

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: P386387

Luminaire Tested: **GWC-SA2A-740-U-SL3**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P386387  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-22)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GWC-SA2A-740-U-SL3  
Description: GALLEON WALL LUMINAIRE  
(2) 70 CRI, 4000K, 615mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III  
SPILL LIGHT ELIMINATOR OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 9727 lumens  
Efficiency: N/A  
Efficacy: 147.4 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 0.5' x H: 0')  
IES Classification: Type III - Medium  
BUG Rating: B1 - U0 - G3

Input Watts (W): 66  
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

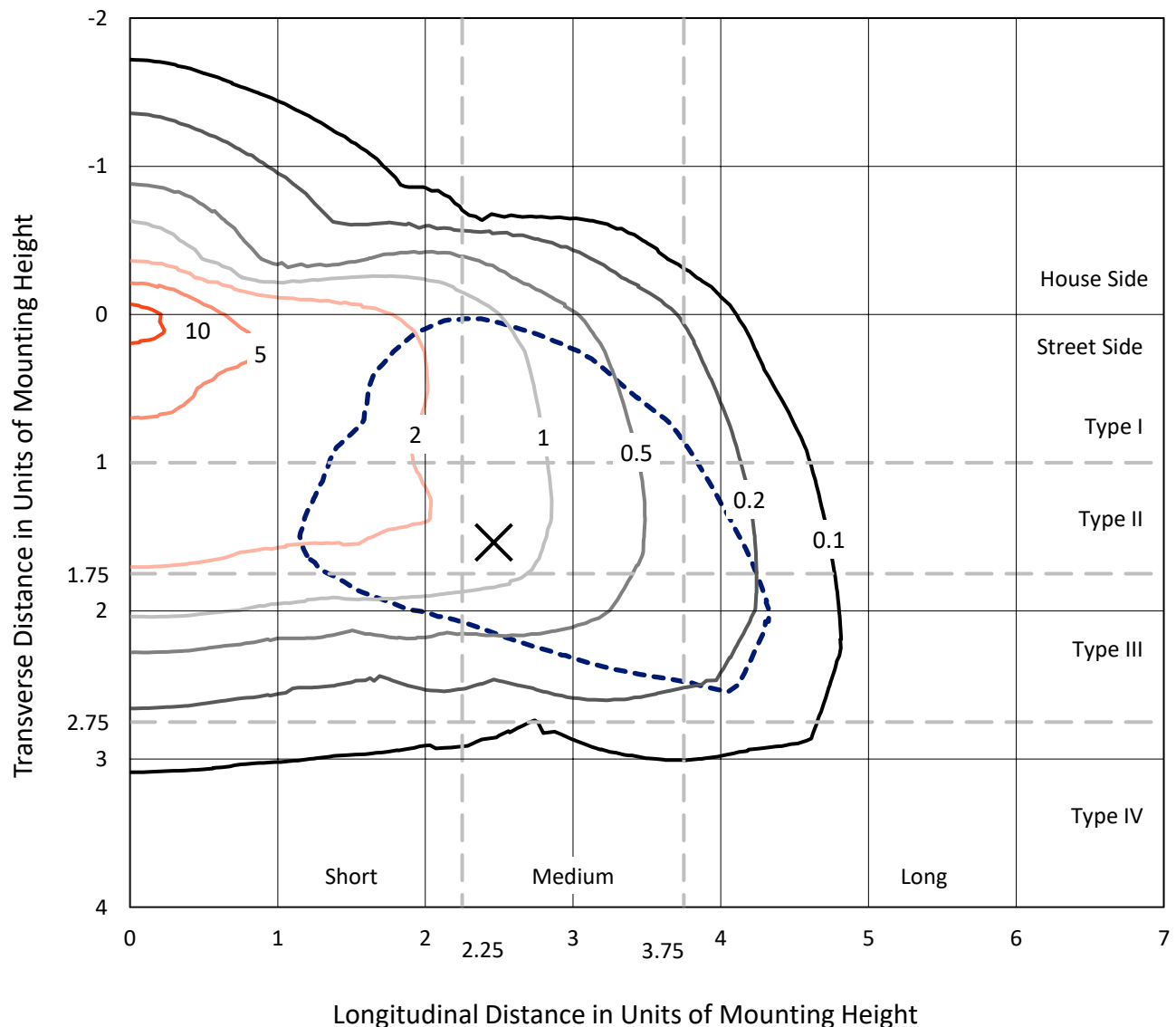


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## Iso-Footcandle Lines of Horizontal Illumination

× Max cd  
 - - - 1/2 Max cd

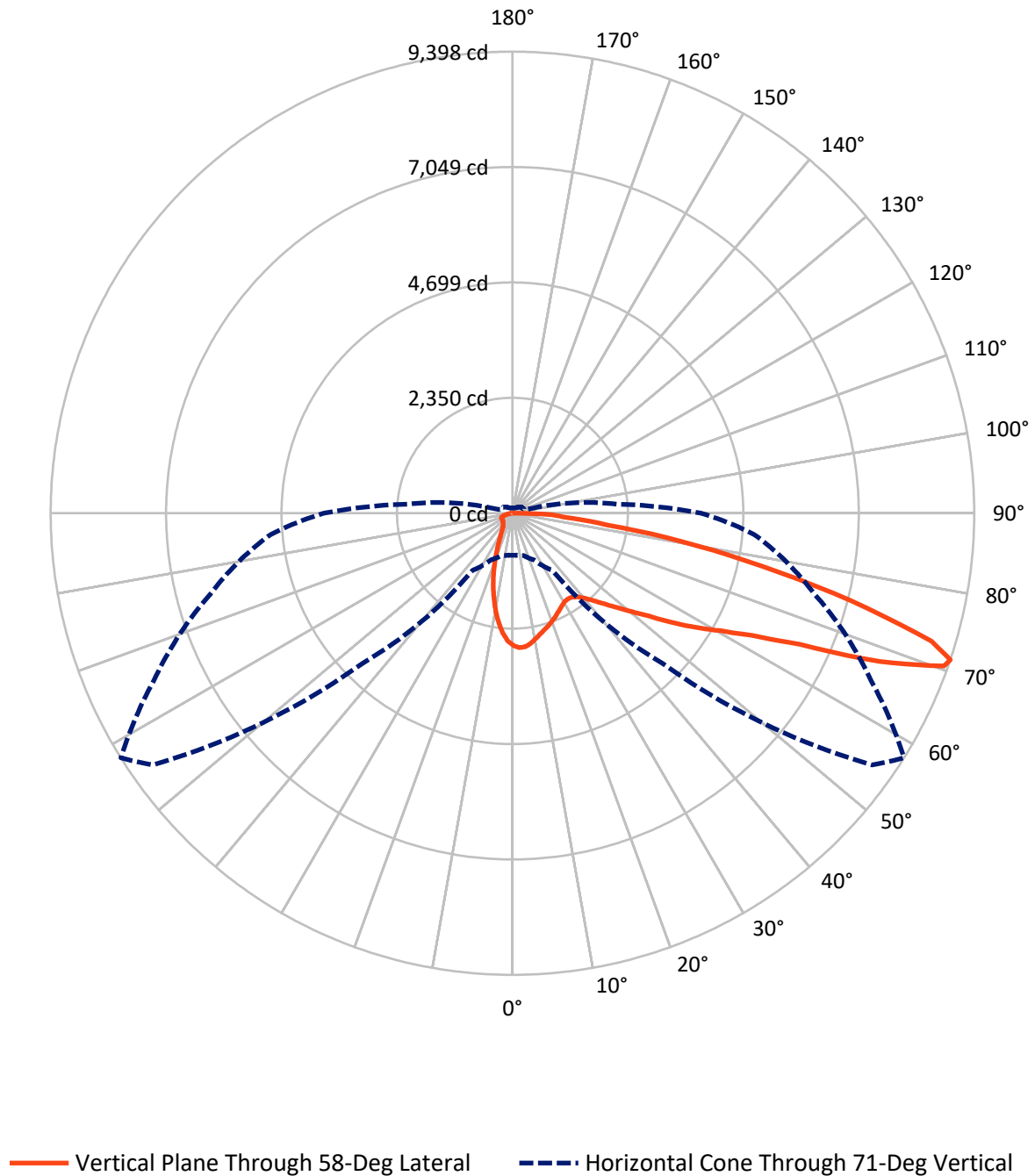


Based on 15 foot mounting height. Maximum calculated value = 12 fc  
 Type III - Medium - N/A

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## Luminous Intensity Polar Plot



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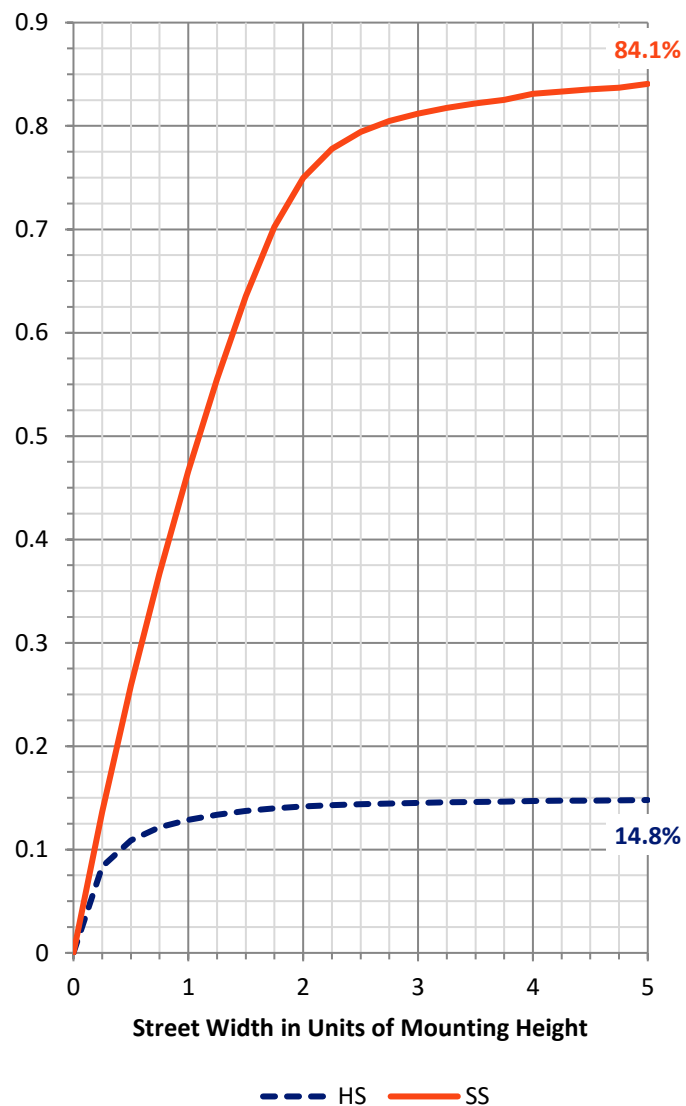
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 1454.3   | 0.0    | 1454.3 |
|                    | % Fixture | 15.0     | 0.0    | 15.0   |
| <b>Street Side</b> | Lumens    | 8272.7   | 0.0    | 8272.7 |
|                    | % Fixture | 85.0     | 0.0    | 85.0   |
| <b>Total</b>       | Lumens    | 9727.0   | 0.0    | 9727.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 232.5  | 2.4       |
| 10°-20°   | 517.0  | 5.3       |
| 20°-30°   | 657.0  | 6.8       |
| 30°-40°   | 836.9  | 8.6       |
| 40°-50°   | 1186.8 | 12.2      |
| 50°-60°   | 1836.7 | 18.9      |
| 60°-70°   | 2500.4 | 25.7      |
| 70°-80°   | 1668.0 | 17.1      |
| 80°-90°   | 291.6  | 3.0       |
| 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°    | 9727.0 | 100.0     |
| 0°-180°   | 9727.0 | 100.0     |

**Coefficient of Utilization**



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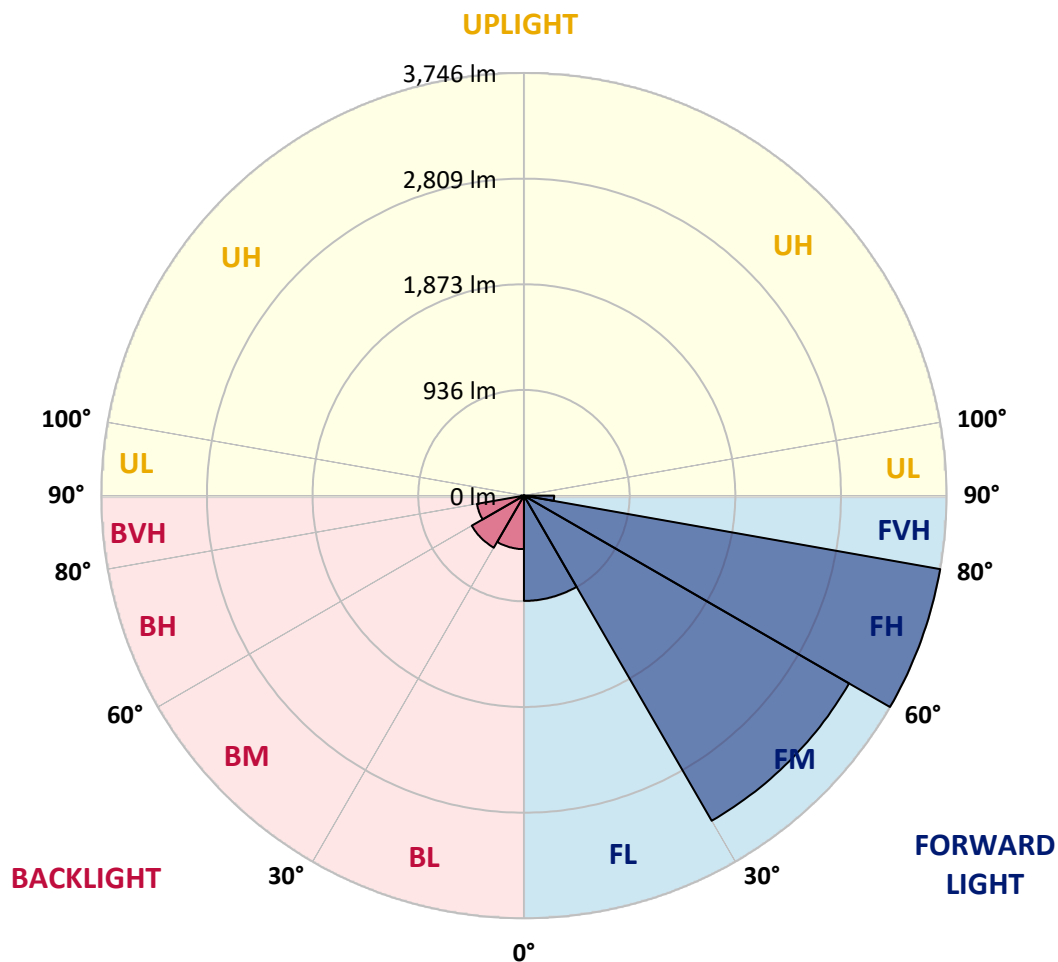
CATALOG NUMBER: GWC-SA2A-740-U-SL3

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 932.5  | 9.6       |                         |      |         |
| FM   | (30°-60°)   | 3327.1 | 34.2      |                         |      |         |
| FH   | (60°-80°)   | 3745.7 | 38.5      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 267.4  | 2.7       |                         |      | G3/500  |
| BL   | (0°-30°)    | 474.0  | 4.9       | B1/500                  |      |         |
| BM   | (30°-60°)   | 533.3  | 5.5       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 422.7  | 4.3       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 24.2   | 0.2       |                         |      | G1/100  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B1-U0-G3**

Type III Medium



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 58°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 2695.0 | 2695.0 | 2695.0 | 2695.0 | 2695.0 | 2695.0 | 2695.0 | 2695.0 | 2695.0 | 2695.0 | 2695.0 |
| 2.5°  | 2766.5 | 2762.8 | 2764.1 | 2761.4 | 2755.0 | 2748.6 | 2739.1 | 2740.8 | 2727.6 | 2707.9 | 2683.5 |
| 5°    | 2714.3 | 2713.0 | 2723.2 | 2728.9 | 2733.7 | 2729.9 | 2727.2 | 2730.6 | 2711.3 | 2684.2 | 2641.8 |
| 7.5°  | 2604.9 | 2590.0 | 2602.9 | 2622.2 | 2640.5 | 2654.4 | 2672.7 | 2675.0 | 2662.8 | 2634.4 | 2578.8 |
| 10°   | 2449.4 | 2435.1 | 2454.1 | 2484.3 | 2520.9 | 2554.1 | 2591.0 | 2597.8 | 2600.2 | 2574.4 | 2507.0 |
| 12.5° | 2288.1 | 2277.3 | 2296.2 | 2338.6 | 2399.2 | 2450.4 | 2509.4 | 2519.5 | 2540.5 | 2523.2 | 2440.6 |
| 15°   | 2143.8 | 2139.7 | 2162.7 | 2204.4 | 2274.2 | 2352.5 | 2437.5 | 2456.2 | 2491.7 | 2486.0 | 2388.7 |
| 17.5° | 2019.1 | 2018.1 | 2035.7 | 2079.4 | 2156.6 | 2255.6 | 2366.0 | 2397.5 | 2450.4 | 2457.2 | 2346.0 |
| 20°   | 1926.2 | 1924.2 | 1936.4 | 1968.6 | 2048.2 | 2160.4 | 2288.8 | 2332.1 | 2408.4 | 2432.1 | 2302.0 |
| 22.5° | 1876.4 | 1876.1 | 1876.4 | 1891.7 | 1956.7 | 2061.1 | 2213.6 | 2266.4 | 2367.4 | 2412.1 | 2253.2 |
| 25°   | 1868.0 | 1866.9 | 1859.5 | 1857.8 | 1894.7 | 1978.1 | 2139.0 | 2197.3 | 2328.4 | 2398.2 | 2206.8 |
| 27.5° | 1890.0 | 1891.3 | 1881.5 | 1865.6 | 1873.0 | 1923.5 | 2074.3 | 2136.6 | 2297.2 | 2395.5 | 2174.6 |
| 30°   | 1935.7 | 1935.0 | 1926.6 | 1910.0 | 1895.4 | 1903.2 | 2028.2 | 2090.6 | 2276.2 | 2407.4 | 2152.6 |
| 32.5° | 1986.2 | 1989.9 | 1988.2 | 1979.1 | 1957.4 | 1926.2 | 2014.3 | 2075.3 | 2270.1 | 2435.8 | 2143.1 |
| 35°   | 2046.9 | 2050.9 | 2063.1 | 2070.2 | 2044.8 | 1994.7 | 2044.1 | 2097.0 | 2287.8 | 2489.4 | 2158.3 |
| 37.5° | 2104.5 | 2115.0 | 2149.2 | 2179.3 | 2157.6 | 2101.7 | 2123.4 | 2161.0 | 2342.3 | 2573.7 | 2199.3 |
| 40°   | 2170.9 | 2180.0 | 2235.9 | 2300.0 | 2296.6 | 2238.6 | 2251.2 | 2276.2 | 2438.5 | 2694.7 | 2273.5 |
| 42.5° | 2236.3 | 2254.6 | 2335.5 | 2426.3 | 2452.4 | 2401.3 | 2421.3 | 2434.5 | 2574.1 | 2855.0 | 2403.0 |
| 45°   | 2323.3 | 2343.0 | 2455.5 | 2564.9 | 2625.9 | 2597.1 | 2629.0 | 2634.0 | 2744.5 | 3073.2 | 2591.0 |
| 47.5° | 2455.1 | 2477.5 | 2608.6 | 2723.5 | 2816.7 | 2819.7 | 2872.2 | 2870.2 | 2957.3 | 3322.9 | 2827.8 |
| 50°   | 2660.5 | 2692.7 | 2800.1 | 2907.5 | 3020.6 | 3083.7 | 3153.8 | 3144.0 | 3212.4 | 3588.9 | 3100.6 |
| 52.5° | 2929.5 | 2944.4 | 3024.0 | 3103.3 | 3243.9 | 3385.2 | 3485.9 | 3477.0 | 3501.8 | 3862.3 | 3410.3 |
| 55°   | 3208.4 | 3219.5 | 3252.4 | 3295.8 | 3484.8 | 3715.2 | 3928.0 | 3914.1 | 3851.4 | 4146.2 | 3716.3 |
| 57.5° | 3459.1 | 3481.8 | 3504.5 | 3522.4 | 3727.4 | 4060.2 | 4380.4 | 4381.4 | 4230.9 | 4452.5 | 4032.4 |
| 60°   | 3498.0 | 3518.0 | 3668.1 | 3809.8 | 4142.5 | 4520.3 | 4864.5 | 4854.4 | 4623.6 | 4784.9 | 4384.8 |
| 62.5° | 3092.1 | 3137.2 | 3387.9 | 3764.7 | 4542.3 | 5361.9 | 5482.2 | 5469.7 | 5093.2 | 5194.6 | 4795.1 |
| 65°   | 2215.9 | 2267.1 | 2569.7 | 3135.8 | 4348.5 | 6289.3 | 6597.0 | 6428.2 | 5733.6 | 5698.4 | 5275.5 |
| 67.5° | 1278.4 | 1290.6 | 1421.7 | 1876.4 | 3311.0 | 6337.8 | 8297.5 | 8061.4 | 6728.1 | 6270.0 | 5510.7 |
| 70°   | 945.3  | 945.0  | 976.2  | 1154.7 | 1791.7 | 5172.5 | 9106.3 | 9318.1 | 7775.1 | 6458.0 | 5178.3 |
| 71°   | 854.9  | 855.9  | 890.8  | 1051.0 | 1419.0 | 4329.5 | 8934.5 | 9398.0 | 8050.9 | 6365.2 | 4937.7 |
| 72.5° | 731.2  | 734.6  | 783.0  | 942.6  | 1193.7 | 2985.7 | 8194.5 | 8918.3 | 8181.7 | 6136.2 | 4561.3 |
| 75°   | 554.7  | 562.5  | 629.5  | 794.5  | 1091.0 | 1514.2 | 6014.2 | 7121.5 | 7268.2 | 5414.5 | 3389.3 |
| 77.5° | 395.7  | 404.6  | 480.5  | 668.2  | 1037.1 | 1141.2 | 4027.6 | 5194.6 | 5348.7 | 3469.9 | 1528.8 |
| 80°   | 250.1  | 260.6  | 317.8  | 531.6  | 974.5  | 1083.6 | 2531.0 | 3491.6 | 2916.6 | 1110.3 | 389.0  |
| 82.5° | 146.7  | 154.8  | 197.2  | 347.3  | 795.9  | 1043.6 | 1489.1 | 1935.4 | 1135.1 | 335.4  | 176.9  |
| 85°   | 85.0   | 88.8   | 123.0  | 221.3  | 578.0  | 985.0  | 1094.1 | 1081.9 | 492.7  | 164.0  | 83.7   |
| 87.5° | 39.6   | 44.0   | 72.8   | 115.5  | 320.9  | 713.9  | 864.7  | 747.1  | 306.3  | 76.9   | 39.3   |
| 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-SA2A-740-U-SL3

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 2695.0 | 2695.0 | 2695.0 | 2695.0 | 2695.0 | 2695.0 | 2695.0 | 2695.0 | 2695.0 | 2695.0 | 2695.0 |
| 2.5°  | 2671.7 | 2665.9 | 2641.8 | 2620.5 | 2598.1 | 2569.0 | 2536.8 | 2532.7 | 2513.1 | 2516.8 | 2510.0 |
| 5°    | 2618.8 | 2604.2 | 2546.3 | 2493.8 | 2431.8 | 2376.2 | 2315.9 | 2288.1 | 2248.1 | 2245.4 | 2235.2 |
| 7.5°  | 2543.2 | 2516.1 | 2426.3 | 2326.7 | 2227.1 | 2132.2 | 2038.4 | 1976.7 | 1913.7 | 1886.9 | 1884.6 |
| 10°   | 2458.2 | 2412.1 | 2280.0 | 2132.6 | 1988.9 | 1850.3 | 1716.2 | 1616.9 | 1527.4 | 1485.1 | 1483.4 |
| 12.5° | 2377.5 | 2309.4 | 2128.2 | 1927.6 | 1731.1 | 1551.5 | 1367.5 | 1237.1 | 1124.9 | 1087.3 | 1071.4 |
| 15°   | 2309.1 | 2213.2 | 1980.4 | 1724.0 | 1485.4 | 1236.0 | 1026.6 | 889.4  | 785.7  | 749.8  | 743.0  |
| 17.5° | 2242.7 | 2119.4 | 1829.0 | 1518.3 | 1229.9 | 955.8  | 746.1  | 644.1  | 588.9  | 574.3  | 574.0  |
| 20°   | 2176.6 | 2022.8 | 1670.8 | 1307.9 | 982.9  | 714.9  | 573.6  | 527.9  | 509.3  | 507.6  | 504.9  |
| 22.5° | 2101.7 | 1920.5 | 1504.4 | 1096.8 | 767.1  | 562.1  | 487.6  | 469.3  | 466.9  | 473.0  | 473.0  |
| 25°   | 2031.6 | 1818.8 | 1335.7 | 890.1  | 596.7  | 468.9  | 435.4  | 431.7  | 438.1  | 448.9  | 450.0  |
| 27.5° | 1966.2 | 1720.9 | 1171.0 | 706.5  | 478.1  | 413.0  | 399.1  | 403.5  | 415.1  | 427.6  | 427.9  |
| 30°   | 1912.3 | 1628.4 | 1011.1 | 556.7  | 403.9  | 371.4  | 369.0  | 377.8  | 390.3  | 400.2  | 402.5  |
| 32.5° | 1870.7 | 1549.5 | 856.6  | 447.6  | 355.4  | 340.2  | 342.2  | 349.7  | 357.5  | 362.9  | 366.6  |
| 35°   | 1851.4 | 1481.7 | 713.9  | 377.5  | 324.6  | 316.1  | 318.8  | 322.9  | 326.3  | 330.4  | 333.4  |
| 37.5° | 1854.7 | 1429.2 | 586.5  | 333.7  | 303.9  | 299.5  | 299.5  | 299.5  | 299.5  | 301.6  | 301.9  |
| 40°   | 1886.2 | 1399.0 | 482.8  | 306.0  | 290.0  | 285.3  | 281.6  | 278.2  | 275.5  | 276.8  | 276.1  |
| 42.5° | 1966.9 | 1396.3 | 406.9  | 288.3  | 278.9  | 271.1  | 263.6  | 258.9  | 255.5  | 256.8  | 257.5  |
| 45°   | 2103.8 | 1430.2 | 355.8  | 275.8  | 268.4  | 256.5  | 247.0  | 241.9  | 239.6  | 244.0  | 244.6  |
| 47.5° | 2281.0 | 1504.1 | 324.6  | 266.7  | 258.5  | 242.9  | 232.8  | 228.0  | 228.7  | 235.1  | 236.8  |
| 50°   | 2509.4 | 1624.0 | 309.7  | 260.9  | 251.7  | 231.4  | 220.9  | 216.8  | 218.9  | 228.0  | 230.1  |
| 52.5° | 2760.1 | 1796.8 | 311.4  | 259.2  | 247.3  | 222.9  | 211.8  | 207.0  | 210.4  | 218.9  | 220.6  |
| 55°   | 3049.4 | 2004.5 | 339.5  | 261.6  | 240.9  | 217.5  | 204.3  | 196.2  | 198.9  | 206.7  | 208.0  |
| 57.5° | 3371.0 | 2242.4 | 396.1  | 260.9  | 232.8  | 212.4  | 196.5  | 184.3  | 186.4  | 191.1  | 192.5  |
| 60°   | 3705.7 | 2529.7 | 483.8  | 262.9  | 229.0  | 206.3  | 186.0  | 170.8  | 170.1  | 174.2  | 174.8  |
| 62.5° | 4107.6 | 2862.1 | 584.1  | 264.3  | 231.4  | 198.6  | 172.1  | 157.2  | 155.2  | 156.2  | 156.9  |
| 65°   | 4521.6 | 3102.6 | 546.5  | 258.9  | 238.9  | 192.1  | 159.9  | 144.0  | 140.3  | 139.6  | 139.9  |
| 67.5° | 4534.5 | 2844.8 | 383.2  | 248.0  | 241.9  | 188.7  | 150.8  | 132.8  | 126.7  | 124.3  | 124.0  |
| 70°   | 4066.6 | 2311.1 | 298.5  | 236.5  | 229.7  | 183.3  | 142.3  | 123.7  | 114.5  | 110.8  | 110.5  |
| 71°   | 3838.2 | 2127.5 | 282.9  | 230.7  | 220.6  | 177.9  | 138.6  | 119.6  | 110.1  | 106.1  | 105.4  |
| 72.5° | 3480.1 | 1907.3 | 263.9  | 221.6  | 203.0  | 164.0  | 131.5  | 113.8  | 104.0  | 99.3   | 98.3   |
| 75°   | 2497.5 | 1247.2 | 226.7  | 197.5  | 168.1  | 130.8  | 115.2  | 102.3  | 93.9   | 88.1   | 87.4   |
| 77.5° | 962.3  | 496.4  | 171.4  | 164.3  | 128.8  | 102.3  | 94.9   | 88.4   | 82.3   | 76.6   | 76.2   |
| 80°   | 297.5  | 221.9  | 125.0  | 123.7  | 93.2   | 76.2   | 73.9   | 72.2   | 69.8   | 63.7   | 62.3   |
| 82.5° | 158.9  | 127.4  | 86.1   | 80.0   | 61.0   | 50.8   | 53.5   | 54.2   | 54.6   | 48.1   | 47.4   |
| 85°   | 75.9   | 67.4   | 48.5   | 45.4   | 35.6   | 28.5   | 32.9   | 35.6   | 35.9   | 29.5   | 27.4   |
| 87.5° | 36.3   | 35.2   | 22.7   | 17.3   | 13.2   | 9.5    | 11.5   | 14.2   | 15.6   | 11.2   | 9.8    |
| 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: SP1-2104-224-3

Luminaire Tested: CCW-SA-2A-740-U-SL4

Test Date: 04/26/2021

### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2104-224-3  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 04/26/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: INVUE  
 Catalog Number: **CCW-SA-2A-740-U-SL4**  
 Description: INVUE WALL PACK ClearCurve Light Square

### Spectral Parameters

|                           |        |           |      |      |       |
|---------------------------|--------|-----------|------|------|-------|
| CCT (K):                  | 3829   | CRI (Ra): | 69.8 |      |       |
| CIE u':                   | 0.2271 | R1:       | 67.2 | R9:  | -35.1 |
| CIE v':                   | 0.5076 | R2:       | 75.2 | R10: | 43.1  |
| Duv:                      | 0.0022 | R3:       | 83.2 | R11: | 69.0  |
| CIE x:                    | 0.3900 | R4:       | 71.0 | R12: | 44.3  |
| CIE y:                    | 0.3873 | R5:       | 67.4 | R13: | 67.6  |
| CIE z:                    | 0.2227 | R6:       | 66.8 | R14: | 90.3  |
| Peak Wavelength (nm):     | 440    | R7:       | 77.6 |      |       |
| Dominant Wavelength (nm): | 578    | R8:       | 50.3 |      |       |
| Purity:                   | 33.4   |           |      |      |       |
| Rf:                       | 70.6   |           |      |      |       |
| Rg:                       | 96.7   |           |      |      |       |



### Test Conditions

Stabilization Time: 62M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.8/39%  
 Sphere Temperature (°C): 24.2

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| 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 4000K 7-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       | 1901             | 0.0              | 490       | 14057            | 2.0              | 620       | 73853            | 19.2             | 750       | 3678             | 0.0              | 880       | 2528             | 0.0              |
| 365       | 1585             | 0.0              | 495       | 20304            | 3.7              | 625       | 68653            | 15.1             | 755       | 3385             | 0.0              | 885       | 2638             | 0.0              |
| 370       | 1604             | 0.0              | 500       | 28346            | 6.3              | 630       | 62254            | 11.3             | 760       | 2963             | 0.0              | 890       | 2417             | 0.0              |
| 375       | 1905             | 0.0              | 505       | 37228            | 10.4             | 635       | 56177            | 8.4              | 765       | 2782             | 0.0              | 895       | 1902             | 0.0              |
| 380       | 1882             | 0.0              | 510       | 46037            | 15.8             | 640       | 50521            | 6.0              | 770       | 2657             | 0.0              | 900       | 2330             | 0.0              |
| 385       | 1693             | 0.0              | 515       | 53619            | 22.2             | 645       | 45727            | 4.4              | 775       | 2259             | 0.0              | 905       | 2456             | 0.0              |
| 390       | 1640             | 0.0              | 520       | 59890            | 29.0             | 650       | 40814            | 3.0              | 780       | 2169             | 0.0              | 910       | 2205             | 0.0              |
| 395       | 1513             | 0.0              | 525       | 64946            | 34.9             | 655       | 35925            | 2.1              | 785       | 2065             | 0.0              | 915       | 2002             | 0.0              |
| 400       | 1481             | 0.0              | 530       | 69048            | 40.7             | 660       | 31824            | 1.3              | 790       | 2054             | 0.0              | 920       | 2125             | 0.0              |
| 405       | 2044             | 0.0              | 535       | 72246            | 44.8             | 665       | 27860            | 0.9              | 795       | 1908             | 0.0              | 925       | 2266             | 0.0              |
| 410       | 3966             | 0.0              | 540       | 74621            | 48.6             | 670       | 24069            | 0.5              | 800       | 2026             | 0.0              | 930       | 2159             | 0.0              |
| 415       | 8943             | 0.0              | 545       | 77288            | 51.4             | 675       | 20926            | 0.4              | 805       | 1766             | 0.0              | 935       | 2581             | 0.0              |
| 420       | 19566            | 0.1              | 550       | 80334            | 54.6             | 680       | 18170            | 0.2              | 810       | 1913             | 0.0              | 940       | 2052             | 0.0              |
| 425       | 39243            | 0.2              | 555       | 83561            | 57.1             | 685       | 15785            | 0.1              | 815       | 2019             | 0.0              | 945       | 1631             | 0.0              |
| 430       | 66113            | 0.5              | 560       | 86964            | 59.1             | 690       | 13770            | 0.1              | 820       | 1876             | 0.0              | 950       | 2301             | 0.0              |
| 435       | 92550            | 1.1              | 565       | 90264            | 60.0             | 695       | 11953            | 0.1              | 825       | 1869             | 0.0              | 955       | 3077             | 0.0              |
| 440       | 106034           | 1.7              | 570       | 93519            | 60.8             | 700       | 10452            | 0.0              | 830       | 1862             | 0.0              | 960       | 2911             | 0.0              |
| 445       | 86383            | 1.8              | 575       | 95920            | 59.7             | 705       | 9162             | 0.0              | 835       | 1663             | 0.0              | 965       | 3163             | 0.0              |
| 450       | 49216            | 1.3              | 580       | 97650            | 58.0             | 710       | 8266             | 0.0              | 840       | 1843             | 0.0              | 970       | 1995             | 0.0              |
| 455       | 27376            | 0.9              | 585       | 98486            | 54.7             | 715       | 7583             | 0.0              | 845       | 1921             | 0.0              | 975       | 2418             | 0.0              |
| 460       | 17830            | 0.7              | 590       | 98332            | 50.8             | 720       | 6750             | 0.0              | 850       | 2105             | 0.0              | 980       | 2674             | 0.0              |
| 465       | 11374            | 0.6              | 595       | 96023            | 45.5             | 725       | 5965             | 0.0              | 855       | 2096             | 0.0              | 985       | 2850             | 0.0              |
| 470       | 8344             | 0.5              | 600       | 93650            | 40.4             | 730       | 5310             | 0.0              | 860       | 2601             | 0.0              | 990       | 1972             | 0.0              |
| 475       | 7639             | 0.6              | 605       | 90313            | 35.0             | 735       | 4838             | 0.0              | 865       | 2199             | 0.0              | 995       | 2443             | 0.0              |
| 480       | 7991             | 0.8              | 610       | 85305            | 29.3             | 740       | 4280             | 0.0              | 870       | 2491             | 0.0              | 1000      | 1979             | 0.0              |
| 485       | 9994             | 1.2              | 615       | 79870            | 24.1             | 745       | 3928             | 0.0              | 875       | 2370             | 0.0              |           |                  |                  |

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### Scotopic Flux vs. Wavelength



Scotopic Lumens: 7682.8

S/P: 1.42

| 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       | 1901             | 0.0              | 490       | 14057            | 21.6             | 620       | 73853            | 0.9              | 750       | 3678             | 0.0              | 880       | 2528             | 0.0              |
| 365       | 1585             | 0.0              | 495       | 20304            | 32.8             | 625       | 68653            | 0.6              | 755       | 3385             | 0.0              | 885       | 2638             | 0.0              |
| 370       | 1604             | 0.0              | 500       | 28346            | 47.4             | 630       | 62254            | 0.4              | 760       | 2963             | 0.0              | 890       | 2417             | 0.0              |
| 375       | 1905             | 0.0              | 505       | 37228            | 63.3             | 635       | 56177            | 0.2              | 765       | 2782             | 0.0              | 895       | 1902             | 0.0              |
| 380       | 1882             | 0.0              | 510       | 46037            | 78.0             | 640       | 50521            | 0.1              | 770       | 2657             | 0.0              | 900       | 2330             | 0.0              |
| 385       | 1693             | 0.0              | 515       | 53619            | 88.9             | 645       | 45727            | 0.1              | 775       | 2259             | 0.0              | 905       | 2456             | 0.0              |
| 390       | 1640             | 0.0              | 520       | 59890            | 95.2             | 650       | 40814            | 0.0              | 780       | 2169             | 0.0              | 910       | 2205             | 0.0              |
| 395       | 1513             | 0.0              | 525       | 64946            | 97.2             | 655       | 35925            | 0.0              | 785       | 2065             | 0.0              | 915       | 2002             | 0.0              |
| 400       | 1481             | 0.0              | 530       | 69048            | 95.2             | 660       | 31824            | 0.0              | 790       | 2054             | 0.0              | 920       | 2125             | 0.0              |
| 405       | 2044             | 0.1              | 535       | 72246            | 90.0             | 665       | 27860            | 0.0              | 795       | 1908             | 0.0              | 925       | 2266             | 0.0              |
| 410       | 3966             | 0.2              | 540       | 74621            | 82.5             | 670       | 24069            | 0.0              | 800       | 2026             | 0.0              | 930       | 2159             | 0.0              |
| 415       | 8943             | 0.9              | 545       | 77288            | 74.1             | 675       | 20926            | 0.0              | 805       | 1766             | 0.0              | 935       | 2581             | 0.0              |
| 420       | 19566            | 3.2              | 550       | 80334            | 65.7             | 680       | 18170            | 0.0              | 810       | 1913             | 0.0              | 940       | 2052             | 0.0              |
| 425       | 39243            | 9.6              | 555       | 83561            | 57.1             | 685       | 15785            | 0.0              | 815       | 2019             | 0.0              | 945       | 1631             | 0.0              |
| 430       | 66113            | 22.5             | 560       | 86964            | 48.6             | 690       | 13770            | 0.0              | 820       | 1876             | 0.0              | 950       | 2301             | 0.0              |
| 435       | 92550            | 41.4             | 565       | 90264            | 40.5             | 695       | 11953            | 0.0              | 825       | 1869             | 0.0              | 955       | 3077             | 0.0              |
| 440       | 106034           | 59.3             | 570       | 93519            | 33.0             | 700       | 10452            | 0.0              | 830       | 1862             | 0.0              | 960       | 2911             | 0.0              |
| 445       | 86383            | 57.8             | 575       | 95920            | 26.1             | 705       | 9162             | 0.0              | 835       | 1663             | 0.0              | 965       | 3163             | 0.0              |
| 450       | 49216            | 38.1             | 580       | 97650            | 20.1             | 710       | 8266             | 0.0              | 840       | 1843             | 0.0              | 970       | 1995             | 0.0              |
| 455       | 27376            | 23.9             | 585       | 98486            | 15.1             | 715       | 7583             | 0.0              | 845       | 1921             | 0.0              | 975       | 2418             | 0.0              |
| 460       | 17830            | 17.2             | 590       | 98332            | 10.9             | 720       | 6750             | 0.0              | 850       | 2105             | 0.0              | 980       | 2674             | 0.0              |
| 465       | 11374            | 12.0             | 595       | 96023            | 7.7              | 725       | 5965             | 0.0              | 855       | 2096             | 0.0              | 985       | 2850             | 0.0              |
| 470       | 8344             | 9.6              | 600       | 93650            | 5.3              | 730       | 5310             | 0.0              | 860       | 2601             | 0.0              | 990       | 1972             | 0.0              |
| 475       | 7639             | 9.6              | 605       | 90313            | 3.5              | 735       | 4838             | 0.0              | 865       | 2199             | 0.0              | 995       | 2443             | 0.0              |
| 480       | 7991             | 10.8             | 610       | 85305            | 2.3              | 740       | 4280             | 0.0              | 870       | 2491             | 0.0              | 1000      | 1979             | 0.0              |
| 485       | 9994             | 14.5             | 615       | 79870            | 1.5              | 745       | 3928             | 0.0              | 875       | 2370             | 0.0              |           |                  |                  |

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### Melanopic Flux vs. Wavelength



**Melanopic Lumens: 2823**

**M/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       | 1901             | 0.0              | 490       | 14057            | 11.7             | 620       | 73853            | 0.1              | 750       | 3678             | 0.0              | 880       | 2528             | 0.0              |
| 365       | 1585             | 0.0              | 495       | 20304            | 16.8             | 625       | 68653            | 0.0              | 755       | 3385             | 0.0              | 885       | 2638             | 0.0              |
| 370       | 1604             | 0.0              | 500       | 28346            | 22.8             | 630       | 62254            | 0.0              | 760       | 2963             | 0.0              | 890       | 2417             | 0.0              |
| 375       | 1905             | 0.0              | 505       | 37228            | 28.6             | 635       | 56177            | 0.0              | 765       | 2782             | 0.0              | 895       | 1902             | 0.0              |
| 380       | 1882             | 0.0              | 510       | 46037            | 33.1             | 640       | 50521            | 0.0              | 770       | 2657             | 0.0              | 900       | 2330             | 0.0              |
| 385       | 1693             | 0.0              | 515       | 53619            | 35.0             | 645       | 45727            | 0.0              | 775       | 2259             | 0.0              | 905       | 2456             | 0.0              |
| 390       | 1640             | 0.0              | 520       | 59890            | 34.9             | 650       | 40814            | 0.0              | 780       | 2169             | 0.0              | 910       | 2205             | 0.0              |
| 395       | 1513             | 0.0              | 525       | 64946            | 32.9             | 655       | 35925            | 0.0              | 785       | 2065             | 0.0              | 915       | 2002             | 0.0              |
| 400       | 1481             | 0.0              | 530       | 69048            | 29.8             | 660       | 31824            | 0.0              | 790       | 2054             | 0.0              | 920       | 2125             | 0.0              |
| 405       | 2044             | 0.0              | 535       | 72246            | 26.0             | 665       | 27860            | 0.0              | 795       | 1908             | 0.0              | 925       | 2266             | 0.0              |
| 410       | 3966             | 0.2              | 540       | 74621            | 21.8             | 670       | 24069            | 0.0              | 800       | 2026             | 0.0              | 930       | 2159             | 0.0              |
| 415       | 8943             | 0.6              | 545       | 77288            | 18.0             | 675       | 20926            | 0.0              | 805       | 1766             | 0.0              | 935       | 2581             | 0.0              |
| 420       | 19566            | 2.2              | 550       | 80334            | 14.4             | 680       | 18170            | 0.0              | 810       | 1913             | 0.0              | 940       | 2052             | 0.0              |
| 425       | 39243            | 6.1              | 555       | 83561            | 11.3             | 685       | 15785            | 0.0              | 815       | 2019             | 0.0              | 945       | 1631             | 0.0              |
| 430       | 66113            | 14.0             | 560       | 86964            | 8.6              | 690       | 13770            | 0.0              | 820       | 1876             | 0.0              | 950       | 2301             | 0.0              |
| 435       | 92550            | 24.7             | 565       | 90264            | 6.3              | 695       | 11953            | 0.0              | 825       | 1869             | 0.0              | 955       | 3077             | 0.0              |
| 440       | 106034           | 35.4             | 570       | 93519            | 4.6              | 700       | 10452            | 0.0              | 830       | 1862             | 0.0              | 960       | 2911             | 0.0              |
| 445       | 86383            | 34.1             | 575       | 95920            | 3.2              | 705       | 9162             | 0.0              | 835       | 1663             | 0.0              | 965       | 3163             | 0.0              |
| 450       | 49216            | 22.7             | 580       | 97650            | 2.2              | 710       | 8266             | 0.0              | 840       | 1843             | 0.0              | 970       | 1995             | 0.0              |
| 455       | 27376            | 14.3             | 585       | 98486            | 1.5              | 715       | 7583             | 0.0              | 845       | 1921             | 0.0              | 975       | 2418             | 0.0              |
| 460       | 17830            | 10.5             | 590       | 98332            | 1.0              | 720       | 6750             | 0.0              | 850       | 2105             | 0.0              | 980       | 2674             | 0.0              |
| 465       | 11374            | 7.4              | 595       | 96023            | 0.6              | 725       | 5965             | 0.0              | 855       | 2096             | 0.0              | 985       | 2850             | 0.0              |
| 470       | 8344             | 6.0              | 600       | 93650            | 0.4              | 730       | 5310             | 0.0              | 860       | 2601             | 0.0              | 990       | 1972             | 0.0              |
| 475       | 7639             | 5.8              | 605       | 90313            | 0.2              | 735       | 4838             | 0.0              | 865       | 2199             | 0.0              | 995       | 2443             | 0.0              |
| 480       | 7991             | 6.4              | 610       | 85305            | 0.2              | 740       | 4280             | 0.0              | 870       | 2491             | 0.0              | 1000      | 1979             | 0.0              |
| 485       | 9994             | 8.2              | 615       | 79870            | 0.1              | 745       | 3928             | 0.0              | 875       | 2370             | 0.0              |           |                  |                  |

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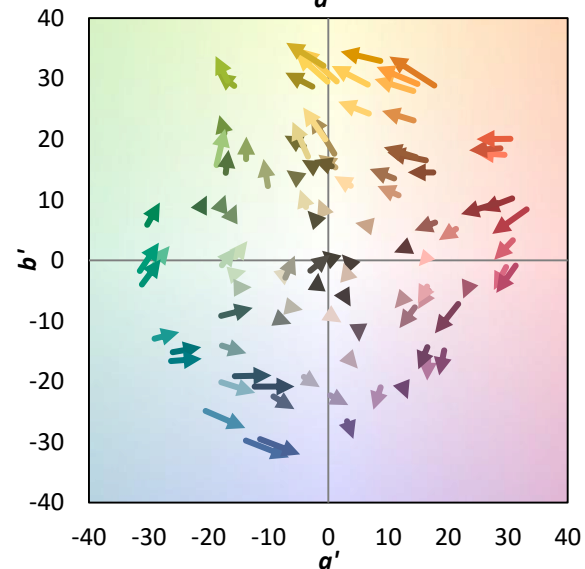
TM-30-18

### Summary

$R_f = 70.6$   
 $R_g = 96.7$   
 CIE  $R_a = 69.8$   
 $R_g = -35.1$



### Color Vector Graphics



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 54 | CES51 = 84 | CES76 = 46 |
| CES02 = 61 | CES27 = 76 | CES52 = 86 | CES77 = 70 |
| CES03 = 30 | CES28 = 78 | CES53 = 71 | CES78 = 50 |
| CES04 = 70 | CES29 = 46 | CES54 = 77 | CES79 = 77 |
| CES05 = 47 | CES30 = 49 | CES55 = 76 | CES80 = 75 |
| CES06 = 50 | CES31 = 52 | CES56 = 65 | CES81 = 74 |
| CES07 = 40 | CES32 = 51 | CES57 = 62 | CES82 = 90 |
| CES08 = 39 | CES33 = 57 | CES58 = 65 | CES83 = 84 |
| CES09 = 29 | CES34 = 65 | CES59 = 86 | CES84 = 89 |
| CES10 = 74 | CES35 = 81 | CES60 = 90 | CES85 = 87 |
| CES11 = 57 | CES36 = 82 | CES61 = 87 | CES86 = 71 |
| CES12 = 63 | CES37 = 74 | CES62 = 73 | CES87 = 77 |
| CES13 = 42 | CES38 = 58 | CES63 = 72 | CES88 = 75 |
| CES14 = 74 | CES39 = 91 | CES64 = 70 | CES89 = 72 |
| CES15 = 71 | CES40 = 84 | CES65 = 63 | CES90 = 71 |
| CES16 = 46 | CES41 = 79 | CES66 = 65 | CES91 = 95 |
| CES17 = 49 | CES42 = 74 | CES67 = 63 | CES92 = 68 |
| CES18 = 56 | CES43 = 69 | CES68 = 70 | CES93 = 82 |
| CES19 = 72 | CES44 = 98 | CES69 = 81 | CES94 = 56 |
| CES20 = 65 | CES45 = 79 | CES70 = 59 | CES95 = 74 |
| CES21 = 86 | CES46 = 75 | CES71 = 57 | CES96 = 78 |
| CES22 = 78 | CES47 = 69 | CES72 = 85 | CES97 = 82 |
| CES23 = 92 | CES48 = 58 | CES73 = 50 | CES98 = 71 |
| CES24 = 91 | CES49 = 74 | CES74 = 91 | CES99 = 59 |
| CES25 = 72 | CES50 = 83 | CES75 = 54 |            |



### Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)