

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: P361936

Luminaire Tested: NVN-SA6B-827-U-SL3

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-2019  
Report Number: P361936  
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  
Product Line: STREETWORKS  
Catalog Number: NVN-SA6B-827-U-SL3  
Description: NAVION ROADWAY AND AREA LUMINAIRE  
(6) 80 CRI, 2700K, 800mA 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: 25390 lumens  
Efficiency: N/A  
Efficacy: 102.0 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 1.5' x H: 0')  
IES Classification: Type III - Medium  
BUG Rating: B3 - U0 - G4

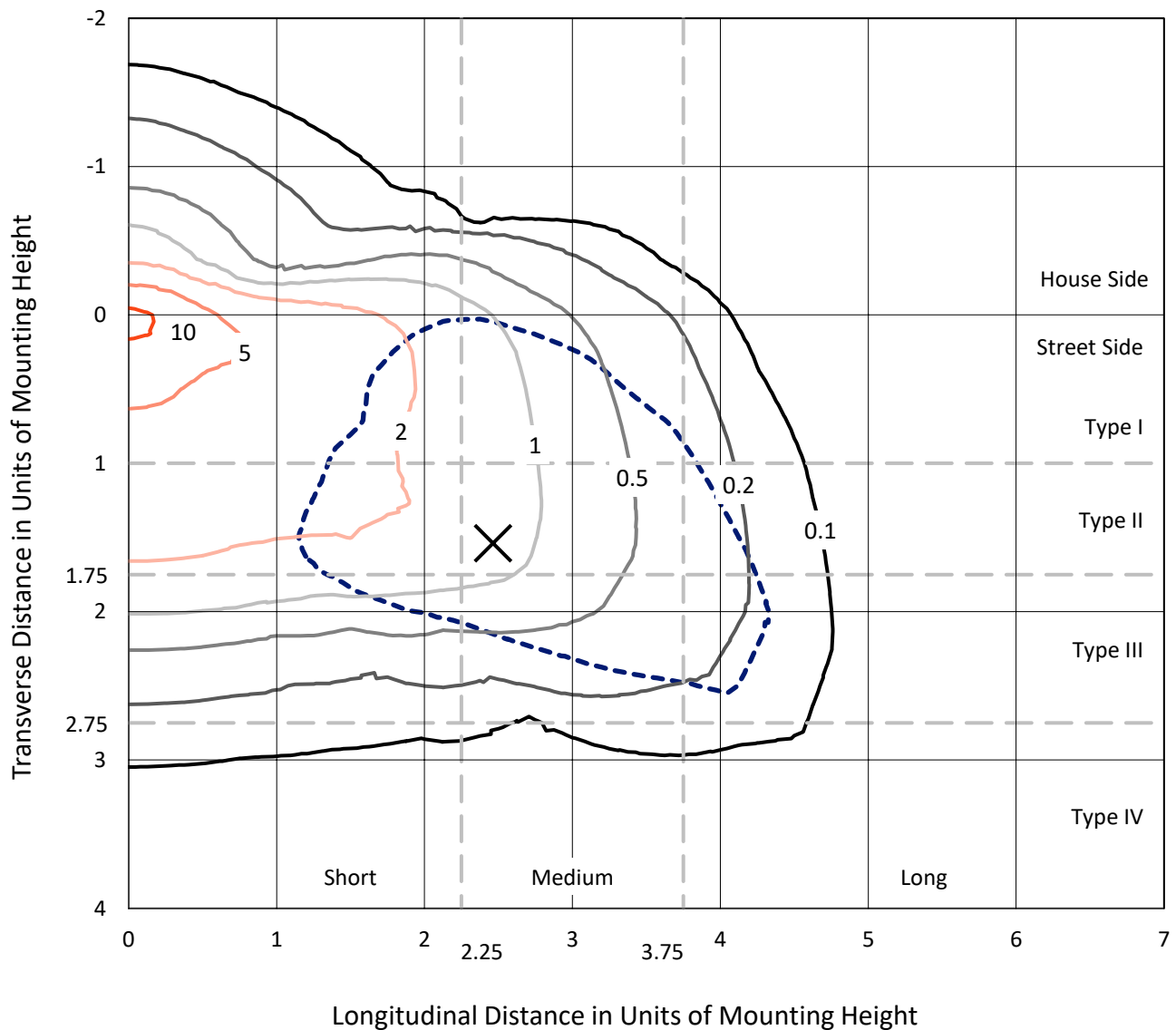
Input Watts (W): 249  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT



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## Iso-Footcandle Lines of Horizontal Illumination

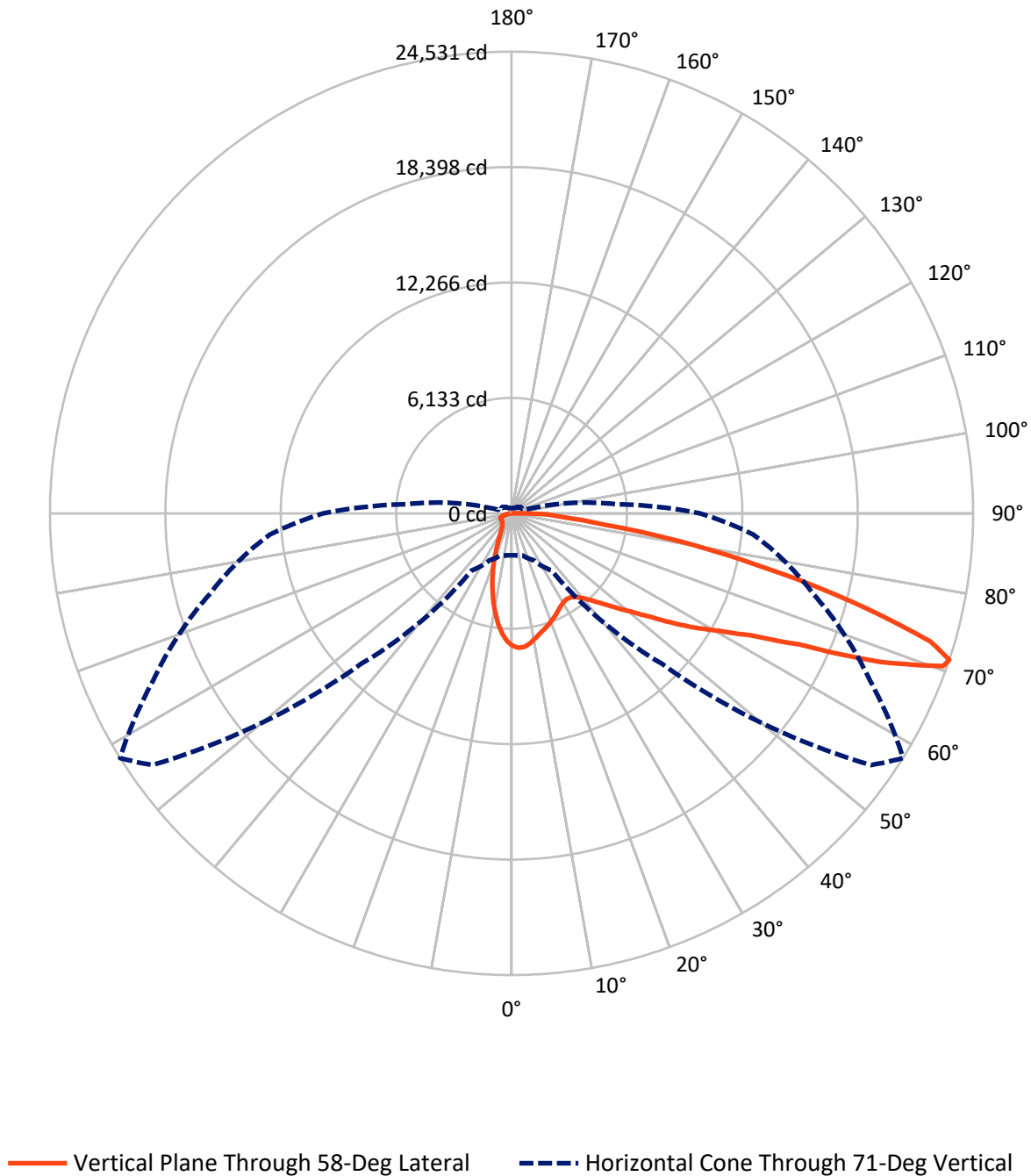
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 11.3 fc  
 Type III - Medium - N/A

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## Luminous Intensity Polar Plot



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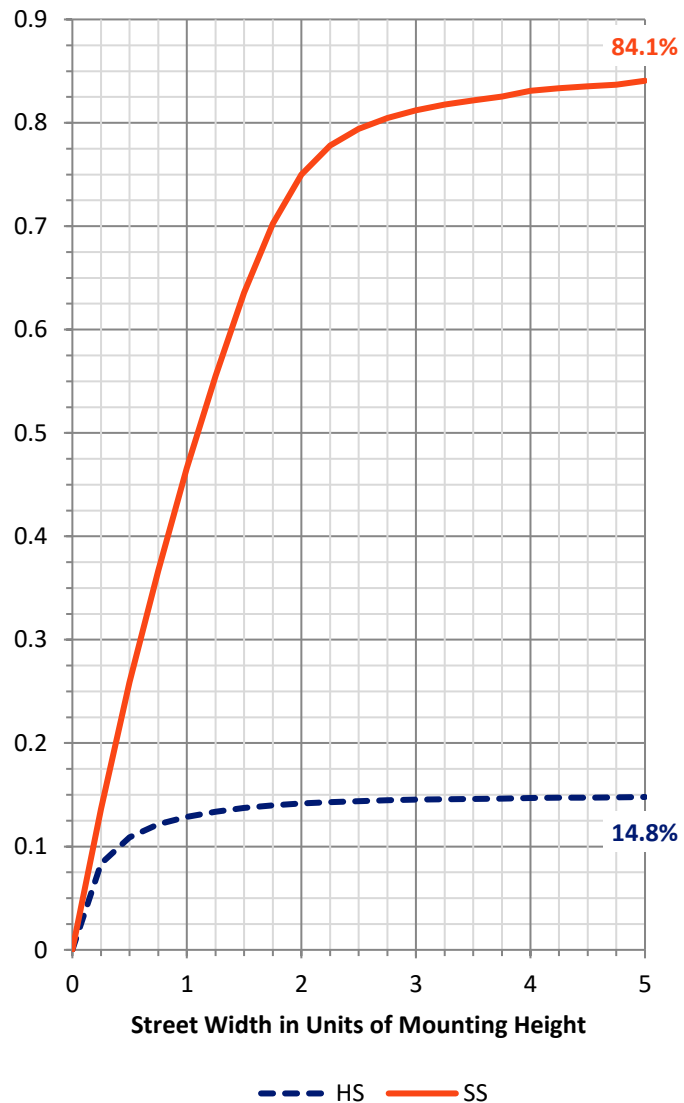
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 3796.0   | 0.0    | 3796.0  |
|                    | % Fixture | 15.0     | 0.0    | 15.0    |
| <b>Street Side</b> | Lumens    | 21594.0  | 0.0    | 21594.0 |
|                    | % Fixture | 85.0     | 0.0    | 85.0    |
| <b>Total</b>       | Lumens    | 25390.0  | 0.0    | 25390.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 606.9   | 2.4       |
| 10°-20°   | 1349.5  | 5.3       |
| 20°-30°   | 1715.1  | 6.8       |
| 30°-40°   | 2184.6  | 8.6       |
| 40°-50°   | 3097.9  | 12.2      |
| 50°-60°   | 4794.1  | 18.9      |
| 60°-70°   | 6526.6  | 25.7      |
| 70°-80°   | 4354.0  | 17.1      |
| 80°-90°   | 761.2   | 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°    | 25390.0 | 100.0     |
| 0°-180°   | 25390.0 | 100.0     |

**Coefficient of Utilization**



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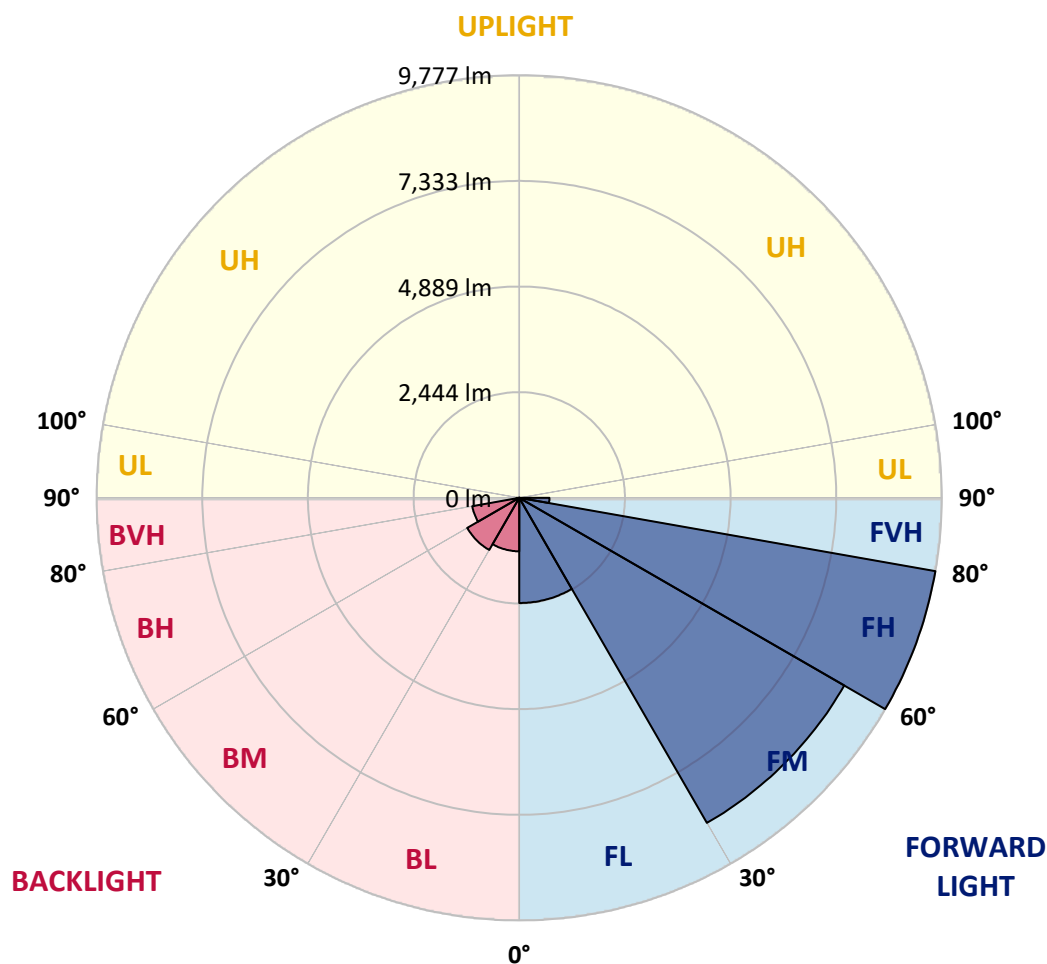
CATALOG NUMBER: NVN-SA6B-827-U-SL3

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |          |
|------|-------------|--------|-----------|-------------------------|------|----------|
|      |             |        |           | B                       | U    | G        |
| FL   | (0°-30°)    | 2434.0 | 9.6       |                         |      |          |
| FM   | (30°-60°)   | 8684.6 | 34.2      |                         |      |          |
| FH   | (60°-80°)   | 9777.4 | 38.5      |                         |      | G4/12000 |
| FVH  | (80°-90°)   | 698.0  | 2.7       |                         |      | G4/750   |
| BL   | (0°-30°)    | 1237.4 | 4.9       | B3/2500                 |      |          |
| BM   | (30°-60°)   | 1392.1 | 5.5       | B2/2500                 |      |          |
| BH   | (60°-80°)   | 1103.3 | 4.3       | B3/2500                 |      | G3/2500  |
| BVH  | (80°-90°)   | 63.2   | 0.2       |                         |      | G1/100   |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |          |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |          |

**BUG Rating: B3-U0-G4**

Type III Medium





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°     | 45°     | 55°     | 58°     | 65°     | 75°     | 85°     |
|-------|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 7034.7 | 7034.7 | 7034.7 | 7034.7 | 7034.7  | 7034.7  | 7034.7  | 7034.7  | 7034.7  | 7034.7  | 7034.7  |
| 2.5°  | 7221.3 | 7211.6 | 7215.2 | 7208.1 | 7191.3  | 7174.5  | 7149.7  | 7154.1  | 7119.6  | 7068.3  | 7004.7  |
| 5°    | 7085.1 | 7081.6 | 7108.1 | 7123.2 | 7135.6  | 7125.8  | 7118.7  | 7127.6  | 7077.2  | 7006.4  | 6895.9  |
| 7.5°  | 6799.5 | 6760.6 | 6794.2 | 6844.6 | 6892.3  | 6928.6  | 6976.4  | 6982.5  | 6950.7  | 6876.4  | 6731.4  |
| 10°   | 6393.5 | 6356.4 | 6405.9 | 6484.6 | 6580.1  | 6666.8  | 6763.2  | 6780.9  | 6787.1  | 6719.9  | 6543.9  |
| 12.5° | 5972.5 | 5944.2 | 5993.8 | 6104.3 | 6262.6  | 6396.2  | 6550.1  | 6576.6  | 6631.4  | 6586.3  | 6370.5  |
| 15°   | 5595.8 | 5585.2 | 5645.3 | 5754.1 | 5936.3  | 6140.6  | 6362.6  | 6411.2  | 6504.1  | 6489.0  | 6235.2  |
| 17.5° | 5270.3 | 5267.6 | 5313.6 | 5427.7 | 5629.4  | 5887.6  | 6175.9  | 6258.2  | 6396.2  | 6413.9  | 6123.8  |
| 20°   | 5028.0 | 5022.7 | 5054.5 | 5138.5 | 5346.4  | 5639.1  | 5974.3  | 6087.5  | 6286.5  | 6348.4  | 6008.8  |
| 22.5° | 4898.0 | 4897.1 | 4898.0 | 4937.8 | 5107.6  | 5380.0  | 5778.0  | 5915.9  | 6179.5  | 6296.2  | 5881.4  |
| 25°   | 4875.8 | 4873.2 | 4853.7 | 4849.3 | 4945.7  | 5163.3  | 5583.4  | 5735.5  | 6077.8  | 6260.0  | 5760.3  |
| 27.5° | 4933.3 | 4936.9 | 4911.2 | 4869.7 | 4889.1  | 5020.9  | 5414.5  | 5577.2  | 5996.4  | 6252.9  | 5676.2  |
| 30°   | 5052.7 | 5051.0 | 5028.8 | 4985.5 | 4947.5  | 4967.8  | 5294.2  | 5456.9  | 5941.6  | 6283.8  | 5618.8  |
| 32.5° | 5184.5 | 5194.2 | 5189.8 | 5165.9 | 5109.3  | 5028.0  | 5257.9  | 5417.1  | 5925.7  | 6358.1  | 5594.0  |
| 35°   | 5342.8 | 5353.4 | 5385.3 | 5403.8 | 5337.5  | 5206.6  | 5335.7  | 5473.7  | 5971.6  | 6497.9  | 5633.8  |
| 37.5° | 5493.2 | 5520.6 | 5609.9 | 5688.6 | 5632.0  | 5486.1  | 5542.7  | 5640.9  | 6114.0  | 6718.1  | 5740.8  |
| 40°   | 5666.5 | 5690.4 | 5836.3 | 6003.5 | 5994.6  | 5843.4  | 5876.1  | 5941.6  | 6365.2  | 7033.8  | 5934.5  |
| 42.5° | 5837.2 | 5885.0 | 6096.4 | 6333.4 | 6401.5  | 6267.9  | 6320.1  | 6354.6  | 6719.0  | 7452.2  | 6272.4  |
| 45°   | 6064.5 | 6115.8 | 6409.4 | 6695.1 | 6854.3  | 6779.1  | 6862.3  | 6875.5  | 7163.9  | 8021.7  | 6763.2  |
| 47.5° | 6408.6 | 6466.9 | 6809.2 | 7109.0 | 7352.2  | 7360.2  | 7497.3  | 7492.0  | 7719.3  | 8673.6  | 7381.4  |
| 50°   | 6944.5 | 7028.5 | 7308.9 | 7589.3 | 7884.7  | 8049.2  | 8232.2  | 8206.6  | 8385.2  | 9367.8  | 8093.4  |
| 52.5° | 7646.8 | 7685.7 | 7893.5 | 8100.5 | 8467.5  | 8836.3  | 9099.0  | 9076.0  | 9140.5  | 10081.6 | 8901.8  |
| 55°   | 8374.6 | 8403.8 | 8489.6 | 8602.8 | 9096.3  | 9697.7  | 10253.2 | 10216.9 | 10053.3 | 10822.7 | 9700.4  |
| 57.5° | 9029.1 | 9088.4 | 9147.6 | 9194.5 | 9729.6  | 10598.1 | 11433.9 | 11436.5 | 11043.8 | 11622.2 | 10525.6 |
| 60°   | 9130.8 | 9183.0 | 9574.8 | 9944.5 | 10813.0 | 11799.1 | 12697.7 | 12671.2 | 12068.9 | 12489.9 | 11445.4 |
| 62.5° | 8071.3 | 8188.9 | 8843.4 | 9826.9 | 11856.6 | 13996.0 | 14310.0 | 14277.3 | 13294.7 | 13559.1 | 12516.4 |
| 65°   | 5784.1 | 5917.7 | 6707.5 | 8185.4 | 11350.7 | 16416.7 | 17219.8 | 16779.3 | 14966.3 | 14874.3 | 13770.5 |
| 67.5° | 3336.9 | 3368.8 | 3711.1 | 4898.0 | 8642.6  | 16543.2 | 21658.7 | 21042.3 | 17562.1 | 16366.3 | 14384.3 |
| 70°   | 2467.5 | 2466.7 | 2548.0 | 3014.1 | 4676.8  | 13501.7 | 23769.8 | 24322.6 | 20294.9 | 16857.2 | 13516.7 |
| 71°   | 2231.4 | 2234.1 | 2325.2 | 2743.5 | 3704.0  | 11301.2 | 23321.4 | 24531.3 | 21014.9 | 16614.8 | 12888.7 |
| 72.5° | 1908.6 | 1917.4 | 2043.9 | 2460.5 | 3115.8  | 7793.6  | 21389.9 | 23279.0 | 21356.2 | 16017.0 | 11906.1 |
| 75°   | 1447.8 | 1468.1 | 1643.3 | 2074.0 | 2847.9  | 3952.5  | 15698.6 | 18588.9 | 18971.8 | 14133.1 | 8846.9  |
| 77.5° | 1033.0 | 1056.0 | 1254.1 | 1744.1 | 2707.2  | 2978.7  | 10513.2 | 13559.1 | 13961.6 | 9057.4  | 3990.5  |
| 80°   | 652.7  | 680.1  | 829.6  | 1387.7 | 2543.6  | 2828.4  | 6606.7  | 9114.0  | 7613.1  | 2898.3  | 1015.3  |
| 82.5° | 383.0  | 404.2  | 514.7  | 906.5  | 2077.5  | 2724.0  | 3887.1  | 5051.8  | 2962.8  | 875.6   | 461.7   |
| 85°   | 222.0  | 231.7  | 321.0  | 577.5  | 1508.8  | 2571.0  | 2855.8  | 2824.0  | 1286.0  | 428.1   | 218.5   |
| 87.5° | 103.5  | 115.0  | 190.2  | 301.6  | 837.6   | 1863.5  | 2257.1  | 1950.2  | 799.5   | 200.8   | 102.6   |
| 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-SA6B-827-U-SL3

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 7034.7  | 7034.7 | 7034.7 | 7034.7 | 7034.7 | 7034.7 | 7034.7 | 7034.7 | 7034.7 | 7034.7 | 7034.7 |
| 2.5°  | 6973.7  | 6958.7 | 6895.9 | 6840.2 | 6781.8 | 6705.7 | 6621.7 | 6611.1 | 6559.8 | 6569.5 | 6551.8 |
| 5°    | 6835.7  | 6797.7 | 6646.5 | 6509.4 | 6347.5 | 6202.5 | 6045.1 | 5972.5 | 5868.2 | 5861.1 | 5834.6 |
| 7.5°  | 6638.5  | 6567.8 | 6333.4 | 6073.4 | 5813.3 | 5565.7 | 5320.7 | 5159.7 | 4995.2 | 4925.4 | 4919.2 |
| 10°   | 6416.5  | 6296.2 | 5951.3 | 5566.6 | 5191.6 | 4829.9 | 4479.6 | 4220.5 | 3987.0 | 3876.4 | 3872.0 |
| 12.5° | 6206.0  | 6028.3 | 5555.1 | 5031.5 | 4518.5 | 4049.8 | 3569.5 | 3229.0 | 2936.3 | 2838.1 | 2796.6 |
| 15°   | 6027.4  | 5777.1 | 5169.5 | 4500.0 | 3877.3 | 3226.4 | 2679.8 | 2321.6 | 2051.0 | 1957.2 | 1939.5 |
| 17.5° | 5854.0  | 5532.1 | 4774.1 | 3963.1 | 3210.5 | 2495.0 | 1947.5 | 1681.3 | 1537.1 | 1499.1 | 1498.2 |
| 20°   | 5681.6  | 5280.0 | 4361.1 | 3413.9 | 2565.7 | 1866.1 | 1497.3 | 1377.9 | 1329.3 | 1324.9 | 1317.8 |
| 22.5° | 5486.1  | 5012.9 | 3926.9 | 2862.9 | 2002.3 | 1467.3 | 1272.7 | 1224.9 | 1218.7 | 1234.7 | 1234.7 |
| 25°   | 5303.0  | 4747.6 | 3486.4 | 2323.4 | 1557.5 | 1224.0 | 1136.5 | 1126.8 | 1143.6 | 1171.9 | 1174.5 |
| 27.5° | 5132.3  | 4492.0 | 3056.6 | 1844.0 | 1247.9 | 1078.1 | 1041.9 | 1053.4 | 1083.4 | 1116.1 | 1117.0 |
| 30°   | 4991.7  | 4250.6 | 2639.1 | 1453.1 | 1054.2 | 969.3  | 963.1  | 986.1  | 1018.9 | 1044.5 | 1050.7 |
| 32.5° | 4882.9  | 4044.5 | 2235.8 | 1168.3 | 927.8  | 888.0  | 893.3  | 912.7  | 933.1  | 947.2  | 956.9  |
| 35°   | 4832.5  | 3867.6 | 1863.5 | 985.3  | 847.3  | 825.2  | 832.2  | 842.9  | 851.7  | 862.3  | 870.3  |
| 37.5° | 4841.3  | 3730.5 | 1530.9 | 871.2  | 793.3  | 781.8  | 781.8  | 781.8  | 781.8  | 787.1  | 788.0  |
| 40°   | 4923.6  | 3651.8 | 1260.3 | 798.6  | 757.1  | 744.7  | 735.0  | 726.1  | 719.0  | 722.6  | 720.8  |
| 42.5° | 5134.1  | 3644.7 | 1062.2 | 752.6  | 727.9  | 707.5  | 688.1  | 675.7  | 666.9  | 670.4  | 672.2  |
| 45°   | 5491.4  | 3733.2 | 928.6  | 719.9  | 700.5  | 669.5  | 644.7  | 631.5  | 625.3  | 636.8  | 638.6  |
| 47.5° | 5954.0  | 3926.0 | 847.3  | 696.0  | 674.8  | 634.1  | 607.6  | 595.2  | 597.0  | 613.8  | 618.2  |
| 50°   | 6550.1  | 4239.1 | 808.4  | 681.0  | 657.1  | 604.1  | 576.6  | 566.0  | 571.3  | 595.2  | 600.5  |
| 52.5° | 7204.5  | 4690.1 | 812.8  | 676.6  | 645.6  | 582.0  | 552.8  | 540.4  | 549.2  | 571.3  | 575.8  |
| 55°   | 7959.8  | 5232.3 | 886.2  | 682.8  | 628.8  | 567.8  | 533.3  | 512.1  | 519.2  | 539.5  | 543.0  |
| 57.5° | 8799.2  | 5853.1 | 1033.9 | 681.0  | 607.6  | 554.5  | 513.0  | 481.1  | 486.4  | 498.8  | 502.4  |
| 60°   | 9673.0  | 6603.1 | 1263.0 | 686.3  | 597.9  | 538.6  | 485.6  | 445.8  | 444.0  | 454.6  | 456.4  |
| 62.5° | 10721.9 | 7470.7 | 1524.8 | 689.9  | 604.1  | 518.3  | 449.3  | 410.4  | 405.1  | 407.7  | 409.5  |
| 65°   | 11802.7 | 8098.7 | 1426.6 | 675.7  | 623.5  | 501.5  | 417.4  | 375.9  | 366.2  | 364.4  | 365.3  |
| 67.5° | 11836.3 | 7425.6 | 1000.3 | 647.4  | 631.5  | 492.6  | 393.6  | 346.7  | 330.8  | 324.6  | 323.7  |
| 70°   | 10614.9 | 6032.7 | 779.2  | 617.3  | 599.6  | 478.5  | 371.5  | 322.8  | 298.9  | 289.2  | 288.3  |
| 71°   | 10018.8 | 5553.3 | 738.5  | 602.3  | 575.8  | 464.3  | 361.7  | 312.2  | 287.4  | 276.8  | 275.1  |
| 72.5° | 9083.9  | 4978.4 | 689.0  | 578.4  | 529.8  | 428.1  | 343.2  | 297.2  | 271.5  | 259.1  | 256.5  |
| 75°   | 6519.1  | 3255.6 | 591.7  | 515.6  | 438.7  | 341.4  | 300.7  | 267.1  | 245.0  | 230.0  | 228.2  |
| 77.5° | 2511.8  | 1295.7 | 447.5  | 428.9  | 336.1  | 267.1  | 247.6  | 230.8  | 214.9  | 199.9  | 199.0  |
| 80°   | 776.5   | 579.3  | 326.4  | 322.8  | 243.2  | 199.0  | 192.8  | 188.4  | 182.2  | 166.3  | 162.7  |
| 82.5° | 414.8   | 332.5  | 224.6  | 208.7  | 159.2  | 132.7  | 139.7  | 141.5  | 142.4  | 125.6  | 123.8  |
| 85°   | 198.1   | 176.0  | 126.5  | 118.5  | 92.9   | 74.3   | 85.8   | 92.9   | 93.7   | 76.9   | 71.6   |
| 87.5° | 94.6    | 92.0   | 59.3   | 45.1   | 34.5   | 24.8   | 30.1   | 37.1   | 40.7   | 29.2   | 25.6   |
| 90°   | 0.0     | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

LM-79-2019: 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:  $4\pi$   
 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  
 R<sub>f</sub>: 84.7  
 R<sub>g</sub>: 94.6

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



### 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

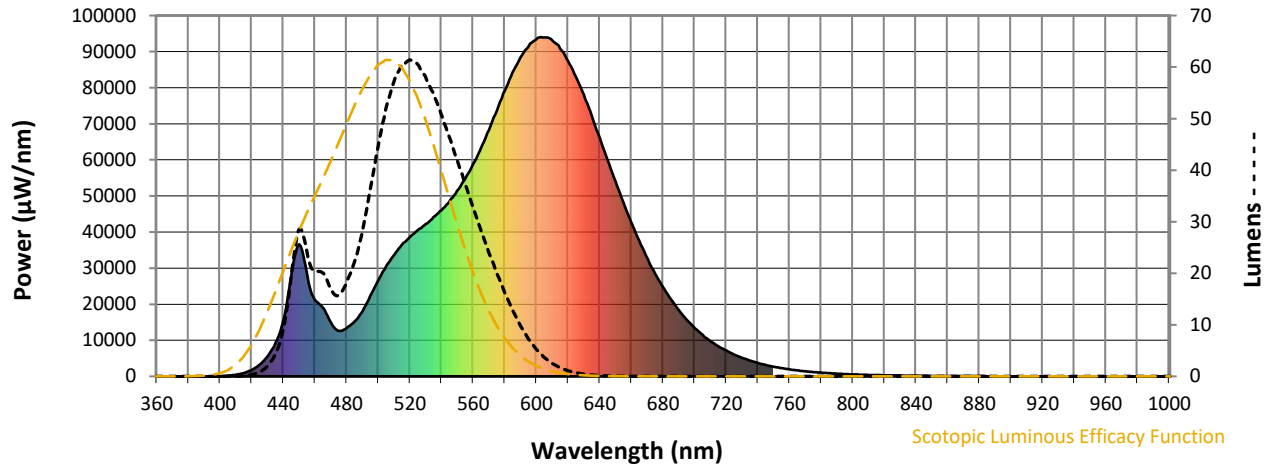


### Photopic Lumens: 4337.9

| λ (nm) | Power (μW/nm) | Lumens (φ/nm) | λ (nm) | Power (μW/nm) | Lumens (φ/nm) | λ (nm) | Power (μW/nm) | Lumens (φ/nm) | λ (nm) | Power (μW/nm) | Lumens (φ/nm) | λ (nm) | Power (μW/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           |        |               |               |

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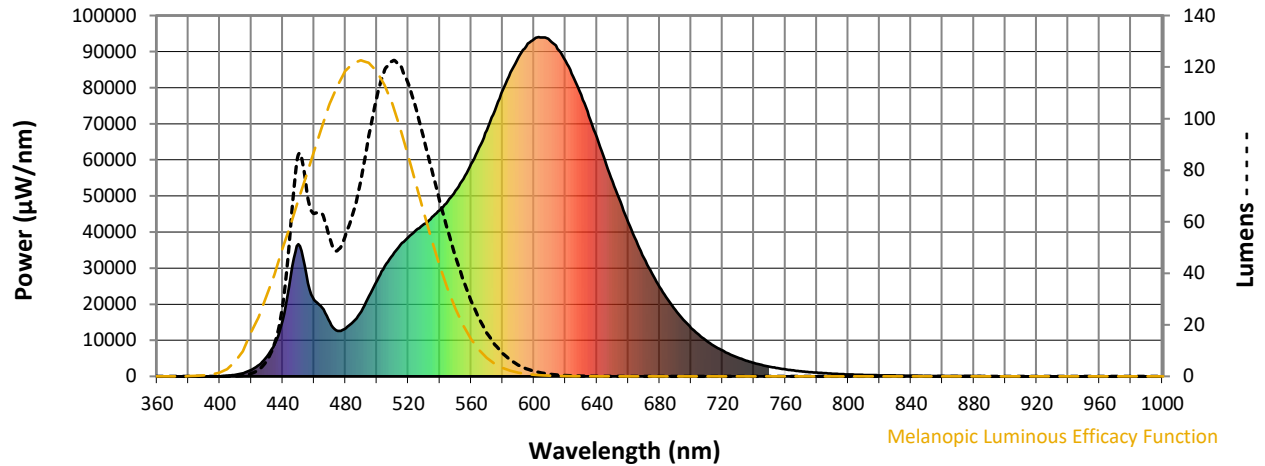
### Scotopic Flux vs. Wavelength


**Scotopic Lumens: 5286.7**
**S/P: 1.22**

| 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       | 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              |           |                  |                  |

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### Melanopic Flux vs. Wavelength



**Melanopic Lumens: 9797**

**M/P: 2.26**

| 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       | 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              |           |                  |                  |

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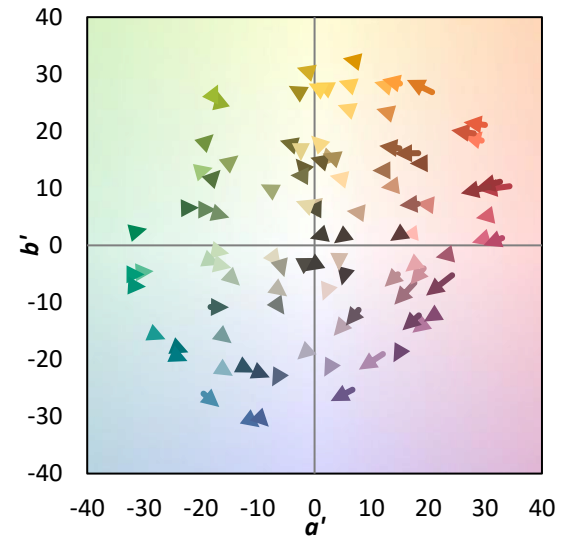
TM-30-18

### 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)