

Signify Classified - Internal
Cooper Lighting Solutions Photometric Lab
1121 Highway 74 South
Peachtree City, GA 30269



Scaled data based on original data using
LM-79-2019 Approved Method: Electrical and Photometric Measurements of Solid-
State Lighting Products

Test Report Prepared for
Cooper Lighting Solutions

Brand: STREETWORKS

Report Number: P363511

Luminaire Tested: NVN-SA3A-827-U-SL2-HSS

Issue Date: 3/3/2020

Test Information

Test Method: LM-79-2019
Report Number: P363511
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-21)
Test Lab: INNOVATION CENTER
Issue Date: 3/3/2020
Manufacturer: COOPER LIGHTING SOLUTIONS
Product Line: STREETWORKS
Catalog Number: NVN-SA3A-827-U-SL2-HSS
Description: NAVION ROADWAY AND AREA LUMINAIRE
(3) 80 CRI, 2700K, 615mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE II SPILL
LIGHT ELIMINATOR OPTICS WITH HOUSE SIDE SHIELD
Light Source: -
Ballast/Driver: ELECTRONIC DRIVER

Summary

Lumens per Lamp: N/A
Luminaire Lumens: 8503 lumens
Efficiency: N/A
Efficacy: 88.6 lumens/watt
Luminous Opening: Rectangular (W 0.5' x L: 1.5' x H: 0')
IES Classification: Type III - Medium
BUG Rating: B1 - U0 - G2

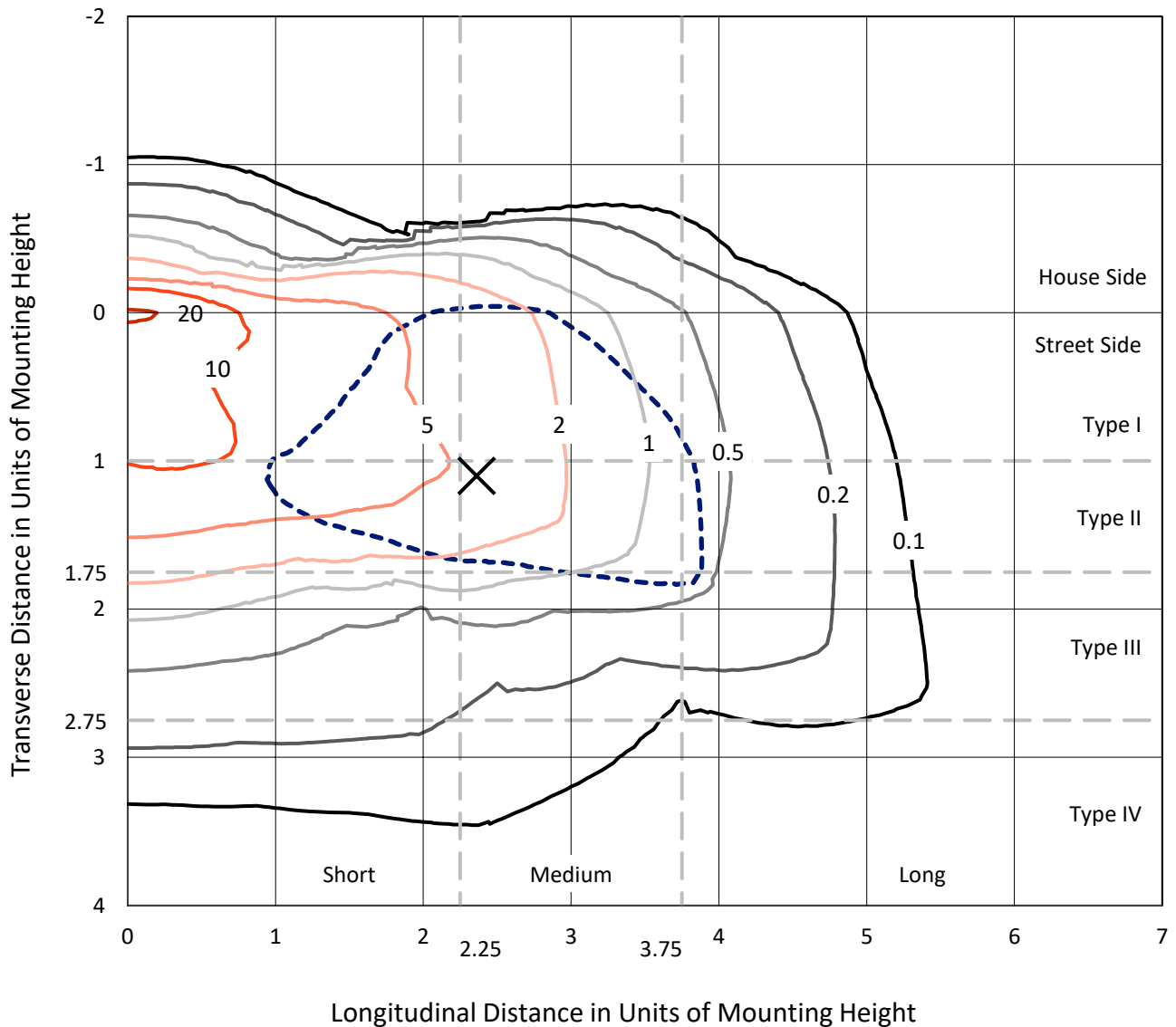
Input Watts (W): 96
Input Voltage (V): NR
Input Current (Ain): NR
Voltage Rise (V): NR
Power Factor: NR
Total Harmonic Distortion (THDi): NR
Frequency (hertz): 60
Stabilization Time: NR
Operation Time: NR
Ambient Temperature (°C): NR
Test Distance: 28.75 FT



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Iso-Footcandle Lines of Horizontal Illumination

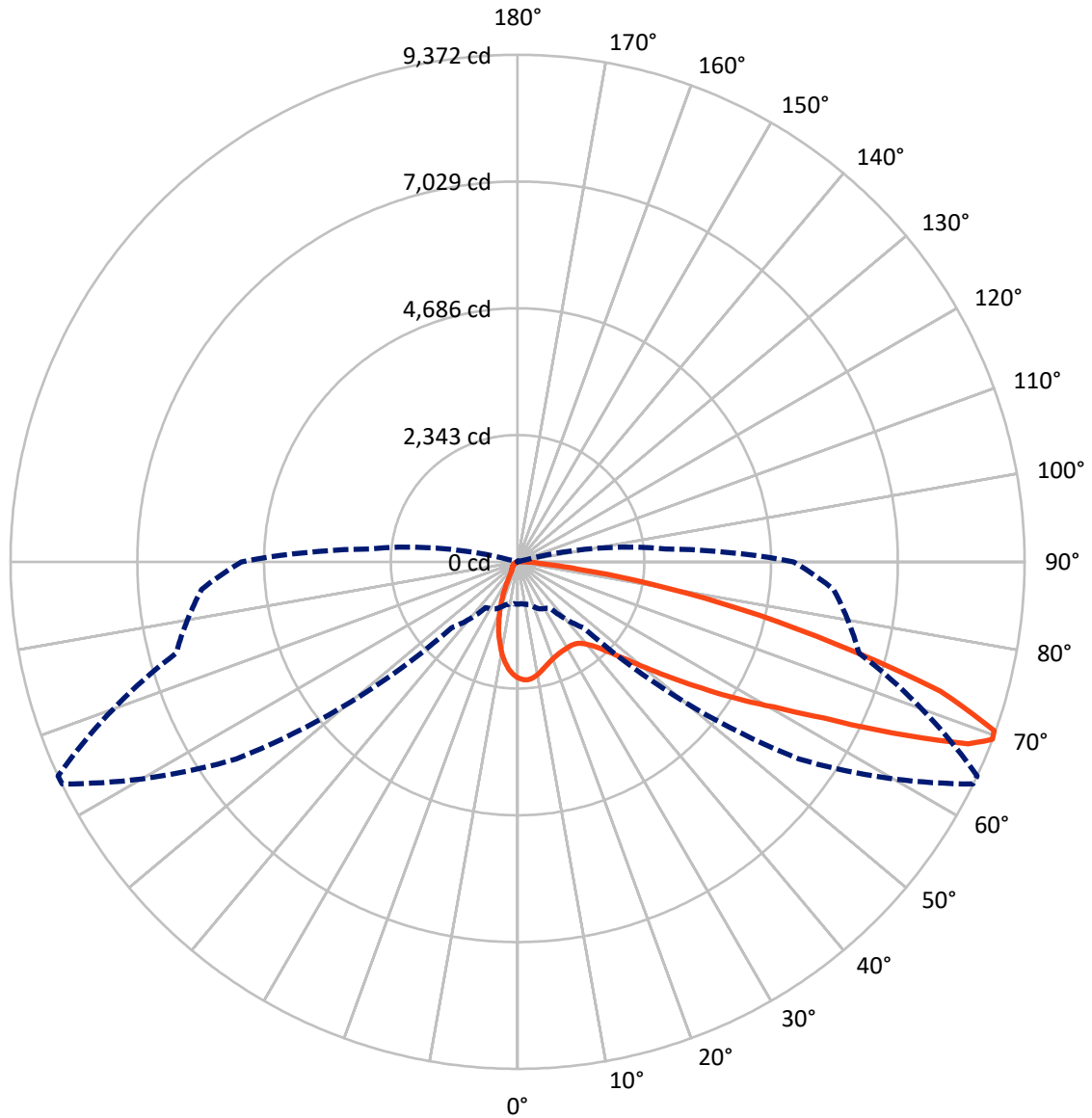
× Max cd
 - - - 1/2 Max cd



Based on 10 foot mounting height. Maximum calculated value = 21.5 fc
 Type III - Medium - N/A

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Luminous Intensity Polar Plot



— Vertical Plane Through 65-Deg Lateral - - - Horizontal Cone Through 69-Deg Vertical

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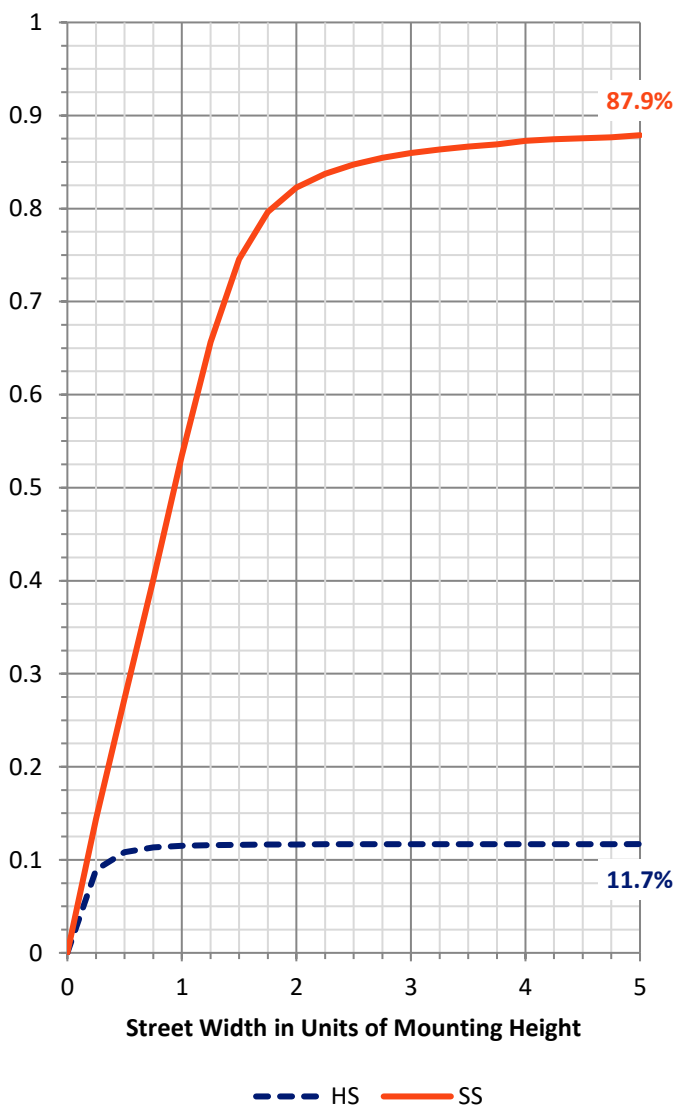
FLUX DISTRIBUTION:

| | | Downward | Upward | Total |
|--------------------|-----------|----------|--------|--------|
| House Side | Lumens | 1002.3 | 0.0 | 1002.3 |
| | % Fixture | 11.8 | 0.0 | 11.8 |
| Street Side | Lumens | 7500.7 | 0.0 | 7500.7 |
| | % Fixture | 88.2 | 0.0 | 88.2 |
| Total | Lumens | 8503.0 | 0.0 | 8503.0 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

ZONAL LUMENS:

| Zone | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10° | 179.7 | 2.1 |
| 10°-20° | 393.3 | 4.6 |
| 20°-30° | 544.8 | 6.4 |
| 30°-40° | 759.6 | 8.9 |
| 40°-50° | 1180.6 | 13.9 |
| 50°-60° | 1895.4 | 22.3 |
| 60°-70° | 2144.0 | 25.2 |
| 70°-80° | 1259.2 | 14.8 |
| 80°-90° | 146.5 | 1.7 |
| 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° | 8503.0 | 100.0 |
| 0°-180° | 8503.0 | 100.0 |

Coefficient of Utilization

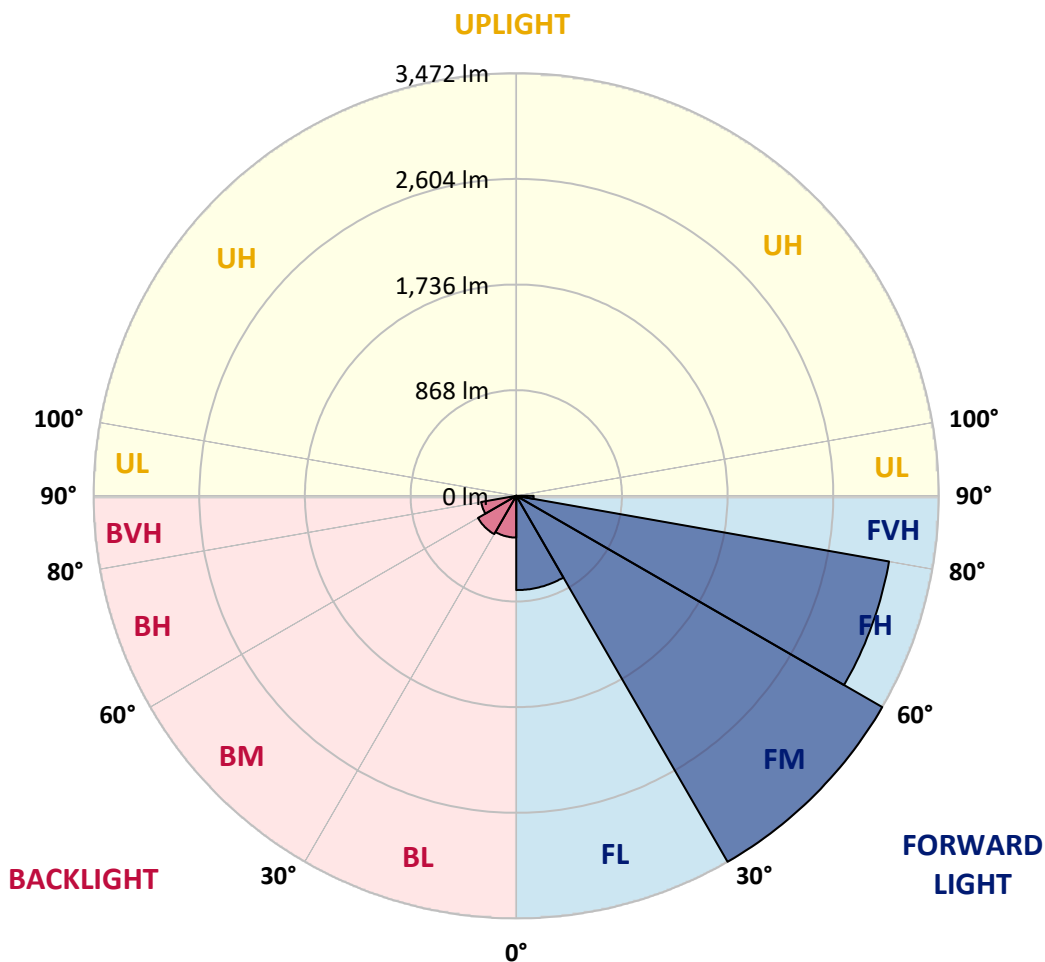


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LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | Lumens | % Fixture | Zone Rating/Lumen Limit | | |
|----------------|--------|-----------|-------------------------|------|---------|
| | | | B | U | G |
| FL (0°-30°) | 774.8 | 9.1 | | | |
| FM (30°-60°) | 3472.4 | 40.8 | | | |
| FH (60°-80°) | 3110.3 | 36.6 | | | G2/5000 |
| FVH (80°-90°) | 143.2 | 1.7 | | | G2/225 |
| BL (0°-30°) | 342.9 | 4.0 | B1/500 | | |
| BM (30°-60°) | 363.2 | 4.3 | B1/1000 | | |
| BH (60°-80°) | 292.9 | 3.4 | B1/500 | | G1/500 |
| BVH (80°-90°) | 3.3 | 0.0 | | | G0/10 |
| 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° | 64° | 65° | 75° | 85° |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0° | 2148.7 | 2148.7 | 2148.7 | 2148.7 | 2148.7 | 2148.7 | 2148.7 | 2148.7 | 2148.7 | 2148.7 | 2148.7 |
| 2.5° | 2167.8 | 2162.4 | 2166.7 | 2176.1 | 2180.7 | 2180.7 | 2184.3 | 2180.0 | 2181.5 | 2171.0 | 2155.9 |
| 5° | 2032.1 | 2023.9 | 2035.7 | 2062.0 | 2094.4 | 2122.1 | 2163.1 | 2184.7 | 2186.9 | 2187.2 | 2169.6 |
| 7.5° | 1886.1 | 1878.5 | 1896.1 | 1927.1 | 1968.8 | 2020.3 | 2091.9 | 2154.5 | 2158.1 | 2191.9 | 2178.9 |
| 10° | 1767.3 | 1761.9 | 1782.4 | 1815.5 | 1864.5 | 1922.0 | 2009.8 | 2096.9 | 2107.3 | 2182.2 | 2177.5 |
| 12.5° | 1673.1 | 1668.8 | 1688.2 | 1726.3 | 1776.3 | 1840.0 | 1931.8 | 2032.9 | 2046.9 | 2160.2 | 2170.3 |
| 15° | 1604.3 | 1603.6 | 1619.8 | 1656.5 | 1711.9 | 1771.3 | 1865.2 | 1973.5 | 1989.7 | 2136.5 | 2169.2 |
| 17.5° | 1568.4 | 1569.4 | 1581.3 | 1612.6 | 1660.1 | 1719.1 | 1809.1 | 1923.5 | 1941.1 | 2115.3 | 2174.6 |
| 20° | 1564.8 | 1565.8 | 1572.3 | 1590.0 | 1628.5 | 1680.6 | 1763.4 | 1881.4 | 1899.7 | 2099.4 | 2183.3 |
| 22.5° | 1596.4 | 1595.7 | 1597.5 | 1595.7 | 1617.3 | 1656.9 | 1733.2 | 1849.0 | 1870.2 | 2089.0 | 2190.1 |
| 25° | 1657.2 | 1656.2 | 1655.4 | 1642.1 | 1627.7 | 1649.0 | 1720.6 | 1830.7 | 1850.8 | 2081.4 | 2194.1 |
| 27.5° | 1741.8 | 1741.1 | 1740.0 | 1718.0 | 1674.9 | 1661.6 | 1722.0 | 1823.8 | 1840.7 | 2075.3 | 2193.3 |
| 30° | 1853.0 | 1858.0 | 1856.6 | 1826.0 | 1758.7 | 1700.1 | 1737.1 | 1820.2 | 1835.0 | 2063.5 | 2185.8 |
| 32.5° | 1983.6 | 1993.6 | 2001.6 | 1968.8 | 1884.6 | 1776.3 | 1772.0 | 1824.2 | 1835.0 | 2054.5 | 2172.1 |
| 35° | 2119.2 | 2132.2 | 2161.3 | 2149.8 | 2039.0 | 1891.1 | 1832.1 | 1847.9 | 1856.9 | 2059.5 | 2165.6 |
| 37.5° | 2252.7 | 2268.2 | 2331.5 | 2365.0 | 2241.2 | 2042.9 | 1925.6 | 1906.6 | 1911.3 | 2090.1 | 2172.8 |
| 40° | 2407.8 | 2431.2 | 2527.2 | 2581.2 | 2482.6 | 2246.2 | 2065.6 | 2007.3 | 2009.1 | 2157.4 | 2206.3 |
| 42.5° | 2611.4 | 2635.5 | 2739.5 | 2824.1 | 2754.6 | 2503.1 | 2255.6 | 2161.3 | 2159.5 | 2283.3 | 2285.1 |
| 45° | 2859.7 | 2884.9 | 2992.5 | 3086.4 | 3055.1 | 2807.5 | 2498.8 | 2386.2 | 2384.0 | 2481.9 | 2434.4 |
| 47.5° | 3141.1 | 3165.9 | 3261.9 | 3358.7 | 3392.6 | 3163.0 | 2808.6 | 2693.1 | 2688.1 | 2757.9 | 2665.0 |
| 50° | 3382.5 | 3398.7 | 3487.2 | 3617.4 | 3770.0 | 3599.8 | 3193.9 | 3082.8 | 3077.4 | 3124.5 | 3003.6 |
| 52.5° | 3470.3 | 3479.6 | 3569.6 | 3752.0 | 4132.7 | 4191.3 | 3700.2 | 3557.0 | 3553.0 | 3573.5 | 3454.4 |
| 55° | 3292.5 | 3309.4 | 3419.9 | 3690.5 | 4329.1 | 4859.8 | 4339.2 | 4144.2 | 4114.3 | 4070.1 | 3925.8 |
| 57.5° | 2808.2 | 2835.2 | 2954.0 | 3313.8 | 4237.4 | 5390.2 | 5278.3 | 4808.4 | 4764.5 | 4493.9 | 4309.0 |
| 60° | 2104.1 | 2137.2 | 2235.8 | 2624.0 | 3747.7 | 5579.1 | 6304.4 | 5548.5 | 5449.5 | 4831.4 | 4661.2 |
| 62.5° | 1443.9 | 1460.4 | 1527.3 | 1780.3 | 2760.0 | 5269.6 | 7162.9 | 6539.7 | 6359.1 | 5198.4 | 5042.2 |
| 65° | 1102.8 | 1108.5 | 1135.9 | 1223.0 | 1643.6 | 4280.5 | 7504.3 | 7847.6 | 7629.2 | 5637.3 | 5437.7 |
| 67.5° | 888.7 | 884.0 | 921.8 | 1046.3 | 1100.6 | 2611.4 | 7106.0 | 9084.9 | 8982.8 | 6224.2 | 5835.6 |
| 69° | 783.6 | 777.2 | 815.7 | 960.3 | 1033.7 | 1726.3 | 6352.6 | 9365.9 | 9372.4 | 6534.0 | 5862.9 |
| 70° | 705.2 | 709.5 | 747.7 | 909.2 | 1011.0 | 1355.0 | 5633.0 | 9294.3 | 9345.4 | 6649.8 | 5698.9 |
| 72.5° | 471.0 | 482.5 | 559.1 | 754.9 | 972.2 | 1025.4 | 3401.2 | 7975.7 | 8172.1 | 6389.0 | 4889.3 |
| 75° | 265.5 | 274.2 | 365.2 | 569.2 | 916.0 | 976.5 | 1796.5 | 5875.9 | 6065.9 | 5342.7 | 3770.3 |
| 77.5° | 130.2 | 134.9 | 206.5 | 367.4 | 766.0 | 930.4 | 1019.0 | 3991.3 | 4208.2 | 3487.2 | 2132.5 |
| 80° | 55.0 | 57.6 | 103.3 | 226.7 | 547.6 | 888.0 | 756.7 | 2456.4 | 2483.3 | 1366.2 | 568.1 |
| 82.5° | 21.2 | 21.9 | 43.5 | 141.4 | 347.9 | 692.3 | 632.9 | 1164.7 | 1136.6 | 257.3 | 129.5 |
| 85° | 2.5 | 2.9 | 15.8 | 84.9 | 193.6 | 356.2 | 514.2 | 501.9 | 464.5 | 51.1 | 66.6 |
| 87.5° | 0.0 | 0.0 | 1.1 | 25.9 | 57.6 | 166.9 | 267.3 | 208.3 | 187.8 | 16.6 | 34.5 |
| 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: NVN-SA3A-827-U-SL2-HSS

CANDELA DISTRIBUTION (continued):

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0° | 2148.7 | 2148.7 | 2148.7 | 2148.7 | 2148.7 | 2148.7 | 2148.7 | 2148.7 | 2148.7 | 2148.7 | 2148.7 |
| 2.5° | 2143.3 | 2139.7 | 2120.3 | 2092.2 | 2065.6 | 2032.5 | 2000.8 | 1981.8 | 1966.7 | 1956.6 | 1968.5 |
| 5° | 2149.1 | 2133.3 | 2074.2 | 1998.7 | 1924.6 | 1841.1 | 1763.4 | 1697.5 | 1671.6 | 1642.8 | 1655.8 |
| 7.5° | 2147.3 | 2117.4 | 2011.3 | 1876.7 | 1740.7 | 1600.0 | 1466.9 | 1364.4 | 1311.1 | 1258.9 | 1272.3 |
| 10° | 2138.3 | 2087.9 | 1927.1 | 1727.8 | 1524.1 | 1321.9 | 1133.0 | 989.4 | 909.2 | 836.5 | 847.0 |
| 12.5° | 2118.5 | 2048.3 | 1827.8 | 1557.2 | 1284.8 | 1018.2 | 797.0 | 613.1 | 514.5 | 471.0 | 476.4 |
| 15° | 2106.6 | 2009.8 | 1722.7 | 1384.5 | 1029.4 | 709.2 | 487.2 | 362.3 | 317.3 | 303.0 | 304.8 |
| 17.5° | 2100.9 | 1972.8 | 1614.1 | 1187.0 | 768.2 | 451.5 | 314.8 | 277.8 | 268.1 | 265.5 | 266.3 |
| 20° | 2095.1 | 1935.4 | 1502.2 | 991.6 | 529.3 | 303.7 | 258.7 | 247.9 | 244.3 | 241.1 | 241.8 |
| 22.5° | 2085.4 | 1899.4 | 1382.0 | 793.7 | 356.9 | 246.5 | 233.2 | 222.7 | 215.2 | 211.2 | 211.9 |
| 25° | 2073.5 | 1861.6 | 1259.3 | 591.2 | 260.5 | 219.8 | 207.2 | 192.5 | 183.5 | 176.3 | 176.7 |
| 27.5° | 2054.5 | 1815.2 | 1132.6 | 430.3 | 218.8 | 196.8 | 179.9 | 163.7 | 148.6 | 140.3 | 140.3 |
| 30° | 2027.8 | 1762.7 | 992.0 | 308.0 | 196.1 | 174.1 | 153.6 | 133.5 | 117.3 | 109.7 | 109.0 |
| 32.5° | 1998.3 | 1708.0 | 849.8 | 233.5 | 178.1 | 152.9 | 129.5 | 108.3 | 93.9 | 87.8 | 87.4 |
| 35° | 1973.1 | 1649.0 | 708.1 | 195.7 | 160.1 | 132.4 | 106.9 | 88.9 | 77.4 | 72.3 | 72.0 |
| 37.5° | 1956.9 | 1590.0 | 569.9 | 174.9 | 143.9 | 113.3 | 89.6 | 73.4 | 65.1 | 61.2 | 60.8 |
| 40° | 1954.4 | 1546.1 | 443.6 | 159.0 | 128.8 | 96.4 | 74.8 | 62.2 | 54.7 | 50.4 | 50.0 |
| 42.5° | 1987.2 | 1520.9 | 340.4 | 145.7 | 113.3 | 81.7 | 63.7 | 53.3 | 45.3 | 41.0 | 40.7 |
| 45° | 2073.2 | 1528.8 | 261.9 | 133.8 | 97.9 | 69.1 | 54.0 | 44.3 | 37.1 | 33.8 | 33.1 |
| 47.5° | 2230.0 | 1583.5 | 208.3 | 122.0 | 83.1 | 58.6 | 46.1 | 36.7 | 30.6 | 27.3 | 27.0 |
| 50° | 2509.2 | 1711.9 | 174.1 | 109.0 | 69.4 | 50.0 | 38.1 | 29.9 | 24.8 | 21.9 | 21.6 |
| 52.5° | 2879.8 | 1940.8 | 155.4 | 96.4 | 57.6 | 42.5 | 31.3 | 23.7 | 19.4 | 17.3 | 16.9 |
| 55° | 3288.6 | 2217.8 | 143.2 | 82.8 | 47.1 | 35.3 | 24.8 | 18.7 | 15.1 | 13.3 | 12.6 |
| 57.5° | 3687.6 | 2457.8 | 131.7 | 69.4 | 39.2 | 28.8 | 19.8 | 14.8 | 11.9 | 10.1 | 9.7 |
| 60° | 4054.2 | 2678.3 | 118.4 | 55.8 | 32.0 | 22.7 | 15.5 | 11.5 | 9.4 | 7.6 | 7.6 |
| 62.5° | 4446.8 | 2848.9 | 100.0 | 43.5 | 26.3 | 17.3 | 12.6 | 10.4 | 7.6 | 6.5 | 6.1 |
| 65° | 4862.7 | 2975.5 | 78.4 | 33.8 | 20.5 | 13.0 | 10.4 | 10.8 | 6.1 | 4.7 | 4.3 |
| 67.5° | 5170.0 | 2950.4 | 57.9 | 26.6 | 15.8 | 10.1 | 10.1 | 11.5 | 5.4 | 3.6 | 3.2 |
| 69° | 5102.3 | 2745.6 | 48.6 | 23.0 | 13.7 | 8.6 | 9.4 | 11.5 | 5.0 | 3.2 | 2.9 |
| 70° | 4906.2 | 2519.0 | 42.8 | 20.5 | 12.2 | 7.9 | 9.0 | 11.2 | 4.7 | 3.2 | 2.9 |
| 72.5° | 4085.9 | 1897.2 | 33.5 | 15.5 | 9.7 | 6.5 | 7.6 | 9.7 | 4.7 | 3.2 | 2.5 |
| 75° | 3073.4 | 1214.3 | 25.5 | 11.2 | 7.2 | 5.0 | 5.8 | 7.2 | 4.7 | 2.9 | 2.5 |
| 77.5° | 1672.3 | 437.9 | 18.3 | 7.6 | 5.0 | 4.0 | 4.0 | 5.4 | 4.3 | 2.2 | 1.4 |
| 80° | 430.0 | 110.1 | 11.5 | 5.0 | 4.0 | 2.9 | 2.5 | 3.6 | 2.5 | 0.4 | 0.0 |
| 82.5° | 106.1 | 24.8 | 6.1 | 3.6 | 2.9 | 1.1 | 1.1 | 1.8 | 1.1 | 0.0 | 0.0 |
| 85° | 58.3 | 12.2 | 4.0 | 2.5 | 1.4 | 0.0 | 0.0 | 0.4 | 0.0 | 0.0 | 0.0 |
| 87.5° | 29.9 | 3.6 | 1.1 | 0.7 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 90° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

Cooper Lighting Solutions Photometric Lab
1121 Highway 74 South
Peachtree City, GA 30269



LM-79-2019: Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Report Prepared for

Cooper Lighting Solutions

Invue

Report Number: SP1-2407-157-9

Test Date: 10/03/2024

Luminaire Tested: EMM2-HTN-SA1A-827-U-5WQ

Data applicable to all product families utilizing light square engine

Test Information

Test Method: LM-79-2019
 Report Number: SP1-2407-157-9
 Test Lab: COOPER LIGHTING SOLUTIONS
 Photometer: SP1 - 76IN SPHERE
 Measurement Geometry: 4π
 Issue Date: 10/03/2024
 Manufacturer: COOPER LIGHTING SOLUTIONS
 Product Line: Invue
 Catalog Number: **EMM2-HTN-SA1A-827-U-5WQ**
 Description: Epic Modern Light Square 40W 5WQ Optic

Spectral Parameters

CCT (K): 2764
 CIE u': 0.2591
 CIE v': 0.5290
 Duv: 0.0020
 CIE x: 0.4581
 CIE y: 0.4156
 CIE z: 0.1263
 Peak Wavelength (nm): 603
 Dominant Wavelength (nm): 583
 Purity: 62.2537
 Rf: 84.7
 Rg: 94.6

| | | | |
|-----------|------|------|------|
| CRI (Ra): | 80.9 | | |
| R1: | 78.8 | R9: | -1.5 |
| R2: | 89.9 | R10: | 77.9 |
| R3: | 96.2 | R11: | 78.9 |
| R4: | 79.1 | R12: | 71.6 |
| R5: | 79.1 | R13: | 81.2 |
| R6: | 88.8 | R14: | 98.5 |
| R7: | 81.3 | R15: | 69.9 |
| R8: | 54.3 | | |



Test Conditions

Stabilization Time: 81M
 Operation Time: 2H 21M
 Sphere Temperature (°C): 25.2

REPORT NUMBER: SP1-2407-157-9

| Measurement and Test Equipment | | | |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 6/18/2024 | 12/18/2024 |
| Power Meter | INXT2011004 | 2/8/2024 | 2/8/2025 |
| AC Power Source | IN0063 | 10/24/2023 | 10/24/2024 |
| DC Power Source | IN0208 | 10/24/2023 | 10/24/2024 |
| Sphere Thermometer | IN0085 | 10/24/2023 | 10/24/2024 |
| Room Thermometer | IN0046 | 10/24/2023 | 10/24/2024 |

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CIE 1931 Chromaticity Diagram



CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles



Point lies inside the ANSI 2700K 4-step quadrangle

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Photopic Flux vs. Wavelength



Photopic Lumens: 4337.9

| λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) | λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) | λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) | λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) | λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) |
|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|
| 360 | 0 | 0.0 | 490 | 18018 | 2.6 | 620 | 87426 | 22.8 | 750 | 2680 | 0.0 | 880 | 58 | 0.0 |
| 365 | 0 | 0.0 | 495 | 22295 | 3.9 | 625 | 83013 | 18.2 | 755 | 2287 | 0.0 | 885 | 46 | 0.0 |
| 370 | 0 | 0.0 | 500 | 26478 | 5.8 | 630 | 78077 | 14.1 | 760 | 1944 | 0.0 | 890 | 45 | 0.0 |
| 375 | 0 | 0.0 | 505 | 30524 | 8.5 | 635 | 72080 | 10.7 | 765 | 1653 | 0.0 | 895 | 41 | 0.0 |
| 380 | 0 | 0.0 | 510 | 33611 | 11.5 | 640 | 66249 | 7.9 | 770 | 1413 | 0.0 | 900 | 38 | 0.0 |
| 385 | 0 | 0.0 | 515 | 36490 | 15.2 | 645 | 59973 | 5.7 | 775 | 1198 | 0.0 | 905 | 33 | 0.0 |
| 390 | 0 | 0.0 | 520 | 38610 | 18.7 | 650 | 53972 | 3.9 | 780 | 1025 | 0.0 | 910 | 30 | 0.0 |
| 395 | 0 | 0.0 | 525 | 40511 | 21.9 | 655 | 48369 | 2.7 | 785 | 874 | 0.0 | 915 | 23 | 0.0 |
| 400 | 48 | 0.0 | 530 | 42223 | 24.9 | 660 | 42641 | 1.8 | 790 | 747 | 0.0 | 920 | 24 | 0.0 |
| 405 | 201 | 0.0 | 535 | 44137 | 27.6 | 665 | 37602 | 1.1 | 795 | 639 | 0.0 | 925 | 22 | 0.0 |
| 410 | 457 | 0.0 | 540 | 46032 | 30.0 | 670 | 32798 | 0.7 | 800 | 547 | 0.0 | 930 | 22 | 0.0 |
| 415 | 925 | 0.0 | 545 | 48553 | 32.5 | 675 | 28558 | 0.5 | 805 | 473 | 0.0 | 935 | 17 | 0.0 |
| 420 | 1816 | 0.0 | 550 | 51408 | 34.9 | 680 | 24782 | 0.3 | 810 | 401 | 0.0 | 940 | 13 | 0.0 |
| 425 | 3217 | 0.0 | 555 | 54711 | 37.4 | 685 | 21386 | 0.2 | 815 | 351 | 0.0 | 945 | 6 | 0.0 |
| 430 | 5520 | 0.0 | 560 | 58847 | 40.0 | 690 | 18413 | 0.1 | 820 | 307 | 0.0 | 950 | 10 | 0.0 |
| 435 | 9225 | 0.1 | 565 | 63386 | 42.4 | 695 | 15721 | 0.1 | 825 | 261 | 0.0 | 955 | 11 | 0.0 |
| 440 | 15522 | 0.2 | 570 | 68196 | 44.3 | 700 | 13432 | 0.0 | 830 | 228 | 0.0 | 960 | 8 | 0.0 |
| 445 | 27642 | 0.6 | 575 | 73613 | 46.0 | 705 | 11513 | 0.0 | 835 | 193 | 0.0 | 965 | 12 | 0.0 |
| 450 | 36602 | 0.9 | 580 | 79207 | 47.1 | 710 | 9780 | 0.0 | 840 | 174 | 0.0 | 970 | 3 | 0.0 |
| 455 | 28292 | 0.9 | 585 | 84248 | 47.0 | 715 | 8356 | 0.0 | 845 | 151 | 0.0 | 975 | 8 | 0.0 |
| 460 | 21166 | 0.9 | 590 | 88397 | 45.7 | 720 | 7161 | 0.0 | 850 | 123 | 0.0 | 980 | 2 | 0.0 |
| 465 | 19092 | 1.0 | 595 | 91428 | 43.4 | 725 | 6067 | 0.0 | 855 | 106 | 0.0 | 985 | 13 | 0.0 |
| 470 | 14951 | 0.9 | 600 | 93452 | 40.3 | 730 | 5164 | 0.0 | 860 | 95 | 0.0 | 990 | 16 | 0.0 |
| 475 | 12606 | 1.0 | 605 | 93959 | 36.4 | 735 | 4393 | 0.0 | 865 | 82 | 0.0 | 995 | 20 | 0.0 |
| 480 | 13323 | 1.3 | 610 | 93079 | 32.0 | 740 | 3694 | 0.0 | 870 | 77 | 0.0 | 1000 | 0 | 0.0 |
| 485 | 15164 | 1.8 | 615 | 90707 | 27.3 | 745 | 3157 | 0.0 | 875 | 65 | 0.0 | | | |

REPORT NUMBER: SP1-2407-157-9

Scotopic Flux vs. Wavelength



Scotopic Lumens: 5286.7

S/P: 1.22

| λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) | λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) | λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) | λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) | λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) |
|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|
| 360 | 0 | 0.0 | 490 | 18018 | 75.9 | 620 | 87426 | 0.4 | 750 | 2680 | 0.0 | 880 | 58 | 0.0 |
| 365 | 0 | 0.0 | 495 | 22295 | 93.2 | 625 | 83013 | 0.2 | 755 | 2287 | 0.0 | 885 | 46 | 0.0 |
| 370 | 0 | 0.0 | 500 | 26478 | 107.8 | 630 | 78077 | 0.1 | 760 | 1944 | 0.0 | 890 | 45 | 0.0 |
| 375 | 0 | 0.0 | 505 | 30524 | 118.7 | 635 | 72080 | 0.1 | 765 | 1653 | 0.0 | 895 | 41 | 0.0 |
| 380 | 0 | 0.0 | 510 | 33611 | 122.2 | 640 | 66249 | 0.1 | 770 | 1413 | 0.0 | 900 | 38 | 0.0 |
| 385 | 0 | 0.0 | 515 | 36490 | 120.8 | 645 | 59973 | 0.0 | 775 | 1198 | 0.0 | 905 | 33 | 0.0 |
| 390 | 0 | 0.0 | 520 | 38610 | 113.9 | 650 | 53972 | 0.0 | 780 | 1025 | 0.0 | 910 | 30 | 0.0 |
| 395 | 0 | 0.0 | 525 | 40511 | 104.1 | 655 | 48369 | 0.0 | 785 | 874 | 0.0 | 915 | 23 | 0.0 |
| 400 | 48 | 0.0 | 530 | 42223 | 92.4 | 660 | 42641 | 0.0 | 790 | 747 | 0.0 | 920 | 24 | 0.0 |
| 405 | 201 | 0.0 | 535 | 44137 | 80.5 | 665 | 37602 | 0.0 | 795 | 639 | 0.0 | 925 | 22 | 0.0 |
| 410 | 457 | 0.1 | 540 | 46032 | 68.2 | 670 | 32798 | 0.0 | 800 | 547 | 0.0 | 930 | 22 | 0.0 |
| 415 | 925 | 0.3 | 545 | 48553 | 57.1 | 675 | 28558 | 0.0 | 805 | 473 | 0.0 | 935 | 17 | 0.0 |
| 420 | 1816 | 1.1 | 550 | 51408 | 46.7 | 680 | 24782 | 0.0 | 810 | 401 | 0.0 | 940 | 13 | 0.0 |
| 425 | 3217 | 2.5 | 555 | 54711 | 37.4 | 685 | 21386 | 0.0 | 815 | 351 | 0.0 | 945 | 6 | 0.0 |
| 430 | 5520 | 5.9 | 560 | 58847 | 29.4 | 690 | 18413 | 0.0 | 820 | 307 | 0.0 | 950 | 10 | 0.0 |
| 435 | 9225 | 12.5 | 565 | 63386 | 22.5 | 695 | 15721 | 0.0 | 825 | 261 | 0.0 | 955 | 11 | 0.0 |
| 440 | 15522 | 26.3 | 570 | 68196 | 16.9 | 700 | 13432 | 0.0 | 830 | 228 | 0.0 | 960 | 8 | 0.0 |
| 445 | 27642 | 55.2 | 575 | 73613 | 12.4 | 705 | 11513 | 0.0 | 835 | 193 | 0.0 | 965 | 12 | 0.0 |
| 450 | 36602 | 85.4 | 580 | 79207 | 9.0 | 710 | 9780 | 0.0 | 840 | 174 | 0.0 | 970 | 3 | 0.0 |
| 455 | 28292 | 75.1 | 585 | 84248 | 6.3 | 715 | 8356 | 0.0 | 845 | 151 | 0.0 | 975 | 8 | 0.0 |
| 460 | 21166 | 63.2 | 590 | 88397 | 4.4 | 720 | 7161 | 0.0 | 850 | 123 | 0.0 | 980 | 2 | 0.0 |
| 465 | 19092 | 63.2 | 595 | 91428 | 3.0 | 725 | 6067 | 0.0 | 855 | 106 | 0.0 | 985 | 13 | 0.0 |
| 470 | 14951 | 54.2 | 600 | 93452 | 2.0 | 730 | 5164 | 0.0 | 860 | 95 | 0.0 | 990 | 16 | 0.0 |
| 475 | 12606 | 48.8 | 605 | 93959 | 1.3 | 735 | 4393 | 0.0 | 865 | 82 | 0.0 | 995 | 20 | 0.0 |
| 480 | 13323 | 54.2 | 610 | 93079 | 0.9 | 740 | 3694 | 0.0 | 870 | 77 | 0.0 | 1000 | 0 | 0.0 |
| 485 | 15164 | 63.3 | 615 | 90707 | 0.5 | 745 | 3157 | 0.0 | 875 | 65 | 0.0 | | | |

REPORT NUMBER: SP1-2407-157-9

Melanopic Flux vs. Wavelength



Melanopic Lumens: 9797

M/P: 2.26

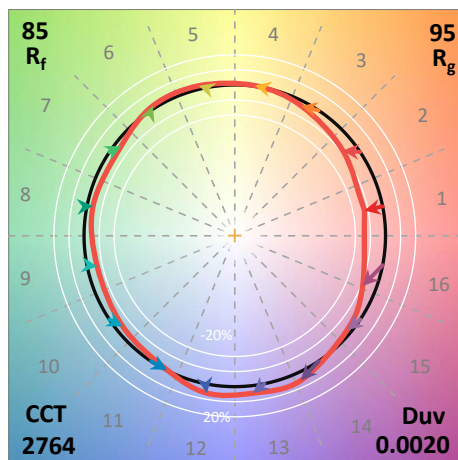
| λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) | λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) | λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) | λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) | λ (nm) | Power ($\mu\text{W}/\text{nm}$) | Lumens (ϕ/nm) |
|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|
| 360 | 0 | 0.0 | 490 | 18018 | 27.7 | 620 | 87426 | 1.1 | 750 | 2680 | 0.0 | 880 | 58 | 0.0 |
| 365 | 0 | 0.0 | 495 | 22295 | 36.0 | 625 | 83013 | 0.7 | 755 | 2287 | 0.0 | 885 | 46 | 0.0 |
| 370 | 0 | 0.0 | 500 | 26478 | 44.2 | 630 | 78077 | 0.4 | 760 | 1944 | 0.0 | 890 | 45 | 0.0 |
| 375 | 0 | 0.0 | 505 | 30524 | 51.8 | 635 | 72080 | 0.3 | 765 | 1653 | 0.0 | 895 | 41 | 0.0 |
| 380 | 0 | 0.0 | 510 | 33611 | 57.0 | 640 | 66249 | 0.2 | 770 | 1413 | 0.0 | 900 | 38 | 0.0 |
| 385 | 0 | 0.0 | 515 | 36490 | 60.5 | 645 | 59973 | 0.1 | 775 | 1198 | 0.0 | 905 | 33 | 0.0 |
| 390 | 0 | 0.0 | 520 | 38610 | 61.4 | 650 | 53972 | 0.1 | 780 | 1025 | 0.0 | 910 | 30 | 0.0 |
| 395 | 0 | 0.0 | 525 | 40511 | 60.6 | 655 | 48369 | 0.0 | 785 | 874 | 0.0 | 915 | 23 | 0.0 |
| 400 | 48 | 0.0 | 530 | 42223 | 58.2 | 660 | 42641 | 0.0 | 790 | 747 | 0.0 | 920 | 24 | 0.0 |
| 405 | 201 | 0.0 | 535 | 44137 | 55.0 | 665 | 37602 | 0.0 | 795 | 639 | 0.0 | 925 | 22 | 0.0 |
| 410 | 457 | 0.0 | 540 | 46032 | 50.9 | 670 | 32798 | 0.0 | 800 | 547 | 0.0 | 930 | 22 | 0.0 |
| 415 | 925 | 0.1 | 545 | 48553 | 46.6 | 675 | 28558 | 0.0 | 805 | 473 | 0.0 | 935 | 17 | 0.0 |
| 420 | 1816 | 0.3 | 550 | 51408 | 42.0 | 680 | 24782 | 0.0 | 810 | 401 | 0.0 | 940 | 13 | 0.0 |
| 425 | 3217 | 0.8 | 555 | 54711 | 37.4 | 685 | 21386 | 0.0 | 815 | 351 | 0.0 | 945 | 6 | 0.0 |
| 430 | 5520 | 1.9 | 560 | 58847 | 32.9 | 690 | 18413 | 0.0 | 820 | 307 | 0.0 | 950 | 10 | 0.0 |
| 435 | 9225 | 4.1 | 565 | 63386 | 28.4 | 695 | 15721 | 0.0 | 825 | 261 | 0.0 | 955 | 11 | 0.0 |
| 440 | 15522 | 8.7 | 570 | 68196 | 24.1 | 700 | 13432 | 0.0 | 830 | 228 | 0.0 | 960 | 8 | 0.0 |
| 445 | 27642 | 18.5 | 575 | 73613 | 20.0 | 705 | 11513 | 0.0 | 835 | 193 | 0.0 | 965 | 12 | 0.0 |
| 450 | 36602 | 28.3 | 580 | 79207 | 16.3 | 710 | 9780 | 0.0 | 840 | 174 | 0.0 | 970 | 3 | 0.0 |
| 455 | 28292 | 24.7 | 585 | 84248 | 12.9 | 715 | 8356 | 0.0 | 845 | 151 | 0.0 | 975 | 8 | 0.0 |
| 460 | 21166 | 20.4 | 590 | 88397 | 9.8 | 720 | 7161 | 0.0 | 850 | 123 | 0.0 | 980 | 2 | 0.0 |
| 465 | 19092 | 20.1 | 595 | 91428 | 7.3 | 725 | 6067 | 0.0 | 855 | 106 | 0.0 | 985 | 13 | 0.0 |
| 470 | 14951 | 17.2 | 600 | 93452 | 5.3 | 730 | 5164 | 0.0 | 860 | 95 | 0.0 | 990 | 16 | 0.0 |
| 475 | 12606 | 15.7 | 605 | 93959 | 3.7 | 735 | 4393 | 0.0 | 865 | 82 | 0.0 | 995 | 20 | 0.0 |
| 480 | 13323 | 18.0 | 610 | 93079 | 2.5 | 740 | 3694 | 0.0 | 870 | 77 | 0.0 | 1000 | 0 | 0.0 |
| 485 | 15164 | 21.9 | 615 | 90707 | 1.7 | 745 | 3157 | 0.0 | 875 | 65 | 0.0 | | | |

Summary

$R_f = 84.7$
 $R_g = 94.6$
 $CIE R_a = 80.9$
 $R_g = -1.5$



Color Vector Graphics

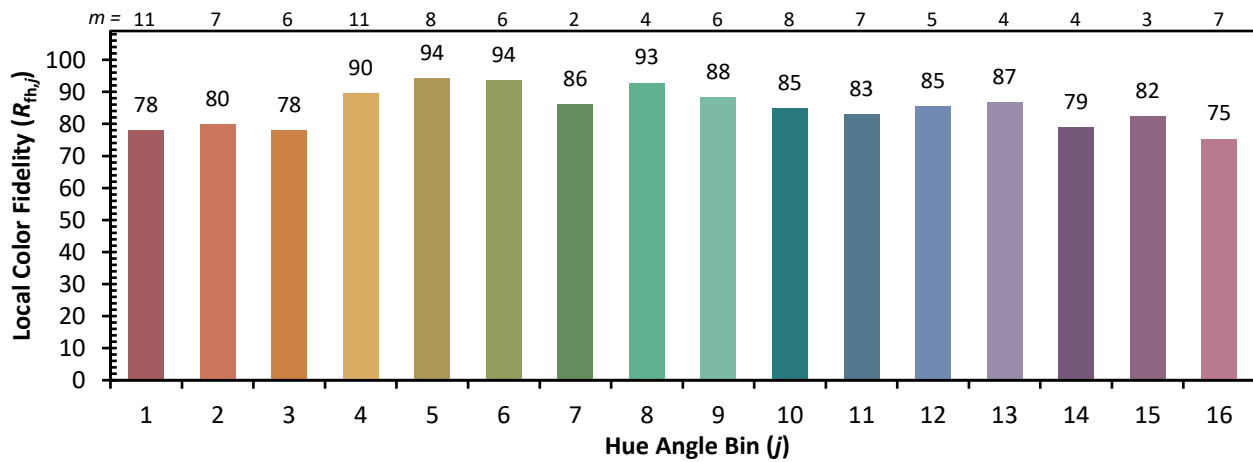


Individual Sample Fidelity Index ($R_{f,i}$)

| | | | |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 84 | CES51 = 95 | CES76 = 81 |
| CES02 = 63 | CES27 = 95 | CES52 = 94 | CES77 = 84 |
| CES03 = 31 | CES28 = 94 | CES53 = 89 | CES78 = 81 |
| CES04 = 71 | CES29 = 87 | CES54 = 91 | CES79 = 89 |
| CES05 = 50 | CES30 = 94 | CES55 = 90 | CES80 = 89 |
| CES06 = 52 | CES31 = 89 | CES56 = 86 | CES81 = 69 |
| CES07 = 43 | CES32 = 82 | CES57 = 85 | CES82 = 96 |
| CES08 = 41 | CES33 = 91 | CES58 = 86 | CES83 = 93 |
| CES09 = 29 | CES34 = 92 | CES59 = 91 | CES84 = 92 |
| CES10 = 77 | CES35 = 96 | CES60 = 94 | CES85 = 76 |
| CES11 = 60 | CES36 = 90 | CES61 = 89 | CES86 = 65 |
| CES12 = 66 | CES37 = 96 | CES62 = 94 | CES87 = 84 |
| CES13 = 44 | CES38 = 98 | CES63 = 87 | CES88 = 86 |
| CES14 = 74 | CES39 = 98 | CES64 = 82 | CES89 = 73 |
| CES15 = 72 | CES40 = 95 | CES65 = 78 | CES90 = 88 |
| CES16 = 48 | CES41 = 96 | CES66 = 81 | CES91 = 82 |
| CES17 = 50 | CES42 = 97 | CES67 = 80 | CES92 = 64 |
| CES18 = 57 | CES43 = 91 | CES68 = 83 | CES93 = 78 |
| CES19 = 73 | CES44 = 99 | CES69 = 88 | CES94 = 59 |
| CES20 = 67 | CES45 = 93 | CES70 = 80 | CES95 = 74 |
| CES21 = 87 | CES46 = 89 | CES71 = 79 | CES96 = 83 |
| CES22 = 79 | CES47 = 92 | CES72 = 92 | CES97 = 88 |
| CES23 = 92 | CES48 = 83 | CES73 = 75 | CES98 = 83 |
| CES24 = 91 | CES49 = 90 | CES74 = 91 | CES99 = 74 |
| CES25 = 72 | CES50 = 94 | CES75 = 81 | |



Color Rendition by Hue-Angle Bin



Measure Comparisons



(END OF REPORT)