

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: P362952

Luminaire Tested: NVN-SA2D-827-U-T2-HSS

Issue Date: 3/3/2020

Test Information

Test Method: LM-79-2019
Report Number: P362952
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-13)
Test Lab: INNOVATION CENTER
Issue Date: 3/3/2020
Manufacturer: COOPER LIGHTING SOLUTIONS
Product Line: STREETWORKS
Catalog Number: NVN-SA2D-827-U-T2-HSS
Description: NAVION ROADWAY AND AREA LUMINAIRE
(2) 80 CRI, 2700K, 1200mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE II OPTICS WITH HOUSE SIDE SHIELD
Light Source: -
Ballast/Driver: ELECTRONIC DRIVER

Summary

Lumens per Lamp: N/A
Luminaire Lumens: 8282 lumens
Efficiency: N/A
Efficacy: 64.2 lumens/watt
Luminous Opening: Rectangular (W 0.5' x L: 1' x H: 0')
IES Classification: Type II - Medium
BUG Rating: B1 - U0 - G2

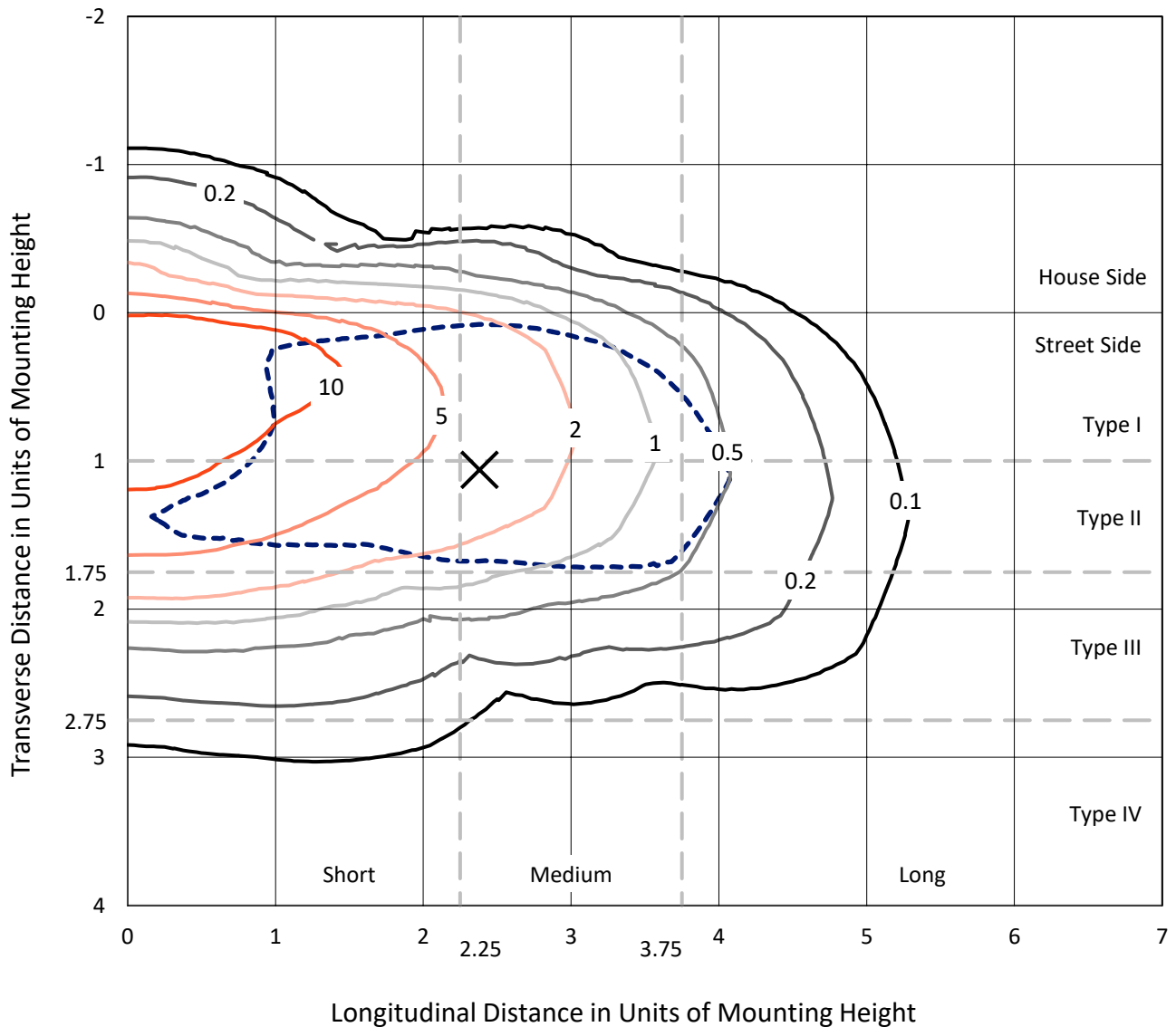
Input Watts (W): 129
Input Voltage (V): NR
Input Current (Ain): NR
Voltage Rise (V): NR
Power Factor: NR
Total Harmonic Distortion (THDi): NR
Frequency (hertz): 60
Stabilization Time: NR
Operation Time: NR
Ambient Temperature (°C): NR
Test Distance: 28.75 FT



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Iso-Footcandle Lines of Horizontal Illumination

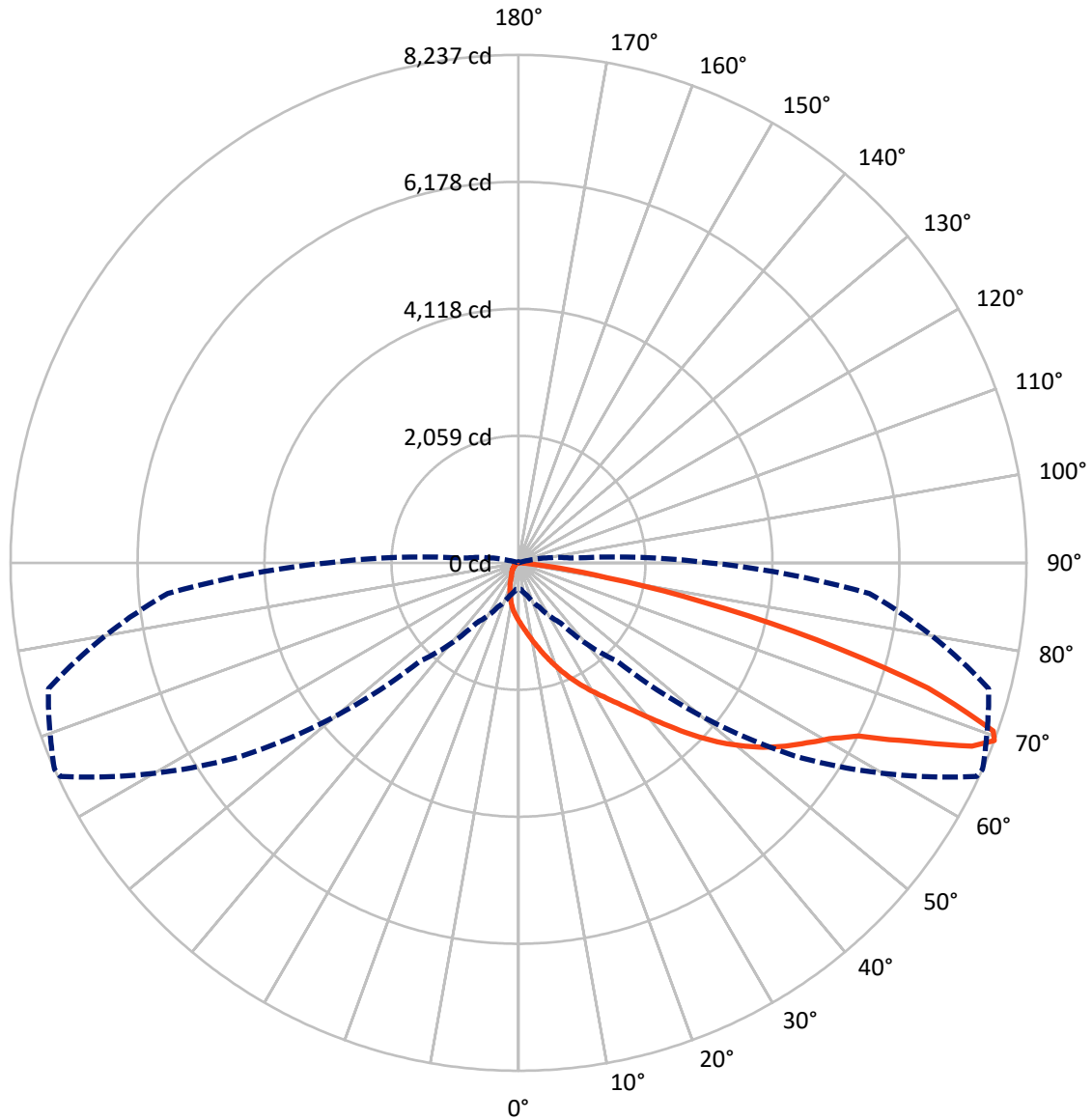
✕ Max cd
 - - - 1/2 Max cd



Based on 10 foot mounting height. Maximum calculated value = 15.6 fc
 Type II - Medium - N/A

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Luminous Intensity Polar Plot



— Vertical Plane Through 66-Deg Lateral - - - Horizontal Cone Through 69-Deg Vertical

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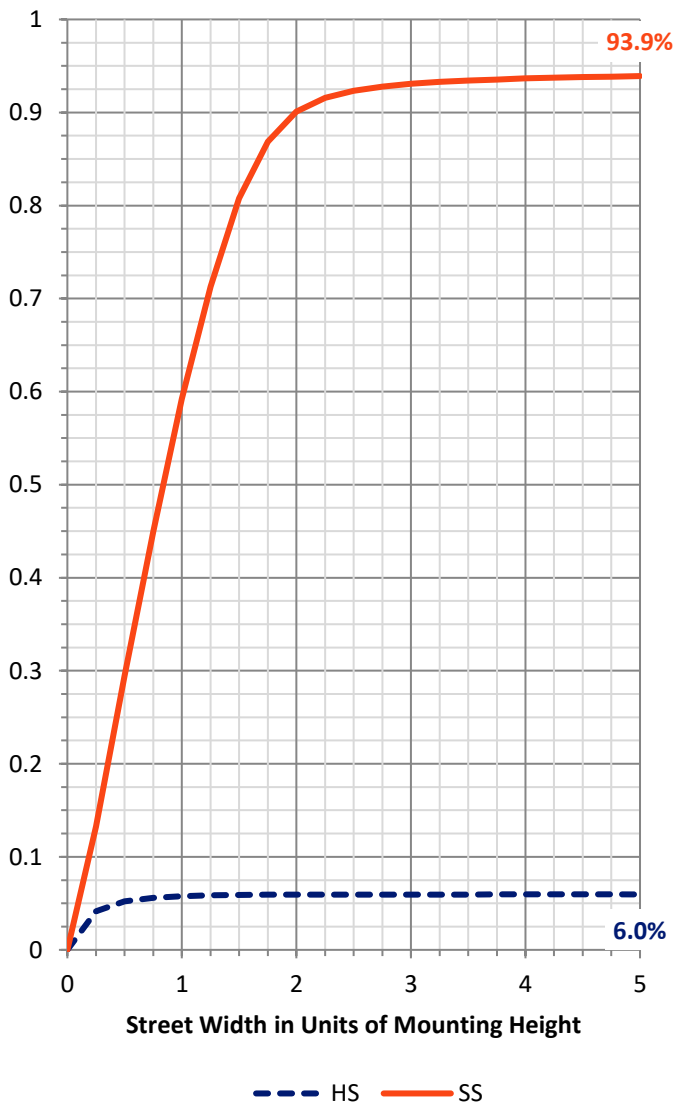
FLUX DISTRIBUTION:

| | | Downward | Upward | Total |
|--------------------|-----------|----------|--------|--------|
| House Side | Lumens | 496.8 | 0.0 | 496.8 |
| | % Fixture | 6.0 | 0.0 | 6.0 |
| Street Side | Lumens | 7785.2 | 0.0 | 7785.2 |
| | % Fixture | 94.0 | 0.0 | 94.0 |
| Total | Lumens | 8282.0 | 0.0 | 8282.0 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

ZONAL LUMENS:

| Zone | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10° | 91.1 | 1.1 |
| 10°-20° | 271.2 | 3.3 |
| 20°-30° | 472.2 | 5.7 |
| 30°-40° | 828.4 | 10.0 |
| 40°-50° | 1386.7 | 16.7 |
| 50°-60° | 2038.3 | 24.6 |
| 60°-70° | 2092.8 | 25.3 |
| 70°-80° | 1033.2 | 12.5 |
| 80°-90° | 68.3 | 0.8 |
| 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° | 8282.0 | 100.0 |
| 0°-180° | 8282.0 | 100.0 |

Coefficient of Utilization

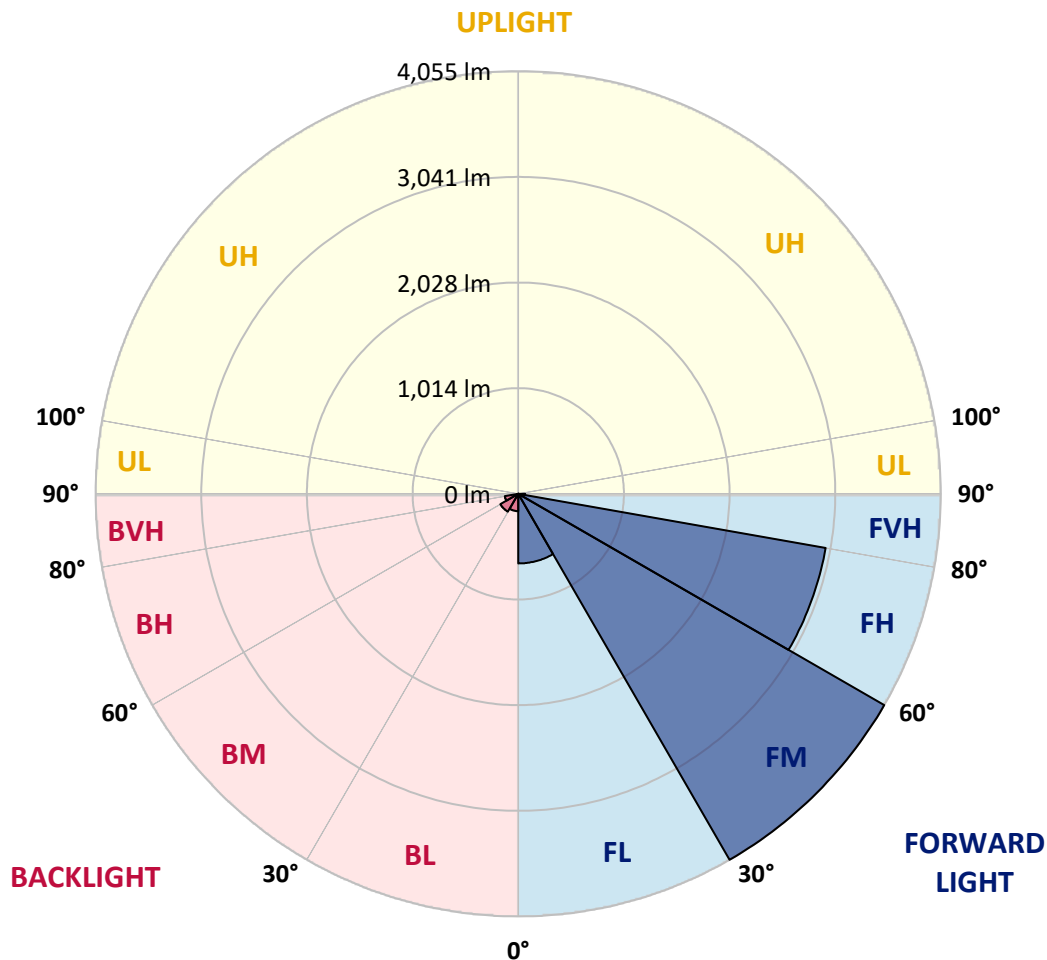


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LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | Lumens | % Fixture | Zone Rating/Lumen Limit | | |
|----------------|--------|-----------|-------------------------|------|---------|
| | | | B | U | G |
| FL (0°-30°) | 668.3 | 8.1 | | | |
| FM (30°-60°) | 4055.3 | 49.0 | | | |
| FH (60°-80°) | 2995.0 | 36.2 | | | G2/5000 |
| FVH (80°-90°) | 66.7 | 0.8 | | | G1/100 |
| BL (0°-30°) | 166.2 | 2.0 | B1/500 | | |
| BM (30°-60°) | 198.1 | 2.4 | B0/220 | | |
| BH (60°-80°) | 130.9 | 1.6 | B1/500 | | G1/500 |
| BVH (80°-90°) | 1.7 | 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 II Medium





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CANDELA DISTRIBUTION (FULL):

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 65° | 66° | 75° | 85° |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0° | 942.5 | 942.5 | 942.5 | 942.5 | 942.5 | 942.5 | 942.5 | 942.5 | 942.5 | 942.5 | 942.5 |
| 2.5° | 1109.3 | 1104.6 | 1102.6 | 1094.0 | 1079.0 | 1067.6 | 1045.6 | 1020.0 | 1015.3 | 990.5 | 960.2 |
| 5° | 1253.3 | 1249.3 | 1246.6 | 1234.4 | 1219.1 | 1190.3 | 1150.2 | 1102.6 | 1093.6 | 1046.4 | 985.8 |
| 7.5° | 1353.6 | 1360.7 | 1360.7 | 1352.8 | 1333.5 | 1311.9 | 1262.7 | 1197.8 | 1186.4 | 1114.0 | 1020.0 |
| 10° | 1412.2 | 1420.9 | 1427.5 | 1434.2 | 1431.5 | 1422.8 | 1376.4 | 1303.2 | 1289.5 | 1193.5 | 1059.7 |
| 12.5° | 1417.7 | 1426.4 | 1445.2 | 1473.2 | 1500.3 | 1520.0 | 1490.9 | 1420.1 | 1404.3 | 1285.5 | 1106.9 |
| 15° | 1387.0 | 1396.1 | 1425.2 | 1479.5 | 1545.2 | 1602.6 | 1612.0 | 1549.5 | 1533.4 | 1395.3 | 1166.0 |
| 17.5° | 1333.5 | 1339.4 | 1381.1 | 1456.3 | 1559.3 | 1664.7 | 1721.8 | 1688.4 | 1673.4 | 1520.8 | 1231.6 |
| 20° | 1293.8 | 1298.1 | 1334.7 | 1415.4 | 1550.7 | 1703.7 | 1825.6 | 1835.9 | 1820.1 | 1655.3 | 1302.8 |
| 22.5° | 1361.9 | 1369.7 | 1370.9 | 1409.1 | 1527.1 | 1723.0 | 1916.9 | 1981.0 | 1969.2 | 1798.1 | 1372.9 |
| 25° | 1547.9 | 1557.0 | 1527.1 | 1503.5 | 1547.1 | 1731.6 | 1995.2 | 2129.7 | 2120.3 | 1951.9 | 1443.3 |
| 27.5° | 1793.8 | 1803.2 | 1764.7 | 1694.3 | 1652.2 | 1764.3 | 2064.8 | 2280.8 | 2280.4 | 2114.8 | 1519.2 |
| 30° | 2035.3 | 2044.7 | 2005.4 | 1935.0 | 1838.2 | 1856.7 | 2125.0 | 2438.9 | 2441.3 | 2282.7 | 1599.8 |
| 32.5° | 2288.6 | 2300.4 | 2259.9 | 2169.4 | 2068.3 | 2016.4 | 2209.6 | 2597.8 | 2611.2 | 2477.5 | 1690.7 |
| 35° | 2576.6 | 2578.2 | 2521.1 | 2426.3 | 2309.9 | 2230.0 | 2345.3 | 2776.0 | 2807.9 | 2718.6 | 1806.0 |
| 37.5° | 2859.0 | 2870.4 | 2823.6 | 2674.1 | 2567.1 | 2476.7 | 2547.1 | 2998.7 | 3043.9 | 3013.2 | 1956.6 |
| 40° | 3068.3 | 3092.3 | 3085.6 | 2924.3 | 2822.8 | 2758.3 | 2797.7 | 3263.4 | 3320.8 | 3356.2 | 2146.6 |
| 42.5° | 3199.7 | 3217.8 | 3248.5 | 3151.3 | 3059.3 | 3069.9 | 3093.5 | 3571.8 | 3642.6 | 3747.3 | 2364.9 |
| 45° | 3350.3 | 3359.0 | 3384.6 | 3341.7 | 3279.5 | 3386.5 | 3407.4 | 3919.2 | 3993.5 | 4167.8 | 2607.3 |
| 47.5° | 3534.4 | 3554.9 | 3562.0 | 3522.6 | 3494.3 | 3666.6 | 3709.9 | 4235.0 | 4339.3 | 4618.2 | 2863.7 |
| 50° | 3768.9 | 3774.4 | 3786.6 | 3761.0 | 3732.7 | 3907.4 | 3981.3 | 4566.7 | 4661.5 | 5070.2 | 3116.7 |
| 52.5° | 3998.2 | 4017.9 | 4060.4 | 4044.3 | 4032.8 | 4112.3 | 4223.2 | 4865.6 | 4971.4 | 5447.0 | 3369.2 |
| 55° | 4064.3 | 4081.2 | 4228.0 | 4328.3 | 4421.1 | 4364.9 | 4454.5 | 5133.5 | 5248.0 | 5783.7 | 3612.3 |
| 57.5° | 3800.4 | 3834.6 | 4088.7 | 4349.9 | 4735.0 | 4757.4 | 4772.4 | 5408.5 | 5511.1 | 6041.8 | 3865.3 |
| 60° | 3133.2 | 3139.9 | 3556.9 | 4004.9 | 4683.1 | 5100.1 | 5236.6 | 5703.9 | 5790.0 | 6282.1 | 4168.2 |
| 62.5° | 1992.8 | 2060.9 | 2518.4 | 3150.9 | 4133.9 | 5050.5 | 5797.9 | 6150.8 | 6182.2 | 6570.5 | 4602.4 |
| 65° | 949.2 | 993.3 | 1322.9 | 1946.8 | 2994.3 | 4416.0 | 6185.4 | 6959.1 | 6973.3 | 7142.1 | 5182.7 |
| 67.5° | 525.5 | 546.8 | 703.7 | 1047.9 | 1750.5 | 3123.0 | 6028.8 | 7916.6 | 7930.0 | 7725.8 | 5691.7 |
| 69° | 411.1 | 429.2 | 552.7 | 789.9 | 1186.8 | 2244.6 | 5455.7 | 8197.1 | 8236.8 | 7893.0 | 5709.8 |
| 70° | 348.9 | 366.6 | 476.0 | 667.2 | 954.3 | 1734.4 | 4856.2 | 8127.4 | 8169.5 | 7877.3 | 5574.9 |
| 72.5° | 213.6 | 223.8 | 317.1 | 469.7 | 639.6 | 872.5 | 2994.7 | 6873.4 | 6944.6 | 7225.8 | 4791.3 |
| 75° | 144.0 | 149.5 | 198.3 | 324.1 | 457.5 | 449.2 | 1555.8 | 4844.8 | 4999.0 | 5620.9 | 3538.8 |
| 77.5° | 103.1 | 108.2 | 133.0 | 209.7 | 320.6 | 296.6 | 704.5 | 3010.9 | 3043.9 | 3371.2 | 1929.9 |
| 80° | 58.6 | 63.3 | 94.0 | 124.7 | 217.5 | 197.9 | 280.1 | 1438.2 | 1454.7 | 1445.6 | 644.3 |
| 82.5° | 30.7 | 34.6 | 51.5 | 82.2 | 139.6 | 129.4 | 116.4 | 481.5 | 483.8 | 402.4 | 141.2 |
| 85° | 5.9 | 7.1 | 25.6 | 56.3 | 72.0 | 56.3 | 47.6 | 112.9 | 115.3 | 101.9 | 35.0 |
| 87.5° | 0.0 | 0.4 | 10.2 | 12.6 | 14.2 | 14.6 | 15.3 | 22.0 | 23.6 | 31.9 | 9.4 |
| 90° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |



REPORT NUMBER: P362952
 CATALOG NUMBER: NVN-SA2D-827-U-T2-HSS

CANDELA DISTRIBUTION (continued):

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0° | 942.5 | 942.5 | 942.5 | 942.5 | 942.5 | 942.5 | 942.5 | 942.5 | 942.5 | 942.5 | 942.5 |
| 2.5° | 946.8 | 932.7 | 905.5 | 874.1 | 849.7 | 825.7 | 806.8 | 787.1 | 780.1 | 776.5 | 776.1 |
| 5° | 956.3 | 926.4 | 869.0 | 810.0 | 761.6 | 715.9 | 683.3 | 652.2 | 637.7 | 631.0 | 628.2 |
| 7.5° | 972.0 | 924.0 | 831.6 | 741.5 | 671.9 | 614.8 | 569.6 | 535.8 | 518.9 | 511.8 | 509.0 |
| 10° | 990.5 | 920.9 | 787.9 | 669.1 | 580.2 | 521.2 | 476.4 | 442.9 | 424.4 | 416.6 | 412.6 |
| 12.5° | 1012.1 | 915.4 | 737.6 | 596.0 | 501.9 | 442.9 | 388.7 | 347.3 | 326.1 | 317.1 | 312.7 |
| 15° | 1038.9 | 909.9 | 684.9 | 527.1 | 433.1 | 361.1 | 301.7 | 273.8 | 269.5 | 267.9 | 268.3 |
| 17.5° | 1065.3 | 901.2 | 627.4 | 459.1 | 360.7 | 282.0 | 251.8 | 250.2 | 251.0 | 251.0 | 251.0 |
| 20° | 1088.9 | 881.5 | 564.9 | 400.8 | 291.9 | 238.0 | 231.7 | 228.9 | 227.0 | 225.4 | 223.4 |
| 22.5° | 1107.3 | 855.2 | 504.7 | 343.0 | 238.4 | 217.9 | 208.1 | 199.4 | 192.4 | 187.6 | 185.3 |
| 25° | 1119.9 | 820.2 | 449.6 | 287.6 | 214.4 | 198.3 | 180.6 | 166.0 | 155.0 | 148.3 | 145.5 |
| 27.5° | 1129.4 | 782.4 | 400.5 | 240.7 | 197.9 | 175.4 | 152.2 | 134.9 | 123.5 | 117.6 | 115.3 |
| 30° | 1136.1 | 739.5 | 357.2 | 211.6 | 179.4 | 151.4 | 126.7 | 109.8 | 101.5 | 98.3 | 96.8 |
| 32.5° | 1142.4 | 691.9 | 316.3 | 197.9 | 162.1 | 129.4 | 106.2 | 93.2 | 88.1 | 84.2 | 83.0 |
| 35° | 1158.1 | 647.9 | 277.3 | 183.3 | 144.4 | 110.5 | 91.3 | 81.8 | 76.7 | 74.3 | 73.6 |
| 37.5° | 1195.5 | 615.2 | 240.0 | 168.4 | 126.7 | 95.6 | 79.9 | 73.2 | 68.4 | 66.1 | 65.3 |
| 40° | 1255.6 | 598.7 | 208.5 | 152.2 | 109.4 | 84.2 | 72.4 | 66.1 | 61.0 | 57.4 | 56.6 |
| 42.5° | 1344.2 | 601.1 | 186.5 | 136.1 | 95.6 | 75.1 | 65.3 | 57.8 | 52.3 | 49.2 | 48.4 |
| 45° | 1451.5 | 618.4 | 171.1 | 120.4 | 84.2 | 68.1 | 57.4 | 49.6 | 44.5 | 41.7 | 40.9 |
| 47.5° | 1568.0 | 646.3 | 158.5 | 106.2 | 75.1 | 61.4 | 49.6 | 41.3 | 37.0 | 34.6 | 34.2 |
| 50° | 1690.7 | 673.5 | 145.5 | 92.4 | 67.3 | 54.7 | 41.7 | 34.2 | 30.7 | 28.7 | 27.9 |
| 52.5° | 1815.0 | 704.9 | 133.7 | 79.9 | 60.6 | 46.8 | 34.6 | 27.9 | 25.2 | 23.6 | 22.8 |
| 55° | 1948.8 | 728.5 | 122.3 | 70.0 | 53.9 | 39.7 | 28.7 | 23.2 | 20.8 | 18.9 | 18.5 |
| 57.5° | 2106.1 | 765.1 | 110.5 | 60.6 | 46.0 | 33.0 | 23.6 | 18.5 | 16.5 | 14.6 | 14.2 |
| 60° | 2318.5 | 808.0 | 97.9 | 53.5 | 37.8 | 27.1 | 19.3 | 14.9 | 12.6 | 11.0 | 10.6 |
| 62.5° | 2598.6 | 855.6 | 82.2 | 46.8 | 30.7 | 22.0 | 15.3 | 11.8 | 9.0 | 7.1 | 7.1 |
| 65° | 2953.8 | 933.1 | 67.3 | 39.3 | 25.2 | 18.1 | 11.8 | 8.7 | 5.1 | 3.1 | 3.1 |
| 67.5° | 3161.1 | 946.5 | 54.3 | 32.3 | 20.5 | 15.3 | 9.8 | 5.9 | 1.6 | 0.4 | 0.0 |
| 69° | 3094.7 | 869.0 | 46.0 | 27.5 | 17.7 | 14.6 | 9.0 | 4.3 | 0.8 | 0.0 | 0.0 |
| 70° | 2969.6 | 794.6 | 40.5 | 24.4 | 16.1 | 13.8 | 8.7 | 3.1 | 0.8 | 0.0 | 0.0 |
| 72.5° | 2453.9 | 565.7 | 30.7 | 18.1 | 11.8 | 12.2 | 7.9 | 2.0 | 0.8 | 0.0 | 0.0 |
| 75° | 1787.5 | 343.8 | 22.0 | 12.6 | 7.5 | 9.0 | 5.5 | 0.8 | 0.4 | 0.0 | 0.0 |
| 77.5° | 994.4 | 162.1 | 13.8 | 7.1 | 4.7 | 5.5 | 2.8 | 0.0 | 0.0 | 0.0 | 0.0 |
| 80° | 323.0 | 44.1 | 6.3 | 3.9 | 2.8 | 3.1 | 1.2 | 0.0 | 0.0 | 0.0 | 0.0 |
| 82.5° | 59.8 | 12.6 | 3.5 | 2.0 | 0.8 | 0.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 85° | 13.0 | 5.1 | 2.0 | 0.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 87.5° | 4.3 | 1.6 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 90° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

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

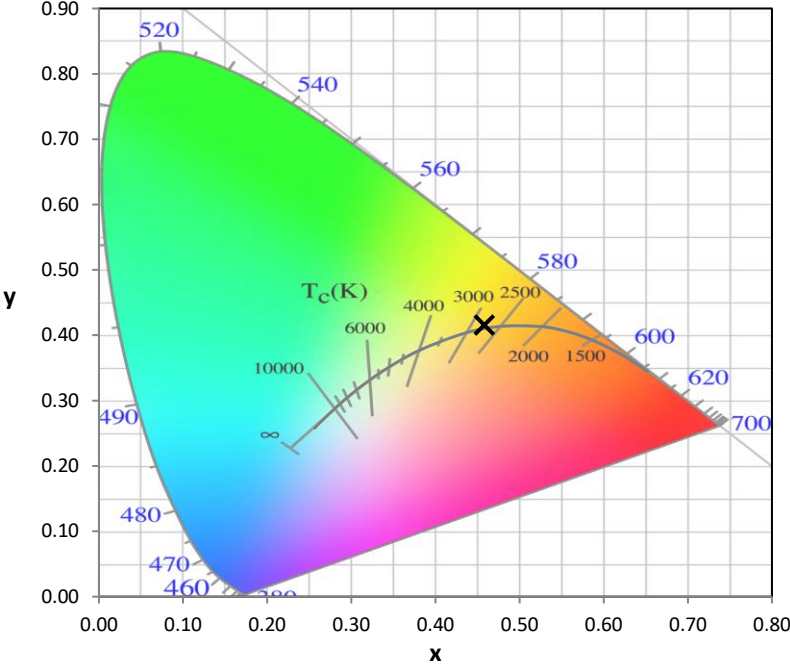
Stabilization Time: 81M
 Operation Time: 2H 21M
 Sphere Temperature (°C): 25.2

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 |

REPORT NUMBER: SP1-2407-157-9

CIE 1931 Chromaticity Diagram



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

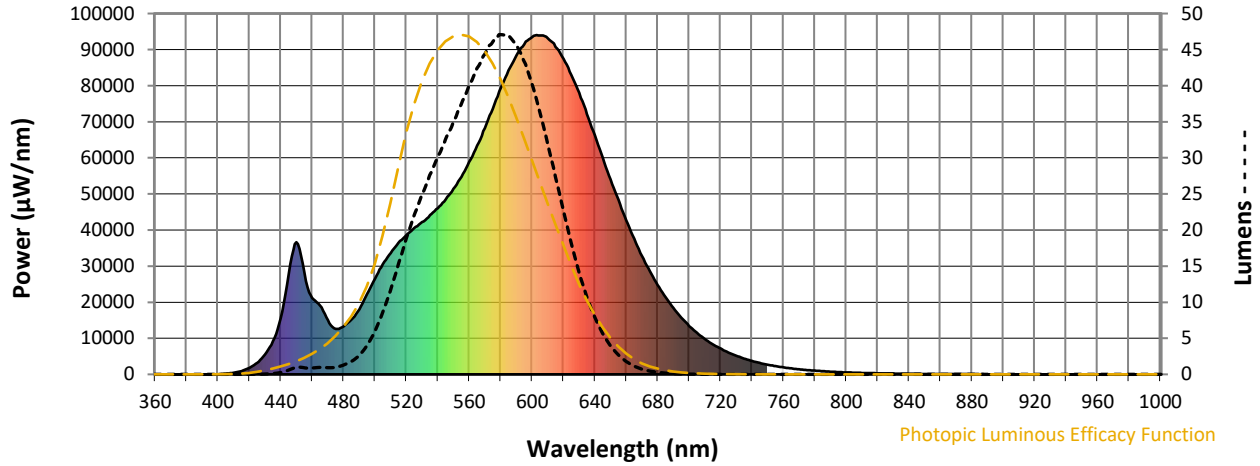


CCT = 2764K
 CIE x = 0.4581
 CIE y = 0.4156
 Duv = 0.0020

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)