

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: P361345

Luminaire Tested: NVN-SA3D-760-U-T3

Issue Date: 3/3/2020

### Test Information

Test Method: LM-79-2019  
Report Number: P361345  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-14)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: STREETWORKS  
Catalog Number: NVN-SA3D-760-U-T3  
Description: NAVION ROADWAY AND AREA LUMINAIRE  
(3) 70 CRI, 5700K, 1200mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

### Summary

Lumens per Lamp: N/A  
Luminaire Lumens: 23619 lumens  
Efficiency: N/A  
Efficacy: 123.7 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 1.5' x H: 0')  
IES Classification: Type III - Short  
BUG Rating: B3 - U0 - G4

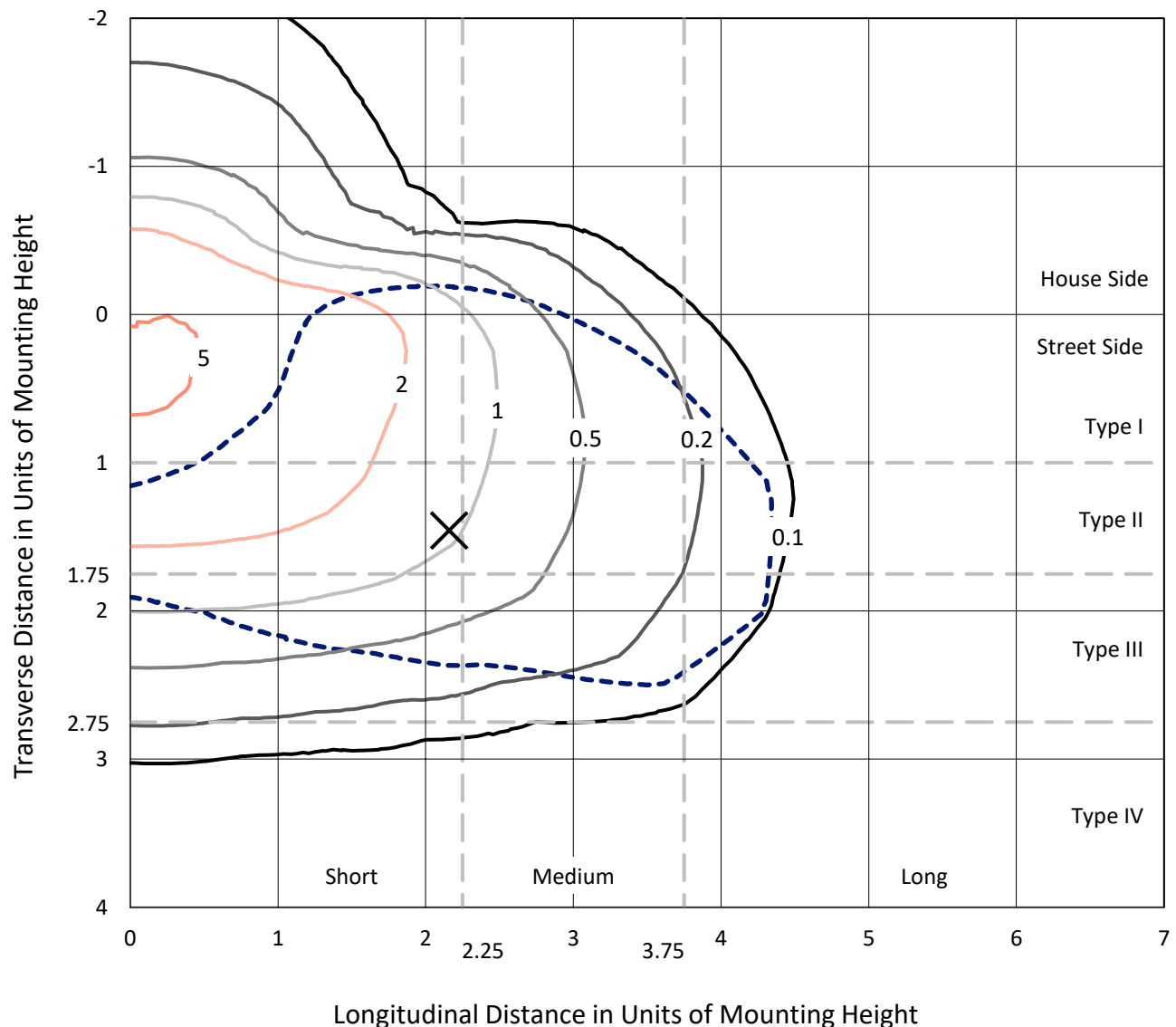
Input Watts (W): 191  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT



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## Iso-Footcandle Lines of Horizontal Illumination

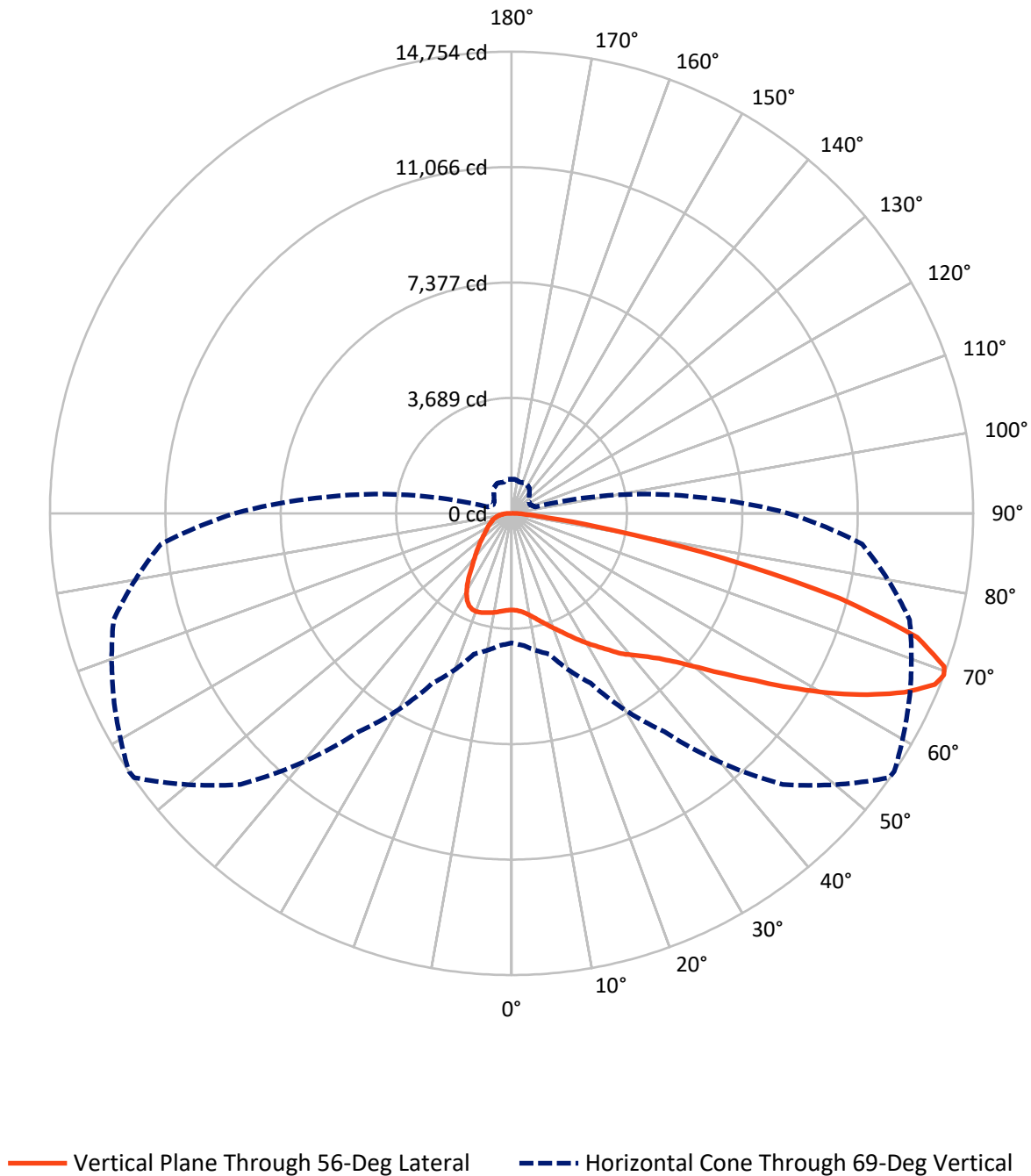
× Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 5.4 fc  
 Type III - 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    | 5259.9   | 0.0    | 5259.9  |
|                    | % Fixture | 22.3     | 0.0    | 22.3    |
| <b>Street Side</b> | Lumens    | 18359.1  | 0.0    | 18359.1 |
|                    | % Fixture | 77.7     | 0.0    | 77.7    |
| <b>Total</b>       | Lumens    | 23619.0  | 0.0    | 23619.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 303.3   | 1.3       |
| 10°-20°   | 975.2   | 4.1       |
| 20°-30°   | 1702.3  | 7.2       |
| 30°-40°   | 2445.4  | 10.4      |
| 40°-50°   | 3384.2  | 14.3      |
| 50°-60°   | 4958.4  | 21.0      |
| 60°-70°   | 6045.2  | 25.6      |
| 70°-80°   | 3342.2  | 14.2      |
| 80°-90°   | 462.9   | 2.0       |
| 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°    | 23619.0 | 100.0     |
| 0°-180°   | 23619.0 | 100.0     |

**Coefficient of Utilization**



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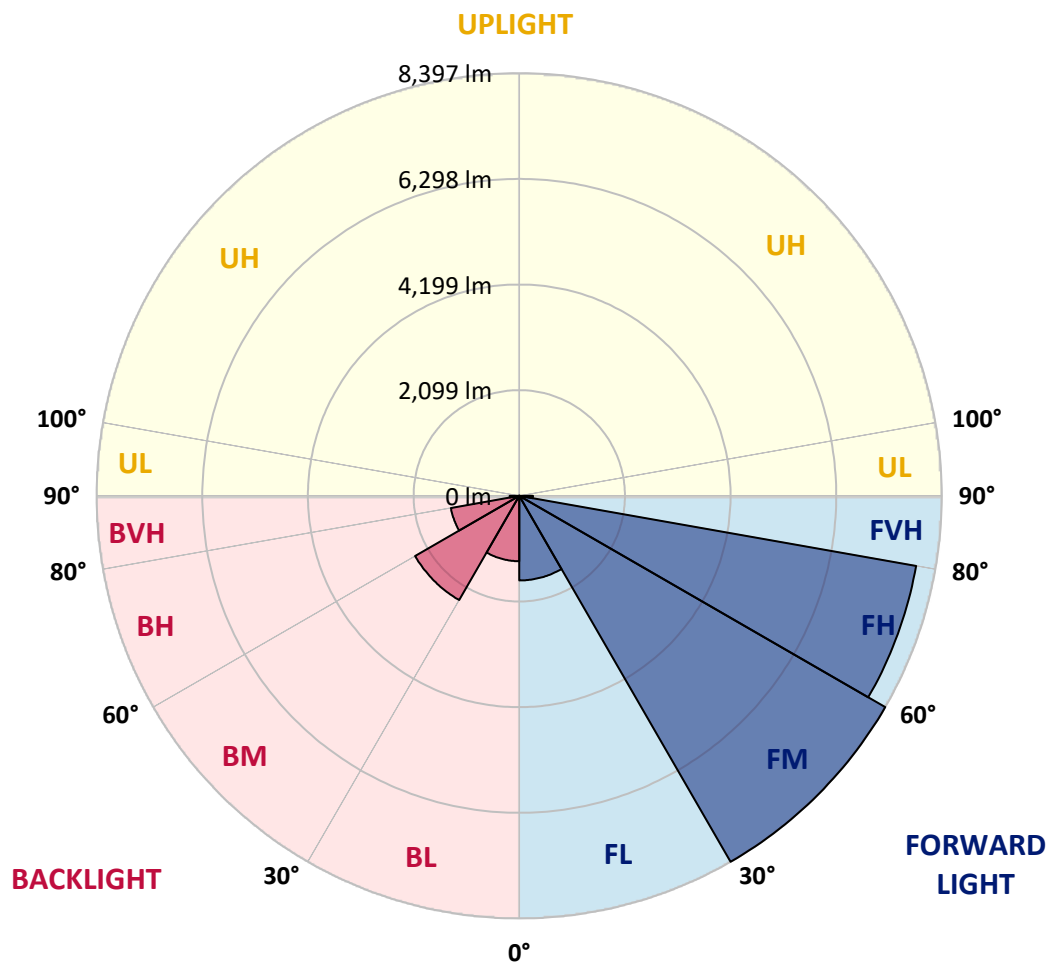
CATALOG NUMBER: NVN-SA3D-760-U-T3

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |          |
|------|-------------|--------|-----------|-------------------------|------|----------|
|      |             |        |           | B                       | U    | G        |
| FL   | (0°-30°)    | 1681.0 | 7.1       |                         |      |          |
| FM   | (30°-60°)   | 8397.4 | 35.6      |                         |      |          |
| FH   | (60°-80°)   | 8008.0 | 33.9      |                         |      | G4/12000 |
| FVH  | (80°-90°)   | 272.7  | 1.2       |                         |      | G3/500   |
| BL   | (0°-30°)    | 1299.8 | 5.5       | B3/2500                 |      |          |
| BM   | (30°-60°)   | 2390.5 | 10.1      | B2/2500                 |      |          |
| BH   | (60°-80°)   | 1379.3 | 5.8       | B3/2500                 |      | G3/2500  |
| BVH  | (80°-90°)   | 190.2  | 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-G4**

Type III Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°     | 45°     | 55°     | 56°     | 65°     | 75°     | 85°     |
|-------|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 3087.8 | 3087.8 | 3087.8 | 3087.8 | 3087.8  | 3087.8  | 3087.8  | 3087.8  | 3087.8  | 3087.8  | 3087.8  |
| 2.5°  | 3107.4 | 3110.6 | 3108.2 | 3114.7 | 3107.4  | 3112.2  | 3108.2  | 3108.2  | 3105.7  | 3098.4  | 3090.3  |
| 5°    | 3156.2 | 3162.7 | 3158.6 | 3165.1 | 3156.2  | 3157.8  | 3150.5  | 3150.5  | 3143.2  | 3127.7  | 3111.4  |
| 7.5°  | 3232.7 | 3240.0 | 3236.7 | 3243.2 | 3231.0  | 3231.0  | 3221.3  | 3220.5  | 3205.8  | 3180.6  | 3161.9  |
| 10°   | 3323.8 | 3333.6 | 3330.3 | 3340.1 | 3330.3  | 3333.6  | 3323.8  | 3323.8  | 3304.3  | 3268.5  | 3244.9  |
| 12.5° | 3456.4 | 3468.6 | 3459.7 | 3458.9 | 3454.8  | 3461.3  | 3453.2  | 3451.5  | 3433.6  | 3384.8  | 3352.3  |
| 15°   | 3633.8 | 3646.8 | 3628.1 | 3626.5 | 3603.7  | 3601.2  | 3601.2  | 3598.8  | 3587.4  | 3528.8  | 3475.1  |
| 17.5° | 3838.0 | 3842.1 | 3825.8 | 3799.8 | 3770.5  | 3751.8  | 3749.3  | 3755.8  | 3755.8  | 3687.5  | 3602.1  |
| 20°   | 4038.2 | 4045.5 | 4032.5 | 4003.2 | 3965.8  | 3938.1  | 3918.6  | 3931.6  | 3930.8  | 3849.4  | 3728.2  |
| 22.5° | 4256.2 | 4273.3 | 4253.8 | 4216.4 | 4172.4  | 4141.5  | 4107.3  | 4118.7  | 4119.5  | 4019.5  | 3851.9  |
| 25°   | 4538.6 | 4523.1 | 4510.9 | 4458.0 | 4395.4  | 4363.6  | 4331.9  | 4343.3  | 4340.0  | 4202.5  | 3979.6  |
| 27.5° | 4788.4 | 4791.6 | 4775.4 | 4719.2 | 4646.8  | 4576.8  | 4575.2  | 4582.5  | 4570.3  | 4392.9  | 4100.0  |
| 30°   | 5078.8 | 5080.5 | 5057.7 | 5007.2 | 4928.3  | 4838.0  | 4816.9  | 4829.1  | 4803.0  | 4573.6  | 4226.9  |
| 32.5° | 5367.7 | 5375.8 | 5350.6 | 5289.6 | 5226.1  | 5116.3  | 5074.0  | 5082.1  | 5017.0  | 4758.3  | 4357.9  |
| 35°   | 5620.7 | 5632.1 | 5624.0 | 5583.3 | 5514.2  | 5419.8  | 5369.3  | 5364.4  | 5283.9  | 4984.5  | 4531.3  |
| 37.5° | 5878.7 | 5889.3 | 5880.3 | 5846.1 | 5818.5  | 5718.4  | 5691.5  | 5691.5  | 5551.6  | 5215.5  | 4751.8  |
| 40°   | 6143.9 | 6160.2 | 6149.6 | 6102.4 | 6078.8  | 6033.3  | 5969.0  | 5953.5  | 5802.2  | 5493.0  | 5111.4  |
| 42.5° | 6390.5 | 6411.6 | 6453.9 | 6426.3 | 6378.3  | 6384.8  | 6255.4  | 6247.3  | 6136.6  | 5903.1  | 5563.0  |
| 45°   | 6740.3 | 6771.3 | 6842.9 | 6821.7 | 6811.9  | 6776.1  | 6622.4  | 6615.0  | 6572.7  | 6454.7  | 6123.6  |
| 47.5° | 7121.9 | 7164.3 | 7293.6 | 7297.7 | 7402.7  | 7335.1  | 7126.0  | 7100.8  | 7110.5  | 7115.4  | 6807.9  |
| 50°   | 7473.4 | 7519.8 | 7732.2 | 7832.3 | 8079.6  | 8094.3  | 7759.8  | 7737.1  | 7775.3  | 7887.6  | 7605.3  |
| 52.5° | 7754.2 | 7812.7 | 8078.0 | 8387.2 | 8811.1  | 8931.5  | 8540.1  | 8523.1  | 8551.5  | 8745.2  | 8506.8  |
| 55°   | 7960.0 | 8023.5 | 8312.3 | 8875.4 | 9552.3  | 9764.7  | 9438.4  | 9422.1  | 9440.0  | 9686.6  | 9487.2  |
| 57.5° | 8008.0 | 8023.5 | 8442.5 | 9204.1 | 10178.0 | 10688.2 | 10537.7 | 10505.1 | 10417.3 | 10632.1 | 10569.4 |
| 60°   | 7782.6 | 7844.5 | 8335.1 | 9319.6 | 10662.2 | 11598.7 | 11686.6 | 11645.9 | 11399.3 | 11575.1 | 11524.6 |
| 62.5° | 7325.4 | 7436.0 | 7934.0 | 9143.9 | 10851.7 | 12342.4 | 12813.5 | 12764.7 | 12339.9 | 12453.8 | 12211.4 |
| 65°   | 6578.4 | 6625.6 | 7148.8 | 8537.7 | 10610.9 | 12818.4 | 13818.3 | 13793.9 | 13259.4 | 13081.2 | 12338.3 |
| 67.5° | 5242.4 | 5331.1 | 5775.3 | 7270.8 | 9625.6  | 12762.2 | 14595.4 | 14592.9 | 13859.8 | 13313.9 | 11888.3 |
| 69°   | 4141.5 | 4233.5 | 4656.6 | 5989.3 | 8517.4  | 12248.8 | 14725.6 | 14754.0 | 14029.1 | 13172.3 | 11245.6 |
| 70°   | 3301.8 | 3408.4 | 3698.9 | 5044.7 | 7533.7  | 11571.8 | 14617.3 | 14668.6 | 13996.5 | 12938.8 | 10652.4 |
| 72.5° | 1405.2 | 1491.4 | 1698.1 | 2600.4 | 4591.5  | 8641.0  | 13365.1 | 13558.8 | 13242.3 | 11842.0 | 8803.8  |
| 75°   | 613.5  | 640.3  | 733.9  | 1060.2 | 2038.2  | 4702.9  | 10470.1 | 10828.1 | 11322.9 | 10009.6 | 6558.1  |
| 77.5° | 449.1  | 460.5  | 511.8  | 622.4  | 914.6   | 1776.2  | 6733.0  | 6941.3  | 8165.9  | 7283.9  | 4022.7  |
| 80°   | 347.4  | 355.6  | 395.4  | 457.3  | 597.2   | 718.5   | 3070.7  | 3249.7  | 4591.5  | 3741.2  | 1675.3  |
| 82.5° | 276.6  | 282.3  | 310.0  | 336.9  | 412.5   | 435.3   | 1019.5  | 1131.0  | 1694.8  | 1033.3  | 443.4   |
| 85°   | 257.1  | 263.6  | 273.4  | 245.7  | 264.4   | 255.5   | 441.0   | 461.3   | 511.8   | 406.0   | 185.5   |
| 87.5° | 116.4  | 137.5  | 270.9  | 191.2  | 140.8   | 112.3   | 180.6   | 188.8   | 212.4   | 213.2   | 82.2    |
| 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: P361345

CATALOG NUMBER: NVN-SA3D-760-U-T3

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 3087.8  | 3087.8 | 3087.8 | 3087.8 | 3087.8 | 3087.8 | 3087.8 | 3087.8 | 3087.8 | 3087.8 | 3087.8 |
| 2.5°  | 3095.2  | 3092.7 | 3096.8 | 3087.0 | 3099.2 | 3098.4 | 3094.3 | 3096.0 | 3104.1 | 3103.3 | 3104.1 |
| 5°    | 3113.9  | 3112.2 | 3117.1 | 3109.8 | 3124.4 | 3129.3 | 3130.1 | 3137.5 | 3146.4 | 3148.9 | 3148.9 |
| 7.5°  | 3161.1  | 3161.1 | 3163.5 | 3153.7 | 3163.5 | 3162.7 | 3158.6 | 3165.9 | 3174.9 | 3175.7 | 3174.9 |
| 10°   | 3242.4  | 3243.2 | 3239.2 | 3213.9 | 3205.8 | 3183.8 | 3163.5 | 3164.3 | 3175.7 | 3184.7 | 3187.1 |
| 12.5° | 3344.9  | 3341.7 | 3323.8 | 3277.4 | 3243.2 | 3198.5 | 3177.3 | 3176.5 | 3187.9 | 3195.2 | 3197.7 |
| 15°   | 3462.1  | 3453.2 | 3406.8 | 3331.1 | 3270.9 | 3227.0 | 3192.8 | 3184.7 | 3178.1 | 3170.0 | 3170.8 |
| 17.5° | 3572.8  | 3552.4 | 3475.1 | 3370.2 | 3306.7 | 3248.1 | 3182.2 | 3129.3 | 3092.7 | 3071.6 | 3065.0 |
| 20°   | 3685.1  | 3645.2 | 3533.7 | 3406.8 | 3326.2 | 3219.6 | 3092.7 | 2985.3 | 2918.6 | 2887.7 | 2882.0 |
| 22.5° | 3787.6  | 3723.3 | 3588.2 | 3445.0 | 3310.8 | 3123.6 | 2924.3 | 2768.1 | 2675.3 | 2633.8 | 2637.1 |
| 25°   | 3887.7  | 3798.2 | 3645.2 | 3471.9 | 3232.7 | 2954.4 | 2690.0 | 2497.9 | 2390.5 | 2344.1 | 2342.5 |
| 27.5° | 3975.5  | 3873.8 | 3707.0 | 3449.9 | 3087.0 | 2713.5 | 2412.5 | 2225.4 | 2135.8 | 2096.0 | 2089.5 |
| 30°   | 4076.4  | 3969.0 | 3789.2 | 3366.1 | 2873.8 | 2435.3 | 2141.5 | 2009.7 | 1946.3 | 1906.4 | 1899.1 |
| 32.5° | 4199.3  | 4098.4 | 3856.7 | 3213.9 | 2601.3 | 2144.8 | 1930.0 | 1838.1 | 1780.3 | 1735.5 | 1727.4 |
| 35°   | 4378.3  | 4269.3 | 3873.8 | 2995.9 | 2301.8 | 1915.3 | 1774.6 | 1680.2 | 1602.1 | 1544.3 | 1538.6 |
| 37.5° | 4602.9  | 4483.3 | 3834.8 | 2713.5 | 2011.4 | 1766.4 | 1645.2 | 1528.9 | 1427.2 | 1345.8 | 1332.8 |
| 40°   | 4926.7  | 4746.1 | 3726.5 | 2388.1 | 1797.4 | 1651.7 | 1519.1 | 1386.5 | 1260.4 | 1165.2 | 1146.4 |
| 42.5° | 5315.6  | 5054.4 | 3560.6 | 2064.2 | 1640.3 | 1535.4 | 1393.8 | 1229.4 | 1109.0 | 1041.5 | 1031.7 |
| 45°   | 5810.3  | 5375.0 | 3330.3 | 1781.1 | 1485.7 | 1419.0 | 1258.7 | 1107.4 | 1032.5 | 982.9  | 974.8  |
| 47.5° | 6375.0  | 5734.7 | 3088.6 | 1550.8 | 1354.7 | 1310.0 | 1150.5 | 1052.9 | 993.5  | 954.4  | 947.1  |
| 50°   | 7069.1  | 6140.7 | 2832.3 | 1362.1 | 1222.9 | 1179.0 | 1099.3 | 1022.8 | 975.6  | 945.5  | 938.1  |
| 52.5° | 7851.8  | 6598.8 | 2647.6 | 1213.2 | 1113.9 | 1082.2 | 1072.4 | 1006.5 | 968.3  | 945.5  | 938.1  |
| 55°   | 8694.7  | 7065.0 | 2448.3 | 1087.9 | 1019.5 | 1028.5 | 1054.5 | 1008.1 | 982.1  | 954.4  | 943.8  |
| 57.5° | 9538.5  | 7546.7 | 2226.2 | 982.1  | 944.7  | 988.6  | 1042.3 | 1011.4 | 989.4  | 962.6  | 952.8  |
| 60°   | 10205.7 | 7851.8 | 1882.0 | 893.4  | 885.3  | 944.7  | 1013.0 | 987.0  | 958.5  | 959.3  | 957.7  |
| 62.5° | 10517.3 | 7835.5 | 1502.0 | 814.5  | 825.9  | 885.3  | 965.8  | 948.7  | 925.1  | 956.9  | 959.3  |
| 65°   | 10342.4 | 7445.0 | 1169.2 | 742.9  | 762.4  | 823.4  | 917.0  | 930.0  | 938.1  | 999.2  | 1007.3 |
| 67.5° | 9608.5  | 6685.0 | 905.6  | 680.2  | 704.6  | 781.1  | 921.9  | 1013.0 | 1023.6 | 1087.9 | 1087.0 |
| 69°   | 8849.3  | 5972.2 | 786.8  | 647.7  | 676.1  | 791.7  | 985.3  | 1065.9 | 1026.0 | 1094.4 | 1084.6 |
| 70°   | 8213.1  | 5408.4 | 723.3  | 625.7  | 663.1  | 810.4  | 1027.6 | 1065.1 | 1013.8 | 1072.4 | 1056.1 |
| 72.5° | 6325.4  | 3890.9 | 613.5  | 585.0  | 619.2  | 775.4  | 1039.9 | 1041.5 | 985.3  | 996.7  | 969.1  |
| 75°   | 4338.4  | 2458.9 | 535.4  | 529.7  | 552.5  | 698.9  | 1000.8 | 995.1  | 911.3  | 895.0  | 872.2  |
| 77.5° | 2392.2  | 1249.0 | 454.8  | 476.8  | 492.3  | 619.2  | 909.7  | 901.5  | 832.4  | 798.2  | 790.1  |
| 80°   | 922.7   | 546.8  | 384.0  | 423.9  | 433.7  | 536.2  | 797.4  | 790.1  | 732.3  | 688.4  | 676.1  |
| 82.5° | 348.2   | 286.4  | 317.3  | 367.0  | 363.7  | 442.6  | 675.3  | 671.3  | 615.1  | 550.8  | 531.3  |
| 85°   | 161.1   | 171.7  | 251.4  | 302.7  | 279.1  | 327.9  | 540.3  | 547.6  | 479.2  | 402.8  | 402.8  |
| 87.5° | 68.3    | 96.0   | 178.2  | 228.6  | 188.0  | 221.3  | 396.3  | 378.4  | 347.4  | 240.8  | 226.2  |
| 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: SP1-1908-441-9-R4

Test Date: 10/23/2019

Luminaire Tested: SA1C-760-U-5WQ

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

### Test Information

Test Method: LM-79-2008  
 Report Number: SP1-1908-441-9-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-760-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):                  | 5474   | CRI (Ra): | 71.7 |      |       |
| CIE u':                   | 0.2052 | R1:       | 70.6 | R9:  | -27.1 |
| CIE v':                   | 0.4804 | R2:       | 74.6 | R10: | 40.8  |
| Duv:                      | 0.0025 | R3:       | 78.3 | R11: | 74.6  |
| CIE x:                    | 0.3330 | R4:       | 73.8 | R12: | 50.4  |
| CIE y:                    | 0.3466 | R5:       | 72.4 | R13: | 70.0  |
| CIE z:                    | 0.3204 | R6:       | 67.5 | R14: | 87.8  |
| Peak Wavelength (nm):     | 442    | R7:       | 77.5 |      |       |
| Dominant Wavelength (nm): | 554    | R8:       | 58.9 |      |       |
| Purity:                   | 4.1    |           |      |      |       |
| Rf:                       | 72.1   |           |      |      |       |
| Rg:                       | 97.2   |           |      |      |       |



### Test Conditions

Stabilization Time: 240M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.6/31%  
 Sphere Temperature (°C): 25.9

REPORT NUMBER: SP1-1908-441-9-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            |

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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 5700K 4-step quadrangle

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**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       | 3540             | NR               | 490       | 33363            | NR               | 620       | 80193            | NR               | 750       | 4663             | NR               | 880       | 4678             | NR               |
| 365       | 2862             | NR               | 495       | 44177            | NR               | 625       | 73091            | NR               | 755       | 4147             | NR               | 885       | 4128             | NR               |
| 370       | 2865             | NR               | 500       | 57019            | NR               | 630       | 66269            | NR               | 760       | 4040             | NR               | 890       | 4504             | NR               |
| 375       | 3254             | NR               | 505       | 70030            | NR               | 635       | 60012            | NR               | 765       | 3474             | NR               | 895       | 4371             | NR               |
| 380       | 3076             | NR               | 510       | 81972            | NR               | 640       | 53914            | NR               | 770       | 3469             | NR               | 900       | 4082             | NR               |
| 385       | 2904             | NR               | 515       | 92590            | NR               | 645       | 48385            | NR               | 775       | 3181             | NR               | 905       | 2982             | NR               |
| 390       | 2689             | NR               | 520       | 100305           | NR               | 650       | 43219            | NR               | 780       | 2969             | NR               | 910       | 4351             | NR               |
| 395       | 2619             | NR               | 525       | 107452           | NR               | 655       | 38562            | NR               | 785       | 3132             | NR               | 915       | 3365             | NR               |
| 400       | 2679             | NR               | 530       | 111373           | NR               | 660       | 34110            | NR               | 790       | 2507             | NR               | 920       | 3430             | NR               |
| 405       | 3515             | NR               | 535       | 114505           | NR               | 665       | 30085            | NR               | 795       | 2968             | NR               | 925       | 4264             | NR               |
| 410       | 6934             | NR               | 540       | 116408           | NR               | 670       | 26205            | NR               | 800       | 2758             | NR               | 930       | 4095             | NR               |
| 415       | 14943            | NR               | 545       | 118700           | NR               | 675       | 22906            | NR               | 805       | 2872             | NR               | 935       | 5048             | NR               |
| 420       | 31939            | NR               | 550       | 119209           | NR               | 680       | 20058            | NR               | 810       | 3094             | NR               | 940       | 4074             | NR               |
| 425       | 64701            | NR               | 555       | 120742           | NR               | 685       | 17413            | NR               | 815       | 3222             | NR               | 945       | 4949             | NR               |
| 430       | 110939           | NR               | 560       | 121594           | NR               | 690       | 15447            | NR               | 820       | 3238             | NR               | 950       | 4387             | NR               |
| 435       | 164597           | NR               | 565       | 121913           | NR               | 695       | 13398            | NR               | 825       | 3524             | NR               | 955       | 4978             | NR               |
| 440       | 207696           | NR               | 570       | 122147           | NR               | 700       | 11777            | NR               | 830       | 2921             | NR               | 960       | 4706             | NR               |
| 445       | 201830           | NR               | 575       | 121605           | NR               | 705       | 10412            | NR               | 835       | 3595             | NR               | 965       | 5083             | NR               |
| 450       | 145410           | NR               | 580       | 120248           | NR               | 710       | 9544             | NR               | 840       | 3016             | NR               | 970       | 4522             | NR               |
| 455       | 89594            | NR               | 585       | 117717           | NR               | 715       | 8940             | NR               | 845       | 4032             | NR               | 975       | 4740             | NR               |
| 460       | 58321            | NR               | 590       | 114359           | NR               | 720       | 7897             | NR               | 850       | 3579             | NR               | 980       | 6122             | NR               |
| 465       | 39318            | NR               | 595       | 109974           | NR               | 725       | 7045             | NR               | 855       | 4571             | NR               | 985       | 6450             | NR               |
| 470       | 27693            | NR               | 600       | 105269           | NR               | 730       | 6483             | NR               | 860       | 4485             | NR               | 990       | 4875             | NR               |
| 475       | 23081            | NR               | 605       | 99453            | NR               | 735       | 5838             | NR               | 865       | 3978             | NR               | 995       | 4764             | NR               |
| 480       | 23002            | NR               | 610       | 92921            | NR               | 740       | 5261             | NR               | 870       | 4298             | NR               | 1000      | 3640             | NR               |
| 485       | 26201            | NR               | 615       | 86989            | NR               | 745       | 4760             | NR               | 875       | 4356             | NR               |           |                  |                  |

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**Scotopic Flux vs. Wavelength**



**Scotopic Lumens: 13759.3**

**S/P: 1.85**

| 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       | 3540             | NR               | 490       | 33363            | NR               | 620       | 80193            | NR               | 750       | 4663             | NR               | 880       | 4678             | NR               |
| 365       | 2862             | NR               | 495       | 44177            | NR               | 625       | 73091            | NR               | 755       | 4147             | NR               | 885       | 4128             | NR               |
| 370       | 2865             | NR               | 500       | 57019            | NR               | 630       | 66269            | NR               | 760       | 4040             | NR               | 890       | 4504             | NR               |
| 375       | 3254             | NR               | 505       | 70030            | NR               | 635       | 60012            | NR               | 765       | 3474             | NR               | 895       | 4371             | NR               |
| 380       | 3076             | NR               | 510       | 81972            | NR               | 640       | 53914            | NR               | 770       | 3469             | NR               | 900       | 4082             | NR               |
| 385       | 2904             | NR               | 515       | 92590            | NR               | 645       | 48385            | NR               | 775       | 3181             | NR               | 905       | 2982             | NR               |
| 390       | 2689             | NR               | 520       | 100305           | NR               | 650       | 43219            | NR               | 780       | 2969             | NR               | 910       | 4351             | NR               |
| 395       | 2619             | NR               | 525       | 107452           | NR               | 655       | 38562            | NR               | 785       | 3132             | NR               | 915       | 3365             | NR               |
| 400       | 2679             | NR               | 530       | 111373           | NR               | 660       | 34110            | NR               | 790       | 2507             | NR               | 920       | 3430             | NR               |
| 405       | 3515             | NR               | 535       | 114505           | NR               | 665       | 30085            | NR               | 795       | 2968             | NR               | 925       | 4264             | NR               |
| 410       | 6934             | NR               | 540       | 116408           | NR               | 670       | 26205            | NR               | 800       | 2758             | NR               | 930       | 4095             | NR               |
| 415       | 14943            | NR               | 545       | 118700           | NR               | 675       | 22906            | NR               | 805       | 2872             | NR               | 935       | 5048             | NR               |
| 420       | 31939            | NR               | 550       | 119209           | NR               | 680       | 20058            | NR               | 810       | 3094             | NR               | 940       | 4074             | NR               |
| 425       | 64701            | NR               | 555       | 120742           | NR               | 685       | 17413            | NR               | 815       | 3222             | NR               | 945       | 4949             | NR               |
| 430       | 110939           | NR               | 560       | 121594           | NR               | 690       | 15447            | NR               | 820       | 3238             | NR               | 950       | 4387             | NR               |
| 435       | 164597           | NR               | 565       | 121913           | NR               | 695       | 13398            | NR               | 825       | 3524             | NR               | 955       | 4978             | NR               |
| 440       | 207696           | NR               | 570       | 122147           | NR               | 700       | 11777            | NR               | 830       | 2921             | NR               | 960       | 4706             | NR               |
| 445       | 201830           | NR               | 575       | 121605           | NR               | 705       | 10412            | NR               | 835       | 3595             | NR               | 965       | 5083             | NR               |
| 450       | 145410           | NR               | 580       | 120248           | NR               | 710       | 9544             | NR               | 840       | 3016             | NR               | 970       | 4522             | NR               |
| 455       | 89594            | NR               | 585       | 117717           | NR               | 715       | 8940             | NR               | 845       | 4032             | NR               | 975       | 4740             | NR               |
| 460       | 58321            | NR               | 590       | 114359           | NR               | 720       | 7897             | NR               | 850       | 3579             | NR               | 980       | 6122             | NR               |
| 465       | 39318            | NR               | 595       | 109974           | NR               | 725       | 7045             | NR               | 855       | 4571             | NR               | 985       | 6450             | NR               |
| 470       | 27693            | NR               | 600       | 105269           | NR               | 730       | 6483             | NR               | 860       | 4485             | NR               | 990       | 4875             | NR               |
| 475       | 23081            | NR               | 605       | 99453            | NR               | 735       | 5838             | NR               | 865       | 3978             | NR               | 995       | 4764             | NR               |
| 480       | 23002            | NR               | 610       | 92921            | NR               | 740       | 5261             | NR               | 870       | 4298             | NR               | 1000      | 3640             | NR               |
| 485       | 26201            | NR               | 615       | 86989            | NR               | 745       | 4760             | NR               | 875       | 4356             | NR               |           |                  |                  |

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**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 5527.6 M/P: 0.74**

| 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       | 3540             | NR               | 490       | 33363            | NR               | 620       | 80193            | NR               | 750       | 4663             | NR               | 880       | 4678             | NR               |
| 365       | 2862             | NR               | 495       | 44177            | NR               | 625       | 73091            | NR               | 755       | 4147             | NR               | 885       | 4128             | NR               |
| 370       | 2865             | NR               | 500       | 57019            | NR               | 630       | 66269            | NR               | 760       | 4040             | NR               | 890       | 4504             | NR               |
| 375       | 3254             | NR               | 505       | 70030            | NR               | 635       | 60012            | NR               | 765       | 3474             | NR               | 895       | 4371             | NR               |
| 380       | 3076             | NR               | 510       | 81972            | NR               | 640       | 53914            | NR               | 770       | 3469             | NR               | 900       | 4082             | NR               |
| 385       | 2904             | NR               | 515       | 92590            | NR               | 645       | 48385            | NR               | 775       | 3181             | NR               | 905       | 2982             | NR               |
| 390       | 2689             | NR               | 520       | 100305           | NR               | 650       | 43219            | NR               | 780       | 2969             | NR               | 910       | 4351             | NR               |
| 395       | 2619             | NR               | 525       | 107452           | NR               | 655       | 38562            | NR               | 785       | 3132             | NR               | 915       | 3365             | NR               |
| 400       | 2679             | NR               | 530       | 111373           | NR               | 660       | 34110            | NR               | 790       | 2507             | NR               | 920       | 3430             | NR               |
| 405       | 3515             | NR               | 535       | 114505           | NR               | 665       | 30085            | NR               | 795       | 2968             | NR               | 925       | 4264             | NR               |
| 410       | 6934             | NR               | 540       | 116408           | NR               | 670       | 26205            | NR               | 800       | 2758             | NR               | 930       | 4095             | NR               |
| 415       | 14943            | NR               | 545       | 118700           | NR               | 675       | 22906            | NR               | 805       | 2872             | NR               | 935       | 5048             | NR               |
| 420       | 31939            | NR               | 550       | 119209           | NR               | 680       | 20058            | NR               | 810       | 3094             | NR               | 940       | 4074             | NR               |
| 425       | 64701            | NR               | 555       | 120742           | NR               | 685       | 17413            | NR               | 815       | 3222             | NR               | 945       | 4949             | NR               |
| 430       | 110939           | NR               | 560       | 121594           | NR               | 690       | 15447            | NR               | 820       | 3238             | NR               | 950       | 4387             | NR               |
| 435       | 164597           | NR               | 565       | 121913           | NR               | 695       | 13398            | NR               | 825       | 3524             | NR               | 955       | 4978             | NR               |
| 440       | 207696           | NR               | 570       | 122147           | NR               | 700       | 11777            | NR               | 830       | 2921             | NR               | 960       | 4706             | NR               |
| 445       | 201830           | NR               | 575       | 121605           | NR               | 705       | 10412            | NR               | 835       | 3595             | NR               | 965       | 5083             | NR               |
| 450       | 145410           | NR               | 580       | 120248           | NR               | 710       | 9544             | NR               | 840       | 3016             | NR               | 970       | 4522             | NR               |
| 455       | 89594            | NR               | 585       | 117717           | NR               | 715       | 8940             | NR               | 845       | 4032             | NR               | 975       | 4740             | NR               |
| 460       | 58321            | NR               | 590       | 114359           | NR               | 720       | 7897             | NR               | 850       | 3579             | NR               | 980       | 6122             | NR               |
| 465       | 39318            | NR               | 595       | 109974           | NR               | 725       | 7045             | NR               | 855       | 4571             | NR               | 985       | 6450             | NR               |
| 470       | 27693            | NR               | 600       | 105269           | NR               | 730       | 6483             | NR               | 860       | 4485             | NR               | 990       | 4875             | NR               |
| 475       | 23081            | NR               | 605       | 99453            | NR               | 735       | 5838             | NR               | 865       | 3978             | NR               | 995       | 4764             | NR               |
| 480       | 23002            | NR               | 610       | 92921            | NR               | 740       | 5261             | NR               | 870       | 4298             | NR               | 1000      | 3640             | NR               |
| 485       | 26201            | NR               | 615       | 86989            | NR               | 745       | 4760             | NR               | 875       | 4356             | NR               |           |                  |                  |

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**Summary**

$R_f = 72.1$   
 $R_g = 97.2$   
 CIE  $R_a = 71.7$   
 $R_g = -27.1$



**Color Vector Graphics**



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 54 | CES51 = 88 | CES76 = 43 |
| CES02 = 59 | CES27 = 79 | CES52 = 90 | CES77 = 64 |
| CES03 = 30 | CES28 = 77 | CES53 = 77 | CES78 = 46 |
| CES04 = 69 | CES29 = 50 | CES54 = 81 | CES79 = 74 |
| CES05 = 46 | CES30 = 59 | CES55 = 80 | CES80 = 70 |
| CES06 = 50 | CES31 = 55 | CES56 = 70 | CES81 = 71 |
| CES07 = 38 | CES32 = 52 | CES57 = 68 | CES82 = 88 |
| CES08 = 38 | CES33 = 63 | CES58 = 70 | CES83 = 82 |
| CES09 = 29 | CES34 = 63 | CES59 = 88 | CES84 = 87 |
| CES10 = 72 | CES35 = 79 | CES60 = 92 | CES85 = 84 |
| CES11 = 55 | CES36 = 90 | CES61 = 88 | CES86 = 76 |
| CES12 = 61 | CES37 = 72 | CES62 = 81 | CES87 = 75 |
| CES13 = 41 | CES38 = 68 | CES63 = 75 | CES88 = 77 |
| CES14 = 74 | CES39 = 91 | CES64 = 72 | CES89 = 76 |
| CES15 = 70 | CES40 = 83 | CES65 = 65 | CES90 = 76 |
| CES16 = 46 | CES41 = 84 | CES66 = 66 | CES91 = 92 |
| CES17 = 48 | CES42 = 70 | CES67 = 64 | CES92 = 70 |
| CES18 = 55 | CES43 = 69 | CES68 = 71 | CES93 = 83 |
| CES19 = 70 | CES44 = 98 | CES69 = 80 | CES94 = 60 |
| CES20 = 64 | CES45 = 79 | CES70 = 58 | CES95 = 73 |
| CES21 = 85 | CES46 = 78 | CES71 = 55 | CES96 = 79 |
| CES22 = 77 | CES47 = 76 | CES72 = 84 | CES97 = 84 |
| CES23 = 91 | CES48 = 68 | CES73 = 47 | CES98 = 73 |
| CES24 = 90 | CES49 = 78 | CES74 = 94 | CES99 = 62 |
| CES25 = 71 | CES50 = 87 | CES75 = 51 |            |



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Color Rendition by Hue-Angle Bin



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**Measure Comparisons**



(END OF REPORT)