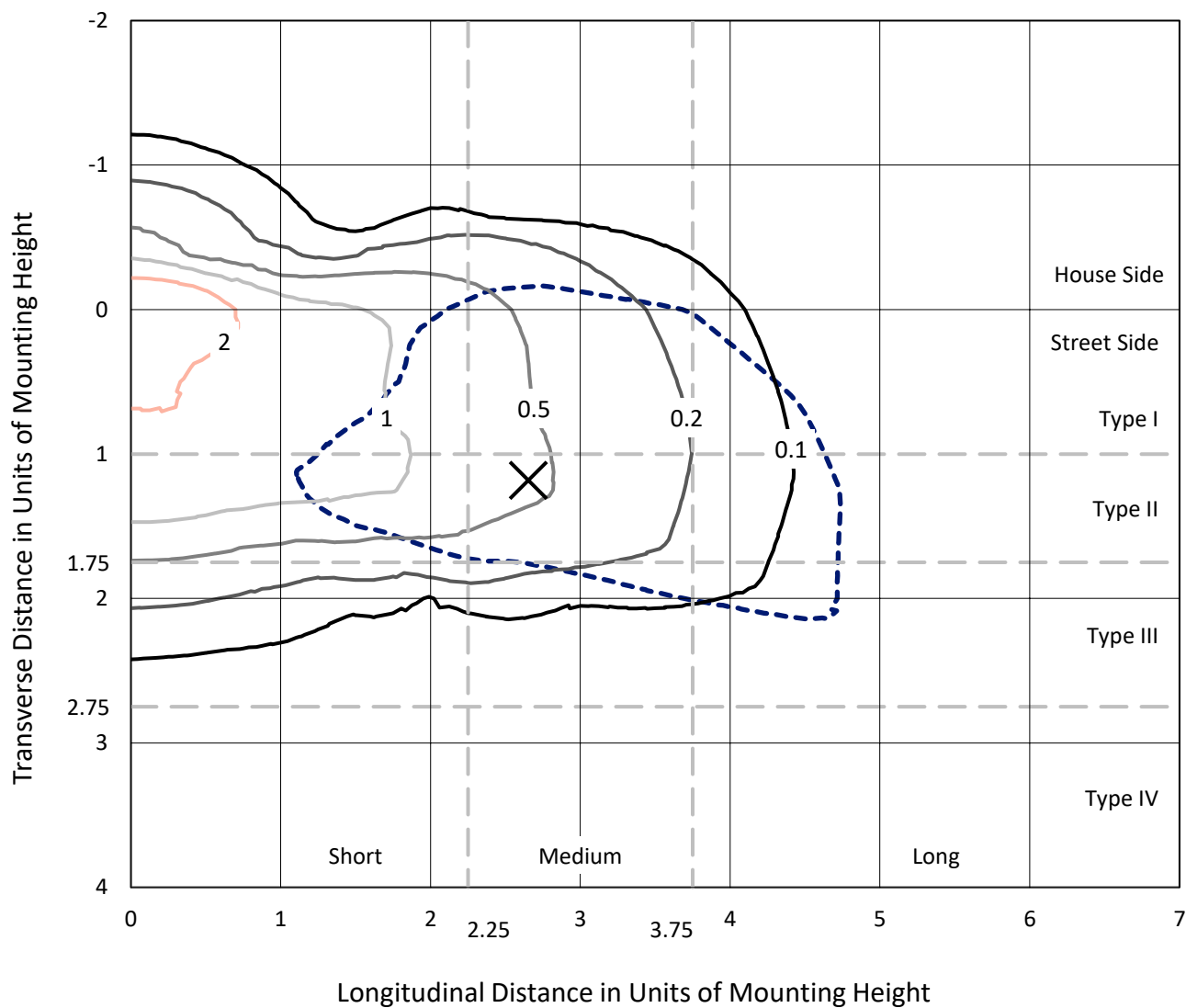
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## Iso-Footcandle Lines of Horizontal Illumination

✕ Max cd

--- 1/2 Max cd

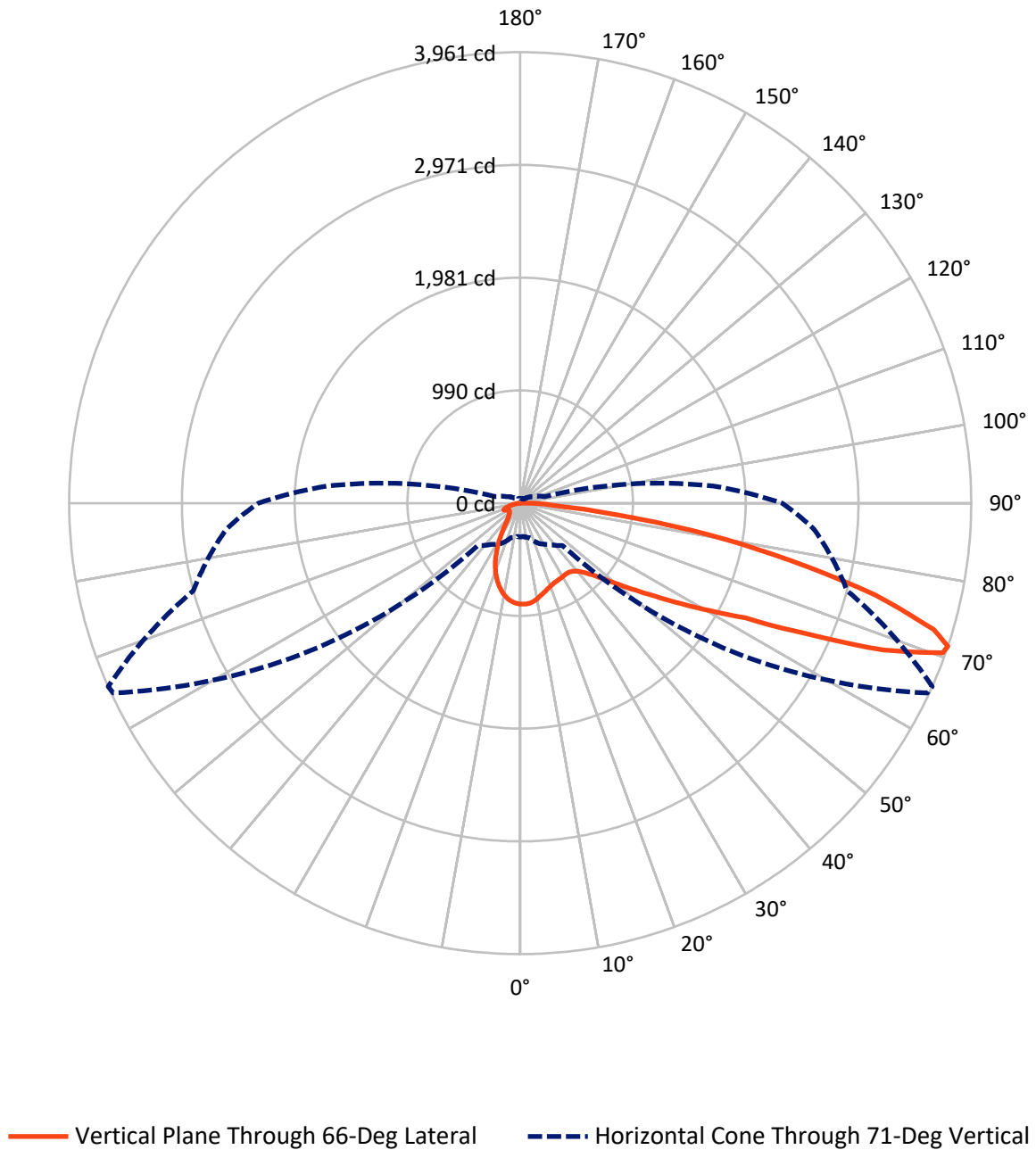


Based on 15 foot mounting height. Maximum calculated value = 3.9 fc  
 Type III - Medium - N/A

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## Luminous Intensity Polar Plot



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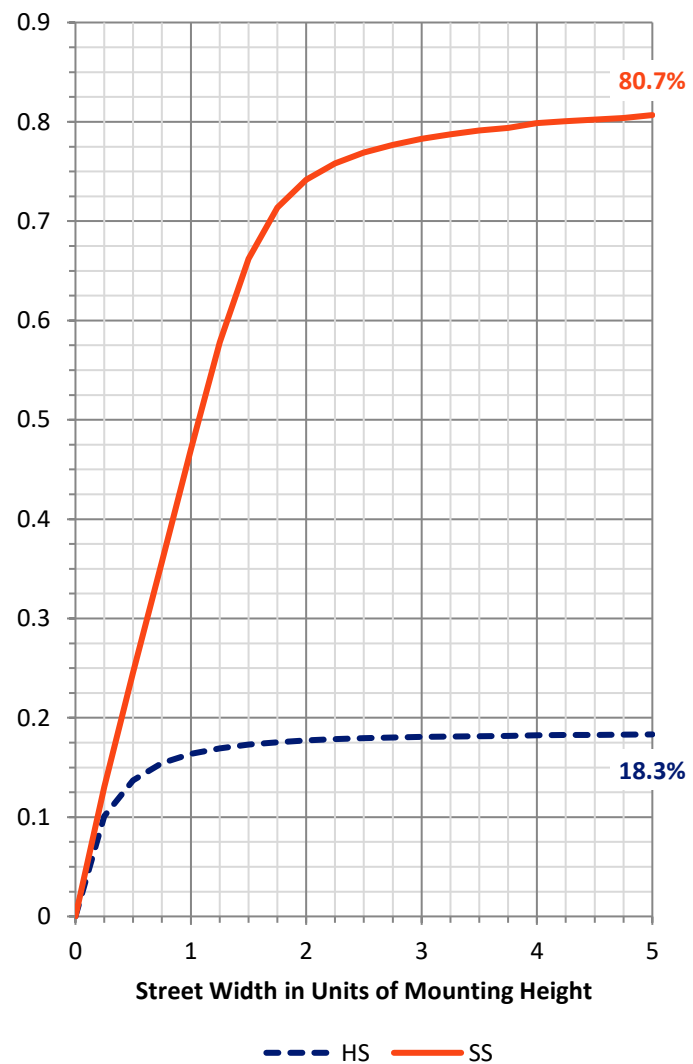
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 717.8    | 0.0    | 717.8  |
|                    | % Fixture | 18.5     | 0.0    | 18.5   |
| <b>Street Side</b> | Lumens    | 3155.2   | 0.0    | 3155.2 |
|                    | % Fixture | 81.5     | 0.0    | 81.5   |
| <b>Total</b>       | Lumens    | 3873.0   | 0.0    | 3873.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 78.1   | 2.0       |
| 10°-20°   | 187.3  | 4.8       |
| 20°-30°   | 251.6  | 6.5       |
| 30°-40°   | 331.0  | 8.5       |
| 40°-50°   | 481.5  | 12.4      |
| 50°-60°   | 752.1  | 19.4      |
| 60°-70°   | 942.2  | 24.3      |
| 70°-80°   | 718.7  | 18.6      |
| 80°-90°   | 130.5  | 3.4       |
| 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°    | 3873.0 | 100.0     |
| 0°-180°   | 3873.0 | 100.0     |

**Coefficient of Utilization**



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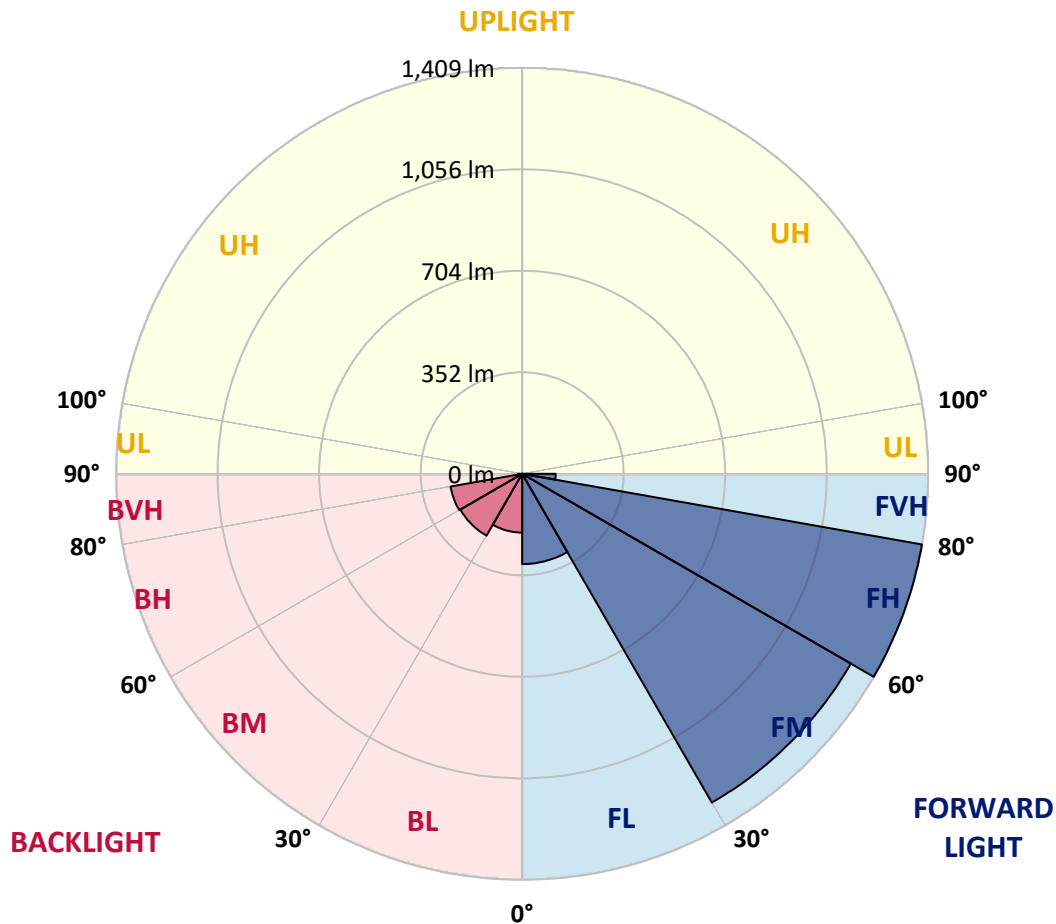
CATALOG NUMBER: GWC-SA1A-830-U-SL2

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 313.2  | 8.1       |                         |      |         |
| FM   | (30°-60°)   | 1317.0 | 34.0      |                         |      |         |
| FH   | (60°-80°)   | 1408.6 | 36.4      |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 116.4  | 3.0       |                         |      | G2/225  |
| BL   | (0°-30°)    | 203.8  | 5.3       | B1/500                  |      |         |
| BM   | (30°-60°)   | 247.6  | 6.4       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 252.2  | 6.5       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 14.1   | 0.4       |                         |      | G1/100  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B1-U0-G2**

Type III Medium



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 66°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 887.2  | 887.2  | 887.2  | 887.2  | 887.2  | 887.2  | 887.2  | 887.2  | 887.2  | 887.2  | 887.2  |
| 2.5°  | 870.8  | 869.4  | 873.5  | 877.6  | 879.2  | 881.9  | 885.9  | 888.2  | 888.0  | 888.4  | 887.1  |
| 5°    | 813.0  | 811.3  | 819.3  | 825.9  | 838.4  | 852.6  | 869.8  | 882.1  | 882.4  | 889.4  | 891.2  |
| 7.5°  | 758.3  | 757.1  | 766.3  | 776.9  | 791.5  | 813.1  | 841.1  | 867.6  | 869.2  | 888.0  | 894.6  |
| 10°   | 714.5  | 714.2  | 723.2  | 734.7  | 751.6  | 775.8  | 807.9  | 846.7  | 849.1  | 881.6  | 895.1  |
| 12.5° | 680.2  | 680.8  | 688.5  | 701.6  | 719.5  | 744.8  | 779.6  | 823.3  | 827.2  | 871.5  | 892.0  |
| 15°   | 655.0  | 657.1  | 663.4  | 676.6  | 694.3  | 719.9  | 755.6  | 801.6  | 807.5  | 860.1  | 890.3  |
| 17.5° | 640.5  | 642.9  | 647.3  | 658.3  | 674.9  | 699.6  | 733.5  | 783.9  | 789.2  | 851.4  | 890.4  |
| 20°   | 636.2  | 638.2  | 640.8  | 647.5  | 661.5  | 684.0  | 715.9  | 767.8  | 773.6  | 844.4  | 891.8  |
| 22.5° | 644.7  | 646.1  | 646.4  | 645.9  | 654.4  | 672.7  | 703.2  | 756.1  | 762.2  | 839.9  | 892.7  |
| 25°   | 662.7  | 664.7  | 663.2  | 658.3  | 655.5  | 666.7  | 696.7  | 748.3  | 754.4  | 836.5  | 890.8  |
| 27.5° | 689.9  | 690.1  | 688.9  | 682.5  | 669.3  | 667.4  | 694.7  | 743.7  | 749.6  | 832.7  | 887.0  |
| 30°   | 726.8  | 728.5  | 726.4  | 717.7  | 696.0  | 678.1  | 697.1  | 739.3  | 744.7  | 827.7  | 880.7  |
| 32.5° | 770.0  | 774.2  | 774.1  | 765.0  | 734.0  | 702.0  | 707.0  | 736.7  | 740.8  | 822.5  | 873.1  |
| 35°   | 814.8  | 820.6  | 831.6  | 827.7  | 789.3  | 739.9  | 726.0  | 740.9  | 743.7  | 821.8  | 867.7  |
| 37.5° | 861.3  | 867.2  | 889.8  | 900.2  | 855.3  | 794.0  | 755.9  | 756.1  | 757.4  | 830.0  | 867.3  |
| 40°   | 910.0  | 916.2  | 950.2  | 977.4  | 940.7  | 862.6  | 804.2  | 787.6  | 786.1  | 850.1  | 875.2  |
| 42.5° | 978.2  | 983.8  | 1024.6 | 1059.2 | 1035.5 | 950.5  | 870.9  | 836.3  | 833.2  | 889.4  | 900.5  |
| 45°   | 1064.4 | 1069.2 | 1112.5 | 1149.6 | 1137.4 | 1050.8 | 954.8  | 903.3  | 902.7  | 954.9  | 951.7  |
| 47.5° | 1167.0 | 1170.7 | 1209.6 | 1245.5 | 1249.9 | 1166.2 | 1060.1 | 1006.6 | 997.9  | 1044.8 | 1031.0 |
| 50°   | 1273.8 | 1278.0 | 1304.4 | 1342.9 | 1375.7 | 1320.6 | 1195.7 | 1133.3 | 1121.6 | 1163.4 | 1143.3 |
| 52.5° | 1344.6 | 1350.0 | 1373.0 | 1421.8 | 1517.2 | 1489.9 | 1356.1 | 1286.8 | 1269.1 | 1307.1 | 1291.7 |
| 55°   | 1313.0 | 1325.3 | 1360.5 | 1438.7 | 1630.3 | 1748.5 | 1553.8 | 1465.8 | 1445.9 | 1477.5 | 1468.4 |
| 57.5° | 1169.5 | 1186.4 | 1234.4 | 1355.1 | 1646.2 | 1976.4 | 1852.8 | 1676.7 | 1662.7 | 1653.6 | 1657.7 |
| 60°   | 907.3  | 923.5  | 983.0  | 1140.4 | 1535.4 | 2142.7 | 2302.8 | 1936.7 | 1916.3 | 1830.4 | 1834.1 |
| 62.5° | 642.1  | 634.0  | 674.7  | 789.9  | 1247.6 | 2162.2 | 2814.8 | 2284.3 | 2217.5 | 2017.0 | 2000.6 |
| 65°   | 489.7  | 487.8  | 506.1  | 542.8  | 755.6  | 1928.6 | 3119.8 | 2868.7 | 2764.3 | 2236.6 | 2197.8 |
| 67.5° | 402.4  | 399.0  | 417.1  | 470.4  | 486.6  | 1244.3 | 3126.5 | 3546.6 | 3444.1 | 2509.9 | 2425.9 |
| 70°   | 330.8  | 327.1  | 343.9  | 412.8  | 449.7  | 631.0  | 2631.3 | 3943.7 | 3938.2 | 2856.0 | 2598.2 |
| 71°   | 296.6  | 293.9  | 314.1  | 390.6  | 441.8  | 525.9  | 2271.9 | 3944.7 | 3961.2 | 2973.1 | 2588.0 |
| 72.5° | 241.5  | 242.4  | 263.8  | 347.7  | 435.9  | 464.4  | 1669.8 | 3760.9 | 3795.6 | 3084.8 | 2495.6 |
| 75°   | 160.5  | 161.3  | 189.3  | 267.4  | 422.7  | 454.4  | 917.7  | 3155.8 | 3219.7 | 3017.9 | 2277.2 |
| 77.5° | 107.8  | 107.5  | 126.6  | 183.5  | 368.3  | 454.4  | 538.1  | 2360.3 | 2430.5 | 2401.3 | 1755.6 |
| 80°   | 74.2   | 73.7   | 87.2   | 126.6  | 278.8  | 459.9  | 416.0  | 1654.1 | 1675.4 | 1296.8 | 713.5  |
| 82.5° | 45.5   | 45.9   | 57.0   | 89.5   | 189.7  | 413.9  | 392.7  | 901.9  | 878.8  | 363.7  | 178.2  |
| 85°   | 26.1   | 25.9   | 36.4   | 60.6   | 121.8  | 349.3  | 383.0  | 388.2  | 356.1  | 109.5  | 64.5   |
| 87.5° | 9.4    | 10.0   | 19.5   | 33.6   | 69.8   | 243.2  | 324.9  | 201.9  | 182.0  | 49.5   | 29.2   |
| 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: GWC-SA1A-830-U-SL2

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 887.2  | 887.2  | 887.2 | 887.2 | 887.2 | 887.2 | 887.2 | 887.2 | 887.2 | 887.2 | 887.2 |
| 2.5°  | 886.2  | 887.0  | 886.0 | 880.7 | 876.1 | 868.8 | 864.6 | 858.9 | 857.1 | 856.3 | 858.5 |
| 5°    | 889.5  | 889.8  | 881.9 | 867.8 | 852.1 | 833.5 | 820.1 | 803.7 | 795.9 | 792.6 | 794.7 |
| 7.5°  | 892.6  | 891.4  | 874.1 | 847.2 | 818.1 | 785.7 | 757.0 | 730.6 | 715.3 | 709.0 | 709.5 |
| 10°   | 893.0  | 887.9  | 860.2 | 818.6 | 773.4 | 726.0 | 681.8 | 641.2 | 615.5 | 598.8 | 603.9 |
| 12.5° | 888.8  | 880.3  | 839.8 | 781.6 | 718.9 | 654.2 | 594.5 | 533.5 | 496.9 | 479.9 | 480.5 |
| 15°   | 885.6  | 870.1  | 814.6 | 738.0 | 653.8 | 568.0 | 486.6 | 414.9 | 375.9 | 358.5 | 350.3 |
| 17.5° | 883.0  | 859.1  | 785.5 | 688.9 | 576.9 | 468.2 | 370.3 | 306.4 | 285.0 | 279.9 | 277.7 |
| 20°   | 879.2  | 847.5  | 753.0 | 632.1 | 489.3 | 356.4 | 270.4 | 238.8 | 239.0 | 244.8 | 245.6 |
| 22.5° | 874.0  | 834.3  | 718.3 | 568.3 | 395.3 | 259.5 | 211.9 | 202.9 | 212.1 | 223.3 | 225.3 |
| 25°   | 866.2  | 818.6  | 679.8 | 497.8 | 301.4 | 199.5 | 181.1 | 180.7 | 191.9 | 203.7 | 205.4 |
| 27.5° | 855.3  | 798.2  | 637.0 | 422.2 | 222.1 | 169.6 | 162.2 | 165.0 | 173.3 | 181.9 | 182.5 |
| 30°   | 840.6  | 774.4  | 589.8 | 342.3 | 174.1 | 151.0 | 150.2 | 152.7 | 157.8 | 163.8 | 164.3 |
| 32.5° | 824.4  | 750.2  | 539.4 | 265.0 | 149.1 | 140.9 | 141.7 | 142.9 | 145.4 | 147.8 | 148.3 |
| 35°   | 809.7  | 725.4  | 487.8 | 201.4 | 137.2 | 134.4 | 133.9 | 133.6 | 133.9 | 133.1 | 133.2 |
| 37.5° | 800.2  | 705.0  | 434.1 | 160.3 | 130.4 | 128.6 | 127.0 | 125.0 | 122.8 | 121.4 | 121.7 |
| 40°   | 796.7  | 689.7  | 379.6 | 138.5 | 124.8 | 123.6 | 120.5 | 116.2 | 113.5 | 112.7 | 112.7 |
| 42.5° | 806.1  | 681.8  | 327.1 | 127.6 | 120.1 | 118.1 | 113.0 | 108.0 | 106.0 | 105.9 | 105.8 |
| 45°   | 834.7  | 685.0  | 277.1 | 121.6 | 115.8 | 111.9 | 105.2 | 101.1 | 99.8  | 100.0 | 99.9  |
| 47.5° | 886.0  | 705.2  | 234.3 | 117.5 | 111.5 | 106.4 | 99.0  | 95.6  | 94.0  | 94.0  | 94.1  |
| 50°   | 973.3  | 752.4  | 200.2 | 114.2 | 107.9 | 101.4 | 94.4  | 90.3  | 88.1  | 88.0  | 88.0  |
| 52.5° | 1100.5 | 837.0  | 178.9 | 111.4 | 103.9 | 96.8  | 89.9  | 84.6  | 82.1  | 81.6  | 81.3  |
| 55°   | 1259.9 | 958.1  | 173.0 | 109.5 | 98.6  | 91.9  | 84.4  | 79.2  | 76.4  | 75.2  | 75.0  |
| 57.5° | 1438.2 | 1105.5 | 184.7 | 107.2 | 93.1  | 86.0  | 78.4  | 73.4  | 70.5  | 69.0  | 68.9  |
| 60°   | 1618.5 | 1266.3 | 232.1 | 104.0 | 88.5  | 79.6  | 72.2  | 67.7  | 64.7  | 63.1  | 62.8  |
| 62.5° | 1799.2 | 1435.9 | 329.1 | 103.8 | 85.3  | 73.4  | 65.9  | 62.0  | 59.2  | 57.5  | 57.1  |
| 65°   | 2003.0 | 1621.5 | 439.3 | 110.9 | 84.2  | 67.8  | 59.5  | 56.4  | 54.0  | 52.4  | 52.3  |
| 67.5° | 2237.0 | 1831.0 | 428.7 | 125.4 | 87.9  | 62.7  | 53.5  | 51.1  | 49.3  | 48.0  | 47.9  |
| 70°   | 2346.8 | 1798.3 | 266.5 | 135.7 | 92.9  | 57.8  | 47.7  | 46.0  | 44.7  | 43.7  | 43.3  |
| 71°   | 2300.8 | 1707.5 | 223.4 | 134.5 | 92.4  | 55.6  | 45.5  | 44.1  | 42.8  | 42.0  | 41.6  |
| 72.5° | 2175.3 | 1557.2 | 186.4 | 125.2 | 86.4  | 51.7  | 42.5  | 41.2  | 40.0  | 39.0  | 38.8  |
| 75°   | 1952.0 | 1390.7 | 149.2 | 100.0 | 68.9  | 43.7  | 37.3  | 35.8  | 34.9  | 34.4  | 33.8  |
| 77.5° | 1434.9 | 992.5  | 115.4 | 79.0  | 50.7  | 35.7  | 31.8  | 30.8  | 29.8  | 29.0  | 28.6  |
| 80°   | 549.7  | 384.4  | 77.7  | 59.0  | 37.2  | 28.2  | 25.7  | 25.1  | 24.2  | 23.7  | 23.7  |
| 82.5° | 148.0  | 114.9  | 41.5  | 35.7  | 24.9  | 20.6  | 19.7  | 19.4  | 18.6  | 17.5  | 17.7  |
| 85°   | 59.9   | 50.7   | 23.3  | 19.7  | 15.2  | 12.2  | 13.2  | 13.4  | 12.4  | 11.1  | 11.2  |
| 87.5° | 26.3   | 21.5   | 13.0  | 8.7   | 6.7   | 4.7   | 6.0   | 6.0   | 5.5   | 4.5   | 4.1   |
| 90°   | 0.0    | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |

LM-79-08: Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

INVUE

Report Number: SP1-2012-088-3

Luminaire Tested: WIS-SA-830-2D-U-SL4

Test Date: 01/11/2021

### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2012-088-3  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 01/11/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: INVUE  
 Catalog Number: **WIS-SA-830-2D-U-SL4**  
 Description: INVUE. WALL PACK LIGHT SQUARE SL4 OPTICS 2-SQUARE.

### Spectral Parameters

|                           |        |           |      |      |      |
|---------------------------|--------|-----------|------|------|------|
| CCT (K):                  | 3049   | CRI (Ra): | 81.7 |      |      |
| CIE u':                   | 0.2482 | R1:       | 79.6 | R9:  | 1.9  |
| CIE v':                   | 0.5224 | R2:       | 90.6 | R10: | 79.3 |
| Duv:                      | 0.0015 | R3:       | 95.7 | R11: | 78.7 |
| CIE x:                    | 0.4354 | R4:       | 79.4 | R12: | 72.2 |
| CIE y:                    | 0.4072 | R5:       | 80.2 | R13: | 82.2 |
| CIE z:                    | 0.1574 | R6:       | 89.0 | R14: | 98.1 |
| Peak Wavelength (nm):     | 601    | R7:       | 82.2 |      |      |
| Dominant Wavelength (nm): | 582    | R8:       | 57.0 |      |      |
| Purity:                   | 53     |           |      |      |      |
| Rf:                       | 85.1   |           |      |      |      |
| Rg:                       | 94.3   |           |      |      |      |



### Test Conditions

Stabilization Time: 83M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.6/29%  
 Sphere Temperature (°C): 25.6

REPORT NUMBER: SP1-2012-088-3

| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 7/29/2020        | 1/29/2021            |
| 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            |

REPORT NUMBER: SP1-2012-088-3

**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

REPORT NUMBER: SP1-2012-088-3

### Photopic Flux vs. Wavelength

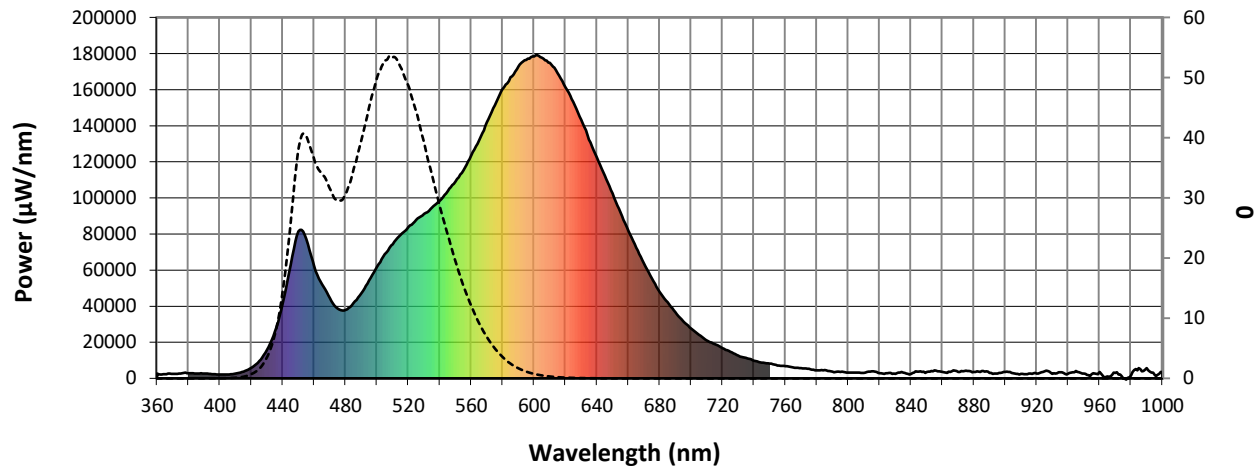


#####

| 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       | 2750             | 0.0              | 490       | 47173            | 6.7              | 620       | 161309           | 42.0             | 750       | 8155             | 0.0              | 880       | 3493             | 0.0              |
| 365       | 2250             | 0.0              | 495       | 54281            | 9.8              | 625       | 153301           | 33.8             | 755       | 7110             | 0.0              | 885       | 4023             | 0.0              |
| 370       | 2449             | 0.0              | 500       | 61837            | 13.6             | 630       | 143292           | 25.9             | 760       | 6829             | 0.0              | 890       | 2983             | 0.0              |
| 375       | 2752             | 0.0              | 505       | 68833            | 19.3             | 635       | 132368           | 19.9             | 765       | 6022             | 0.0              | 895       | 2605             | 0.0              |
| 380       | 2834             | 0.0              | 510       | 74324            | 25.5             | 640       | 122334           | 14.6             | 770       | 5682             | 0.0              | 900       | 3576             | 0.0              |
| 385       | 2613             | 0.0              | 515       | 79410            | 32.9             | 645       | 112200           | 10.8             | 775       | 5247             | 0.0              | 905       | 2786             | 0.0              |
| 390       | 2589             | 0.0              | 520       | 83815            | 40.6             | 650       | 102448           | 7.5              | 780       | 4493             | 0.0              | 910       | 2480             | 0.0              |
| 395       | 2344             | 0.0              | 525       | 87774            | 47.1             | 655       | 91886            | 5.3              | 785       | 4667             | 0.0              | 915       | 2633             | 0.0              |
| 400       | 2067             | 0.0              | 530       | 91247            | 53.7             | 660       | 81865            | 3.4              | 790       | 3736             | 0.0              | 920       | 2726             | 0.0              |
| 405       | 2087             | 0.0              | 535       | 94694            | 58.7             | 665       | 72448            | 2.3              | 795       | 3568             | 0.0              | 925       | 3905             | 0.0              |
| 410       | 2663             | 0.0              | 540       | 98431            | 64.1             | 670       | 63654            | 1.4              | 800       | 3190             | 0.0              | 930       | 2414             | 0.0              |
| 415       | 3760             | 0.0              | 545       | 103765           | 69.1             | 675       | 55284            | 0.9              | 805       | 3215             | 0.0              | 935       | 3414             | 0.0              |
| 420       | 5815             | 0.0              | 550       | 109130           | 74.2             | 680       | 47949            | 0.6              | 810       | 3108             | 0.0              | 940       | 2725             | 0.0              |
| 425       | 9591             | 0.1              | 555       | 115271           | 78.7             | 685       | 42173            | 0.4              | 815       | 3889             | 0.0              | 945       | 4070             | 0.0              |
| 430       | 15806            | 0.1              | 560       | 123390           | 83.9             | 690       | 36755            | 0.2              | 820       | 2869             | 0.0              | 950       | 2640             | 0.0              |
| 435       | 26035            | 0.3              | 565       | 131926           | 87.7             | 695       | 31630            | 0.1              | 825       | 2776             | 0.0              | 955       | 2231             | 0.0              |
| 440       | 41509            | 0.7              | 570       | 141815           | 92.2             | 700       | 27642            | 0.1              | 830       | 2538             | 0.0              | 960       | 3598             | 0.0              |
| 445       | 62857            | 1.3              | 575       | 151359           | 94.2             | 705       | 24213            | 0.1              | 835       | 3283             | 0.0              | 965       | 1098             | 0.0              |
| 450       | 81434            | 2.1              | 580       | 160364           | 95.3             | 710       | 21007            | 0.0              | 840       | 2477             | 0.0              | 970       | 3057             | 0.0              |
| 455       | 77103            | 2.6              | 585       | 166836           | 92.7             | 715       | 18986            | 0.0              | 845       | 3781             | 0.0              | 975       | 152              | 0.0              |
| 460       | 62408            | 2.6              | 590       | 172885           | 89.4             | 720       | 16766            | 0.0              | 850       | 3525             | 0.0              | 980       | 1629             | 0.0              |
| 465       | 52134            | 2.7              | 595       | 176548           | 83.7             | 725       | 14792            | 0.0              | 855       | 4413             | 0.0              | 985       | 5600             | 0.0              |
| 470       | 44297            | 2.8              | 600       | 178427           | 76.9             | 730       | 12553            | 0.0              | 860       | 3598             | 0.0              | 990       | 5671             | 0.0              |
| 475       | 38679            | 3.0              | 605       | 177729           | 68.8             | 735       | 11291            | 0.0              | 865       | 3617             | 0.0              | 995       | 1881             | 0.0              |
| 480       | 38032            | 3.6              | 610       | 174846           | 60.1             | 740       | 9818             | 0.0              | 870       | 3567             | 0.0              | 1000      | 3484             | 0.0              |
| 485       | 41652            | 4.9              | 615       | 169274           | 51.1             | 745       | 8656             | 0.0              | 875       | 4346             | 0.0              |           |                  |                  |

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### Scotopic Flux vs. Wavelength



Scotopic Lumens: 4584.8

S/P: 0.52

| 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       | 2750             | 0.0              | 490       | 47173            | 72.6             | 620       | 161309           | 2.0              | 750       | 8155             | 0.0              | 880       | 3493             | 0.0              |
| 365       | 2250             | 0.0              | 495       | 54281            | 87.7             | 625       | 153301           | 1.3              | 755       | 7110             | 0.0              | 885       | 4023             | 0.0              |
| 370       | 2449             | 0.0              | 500       | 61837            | 103.4            | 630       | 143292           | 0.8              | 760       | 6829             | 0.0              | 890       | 2983             | 0.0              |
| 375       | 2752             | 0.0              | 505       | 68833            | 117.0            | 635       | 132368           | 0.5              | 765       | 6022             | 0.0              | 895       | 2605             | 0.0              |
| 380       | 2834             | 0.0              | 510       | 74324            | 126.0            | 640       | 122334           | 0.3              | 770       | 5682             | 0.0              | 900       | 3576             | 0.0              |
| 385       | 2613             | 0.0              | 515       | 79410            | 131.6            | 645       | 112200           | 0.2              | 775       | 5247             | 0.0              | 905       | 2786             | 0.0              |
| 390       | 2589             | 0.0              | 520       | 83815            | 133.2            | 650       | 102448           | 0.1              | 780       | 4493             | 0.0              | 910       | 2480             | 0.0              |
| 395       | 2344             | 0.0              | 525       | 87774            | 131.3            | 655       | 91886            | 0.1              | 785       | 4667             | 0.0              | 915       | 2633             | 0.0              |
| 400       | 2067             | 0.0              | 530       | 91247            | 125.8            | 660       | 81865            | 0.0              | 790       | 3736             | 0.0              | 920       | 2726             | 0.0              |
| 405       | 2087             | 0.1              | 535       | 94694            | 118.0            | 665       | 72448            | 0.0              | 795       | 3568             | 0.0              | 925       | 3905             | 0.0              |
| 410       | 2663             | 0.2              | 540       | 98431            | 108.8            | 670       | 63654            | 0.0              | 800       | 3190             | 0.0              | 930       | 2414             | 0.0              |
| 415       | 3760             | 0.4              | 545       | 103765           | 99.5             | 675       | 55284            | 0.0              | 805       | 3215             | 0.0              | 935       | 3414             | 0.0              |
| 420       | 5815             | 1.0              | 550       | 109130           | 89.2             | 680       | 47949            | 0.0              | 810       | 3108             | 0.0              | 940       | 2725             | 0.0              |
| 425       | 9591             | 2.3              | 555       | 115271           | 78.8             | 685       | 42173            | 0.0              | 815       | 3889             | 0.0              | 945       | 4070             | 0.0              |
| 430       | 15806            | 5.4              | 560       | 123390           | 69.0             | 690       | 36755            | 0.0              | 820       | 2869             | 0.0              | 950       | 2640             | 0.0              |
| 435       | 26035            | 11.6             | 565       | 131926           | 59.2             | 695       | 31630            | 0.0              | 825       | 2776             | 0.0              | 955       | 2231             | 0.0              |
| 440       | 41509            | 23.2             | 570       | 141815           | 50.0             | 700       | 27642            | 0.0              | 830       | 2538             | 0.0              | 960       | 3598             | 0.0              |
| 445       | 62857            | 42.1             | 575       | 151359           | 41.2             | 705       | 24213            | 0.0              | 835       | 3283             | 0.0              | 965       | 1098             | 0.0              |
| 450       | 81434            | 63.1             | 580       | 160364           | 33.0             | 710       | 21007            | 0.0              | 840       | 2477             | 0.0              | 970       | 3057             | 0.0              |
| 455       | 77103            | 67.4             | 585       | 166836           | 25.5             | 715       | 18986            | 0.0              | 845       | 3781             | 0.0              | 975       | 152              | 0.0              |
| 460       | 62408            | 60.3             | 590       | 172885           | 19.3             | 720       | 16766            | 0.0              | 850       | 3525             | 0.0              | 980       | 1629             | 0.0              |
| 465       | 52134            | 55.1             | 595       | 176548           | 14.1             | 725       | 14792            | 0.0              | 855       | 4413             | 0.0              | 985       | 5600             | 0.0              |
| 470       | 44297            | 51.0             | 600       | 178427           | 10.1             | 730       | 12553            | 0.0              | 860       | 3598             | 0.0              | 990       | 5671             | 0.0              |
| 475       | 38679            | 48.4             | 605       | 177729           | 7.0              | 735       | 11291            | 0.0              | 865       | 3617             | 0.0              | 995       | 1881             | 0.0              |
| 480       | 38032            | 51.4             | 610       | 174846           | 4.7              | 740       | 9818             | 0.0              | 870       | 3567             | 0.0              | 1000      | 3484             | 0.0              |
| 485       | 41652            | 60.4             | 615       | 169274           | 3.1              | 745       | 8656             | 0.0              | 875       | 4346             | 0.0              |           |                  |                  |

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### Melanopic Flux vs. Wavelength


**Melanopic Lumens: 12033.4 S/P: 1.36**

| 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       | 2750             | 0.0              | 490       | 47173            | 39.3             | 620       | 161309           | 0.1              | 750       | 8155             | 0.0              | 880       | 3493             | 0.0              |
| 365       | 2250             | 0.0              | 495       | 54281            | 44.8             | 625       | 153301           | 0.1              | 755       | 7110             | 0.0              | 885       | 4023             | 0.0              |
| 370       | 2449             | 0.0              | 500       | 61837            | 49.7             | 630       | 143292           | 0.0              | 760       | 6829             | 0.0              | 890       | 2983             | 0.0              |
| 375       | 2752             | 0.0              | 505       | 68833            | 52.8             | 635       | 132368           | 0.0              | 765       | 6022             | 0.0              | 895       | 2605             | 0.0              |
| 380       | 2834             | 0.0              | 510       | 74324            | 53.4             | 640       | 122334           | 0.0              | 770       | 5682             | 0.0              | 900       | 3576             | 0.0              |
| 385       | 2613             | 0.0              | 515       | 79410            | 51.9             | 645       | 112200           | 0.0              | 775       | 5247             | 0.0              | 905       | 2786             | 0.0              |
| 390       | 2589             | 0.0              | 520       | 83815            | 48.8             | 650       | 102448           | 0.0              | 780       | 4493             | 0.0              | 910       | 2480             | 0.0              |
| 395       | 2344             | 0.0              | 525       | 87774            | 44.5             | 655       | 91886            | 0.0              | 785       | 4667             | 0.0              | 915       | 2633             | 0.0              |
| 400       | 2067             | 0.0              | 530       | 91247            | 39.4             | 660       | 81865            | 0.0              | 790       | 3736             | 0.0              | 920       | 2726             | 0.0              |
| 405       | 2087             | 0.0              | 535       | 94694            | 34.1             | 665       | 72448            | 0.0              | 795       | 3568             | 0.0              | 925       | 3905             | 0.0              |
| 410       | 2663             | 0.1              | 540       | 98431            | 28.8             | 670       | 63654            | 0.0              | 800       | 3190             | 0.0              | 930       | 2414             | 0.0              |
| 415       | 3760             | 0.2              | 545       | 103765           | 24.1             | 675       | 55284            | 0.0              | 805       | 3215             | 0.0              | 935       | 3414             | 0.0              |
| 420       | 5815             | 0.7              | 550       | 109130           | 19.6             | 680       | 47949            | 0.0              | 810       | 3108             | 0.0              | 940       | 2725             | 0.0              |
| 425       | 9591             | 1.5              | 555       | 115271           | 15.5             | 685       | 42173            | 0.0              | 815       | 3889             | 0.0              | 945       | 4070             | 0.0              |
| 430       | 15806            | 3.3              | 560       | 123390           | 12.2             | 690       | 36755            | 0.0              | 820       | 2869             | 0.0              | 950       | 2640             | 0.0              |
| 435       | 26035            | 6.9              | 565       | 131926           | 9.3              | 695       | 31630            | 0.0              | 825       | 2776             | 0.0              | 955       | 2231             | 0.0              |
| 440       | 41509            | 13.9             | 570       | 141815           | 6.9              | 700       | 27642            | 0.0              | 830       | 2538             | 0.0              | 960       | 3598             | 0.0              |
| 445       | 62857            | 24.8             | 575       | 151359           | 5.0              | 705       | 24213            | 0.0              | 835       | 3283             | 0.0              | 965       | 1098             | 0.0              |
| 450       | 81434            | 37.5             | 580       | 160364           | 3.6              | 710       | 21007            | 0.0              | 840       | 2477             | 0.0              | 970       | 3057             | 0.0              |
| 455       | 77103            | 40.4             | 585       | 166836           | 2.5              | 715       | 18986            | 0.0              | 845       | 3781             | 0.0              | 975       | 152              | 0.0              |
| 460       | 62408            | 36.8             | 590       | 172885           | 1.7              | 720       | 16766            | 0.0              | 850       | 3525             | 0.0              | 980       | 1629             | 0.0              |
| 465       | 52134            | 34.1             | 595       | 176548           | 1.1              | 725       | 14792            | 0.0              | 855       | 4413             | 0.0              | 985       | 5600             | 0.0              |
| 470       | 44297            | 31.7             | 600       | 178427           | 0.8              | 730       | 12553            | 0.0              | 860       | 3598             | 0.0              | 990       | 5671             | 0.0              |
| 475       | 38679            | 29.5             | 605       | 177729           | 0.5              | 735       | 11291            | 0.0              | 865       | 3617             | 0.0              | 995       | 1881             | 0.0              |
| 480       | 38032            | 30.6             | 610       | 174846           | 0.3              | 740       | 9818             | 0.0              | 870       | 3567             | 0.0              | 1000      | 3484             | 0.0              |
| 485       | 41652            | 34.3             | 615       | 169274           | 0.2              | 745       | 8656             | 0.0              | 875       | 4346             | 0.0              |           |                  |                  |

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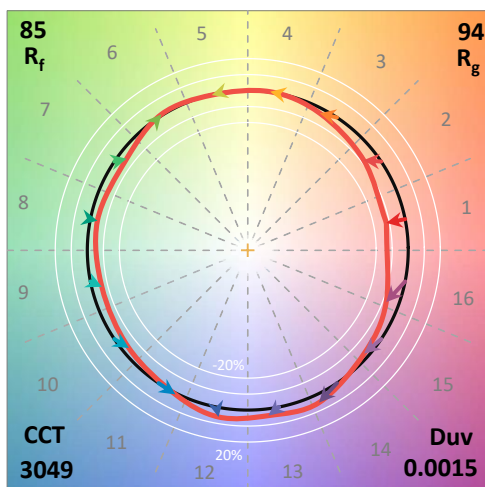
TM-30-18

### Summary

$R_f = 85.1$   
 $R_g = 94.3$   
 CIE  $R_a = 81.7$   
 $R_g = 1.9$



### Color Vector Graphics



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 85 | CES51 = 93 | CES76 = 82 |
| CES02 = 63 | CES27 = 94 | CES52 = 93 | CES77 = 85 |
| CES03 = 31 | CES28 = 95 | CES53 = 89 | CES78 = 82 |
| CES04 = 70 | CES29 = 90 | CES54 = 90 | CES79 = 91 |
| CES05 = 49 | CES30 = 96 | CES55 = 89 | CES80 = 90 |
| CES06 = 51 | CES31 = 91 | CES56 = 86 | CES81 = 72 |
| CES07 = 42 | CES32 = 85 | CES57 = 85 | CES82 = 96 |
| CES08 = 41 | CES33 = 95 | CES58 = 86 | CES83 = 95 |
| CES09 = 29 | CES34 = 92 | CES59 = 91 | CES84 = 92 |
| CES10 = 76 | CES35 = 96 | CES60 = 92 | CES85 = 77 |
| CES11 = 59 | CES36 = 87 | CES61 = 88 | CES86 = 68 |
| CES12 = 65 | CES37 = 96 | CES62 = 90 | CES87 = 84 |
| CES13 = 43 | CES38 = 94 | CES63 = 88 | CES88 = 87 |
| CES14 = 74 | CES39 = 98 | CES64 = 81 | CES89 = 75 |
| CES15 = 71 | CES40 = 96 | CES65 = 79 | CES90 = 88 |
| CES16 = 47 | CES41 = 97 | CES66 = 80 | CES91 = 79 |
| CES17 = 50 | CES42 = 98 | CES67 = 78 | CES92 = 65 |
| CES18 = 56 | CES43 = 92 | CES68 = 82 | CES93 = 78 |
| CES19 = 72 | CES44 = 99 | CES69 = 87 | CES94 = 61 |
| CES20 = 66 | CES45 = 93 | CES70 = 80 | CES95 = 74 |
| CES21 = 87 | CES46 = 90 | CES71 = 77 | CES96 = 83 |
| CES22 = 79 | CES47 = 95 | CES72 = 92 | CES97 = 88 |
| CES23 = 92 | CES48 = 84 | CES73 = 75 | CES98 = 84 |
| CES24 = 91 | CES49 = 91 | CES74 = 92 | CES99 = 75 |
| CES25 = 72 | CES50 = 94 | CES75 = 80 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)