

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: P387033

Luminaire Tested: **GWC-SA2D-730-U-SL4**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P387033  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-24)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GWC-SA2D-730-U-SL4  
Description: GALLEON WALL LUMINAIRE  
(2) 70 CRI, 3000K, 1200mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE IV  
SPILL LIGHT ELIMINATOR OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 14012 lumens  
Efficiency: N/A  
Efficacy: 108.6 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 0.5' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B2 - U0 - G4

Input Watts (W): 129  
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

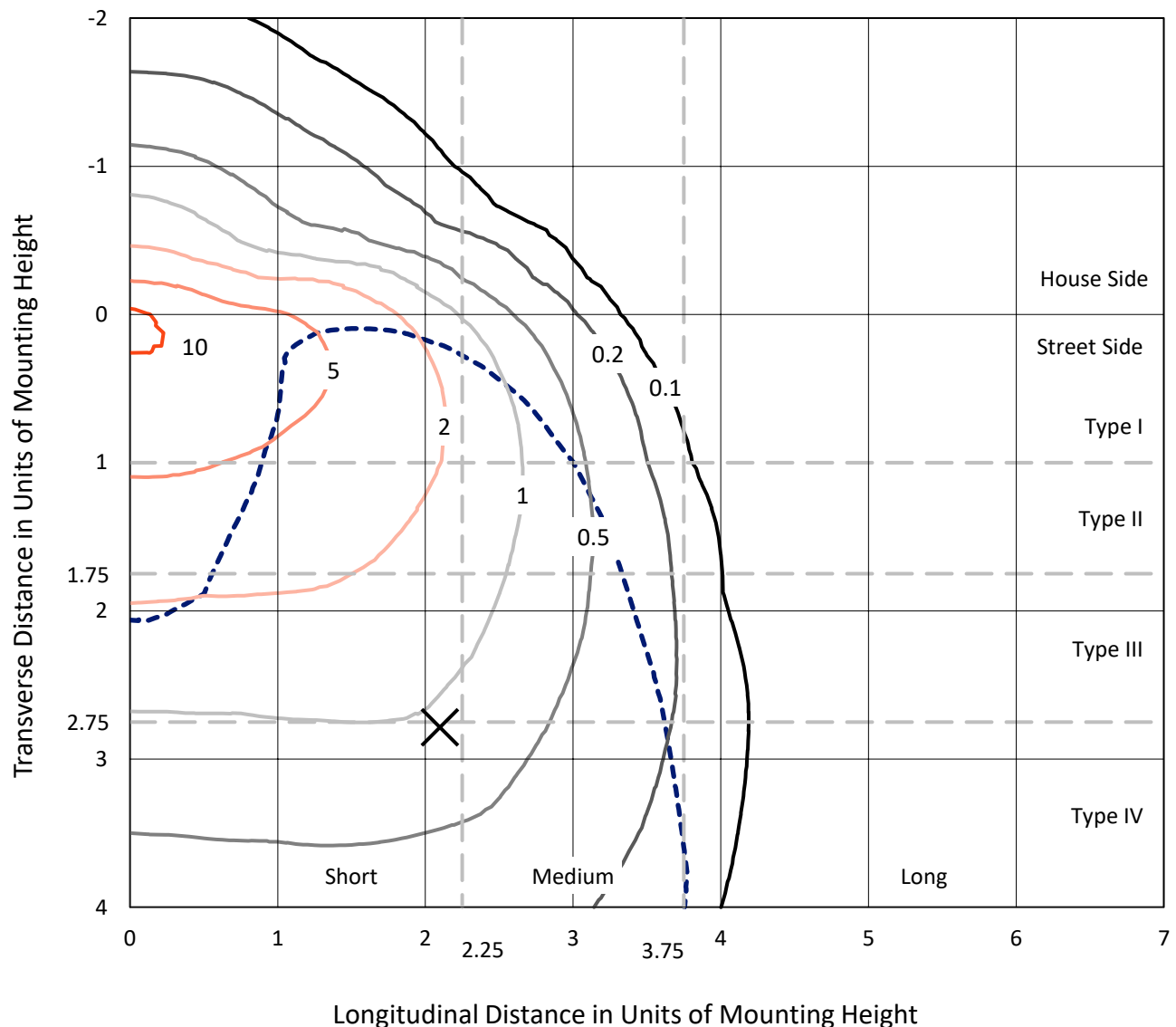


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## Iso-Footcandle Lines of Horizontal Illumination

× Max cd  
 - - - 1/2 Max cd

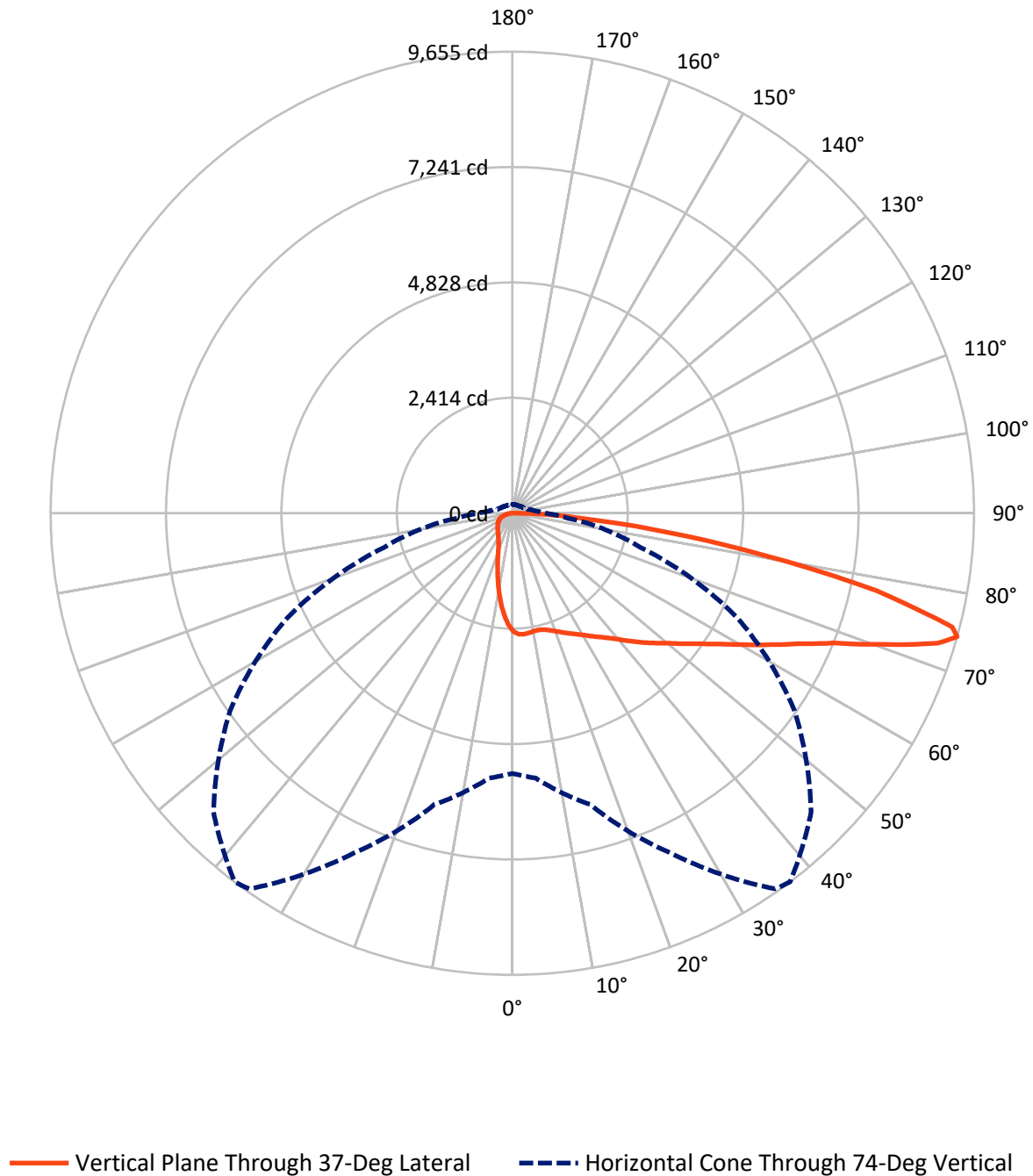


Based on 15 foot mounting height. Maximum calculated value = 11.2 fc  
 Type IV - Short - N/A

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## Luminous Intensity Polar Plot



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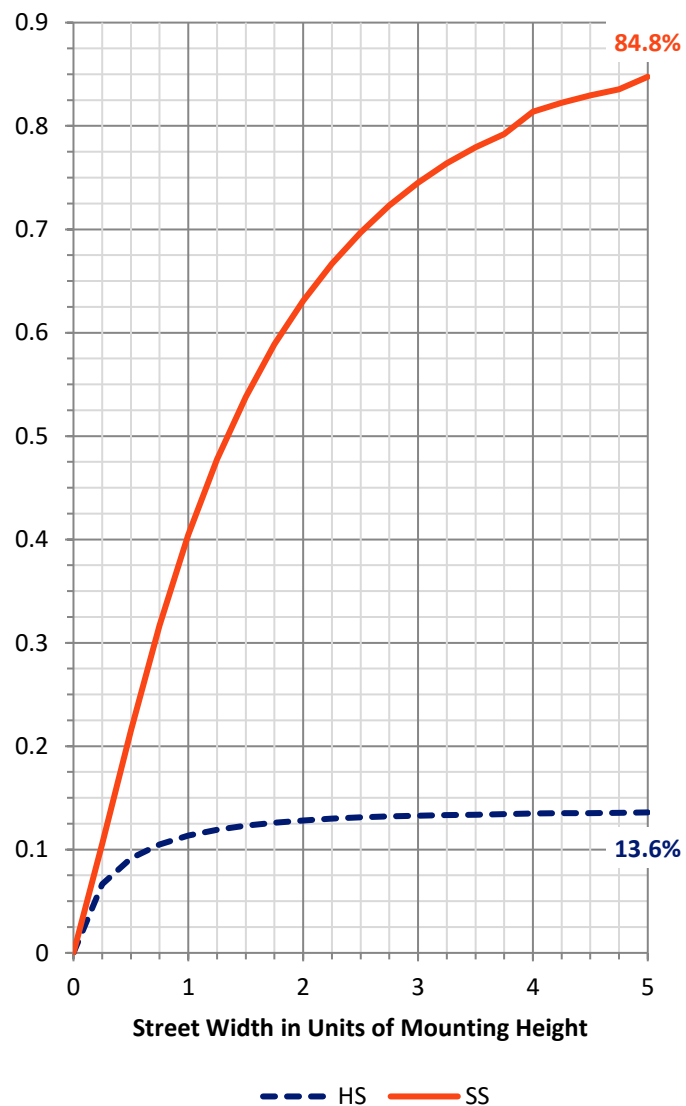
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 1928.0   | 0.0    | 1928.0  |
|                    | % Fixture | 13.8     | 0.0    | 13.8    |
| <b>Street Side</b> | Lumens    | 12084.1  | 0.0    | 12084.1 |
|                    | % Fixture | 86.2     | 0.0    | 86.2    |
| <b>Total</b>       | Lumens    | 14012.0  | 0.0    | 14012.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 217.4   | 1.6       |
| 10°-20°   | 557.3   | 4.0       |
| 20°-30°   | 858.7   | 6.1       |
| 30°-40°   | 1248.6  | 8.9       |
| 40°-50°   | 1837.8  | 13.1      |
| 50°-60°   | 2580.8  | 18.4      |
| 60°-70°   | 3266.5  | 23.3      |
| 70°-80°   | 2876.3  | 20.5      |
| 80°-90°   | 568.7   | 4.1       |
| 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°    | 14012.0 | 100.0     |
| 0°-180°   | 14012.0 | 100.0     |

**Coefficient of Utilization**



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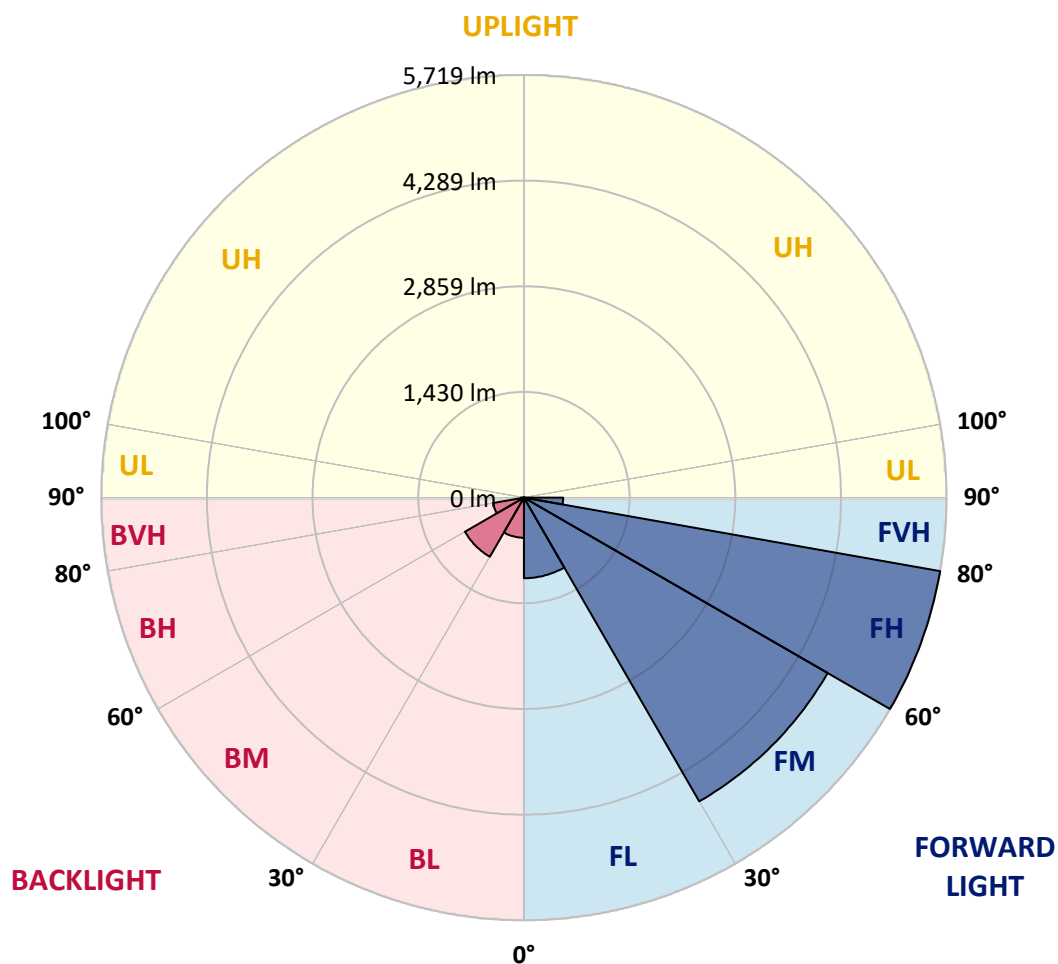
CATALOG NUMBER: GWC-SA2D-730-U-SL4

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 1090.3 | 7.8       |                         |      |         |
| FM   | (30°-60°)   | 4744.6 | 33.9      |                         |      |         |
| FH   | (60°-80°)   | 5719.0 | 40.8      |                         |      | G3/7500 |
| FVH  | (80°-90°)   | 530.2  | 3.8       |                         |      | G4/750  |
| BL   | (0°-30°)    | 543.1  | 3.9       | B2/1000                 |      |         |
| BM   | (30°-60°)   | 922.6  | 6.6       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 423.8  | 3.0       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 38.5   | 0.3       |                         |      | G1/100  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B2-U0-G4**

Type IV Short



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CATALOG NUMBER: GWC-SA2D-730-U-SL4

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 37°    | 45°    | 55°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 2468.9 | 2468.9 | 2468.9 | 2468.9 | 2468.9 | 2468.9 | 2468.9 | 2468.9 | 2468.9 | 2468.9 | 2468.9 |
| 2.5°  | 2553.3 | 2553.8 | 2553.3 | 2549.3 | 2539.9 | 2532.0 | 2525.6 | 2516.2 | 2495.5 | 2479.7 | 2456.0 |
| 5°    | 2577.4 | 2574.5 | 2572.5 | 2565.1 | 2550.3 | 2541.4 | 2529.1 | 2511.3 | 2477.3 | 2445.7 | 2407.2 |
| 7.5°  | 2566.1 | 2562.6 | 2558.2 | 2549.3 | 2532.5 | 2525.1 | 2507.9 | 2484.7 | 2443.7 | 2402.2 | 2346.9 |
| 10°   | 2531.1 | 2530.1 | 2528.1 | 2526.1 | 2511.8 | 2505.9 | 2490.1 | 2465.4 | 2424.9 | 2374.6 | 2309.9 |
| 12.5° | 2492.1 | 2494.5 | 2502.4 | 2512.8 | 2506.4 | 2503.4 | 2493.5 | 2476.8 | 2435.3 | 2381.0 | 2303.0 |
| 15°   | 2467.4 | 2474.3 | 2495.5 | 2522.7 | 2528.1 | 2527.1 | 2524.6 | 2513.8 | 2469.8 | 2409.6 | 2318.8 |
| 17.5° | 2459.0 | 2470.3 | 2510.8 | 2555.7 | 2571.5 | 2575.0 | 2576.0 | 2557.2 | 2508.3 | 2444.7 | 2335.1 |
| 20°   | 2474.3 | 2488.6 | 2547.8 | 2609.5 | 2634.7 | 2636.7 | 2632.2 | 2599.7 | 2544.9 | 2474.8 | 2344.0 |
| 22.5° | 2520.7 | 2533.5 | 2607.6 | 2677.1 | 2705.8 | 2708.7 | 2695.4 | 2646.1 | 2583.4 | 2510.3 | 2356.3 |
| 25°   | 2610.0 | 2625.8 | 2699.9 | 2769.4 | 2784.3 | 2784.7 | 2765.5 | 2704.3 | 2633.7 | 2560.2 | 2383.0 |
| 27.5° | 2726.5 | 2742.3 | 2808.9 | 2877.0 | 2869.1 | 2864.7 | 2838.5 | 2777.3 | 2699.4 | 2628.8 | 2430.4 |
| 30°   | 2856.3 | 2873.6 | 2936.8 | 2985.1 | 2966.4 | 2957.5 | 2936.3 | 2857.3 | 2790.7 | 2722.6 | 2502.9 |
| 32.5° | 2990.6 | 3006.4 | 3061.6 | 3094.7 | 3071.0 | 3067.1 | 3035.0 | 2962.9 | 2909.6 | 2865.7 | 2620.4 |
| 35°   | 3128.3 | 3139.6 | 3193.9 | 3212.7 | 3181.1 | 3180.1 | 3171.2 | 3105.1 | 3071.5 | 3092.2 | 2791.2 |
| 37.5° | 3268.9 | 3271.9 | 3318.3 | 3319.3 | 3309.9 | 3313.9 | 3323.2 | 3281.8 | 3291.2 | 3355.8 | 3013.3 |
| 40°   | 3394.3 | 3402.2 | 3435.8 | 3446.1 | 3462.4 | 3476.2 | 3523.1 | 3496.0 | 3568.5 | 3683.1 | 3289.7 |
| 42.5° | 3487.1 | 3502.4 | 3556.2 | 3582.9 | 3635.7 | 3657.4 | 3723.5 | 3748.7 | 3894.8 | 4066.6 | 3618.4 |
| 45°   | 3565.6 | 3589.3 | 3675.6 | 3730.4 | 3819.8 | 3857.8 | 3952.5 | 4036.9 | 4263.5 | 4482.6 | 3964.4 |
| 47.5° | 3650.5 | 3680.6 | 3788.7 | 3893.3 | 4014.7 | 4057.7 | 4229.9 | 4356.3 | 4656.9 | 4901.2 | 4290.6 |
| 50°   | 3775.4 | 3798.6 | 3904.2 | 4068.5 | 4220.1 | 4275.3 | 4513.7 | 4694.9 | 5056.7 | 5300.0 | 4573.5 |
| 52.5° | 3949.6 | 3940.7 | 4030.0 | 4260.5 | 4463.9 | 4532.0 | 4816.8 | 5055.2 | 5461.9 | 5660.8 | 4812.4 |
| 55°   | 4124.8 | 4110.0 | 4172.7 | 4461.4 | 4748.2 | 4819.8 | 5150.5 | 5417.0 | 5847.4 | 5985.6 | 4995.5 |
| 57.5° | 4319.8 | 4291.6 | 4344.4 | 4688.0 | 5072.0 | 5157.4 | 5524.1 | 5801.5 | 6226.4 | 6248.2 | 5112.0 |
| 60°   | 4520.6 | 4482.6 | 4541.9 | 4968.8 | 5483.1 | 5583.8 | 5961.4 | 6176.6 | 6583.8 | 6458.4 | 5149.5 |
| 62.5° | 4696.4 | 4669.7 | 4761.0 | 5282.2 | 5946.6 | 6057.1 | 6390.8 | 6575.4 | 6936.2 | 6545.8 | 5014.2 |
| 65°   | 4849.9 | 4854.3 | 5012.2 | 5634.6 | 6463.4 | 6581.3 | 6883.4 | 7067.0 | 7213.6 | 6494.0 | 4697.8 |
| 67.5° | 5033.0 | 5058.2 | 5327.6 | 6098.6 | 7113.9 | 7243.2 | 7600.1 | 7603.0 | 7368.6 | 6189.9 | 4075.0 |
| 70°   | 5300.0 | 5351.8 | 5761.5 | 6742.2 | 8038.8 | 8216.5 | 8492.0 | 7917.9 | 7150.9 | 5365.6 | 3206.3 |
| 72.5° | 5536.9 | 5633.7 | 6223.0 | 7478.6 | 9166.2 | 9300.9 | 9013.7 | 7736.3 | 6241.3 | 4021.2 | 1997.5 |
| 74°   | 5440.7 | 5560.6 | 6306.9 | 7841.4 | 9590.6 | 9655.3 | 8837.5 | 7206.2 | 5203.8 | 2784.7 | 1160.9 |
| 75°   | 5233.4 | 5363.7 | 6184.5 | 7838.0 | 9536.8 | 9500.8 | 8412.0 | 6600.6 | 4285.7 | 1899.3 | 772.4  |
| 77.5° | 4223.5 | 4361.2 | 5211.2 | 6717.6 | 7819.7 | 7785.6 | 6461.9 | 4427.9 | 1877.1 | 622.9  | 392.4  |
| 80°   | 2455.5 | 2560.7 | 3234.9 | 4266.0 | 5272.9 | 5334.6 | 4249.7 | 2191.0 | 738.4  | 349.9  | 266.0  |
| 82.5° | 1090.8 | 1163.4 | 1562.7 | 2177.7 | 3182.1 | 3261.5 | 2225.5 | 1148.1 | 456.1  | 212.7  | 159.9  |
| 85°   | 715.7  | 769.5  | 948.7  | 1037.0 | 1515.3 | 1569.6 | 1089.3 | 893.9  | 301.1  | 117.0  | 117.5  |
| 87.5° | 514.8  | 566.6  | 704.8  | 615.5  | 695.4  | 658.4  | 592.8  | 827.2  | 120.9  | 66.6   | 39.5   |
| 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-SA2D-730-U-SL4

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 2468.9 | 2468.9 | 2468.9 | 2468.9 | 2468.9 | 2468.9 | 2468.9 | 2468.9 | 2468.9 | 2468.9 | 2468.9 |
| 2.5°  | 2445.7 | 2437.8 | 2420.0 | 2386.4 | 2367.7 | 2351.9 | 2325.7 | 2310.4 | 2303.5 | 2303.0 | 2306.0 |
| 5°    | 2385.0 | 2366.7 | 2320.8 | 2264.5 | 2219.6 | 2178.6 | 2127.8 | 2097.2 | 2075.5 | 2062.6 | 2066.1 |
| 7.5°  | 2314.4 | 2285.7 | 2213.7 | 2123.9 | 2051.8 | 1972.3 | 1893.8 | 1847.0 | 1810.4 | 1783.3 | 1788.2 |
| 10°   | 2266.0 | 2226.5 | 2121.4 | 1992.1 | 1872.1 | 1756.6 | 1648.5 | 1583.9 | 1532.5 | 1493.1 | 1496.0 |
| 12.5° | 2249.7 | 2196.4 | 2050.8 | 1878.1 | 1709.7 | 1551.8 | 1410.6 | 1311.4 | 1258.6 | 1213.7 | 1217.2 |
| 15°   | 2252.2 | 2180.6 | 1991.6 | 1775.4 | 1563.6 | 1364.7 | 1193.5 | 1077.5 | 1005.9 | 974.8  | 975.3  |
| 17.5° | 2254.2 | 2162.4 | 1929.4 | 1665.3 | 1419.0 | 1190.0 | 1003.9 | 886.5  | 818.8  | 790.2  | 790.7  |
| 20°   | 2247.7 | 2132.7 | 1852.4 | 1539.0 | 1268.0 | 1029.6 | 849.4  | 749.7  | 698.4  | 676.2  | 676.2  |
| 22.5° | 2239.3 | 2097.7 | 1765.5 | 1412.1 | 1118.9 | 890.4  | 738.9  | 662.9  | 633.3  | 618.4  | 618.0  |
| 25°   | 2243.3 | 2071.5 | 1676.7 | 1281.8 | 981.7  | 779.4  | 665.3  | 615.0  | 595.3  | 585.9  | 585.4  |
| 27.5° | 2264.5 | 2059.2 | 1594.7 | 1152.0 | 861.8  | 695.9  | 616.0  | 580.4  | 567.6  | 561.7  | 561.7  |
| 30°   | 2303.0 | 2059.2 | 1509.4 | 1041.4 | 762.1  | 634.2  | 578.0  | 553.8  | 544.9  | 541.0  | 541.0  |
| 32.5° | 2370.1 | 2070.5 | 1426.9 | 931.9  | 682.6  | 585.9  | 546.4  | 530.1  | 523.2  | 521.2  | 521.2  |
| 35°   | 2485.6 | 2109.0 | 1346.5 | 828.2  | 618.4  | 546.4  | 516.3  | 506.9  | 502.0  | 501.5  | 503.0  |
| 37.5° | 2648.0 | 2187.5 | 1271.0 | 751.7  | 573.0  | 514.3  | 491.1  | 483.7  | 480.7  | 483.2  | 485.2  |
| 40°   | 2852.4 | 2294.1 | 1202.3 | 682.6  | 538.5  | 488.6  | 467.9  | 463.0  | 461.5  | 464.9  | 467.9  |
| 42.5° | 3099.2 | 2438.3 | 1146.1 | 632.8  | 511.8  | 466.9  | 448.2  | 442.2  | 440.8  | 444.7  | 448.7  |
| 45°   | 3366.2 | 2593.2 | 1106.6 | 595.7  | 491.1  | 450.6  | 430.9  | 424.5  | 421.5  | 423.5  | 427.9  |
| 47.5° | 3609.0 | 2739.8 | 1090.8 | 569.6  | 471.4  | 436.8  | 415.6  | 407.7  | 402.8  | 401.8  | 405.2  |
| 50°   | 3813.9 | 2848.9 | 1098.2 | 553.8  | 455.6  | 421.5  | 400.8  | 391.9  | 384.5  | 380.1  | 382.5  |
| 52.5° | 3962.9 | 2917.5 | 1105.1 | 546.9  | 443.2  | 404.7  | 384.5  | 376.1  | 366.2  | 358.8  | 358.8  |
| 55°   | 4071.0 | 2933.3 | 1089.8 | 541.5  | 433.9  | 386.5  | 366.2  | 358.3  | 348.5  | 340.1  | 339.1  |
| 57.5° | 4113.5 | 2888.9 | 1033.1 | 533.6  | 427.4  | 369.2  | 347.0  | 341.1  | 332.7  | 322.8  | 322.3  |
| 60°   | 4056.2 | 2751.7 | 923.5  | 516.8  | 419.0  | 354.9  | 327.7  | 323.8  | 319.8  | 310.5  | 310.0  |
| 62.5° | 3826.2 | 2450.6 | 781.8  | 482.7  | 402.3  | 339.6  | 310.0  | 311.9  | 312.4  | 306.0  | 305.0  |
| 65°   | 3409.1 | 2037.0 | 643.6  | 438.3  | 377.1  | 321.3  | 291.7  | 301.1  | 306.5  | 305.5  | 304.0  |
| 67.5° | 2803.0 | 1585.4 | 545.4  | 391.4  | 344.0  | 296.1  | 272.0  | 282.8  | 287.3  | 290.7  | 289.7  |
| 70°   | 2080.4 | 1117.9 | 451.1  | 342.0  | 304.0  | 266.5  | 246.3  | 251.7  | 248.8  | 252.7  | 254.2  |
| 72.5° | 1159.9 | 670.8  | 367.7  | 292.7  | 262.6  | 232.0  | 217.7  | 216.7  | 210.3  | 210.3  | 210.3  |
| 74°   | 695.9  | 492.1  | 323.3  | 262.1  | 237.4  | 209.3  | 196.9  | 192.5  | 186.6  | 187.1  | 186.6  |
| 75°   | 559.7  | 423.0  | 296.6  | 241.9  | 219.6  | 195.9  | 183.6  | 177.7  | 173.2  | 173.2  | 172.8  |
| 77.5° | 353.4  | 321.3  | 238.9  | 192.5  | 175.7  | 161.4  | 153.0  | 145.1  | 145.1  | 144.6  | 144.1  |
| 80°   | 267.0  | 255.7  | 186.1  | 145.6  | 134.7  | 123.9  | 118.5  | 115.0  | 115.0  | 116.5  | 116.0  |
| 82.5° | 183.1  | 192.5  | 130.8  | 101.7  | 96.2   | 88.3   | 87.4   | 87.9   | 86.4   | 84.4   | 83.9   |
| 85°   | 133.8  | 144.6  | 88.3   | 64.2   | 58.7   | 53.8   | 57.7   | 59.7   | 57.3   | 52.8   | 50.8   |
| 87.5° | 51.3   | 94.8   | 47.4   | 26.7   | 24.7   | 21.2   | 24.7   | 25.7   | 27.6   | 21.7   | 22.2   |
| 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: SP1-2012-088-7

Luminaire Tested: WIS-SA-730-2A-U-SL3-HSS

Test Date: 01/20/2021

### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2012-088-7  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 01/20/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: INVUE  
 Catalog Number: **WIS-SA-730-2A-U-SL3-HSS**  
 Description: INVUE WALL PACK

SHIELD

### Spectral Parameters

|                           |        |           |      |      |       |
|---------------------------|--------|-----------|------|------|-------|
| CCT (K):                  | 2978   | CRI (Ra): | 72.4 |      |       |
| CIE u':                   | 0.2511 | R1:       | 68.2 | R9:  | -36.8 |
| CIE v':                   | 0.5225 | R2:       | 83.1 | R10: | 63.2  |
| Duv:                      | 0.0005 | R3:       | 94.9 | R11: | 65.5  |
| CIE x:                    | 0.4391 | R4:       | 68.7 | R12: | 58.5  |
| CIE y:                    | 0.4060 | R5:       | 68.6 | R13: | 71.0  |
| CIE z:                    | 0.1549 | R6:       | 78.2 | R14: | 97.4  |
| Peak Wavelength (nm):     | 596    | R7:       | 76.3 |      |       |
| Dominant Wavelength (nm): | 582    | R8:       | 41.2 |      |       |
| Purity:                   | 54     |           |      |      |       |
|                           |        |           |      |      |       |
| Rf:                       | 76.2   |           |      |      |       |
| Rg:                       | 94.2   |           |      |      |       |



### Test Conditions

Stabilization Time: 82M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.6/28%  
 Sphere Temperature (°C): 25.5

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| 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            |

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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

REPORT NUMBER: SP1-2012-088-7

### 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       | 1195             | 0.0              | 490       | 13880            | 2.0              | 620       | 66879            | 17.4             | 750       | 2571             | 0.0              | 880       | 1235             | 0.0              |
| 365       | 985              | 0.0              | 495       | 17408            | 3.2              | 625       | 62111            | 13.7             | 755       | 2394             | 0.0              | 885       | 1368             | 0.0              |
| 370       | 1066             | 0.0              | 500       | 21285            | 4.7              | 630       | 56551            | 10.2             | 760       | 2199             | 0.0              | 890       | 1027             | 0.0              |
| 375       | 1227             | 0.0              | 505       | 24779            | 6.9              | 635       | 50866            | 7.6              | 765       | 2031             | 0.0              | 895       | 822              | 0.0              |
| 380       | 1176             | 0.0              | 510       | 27951            | 9.6              | 640       | 45859            | 5.5              | 770       | 1735             | 0.0              | 900       | 1068             | 0.0              |
| 385       | 1115             | 0.0              | 515       | 30815            | 12.8             | 645       | 40924            | 3.9              | 775       | 1538             | 0.0              | 905       | 823              | 0.0              |
| 390       | 1039             | 0.0              | 520       | 33040            | 16.0             | 650       | 36434            | 2.7              | 780       | 1455             | 0.0              | 910       | 531              | 0.0              |
| 395       | 908              | 0.0              | 525       | 35159            | 18.9             | 655       | 32132            | 1.8              | 785       | 1506             | 0.0              | 915       | 1184             | 0.0              |
| 400       | 903              | 0.0              | 530       | 37292            | 22.0             | 660       | 27953            | 1.2              | 790       | 1154             | 0.0              | 920       | 1320             | 0.0              |
| 405       | 911              | 0.0              | 535       | 39123            | 24.3             | 665       | 24284            | 0.8              | 795       | 1232             | 0.0              | 925       | 1757             | 0.0              |
| 410       | 1264             | 0.0              | 540       | 41391            | 27.0             | 670       | 20822            | 0.5              | 800       | 1247             | 0.0              | 930       | 1279             | 0.0              |
| 415       | 2142             | 0.0              | 545       | 44515            | 29.6             | 675       | 17848            | 0.3              | 805       | 1043             | 0.0              | 935       | 1399             | 0.0              |
| 420       | 4052             | 0.0              | 550       | 47864            | 32.5             | 680       | 15278            | 0.2              | 810       | 1235             | 0.0              | 940       | 1325             | 0.0              |
| 425       | 7647             | 0.0              | 555       | 52101            | 35.6             | 685       | 13213            | 0.1              | 815       | 1173             | 0.0              | 945       | 612              | 0.0              |
| 430       | 13366            | 0.1              | 560       | 56892            | 38.7             | 690       | 11304            | 0.1              | 820       | 948              | 0.0              | 950       | 1094             | 0.0              |
| 435       | 22367            | 0.3              | 565       | 62242            | 41.4             | 695       | 9794             | 0.0              | 825       | 846              | 0.0              | 955       | 1493             | 0.0              |
| 440       | 34007            | 0.5              | 570       | 67731            | 44.0             | 700       | 8390             | 0.0              | 830       | 987              | 0.0              | 960       | 385              | 0.0              |
| 445       | 41889            | 0.9              | 575       | 72883            | 45.3             | 705       | 7303             | 0.0              | 835       | 1395             | 0.0              | 965       | 585              | 0.0              |
| 450       | 36090            | 0.9              | 580       | 77104            | 45.8             | 710       | 6501             | 0.0              | 840       | 1079             | 0.0              | 970       | 1360             | 0.0              |
| 455       | 23459            | 0.8              | 585       | 80305            | 44.6             | 715       | 5811             | 0.0              | 845       | 1430             | 0.0              | 975       | 805              | 0.0              |
| 460       | 17429            | 0.7              | 590       | 82039            | 42.4             | 720       | 5196             | 0.0              | 850       | 984              | 0.0              | 980       | 813              | 0.0              |
| 465       | 13265            | 0.7              | 595       | 82883            | 39.3             | 725       | 4576             | 0.0              | 855       | 1315             | 0.0              | 985       | 214              | 0.0              |
| 470       | 9887             | 0.6              | 600       | 82307            | 35.5             | 730       | 4031             | 0.0              | 860       | 1245             | 0.0              | 990       | 1247             | 0.0              |
| 475       | 8912             | 0.7              | 605       | 79818            | 30.9             | 735       | 3393             | 0.0              | 865       | 1445             | 0.0              | 995       | 597              | 0.0              |
| 480       | 9543             | 0.9              | 610       | 76405            | 26.2             | 740       | 3117             | 0.0              | 870       | 998              | 0.0              | 1000      | 1691             | 0.0              |
| 485       | 11169            | 1.3              | 615       | 71967            | 21.7             | 745       | 2946             | 0.0              | 875       | 1326             | 0.0              |           |                  |                  |

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### Scotopic Flux vs. Wavelength


**Scotopic Lumens: 1728.4**
**S/P: 0.45**

| 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       | 1195             | 0.0              | 490       | 13880            | 21.4             | 620       | 66879            | 0.8              | 750       | 2571             | 0.0              | 880       | 1235             | 0.0              |
| 365       | 985              | 0.0              | 495       | 17408            | 28.1             | 625       | 62111            | 0.5              | 755       | 2394             | 0.0              | 885       | 1368             | 0.0              |
| 370       | 1066             | 0.0              | 500       | 21285            | 35.6             | 630       | 56551            | 0.3              | 760       | 2199             | 0.0              | 890       | 1027             | 0.0              |
| 375       | 1227             | 0.0              | 505       | 24779            | 42.1             | 635       | 50866            | 0.2              | 765       | 2031             | 0.0              | 895       | 822              | 0.0              |
| 380       | 1176             | 0.0              | 510       | 27951            | 47.4             | 640       | 45859            | 0.1              | 770       | 1735             | 0.0              | 900       | 1068             | 0.0              |
| 385       | 1115             | 0.0              | 515       | 30815            | 51.1             | 645       | 40924            | 0.1              | 775       | 1538             | 0.0              | 905       | 823              | 0.0              |
| 390       | 1039             | 0.0              | 520       | 33040            | 52.5             | 650       | 36434            | 0.0              | 780       | 1455             | 0.0              | 910       | 531              | 0.0              |
| 395       | 908              | 0.0              | 525       | 35159            | 52.6             | 655       | 32132            | 0.0              | 785       | 1506             | 0.0              | 915       | 1184             | 0.0              |
| 400       | 903              | 0.0              | 530       | 37292            | 51.4             | 660       | 27953            | 0.0              | 790       | 1154             | 0.0              | 920       | 1320             | 0.0              |
| 405       | 911              | 0.0              | 535       | 39123            | 48.8             | 665       | 24284            | 0.0              | 795       | 1232             | 0.0              | 925       | 1757             | 0.0              |
| 410       | 1264             | 0.1              | 540       | 41391            | 45.7             | 670       | 20822            | 0.0              | 800       | 1247             | 0.0              | 930       | 1279             | 0.0              |
| 415       | 2142             | 0.2              | 545       | 44515            | 42.7             | 675       | 17848            | 0.0              | 805       | 1043             | 0.0              | 935       | 1399             | 0.0              |
| 420       | 4052             | 0.7              | 550       | 47864            | 39.1             | 680       | 15278            | 0.0              | 810       | 1235             | 0.0              | 940       | 1325             | 0.0              |
| 425       | 7647             | 1.9              | 555       | 52101            | 35.6             | 685       | 13213            | 0.0              | 815       | 1173             | 0.0              | 945       | 612              | 0.0              |
| 430       | 13366            | 4.5              | 560       | 56892            | 31.8             | 690       | 11304            | 0.0              | 820       | 948              | 0.0              | 950       | 1094             | 0.0              |
| 435       | 22367            | 10.0             | 565       | 62242            | 27.9             | 695       | 9794             | 0.0              | 825       | 846              | 0.0              | 955       | 1493             | 0.0              |
| 440       | 34007            | 19.0             | 570       | 67731            | 23.9             | 700       | 8390             | 0.0              | 830       | 987              | 0.0              | 960       | 385              | 0.0              |
| 445       | 41889            | 28.0             | 575       | 72883            | 19.8             | 705       | 7303             | 0.0              | 835       | 1395             | 0.0              | 965       | 585              | 0.0              |
| 450       | 36090            | 28.0             | 580       | 77104            | 15.9             | 710       | 6501             | 0.0              | 840       | 1079             | 0.0              | 970       | 1360             | 0.0              |
| 455       | 23459            | 20.5             | 585       | 80305            | 12.3             | 715       | 5811             | 0.0              | 845       | 1430             | 0.0              | 975       | 805              | 0.0              |
| 460       | 17429            | 16.8             | 590       | 82039            | 9.1              | 720       | 5196             | 0.0              | 850       | 984              | 0.0              | 980       | 813              | 0.0              |
| 465       | 13265            | 14.0             | 595       | 82883            | 6.6              | 725       | 4576             | 0.0              | 855       | 1315             | 0.0              | 985       | 214              | 0.0              |
| 470       | 9887             | 11.4             | 600       | 82307            | 4.6              | 730       | 4031             | 0.0              | 860       | 1245             | 0.0              | 990       | 1247             | 0.0              |
| 475       | 8912             | 11.1             | 605       | 79818            | 3.1              | 735       | 3393             | 0.0              | 865       | 1445             | 0.0              | 995       | 597              | 0.0              |
| 480       | 9543             | 12.9             | 610       | 76405            | 2.1              | 740       | 3117             | 0.0              | 870       | 998              | 0.0              | 1000      | 1691             | 0.0              |
| 485       | 11169            | 16.2             | 615       | 71967            | 1.3              | 745       | 2946             | 0.0              | 875       | 1326             | 0.0              |           |                  |                  |

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### Melanopic Flux vs. Wavelength


**Melanopic Lumens: 4752**
**S/P: 1.23**

| 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       | 1195             | 0.0              | 490       | 13880            | 11.5             | 620       | 66879            | 0.1              | 750       | 2571             | 0.0              | 880       | 1235             | 0.0              |
| 365       | 985              | 0.0              | 495       | 17408            | 14.4             | 625       | 62111            | 0.0              | 755       | 2394             | 0.0              | 885       | 1368             | 0.0              |
| 370       | 1066             | 0.0              | 500       | 21285            | 17.1             | 630       | 56551            | 0.0              | 760       | 2199             | 0.0              | 890       | 1027             | 0.0              |
| 375       | 1227             | 0.0              | 505       | 24779            | 19.0             | 635       | 50866            | 0.0              | 765       | 2031             | 0.0              | 895       | 822              | 0.0              |
| 380       | 1176             | 0.0              | 510       | 27951            | 20.1             | 640       | 45859            | 0.0              | 770       | 1735             | 0.0              | 900       | 1068             | 0.0              |
| 385       | 1115             | 0.0              | 515       | 30815            | 20.1             | 645       | 40924            | 0.0              | 775       | 1538             | 0.0              | 905       | 823              | 0.0              |
| 390       | 1039             | 0.0              | 520       | 33040            | 19.2             | 650       | 36434            | 0.0              | 780       | 1455             | 0.0              | 910       | 531              | 0.0              |
| 395       | 908              | 0.0              | 525       | 35159            | 17.8             | 655       | 32132            | 0.0              | 785       | 1506             | 0.0              | 915       | 1184             | 0.0              |
| 400       | 903              | 0.0              | 530       | 37292            | 16.1             | 660       | 27953            | 0.0              | 790       | 1154             | 0.0              | 920       | 1320             | 0.0              |
| 405       | 911              | 0.0              | 535       | 39123            | 14.1             | 665       | 24284            | 0.0              | 795       | 1232             | 0.0              | 925       | 1757             | 0.0              |
| 410       | 1264             | 0.0              | 540       | 41391            | 12.1             | 670       | 20822            | 0.0              | 800       | 1247             | 0.0              | 930       | 1279             | 0.0              |
| 415       | 2142             | 0.1              | 545       | 44515            | 10.3             | 675       | 17848            | 0.0              | 805       | 1043             | 0.0              | 935       | 1399             | 0.0              |
| 420       | 4052             | 0.5              | 550       | 47864            | 8.6              | 680       | 15278            | 0.0              | 810       | 1235             | 0.0              | 940       | 1325             | 0.0              |
| 425       | 7647             | 1.2              | 555       | 52101            | 7.0              | 685       | 13213            | 0.0              | 815       | 1173             | 0.0              | 945       | 612              | 0.0              |
| 430       | 13366            | 2.8              | 560       | 56892            | 5.6              | 690       | 11304            | 0.0              | 820       | 948              | 0.0              | 950       | 1094             | 0.0              |
| 435       | 22367            | 6.0              | 565       | 62242            | 4.4              | 695       | 9794             | 0.0              | 825       | 846              | 0.0              | 955       | 1493             | 0.0              |
| 440       | 34007            | 11.4             | 570       | 67731            | 3.3              | 700       | 8390             | 0.0              | 830       | 987              | 0.0              | 960       | 385              | 0.0              |
| 445       | 41889            | 16.5             | 575       | 72883            | 2.4              | 705       | 7303             | 0.0              | 835       | 1395             | 0.0              | 965       | 585              | 0.0              |
| 450       | 36090            | 16.6             | 580       | 77104            | 1.7              | 710       | 6501             | 0.0              | 840       | 1079             | 0.0              | 970       | 1360             | 0.0              |
| 455       | 23459            | 12.3             | 585       | 80305            | 1.2              | 715       | 5811             | 0.0              | 845       | 1430             | 0.0              | 975       | 805              | 0.0              |
| 460       | 17429            | 10.3             | 590       | 82039            | 0.8              | 720       | 5196             | 0.0              | 850       | 984              | 0.0              | 980       | 813              | 0.0              |
| 465       | 13265            | 8.7              | 595       | 82883            | 0.5              | 725       | 4576             | 0.0              | 855       | 1315             | 0.0              | 985       | 214              | 0.0              |
| 470       | 9887             | 7.1              | 600       | 82307            | 0.3              | 730       | 4031             | 0.0              | 860       | 1245             | 0.0              | 990       | 1247             | 0.0              |
| 475       | 8912             | 6.8              | 605       | 79818            | 0.2              | 735       | 3393             | 0.0              | 865       | 1445             | 0.0              | 995       | 597              | 0.0              |
| 480       | 9543             | 7.7              | 610       | 76405            | 0.1              | 740       | 3117             | 0.0              | 870       | 998              | 0.0              | 1000      | 1691             | 0.0              |
| 485       | 11169            | 9.2              | 615       | 71967            | 0.1              | 745       | 2946             | 0.0              | 875       | 1326             | 0.0              |           |                  |                  |

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TM-30-18

### Summary

$R_f = 76.2$   
 $R_g = 94.2$   
 CIE  $R_a = 72.4$   
 $R_g = -36.8$



### Color Vector Graphics



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 68 | CES51 = 88 | CES76 = 65 |
| CES02 = 63 | CES27 = 88 | CES52 = 87 | CES77 = 81 |
| CES03 = 31 | CES28 = 88 | CES53 = 79 | CES78 = 67 |
| CES04 = 71 | CES29 = 66 | CES54 = 85 | CES79 = 87 |
| CES05 = 49 | CES30 = 73 | CES55 = 84 | CES80 = 87 |
| CES06 = 51 | CES31 = 70 | CES56 = 76 | CES81 = 70 |
| CES07 = 41 | CES32 = 66 | CES57 = 75 | CES82 = 94 |
| CES08 = 40 | CES33 = 73 | CES58 = 77 | CES83 = 90 |
| CES09 = 29 | CES34 = 80 | CES59 = 86 | CES84 = 89 |
| CES10 = 76 | CES35 = 90 | CES60 = 93 | CES85 = 77 |
| CES11 = 59 | CES36 = 97 | CES61 = 85 | CES86 = 61 |
| CES12 = 65 | CES37 = 88 | CES62 = 90 | CES87 = 78 |
| CES13 = 43 | CES38 = 81 | CES63 = 77 | CES88 = 78 |
| CES14 = 74 | CES39 = 95 | CES64 = 73 | CES89 = 67 |
| CES15 = 71 | CES40 = 91 | CES65 = 69 | CES90 = 76 |
| CES16 = 47 | CES41 = 88 | CES66 = 71 | CES91 = 89 |
| CES17 = 50 | CES42 = 89 | CES67 = 69 | CES92 = 58 |
| CES18 = 56 | CES43 = 80 | CES68 = 73 | CES93 = 75 |
| CES19 = 73 | CES44 = 99 | CES69 = 82 | CES94 = 49 |
| CES20 = 66 | CES45 = 85 | CES70 = 67 | CES95 = 69 |
| CES21 = 87 | CES46 = 81 | CES71 = 68 | CES96 = 77 |
| CES22 = 79 | CES47 = 81 | CES72 = 88 | CES97 = 83 |
| CES23 = 92 | CES48 = 69 | CES73 = 60 | CES98 = 75 |
| CES24 = 91 | CES49 = 80 | CES74 = 95 | CES99 = 63 |
| CES25 = 73 | CES50 = 87 | CES75 = 69 |            |



### Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)