

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: P361455

Luminaire Tested: NVN-SA5B-750-U-T4FT

Issue Date: 3/3/2020

### Test Information

Test Method: LM-79-2019  
Report Number: P361455  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-16)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: STREETWORKS  
Catalog Number: NVN-SA5B-750-U-T4FT  
Description: NAVION ROADWAY AND AREA LUMINAIRE  
(5) 70 CRI, 5000K, 800mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE IV  
FORWARD THROW OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

### Summary

Lumens per Lamp: N/A  
Luminaire Lumens: 29097 lumens  
Efficiency: N/A  
Efficacy: 138.6 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 1.5' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B3 - U0 - G5

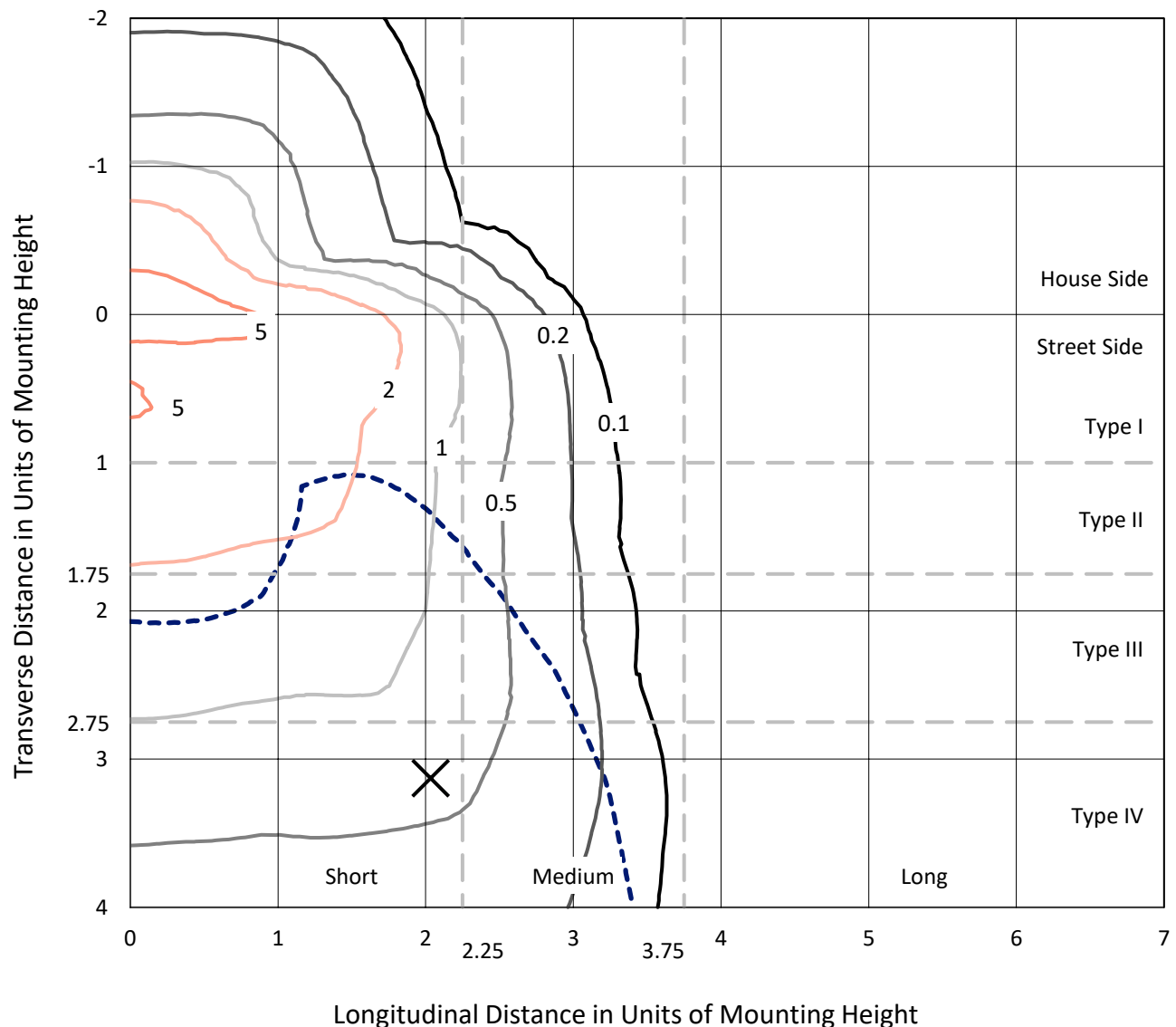
Input Watts (W): 210  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT



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## Iso-Footcandle Lines of Horizontal Illumination

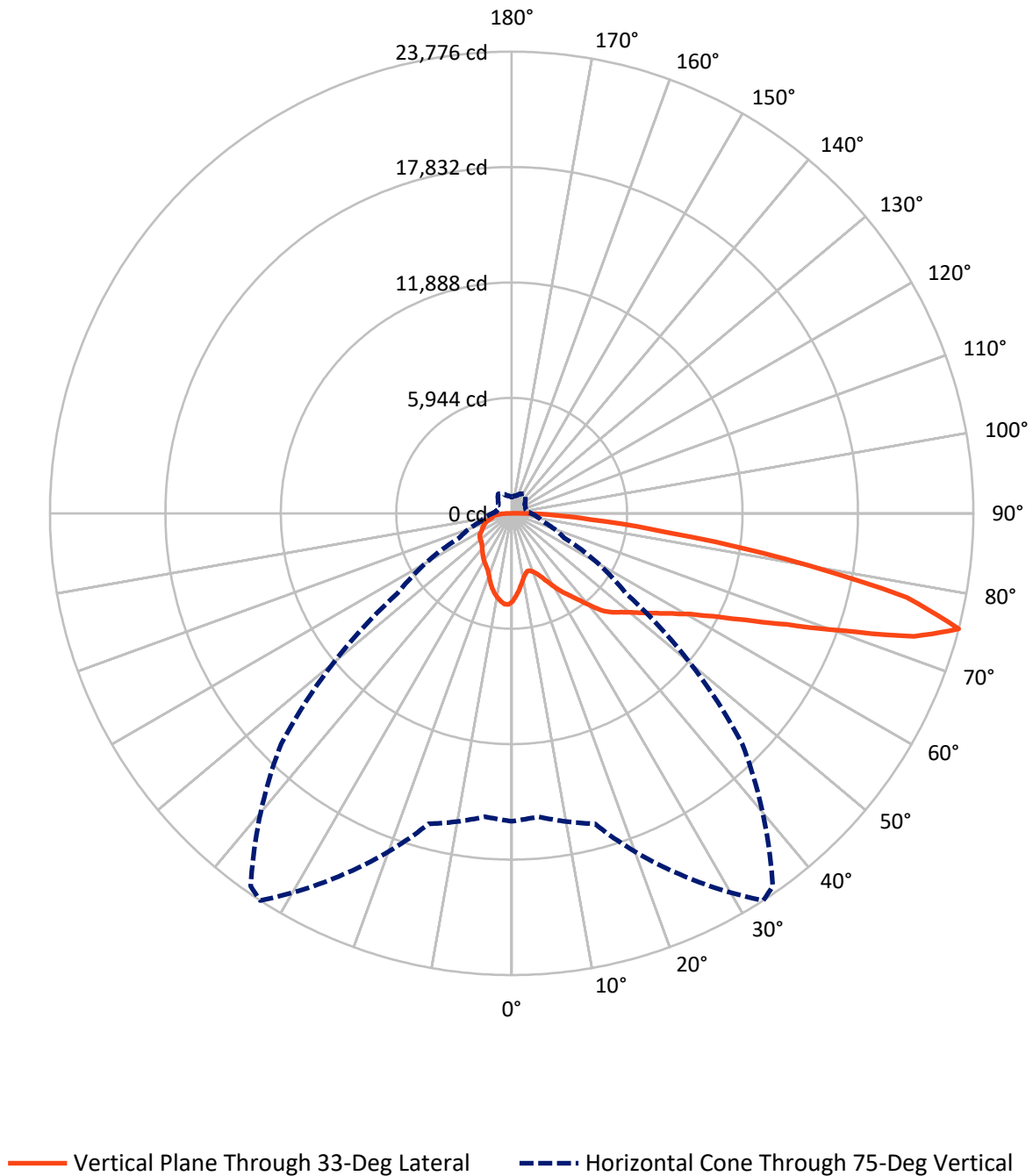
× Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 7.3 fc  
 Type IV - Short - N/A

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## Luminous Intensity Polar Plot



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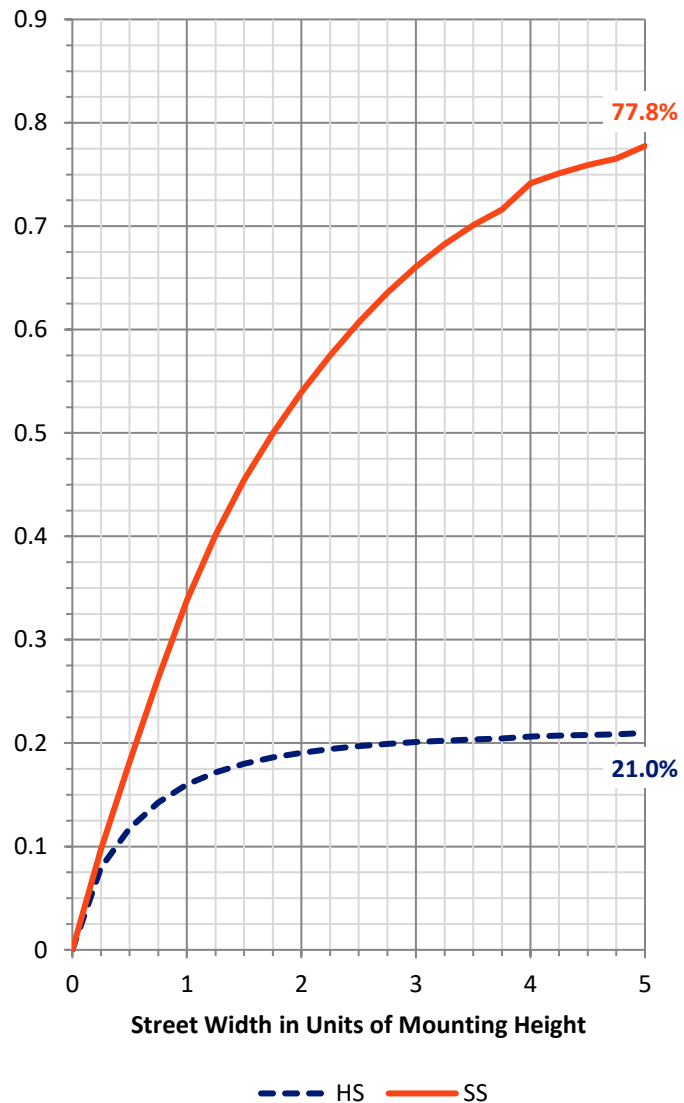
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 6247.9   | 0.0    | 6247.9  |
|                    | % Fixture | 21.5     | 0.0    | 21.5    |
| <b>Street Side</b> | Lumens    | 22849.1  | 0.0    | 22849.1 |
|                    | % Fixture | 78.5     | 0.0    | 78.5    |
| <b>Total</b>       | Lumens    | 29097.0  | 0.0    | 29097.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 411.3   | 1.4       |
| 10°-20°   | 1114.0  | 3.8       |
| 20°-30°   | 1819.3  | 6.3       |
| 30°-40°   | 2709.4  | 9.3       |
| 40°-50°   | 3886.0  | 13.4      |
| 50°-60°   | 5334.9  | 18.3      |
| 60°-70°   | 6679.1  | 23.0      |
| 70°-80°   | 6042.3  | 20.8      |
| 80°-90°   | 1100.6  | 3.8       |
| 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°    | 29097.0 | 100.0     |
| 0°-180°   | 29097.0 | 100.0     |

**Coefficient of Utilization**



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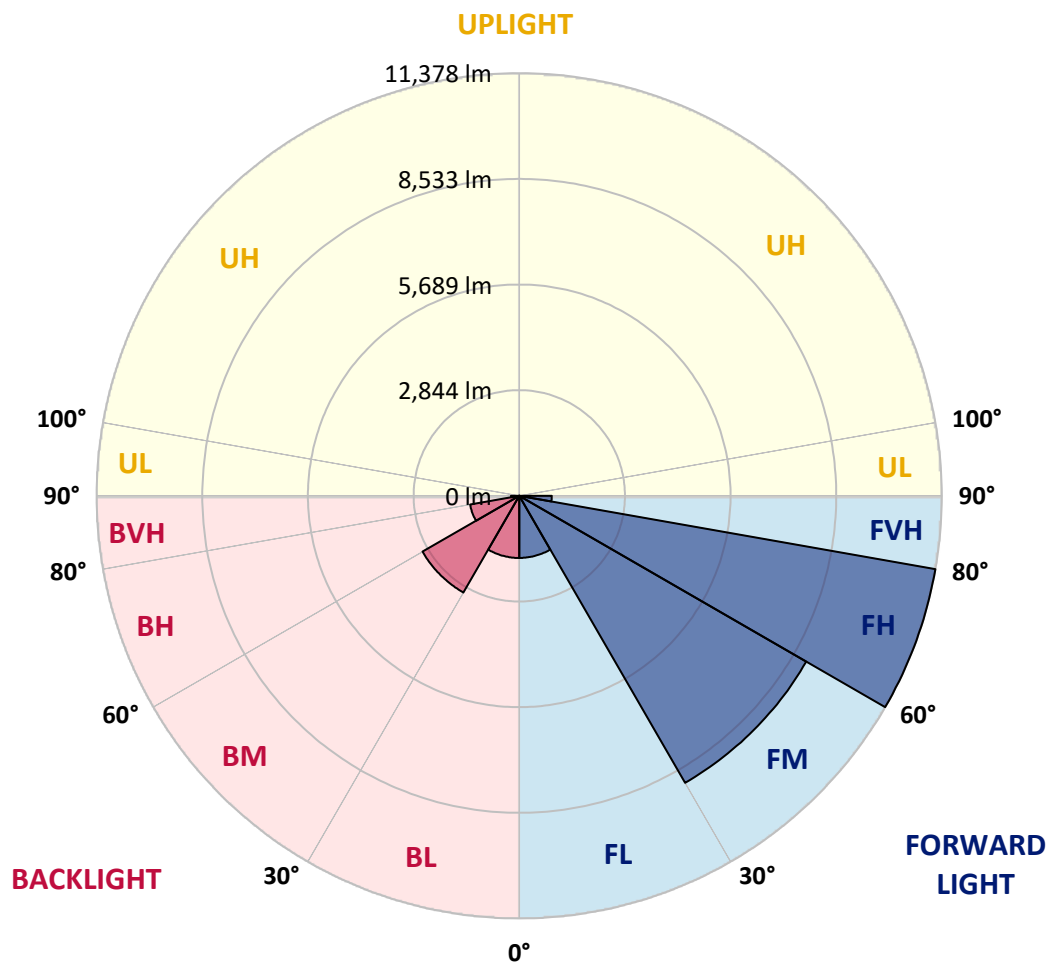
CATALOG NUMBER: NVN-SA5B-750-U-T4FT

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |          |
|------|-------------|---------|-----------|-------------------------|------|----------|
|      |             |         |           | B                       | U    | G        |
| FL   | (0°-30°)    | 1671.2  | 5.7       |                         |      |          |
| FM   | (30°-60°)   | 8923.4  | 30.7      |                         |      |          |
| FH   | (60°-80°)   | 11377.9 | 39.1      |                         |      | G4/12000 |
| FVH  | (80°-90°)   | 876.6   | 3.0       |                         |      | G5       |
| BL   | (0°-30°)    | 1673.5  | 5.8       | B3/2500                 |      |          |
| BM   | (30°-60°)   | 3006.9  | 10.3      | B3/5000                 |      |          |
| BH   | (60°-80°)   | 1343.4  | 4.6       | B3/2500                 |      | G3/2500  |
| BVH  | (80°-90°)   | 224.1   | 0.8       |                         |      | G2/225   |
| UL   | (90°-100°)  | 0.0     | 0.0       |                         | U0/0 |          |
| UH   | (100°-180°) | 0.0     | 0.0       |                         | U0/0 |          |

**BUG Rating: B3-U0-G5**

Type IV Short





REPORT NUMBER: P361455

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**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 33°     | 35°     | 45°     | 55°     | 65°     | 75°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 4548.0  | 4548.0  | 4548.0  | 4548.0  | 4548.0  | 4548.0  | 4548.0  | 4548.0  | 4548.0  | 4548.0  | 4548.0  |
| 2.5°  | 4223.4  | 4207.3  | 4237.5  | 4241.5  | 4267.6  | 4277.7  | 4313.8  | 4370.1  | 4416.4  | 4469.6  | 4517.9  |
| 5°    | 3840.4  | 3829.4  | 3871.6  | 3901.8  | 3959.0  | 3983.2  | 4068.6  | 4188.2  | 4294.7  | 4415.4  | 4524.9  |
| 7.5°  | 3476.6  | 3470.6  | 3517.8  | 3586.2  | 3652.5  | 3685.7  | 3833.4  | 4007.3  | 4185.2  | 4380.2  | 4548.0  |
| 10°   | 3170.0  | 3168.0  | 3213.3  | 3280.6  | 3378.1  | 3415.3  | 3606.3  | 3835.4  | 4084.7  | 4353.0  | 4587.2  |
| 12.5° | 2998.2  | 3005.2  | 3026.3  | 3082.6  | 3173.1  | 3210.3  | 3422.3  | 3691.7  | 4000.3  | 4344.0  | 4644.5  |
| 15°   | 3040.4  | 3051.4  | 3015.3  | 3013.3  | 3077.6  | 3106.7  | 3305.7  | 3589.2  | 3939.9  | 4359.1  | 4727.9  |
| 17.5° | 3220.3  | 3222.3  | 3126.8  | 3066.5  | 3105.7  | 3120.8  | 3269.6  | 3530.9  | 3904.8  | 4393.2  | 4832.5  |
| 20°   | 3473.6  | 3468.6  | 3299.7  | 3199.2  | 3220.3  | 3224.3  | 3320.8  | 3531.9  | 3901.8  | 4452.5  | 4968.2  |
| 22.5° | 3809.3  | 3772.1  | 3544.9  | 3408.3  | 3403.2  | 3397.2  | 3452.5  | 3606.3  | 3946.0  | 4549.0  | 5130.0  |
| 25°   | 4247.5  | 4212.3  | 3899.7  | 3712.8  | 3672.6  | 3657.5  | 3665.6  | 3765.1  | 4033.4  | 4652.6  | 5310.9  |
| 27.5° | 4735.0  | 4673.7  | 4372.1  | 4107.8  | 4024.4  | 4003.3  | 3955.0  | 3989.2  | 4128.9  | 4752.1  | 5526.0  |
| 30°   | 5143.0  | 5109.9  | 4846.5  | 4532.9  | 4434.4  | 4404.3  | 4277.7  | 4240.5  | 4266.6  | 4887.7  | 5797.3  |
| 32.5° | 5371.2  | 5349.1  | 5189.3  | 4936.0  | 4844.5  | 4802.3  | 4623.4  | 4549.0  | 4487.7  | 5101.8  | 6165.2  |
| 35°   | 5647.6  | 5633.5  | 5537.0  | 5353.1  | 5217.4  | 5173.2  | 5034.5  | 4957.1  | 4799.3  | 5396.3  | 6640.6  |
| 37.5° | 5999.4  | 5984.3  | 5986.3  | 5837.6  | 5675.7  | 5634.5  | 5543.1  | 5461.6  | 5203.3  | 5783.3  | 7157.2  |
| 40°   | 6397.4  | 6368.2  | 6357.2  | 6350.1  | 6247.6  | 6224.5  | 6176.3  | 6065.7  | 5709.9  | 6245.6  | 7666.8  |
| 42.5° | 6996.4  | 6892.9  | 6671.8  | 6755.2  | 6856.7  | 6844.7  | 6883.8  | 6725.0  | 6272.8  | 6792.4  | 8164.3  |
| 45°   | 7574.3  | 7404.5  | 7022.6  | 7040.6  | 7262.8  | 7330.1  | 7623.6  | 7511.0  | 6882.8  | 7391.4  | 8678.9  |
| 47.5° | 7837.7  | 7709.0  | 7384.4  | 7385.4  | 7605.5  | 7745.2  | 8388.5  | 8308.1  | 7524.1  | 8071.9  | 9307.1  |
| 50°   | 8132.2  | 8003.5  | 7712.0  | 7821.6  | 8013.6  | 8162.3  | 9127.2  | 9086.0  | 8134.2  | 8816.6  | 10059.9 |
| 52.5° | 8453.8  | 8235.7  | 8050.8  | 8246.7  | 8516.1  | 8689.0  | 9867.0  | 9754.4  | 8694.0  | 9566.4  | 10925.3 |
| 55°   | 8457.8  | 8398.5  | 8539.2  | 8683.0  | 9086.0  | 9298.1  | 10641.9 | 10344.4 | 9150.3  | 10303.2 | 11629.9 |
| 57.5° | 8939.3  | 8842.8  | 9141.3  | 9207.6  | 9734.3  | 9973.5  | 11412.8 | 10858.0 | 9614.7  | 10868.0 | 12009.8 |
| 60°   | 9576.5  | 9494.1  | 9738.3  | 9913.2  | 10536.3 | 10856.0 | 12235.9 | 11385.6 | 9979.5  | 11294.2 | 11991.7 |
| 62.5° | 10677.1 | 10583.6 | 10580.6 | 10825.8 | 11665.1 | 12036.9 | 13159.6 | 11903.3 | 10124.3 | 11378.6 | 11480.1 |
| 65°   | 12288.2 | 12139.5 | 11859.0 | 11975.6 | 13223.9 | 13594.8 | 14191.8 | 12278.2 | 9933.3  | 10926.3 | 10162.4 |
| 67.5° | 13856.1 | 13851.1 | 13506.4 | 13745.6 | 15282.4 | 15579.9 | 15367.8 | 12315.3 | 9337.3  | 9351.3  | 7824.6  |
| 70°   | 15419.1 | 15439.2 | 15380.9 | 16213.1 | 18063.4 | 18373.0 | 16620.1 | 11815.8 | 7997.5  | 6753.2  | 4687.7  |
| 72.5° | 16657.3 | 16652.3 | 16945.8 | 19091.7 | 21672.7 | 21603.4 | 17675.5 | 10302.2 | 5742.1  | 3645.5  | 2240.3  |
| 75°   | 15855.3 | 15680.4 | 16554.8 | 20516.9 | 23776.4 | 23437.7 | 16777.9 | 7186.4  | 2980.1  | 1659.4  | 1206.1  |
| 77.5° | 10341.4 | 10507.2 | 11790.7 | 16948.8 | 20797.3 | 20385.2 | 12309.3 | 3353.0  | 1404.1  | 1088.5  | 874.4   |
| 80°   | 3745.0  | 3919.8  | 5520.9  | 9600.6  | 14328.5 | 14261.2 | 6061.7  | 1378.0  | 949.8   | 822.2   | 637.2   |
| 82.5° | 1288.5  | 1352.8  | 2178.0  | 4263.6  | 8090.0  | 8391.5  | 2280.5  | 783.0   | 690.5   | 583.0   | 436.2   |
| 85°   | 505.6   | 578.9   | 996.0   | 2051.4  | 4080.7  | 4110.8  | 923.7   | 468.4   | 480.4   | 381.9   | 239.2   |
| 87.5° | 192.0   | 233.2   | 476.4   | 952.8   | 1863.4  | 1711.7  | 330.7   | 223.1   | 273.4   | 227.1   | 113.6   |
| 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: P361455

CATALOG NUMBER: NVN-SA5B-750-U-T4FT

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 4548.0 | 4548.0 | 4548.0 | 4548.0 | 4548.0 | 4548.0 | 4548.0 | 4548.0 | 4548.0 | 4548.0 | 4548.0 |
| 2.5°  | 4555.1 | 4576.2 | 4620.4 | 4650.5 | 4682.7 | 4691.8 | 4695.8 | 4703.8 | 4711.9 | 4708.8 | 4709.8 |
| 5°    | 4583.2 | 4624.4 | 4695.8 | 4725.9 | 4740.0 | 4723.9 | 4692.8 | 4667.6 | 4649.5 | 4639.5 | 4636.5 |
| 7.5°  | 4629.4 | 4687.7 | 4764.1 | 4759.1 | 4726.9 | 4655.6 | 4575.2 | 4514.9 | 4464.6 | 4446.5 | 4436.5 |
| 10°   | 4690.7 | 4759.1 | 4812.4 | 4755.1 | 4661.6 | 4538.0 | 4417.4 | 4323.9 | 4248.5 | 4219.4 | 4214.3 |
| 12.5° | 4769.1 | 4838.5 | 4848.5 | 4726.9 | 4572.1 | 4403.3 | 4239.5 | 4115.8 | 4003.3 | 3967.1 | 3959.0 |
| 15°   | 4870.7 | 4936.0 | 4873.7 | 4677.7 | 4461.6 | 4234.4 | 4022.4 | 3854.5 | 3735.9 | 3691.7 | 3675.6 |
| 17.5° | 4977.2 | 5039.5 | 4878.7 | 4596.3 | 4316.9 | 4034.4 | 3768.1 | 3596.2 | 3460.5 | 3409.3 | 3403.2 |
| 20°   | 5104.8 | 5133.0 | 4857.6 | 4479.7 | 4117.8 | 3775.1 | 3494.7 | 3332.9 | 3260.5 | 3224.3 | 3220.3 |
| 22.5° | 5262.6 | 5232.5 | 4809.3 | 4321.9 | 3865.6 | 3475.6 | 3247.4 | 3172.1 | 3154.0 | 3145.9 | 3148.9 |
| 25°   | 5429.5 | 5337.0 | 4738.0 | 4115.8 | 3547.0 | 3176.1 | 3066.5 | 3087.6 | 3111.8 | 3108.7 | 3108.7 |
| 27.5° | 5613.4 | 5443.6 | 4628.4 | 3842.5 | 3194.2 | 2930.8 | 2943.9 | 3021.3 | 3057.5 | 3056.5 | 3055.5 |
| 30°   | 5849.6 | 5564.2 | 4488.7 | 3513.8 | 2864.5 | 2758.0 | 2837.4 | 2931.8 | 2981.1 | 2979.1 | 2980.1 |
| 32.5° | 6140.1 | 5696.8 | 4298.8 | 3146.9 | 2626.3 | 2630.3 | 2721.8 | 2815.3 | 2872.5 | 2867.5 | 2868.5 |
| 35°   | 6479.8 | 5845.6 | 4041.5 | 2785.1 | 2468.5 | 2528.8 | 2601.2 | 2666.5 | 2720.8 | 2713.7 | 2706.7 |
| 37.5° | 6849.7 | 5991.3 | 3699.7 | 2461.5 | 2339.8 | 2434.3 | 2494.6 | 2505.7 | 2530.8 | 2512.7 | 2499.7 |
| 40°   | 7201.5 | 6102.9 | 3259.5 | 2196.1 | 2210.2 | 2353.9 | 2393.1 | 2348.9 | 2303.7 | 2297.6 | 2279.5 |
| 42.5° | 7508.0 | 6140.1 | 2814.2 | 1984.0 | 2073.5 | 2269.5 | 2293.6 | 2201.1 | 2119.7 | 2081.5 | 2065.5 |
| 45°   | 7831.6 | 6153.2 | 2399.1 | 1806.1 | 1941.8 | 2194.1 | 2220.2 | 2096.6 | 1982.0 | 1899.6 | 1872.5 |
| 47.5° | 8254.8 | 6247.6 | 2076.5 | 1674.5 | 1841.3 | 2143.9 | 2181.0 | 2013.2 | 1864.4 | 1746.8 | 1721.7 |
| 50°   | 8808.6 | 6434.6 | 1814.2 | 1574.0 | 1776.0 | 2110.7 | 2152.9 | 1931.8 | 1768.0 | 1626.2 | 1601.1 |
| 52.5° | 9423.7 | 6606.4 | 1602.1 | 1492.6 | 1712.7 | 2052.4 | 2116.7 | 1873.5 | 1677.5 | 1514.7 | 1487.5 |
| 55°   | 9853.9 | 6474.8 | 1431.2 | 1408.1 | 1630.3 | 1969.0 | 2066.5 | 1824.2 | 1547.8 | 1406.1 | 1382.0 |
| 57.5° | 9936.3 | 6024.5 | 1301.6 | 1320.7 | 1530.7 | 1864.4 | 1989.1 | 1714.7 | 1477.5 | 1358.9 | 1333.8 |
| 60°   | 9711.2 | 5397.3 | 1205.1 | 1240.3 | 1424.2 | 1732.8 | 1844.3 | 1637.3 | 1410.1 | 1308.6 | 1287.5 |
| 62.5° | 9145.3 | 4755.1 | 1133.7 | 1167.9 | 1324.7 | 1599.1 | 1753.9 | 1555.9 | 1341.8 | 1251.3 | 1230.2 |
| 65°   | 8002.5 | 3992.2 | 1065.4 | 1103.6 | 1232.2 | 1483.5 | 1672.5 | 1480.5 | 1274.5 | 1205.1 | 1185.0 |
| 67.5° | 6040.6 | 2990.1 | 1001.1 | 1035.2 | 1149.8 | 1383.0 | 1584.0 | 1406.1 | 1209.1 | 1164.9 | 1140.8 |
| 70°   | 3557.0 | 1872.5 | 927.7  | 963.9  | 1063.4 | 1278.5 | 1489.5 | 1324.7 | 1127.7 | 1107.6 | 1076.4 |
| 72.5° | 1655.4 | 1126.7 | 844.3  | 879.5  | 954.8  | 1138.8 | 1367.9 | 1218.2 | 1031.2 | 987.0  | 944.8  |
| 75°   | 988.0  | 824.2  | 745.8  | 776.9  | 830.2  | 990.0  | 1215.2 | 1109.6 | 939.8  | 881.5  | 837.2  |
| 77.5° | 738.7  | 630.2  | 637.2  | 670.4  | 713.6  | 866.4  | 1076.4 | 1024.2 | 869.4  | 824.2  | 794.0  |
| 80°   | 531.7  | 478.4  | 519.6  | 555.8  | 601.0  | 788.0  | 1031.2 | 946.8  | 786.0  | 725.7  | 697.5  |
| 82.5° | 354.8  | 343.7  | 391.0  | 428.2  | 472.4  | 689.5  | 968.9  | 829.2  | 671.4  | 595.0  | 532.7  |
| 85°   | 196.0  | 207.0  | 263.3  | 279.4  | 317.6  | 485.5  | 794.0  | 666.4  | 505.6  | 407.1  | 389.0  |
| 87.5° | 81.4   | 95.5   | 141.7  | 136.7  | 168.9  | 289.5  | 522.6  | 402.0  | 321.6  | 240.2  | 186.9  |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

LM-79-2008: Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Report Prepared for

Cooper Lighting Solutions

McGRAW-EDISON

Report Number: SP1-1908-441-4-R4

Test Date: 10/02/2019

Luminaire Tested: SA1C-750-U-5WQ

Data in this report applies to families of products SA1C-760-U-5WQ .

### Test Information

Test Method: LM-79-2008  
 Report Number: SP1-1908-441-4-R4  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 10/28/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: MCGRAW-EDISON  
 Catalog Number: **SA1C-750-U-5WQ**  
 Description: MCGRAW EDISON ROADWAY AND AREA LUMINAIRE

\*\*\*THIS IS A REVISION OF SP1-1908-441-4-R3. TO UPDATE THE CATALOG INFORMATION.\*\*\*TESTED IN SITU. ROADWAY AND AREA LUMINAIRE. (1) 70 CRI, 5000K, 1050MA LIGHTSQUARE WITH 16 LEDS AND TYPE V WIDE OPTICS.

### Spectral Parameters

|                           |        |           |      |      |       |
|---------------------------|--------|-----------|------|------|-------|
| CCT (K):                  | 4884   | CRI (Ra): | 73.5 |      |       |
| CIE u':                   | 0.2101 | R1:       | 70.5 | R9:  | -28.4 |
| CIE v':                   | 0.4904 | R2:       | 77.7 | R10: | 48.6  |
| Duv:                      | 0.0037 | R3:       | 84.6 | R11: | 73.2  |
| CIE x:                    | 0.3493 | R4:       | 74.7 | R12: | 50.7  |
| CIE y:                    | 0.3624 | R5:       | 71.9 | R13: | 71.2  |
| CIE z:                    | 0.2884 | R6:       | 70.7 | R14: | 91.4  |
| Peak Wavelength (nm):     | 444    | R7:       | 81.2 |      |       |
| Dominant Wavelength (nm): | 571    | R8:       | 56.9 |      |       |
| Purity:                   | 13.7   |           |      |      |       |
| Rf:                       | 74.9   |           |      |      |       |
| Rg:                       | 96.3   |           |      |      |       |



### Test Conditions

Stabilization Time: 240M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.0./44%  
 Sphere Temperature (°C): 25.7

REPORT NUMBER: SP1-1908-441-4-R4

| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 6/28/2019        | 12/28/2019           |
| Power Meter                    | IN0071                | 12/5/2018        | 12/5/2019            |
| AC Power Source                | IN0063                | 12/5/2018        | 12/5/2019            |
| DC Power Source                | IN0208                | 12/5/2018        | 12/5/2019            |
| Sphere Thermometer             | IN0085                | 12/5/2018        | 12/5/2019            |
| Room Thermometer               | IN0046                | 12/5/2018        | 12/5/2019            |

REPORT NUMBER: SP1-1908-441-4-R4

CIE 1931 Chromaticity Diagram



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



Point lies inside the ANSI 5000K 4-step quadrangle

REPORT NUMBER: SP1-1908-441-4-R4

**Photopic Flux vs. Wavelength**



#####

| 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       | 2945             | NR               | 490       | 37941            | NR               | 620       | 88803            | NR               | 750       | 3908             | NR               | 880       | 2997             | NR               |
| 365       | 2596             | NR               | 495       | 48525            | NR               | 625       | 80578            | NR               | 755       | 3988             | NR               | 885       | 2927             | NR               |
| 370       | 2732             | NR               | 500       | 60609            | NR               | 630       | 73127            | NR               | 760       | 3335             | NR               | 890       | 2649             | NR               |
| 375       | 2894             | NR               | 505       | 72036            | NR               | 635       | 66244            | NR               | 765       | 3438             | NR               | 895       | 2828             | NR               |
| 380       | 2822             | NR               | 510       | 82168            | NR               | 640       | 59440            | NR               | 770       | 3427             | NR               | 900       | 1407             | NR               |
| 385       | 2394             | NR               | 515       | 90898            | NR               | 645       | 52864            | NR               | 775       | 2759             | NR               | 905       | 2224             | NR               |
| 390       | 2370             | NR               | 520       | 97142            | NR               | 650       | 47085            | NR               | 780       | 2340             | NR               | 910       | 2905             | NR               |
| 395       | 2267             | NR               | 525       | 103255           | NR               | 655       | 41789            | NR               | 785       | 2412             | NR               | 915       | 3350             | NR               |
| 400       | 2262             | NR               | 530       | 106697           | NR               | 660       | 37064            | NR               | 790       | 1999             | NR               | 920       | 3114             | NR               |
| 405       | 3000             | NR               | 535       | 110081           | NR               | 665       | 32299            | NR               | 795       | 2054             | NR               | 925       | 2834             | NR               |
| 410       | 5324             | NR               | 540       | 112494           | NR               | 670       | 28142            | NR               | 800       | 2331             | NR               | 930       | 2271             | NR               |
| 415       | 10725            | NR               | 545       | 115513           | NR               | 675       | 24505            | NR               | 805       | 2648             | NR               | 935       | 2228             | NR               |
| 420       | 22128            | NR               | 550       | 117203           | NR               | 680       | 21162            | NR               | 810       | 2485             | NR               | 940       | 2833             | NR               |
| 425       | 44095            | NR               | 555       | 119753           | NR               | 685       | 18400            | NR               | 815       | 2409             | NR               | 945       | 2941             | NR               |
| 430       | 77002            | NR               | 560       | 122602           | NR               | 690       | 16065            | NR               | 820       | 2221             | NR               | 950       | 2323             | NR               |
| 435       | 119881           | NR               | 565       | 124314           | NR               | 695       | 13860            | NR               | 825       | 1562             | NR               | 955       | 1667             | NR               |
| 440       | 164454           | NR               | 570       | 126775           | NR               | 700       | 12177            | NR               | 830       | 2249             | NR               | 960       | 749              | NR               |
| 445       | 179997           | NR               | 575       | 127511           | NR               | 705       | 10757            | NR               | 835       | 2573             | NR               | 965       | 2669             | NR               |
| 450       | 142822           | NR               | 580       | 127577           | NR               | 710       | 9601             | NR               | 840       | 2764             | NR               | 970       | 3968             | NR               |
| 455       | 90008            | NR               | 585       | 126153           | NR               | 715       | 8944             | NR               | 845       | 3109             | NR               | 975       | 3886             | NR               |
| 460       | 60557            | NR               | 590       | 123678           | NR               | 720       | 7947             | NR               | 850       | 2963             | NR               | 980       | 2788             | NR               |
| 465       | 43305            | NR               | 595       | 119774           | NR               | 725       | 7062             | NR               | 855       | 2336             | NR               | 985       | 3496             | NR               |
| 470       | 31089            | NR               | 600       | 115733           | NR               | 730       | 6004             | NR               | 860       | 2118             | NR               | 990       | 2913             | NR               |
| 475       | 26278            | NR               | 605       | 109231           | NR               | 735       | 5594             | NR               | 865       | 3144             | NR               | 995       | 4659             | NR               |
| 480       | 27060            | NR               | 610       | 102408           | NR               | 740       | 5165             | NR               | 870       | 3069             | NR               | 1000      | 1308             | NR               |
| 485       | 30698            | NR               | 615       | 96015            | NR               | 745       | 4687             | NR               | 875       | 3311             | NR               |           |                  |                  |

REPORT NUMBER: SP1-1908-441-4-R4

Scotopic Flux vs. Wavelength



Scotopic Lumens: 13493.5

S/P: 1.77

| 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       | 2945             | NR               | 490       | 37941            | NR               | 620       | 88803            | NR               | 750       | 3908             | NR               | 880       | 2997             | NR               |
| 365       | 2596             | NR               | 495       | 48525            | NR               | 625       | 80578            | NR               | 755       | 3988             | NR               | 885       | 2927             | NR               |
| 370       | 2732             | NR               | 500       | 60609            | NR               | 630       | 73127            | NR               | 760       | 3335             | NR               | 890       | 2649             | NR               |
| 375       | 2894             | NR               | 505       | 72036            | NR               | 635       | 66244            | NR               | 765       | 3438             | NR               | 895       | 2828             | NR               |
| 380       | 2822             | NR               | 510       | 82168            | NR               | 640       | 59440            | NR               | 770       | 3427             | NR               | 900       | 1407             | NR               |
| 385       | 2394             | NR               | 515       | 90898            | NR               | 645       | 52864            | NR               | 775       | 2759             | NR               | 905       | 2224             | NR               |
| 390       | 2370             | NR               | 520       | 97142            | NR               | 650       | 47085            | NR               | 780       | 2340             | NR               | 910       | 2905             | NR               |
| 395       | 2267             | NR               | 525       | 103255           | NR               | 655       | 41789            | NR               | 785       | 2412             | NR               | 915       | 3350             | NR               |
| 400       | 2262             | NR               | 530       | 106697           | NR               | 660       | 37064            | NR               | 790       | 1999             | NR               | 920       | 3114             | NR               |
| 405       | 3000             | NR               | 535       | 110081           | NR               | 665       | 32299            | NR               | 795       | 2054             | NR               | 925       | 2834             | NR               |
| 410       | 5324             | NR               | 540       | 112494           | NR               | 670       | 28142            | NR               | 800       | 2331             | NR               | 930       | 2271             | NR               |
| 415       | 10725            | NR               | 545       | 115513           | NR               | 675       | 24505            | NR               | 805       | 2648             | NR               | 935       | 2228             | NR               |
| 420       | 22128            | NR               | 550       | 117203           | NR               | 680       | 21162            | NR               | 810       | 2485             | NR               | 940       | 2833             | NR               |
| 425       | 44095            | NR               | 555       | 119753           | NR               | 685       | 18400            | NR               | 815       | 2409             | NR               | 945       | 2941             | NR               |
| 430       | 77002            | NR               | 560       | 122602           | NR               | 690       | 16065            | NR               | 820       | 2221             | NR               | 950       | 2323             | NR               |
| 435       | 119881           | NR               | 565       | 124314           | NR               | 695       | 13860            | NR               | 825       | 1562             | NR               | 955       | 1667             | NR               |
| 440       | 164454           | NR               | 570       | 126775           | NR               | 700       | 12177            | NR               | 830       | 2249             | NR               | 960       | 749              | NR               |
| 445       | 179997           | NR               | 575       | 127511           | NR               | 705       | 10757            | NR               | 835       | 2573             | NR               | 965       | 2669             | NR               |
| 450       | 142822           | NR               | 580       | 127577           | NR               | 710       | 9601             | NR               | 840       | 2764             | NR               | 970       | 3968             | NR               |
| 455       | 90008            | NR               | 585       | 126153           | NR               | 715       | 8944             | NR               | 845       | 3109             | NR               | 975       | 3886             | NR               |
| 460       | 60557            | NR               | 590       | 123678           | NR               | 720       | 7947             | NR               | 850       | 2963             | NR               | 980       | 2788             | NR               |
| 465       | 43305            | NR               | 595       | 119774           | NR               | 725       | 7062             | NR               | 855       | 2336             | NR               | 985       | 3496             | NR               |
| 470       | 31089            | NR               | 600       | 115733           | NR               | 730       | 6004             | NR               | 860       | 2118             | NR               | 990       | 2913             | NR               |
| 475       | 26278            | NR               | 605       | 109231           | NR               | 735       | 5594             | NR               | 865       | 3144             | NR               | 995       | 4659             | NR               |
| 480       | 27060            | NR               | 610       | 102408           | NR               | 740       | 5165             | NR               | 870       | 3069             | NR               | 1000      | 1308             | NR               |
| 485       | 30698            | NR               | 615       | 96015            | NR               | 745       | 4687             | NR               | 875       | 3311             | NR               |           |                  |                  |

REPORT NUMBER: SP1-1908-441-4-R4

**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 5378.9**

**M/P: 0.71**

| 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       | 2945             | NR               | 490       | 37941            | NR               | 620       | 88803            | NR               | 750       | 3908             | NR               | 880       | 2997             | NR               |
| 365       | 2596             | NR               | 495       | 48525            | NR               | 625       | 80578            | NR               | 755       | 3988             | NR               | 885       | 2927             | NR               |
| 370       | 2732             | NR               | 500       | 60609            | NR               | 630       | 73127            | NR               | 760       | 3335             | NR               | 890       | 2649             | NR               |
| 375       | 2894             | NR               | 505       | 72036            | NR               | 635       | 66244            | NR               | 765       | 3438             | NR               | 895       | 2828             | NR               |
| 380       | 2822             | NR               | 510       | 82168            | NR               | 640       | 59440            | NR               | 770       | 3427             | NR               | 900       | 1407             | NR               |
| 385       | 2394             | NR               | 515       | 90898            | NR               | 645       | 52864            | NR               | 775       | 2759             | NR               | 905       | 2224             | NR               |
| 390       | 2370             | NR               | 520       | 97142            | NR               | 650       | 47085            | NR               | 780       | 2340             | NR               | 910       | 2905             | NR               |
| 395       | 2267             | NR               | 525       | 103255           | NR               | 655       | 41789            | NR               | 785       | 2412             | NR               | 915       | 3350             | NR               |
| 400       | 2262             | NR               | 530       | 106697           | NR               | 660       | 37064            | NR               | 790       | 1999             | NR               | 920       | 3114             | NR               |
| 405       | 3000             | NR               | 535       | 110081           | NR               | 665       | 32299            | NR               | 795       | 2054             | NR               | 925       | 2834             | NR               |
| 410       | 5324             | NR               | 540       | 112494           | NR               | 670       | 28142            | NR               | 800       | 2331             | NR               | 930       | 2271             | NR               |
| 415       | 10725            | NR               | 545       | 115513           | NR               | 675       | 24505            | NR               | 805       | 2648             | NR               | 935       | 2228             | NR               |
| 420       | 22128            | NR               | 550       | 117203           | NR               | 680       | 21162            | NR               | 810       | 2485             | NR               | 940       | 2833             | NR               |
| 425       | 44095            | NR               | 555       | 119753           | NR               | 685       | 18400            | NR               | 815       | 2409             | NR               | 945       | 2941             | NR               |
| 430       | 77002            | NR               | 560       | 122602           | NR               | 690       | 16065            | NR               | 820       | 2221             | NR               | 950       | 2323             | NR               |
| 435       | 119881           | NR               | 565       | 124314           | NR               | 695       | 13860            | NR               | 825       | 1562             | NR               | 955       | 1667             | NR               |
| 440       | 164454           | NR               | 570       | 126775           | NR               | 700       | 12177            | NR               | 830       | 2249             | NR               | 960       | 749              | NR               |
| 445       | 179997           | NR               | 575       | 127511           | NR               | 705       | 10757            | NR               | 835       | 2573             | NR               | 965       | 2669             | NR               |
| 450       | 142822           | NR               | 580       | 127577           | NR               | 710       | 9601             | NR               | 840       | 2764             | NR               | 970       | 3968             | NR               |
| 455       | 90008            | NR               | 585       | 126153           | NR               | 715       | 8944             | NR               | 845       | 3109             | NR               | 975       | 3886             | NR               |
| 460       | 60557            | NR               | 590       | 123678           | NR               | 720       | 7947             | NR               | 850       | 2963             | NR               | 980       | 2788             | NR               |
| 465       | 43305            | NR               | 595       | 119774           | NR               | 725       | 7062             | NR               | 855       | 2336             | NR               | 985       | 3496             | NR               |
| 470       | 31089            | NR               | 600       | 115733           | NR               | 730       | 6004             | NR               | 860       | 2118             | NR               | 990       | 2913             | NR               |
| 475       | 26278            | NR               | 605       | 109231           | NR               | 735       | 5594             | NR               | 865       | 3144             | NR               | 995       | 4659             | NR               |
| 480       | 27060            | NR               | 610       | 102408           | NR               | 740       | 5165             | NR               | 870       | 3069             | NR               | 1000      | 1308             | NR               |
| 485       | 30698            | NR               | 615       | 96015            | NR               | 745       | 4687             | NR               | 875       | 3311             | NR               |           |                  |                  |

REPORT NUMBER: SP1-1908-441-4-R4

**TM-30-18**

### Summary

$R_f = 74.9$   
 $R_g = 96.3$   
 CIE  $R_a = 73.5$   
 $R_g = -28.4$

### Spectral Power Distribution Comparison



### Color Vector Graphics



REPORT NUMBER: SP1-1908-441-4-R4

TM-30-18

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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 61 | CES51 = 90 | CES76 = 52 |
| CES02 = 60 | CES27 = 84 | CES52 = 91 | CES77 = 71 |
| CES03 = 30 | CES28 = 81 | CES53 = 79 | CES78 = 54 |
| CES04 = 69 | CES29 = 58 | CES54 = 83 | CES79 = 80 |
| CES05 = 46 | CES30 = 67 | CES55 = 83 | CES80 = 77 |
| CES06 = 50 | CES31 = 63 | CES56 = 73 | CES81 = 77 |
| CES07 = 39 | CES32 = 59 | CES57 = 72 | CES82 = 90 |
| CES08 = 38 | CES33 = 69 | CES58 = 73 | CES83 = 86 |
| CES09 = 29 | CES34 = 69 | CES59 = 88 | CES84 = 88 |
| CES10 = 73 | CES35 = 83 | CES60 = 93 | CES85 = 84 |
| CES11 = 56 | CES36 = 95 | CES61 = 88 | CES86 = 75 |
| CES12 = 61 | CES37 = 78 | CES62 = 85 | CES87 = 78 |
| CES13 = 41 | CES38 = 76 | CES63 = 77 | CES88 = 79 |
| CES14 = 74 | CES39 = 93 | CES64 = 74 | CES89 = 75 |
| CES15 = 70 | CES40 = 86 | CES65 = 67 | CES90 = 77 |
| CES16 = 46 | CES41 = 87 | CES66 = 69 | CES91 = 89 |
| CES17 = 49 | CES42 = 78 | CES67 = 67 | CES92 = 66 |
| CES18 = 55 | CES43 = 75 | CES68 = 73 | CES93 = 80 |
| CES19 = 71 | CES44 = 99 | CES69 = 81 | CES94 = 57 |
| CES20 = 64 | CES45 = 83 | CES70 = 63 | CES95 = 71 |
| CES21 = 85 | CES46 = 81 | CES71 = 60 | CES96 = 78 |
| CES22 = 77 | CES47 = 80 | CES72 = 86 | CES97 = 85 |
| CES23 = 91 | CES48 = 72 | CES73 = 53 | CES98 = 75 |
| CES24 = 90 | CES49 = 81 | CES74 = 96 | CES99 = 62 |
| CES25 = 71 | CES50 = 89 | CES75 = 58 |            |



REPORT NUMBER: SP1-1908-441-4-R4

**TM-30-18**

**Color Rendition by Hue-Angle Bin**



REPORT NUMBER: SP1-1908-441-4-R4

**TM-30-18**

**Measure Comparisons**



(END OF REPORT)