

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: P361072

Luminaire Tested: NVN-SA6B-827-U-T3R

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-2019  
Report Number: P361072  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-10)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: STREETWORKS  
Catalog Number: NVN-SA6B-827-U-T3R  
Description: NAVION ROADWAY AND AREA LUMINAIRE  
(6) 80 CRI, 2700K, 800mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III  
ROADWAY OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 25858 lumens  
Efficiency: N/A  
Efficacy: 103.8 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 1.5' x H: 0')  
IES Classification: Type IV - 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

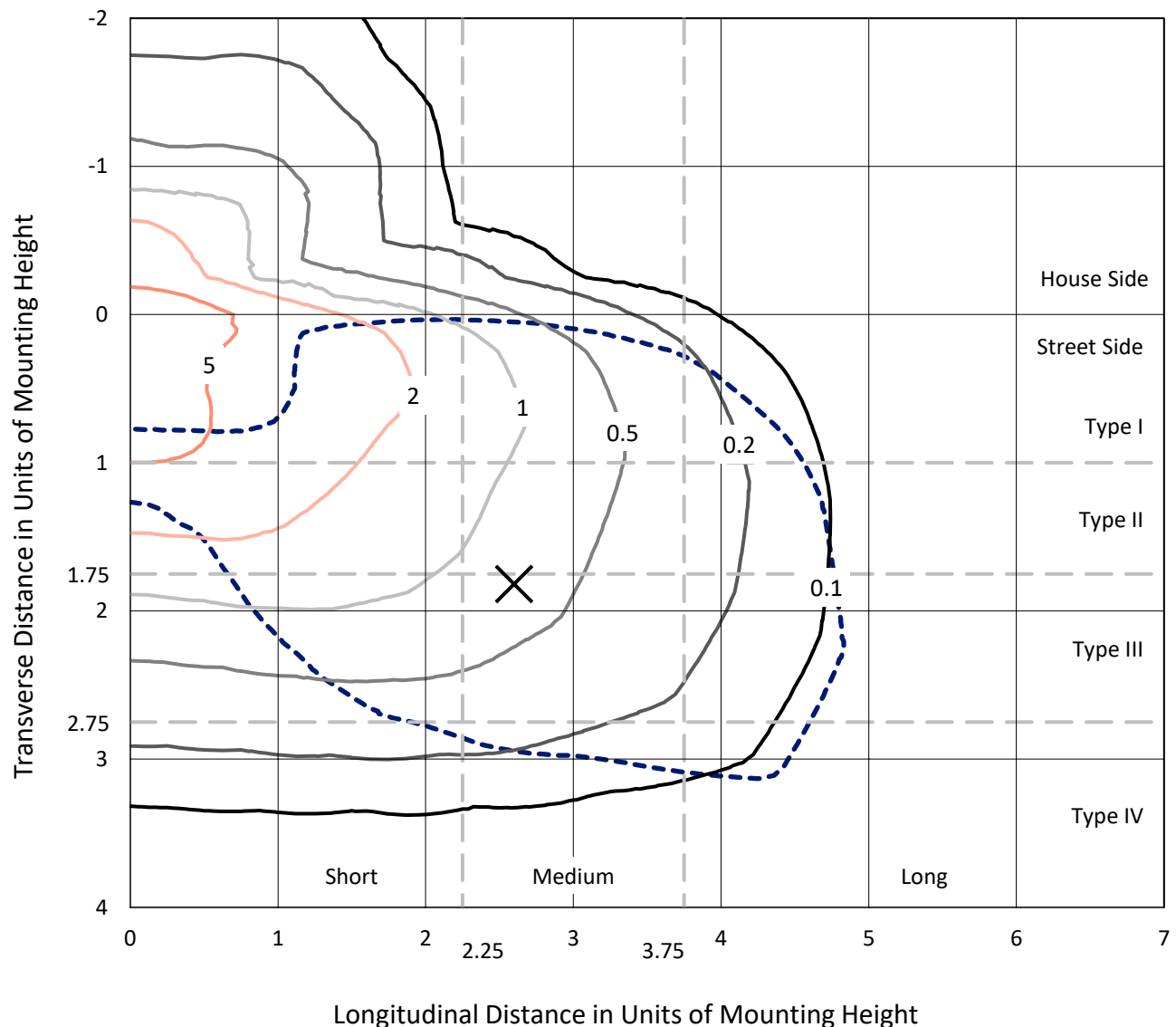


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## Iso-Footcandle Lines of Horizontal Illumination

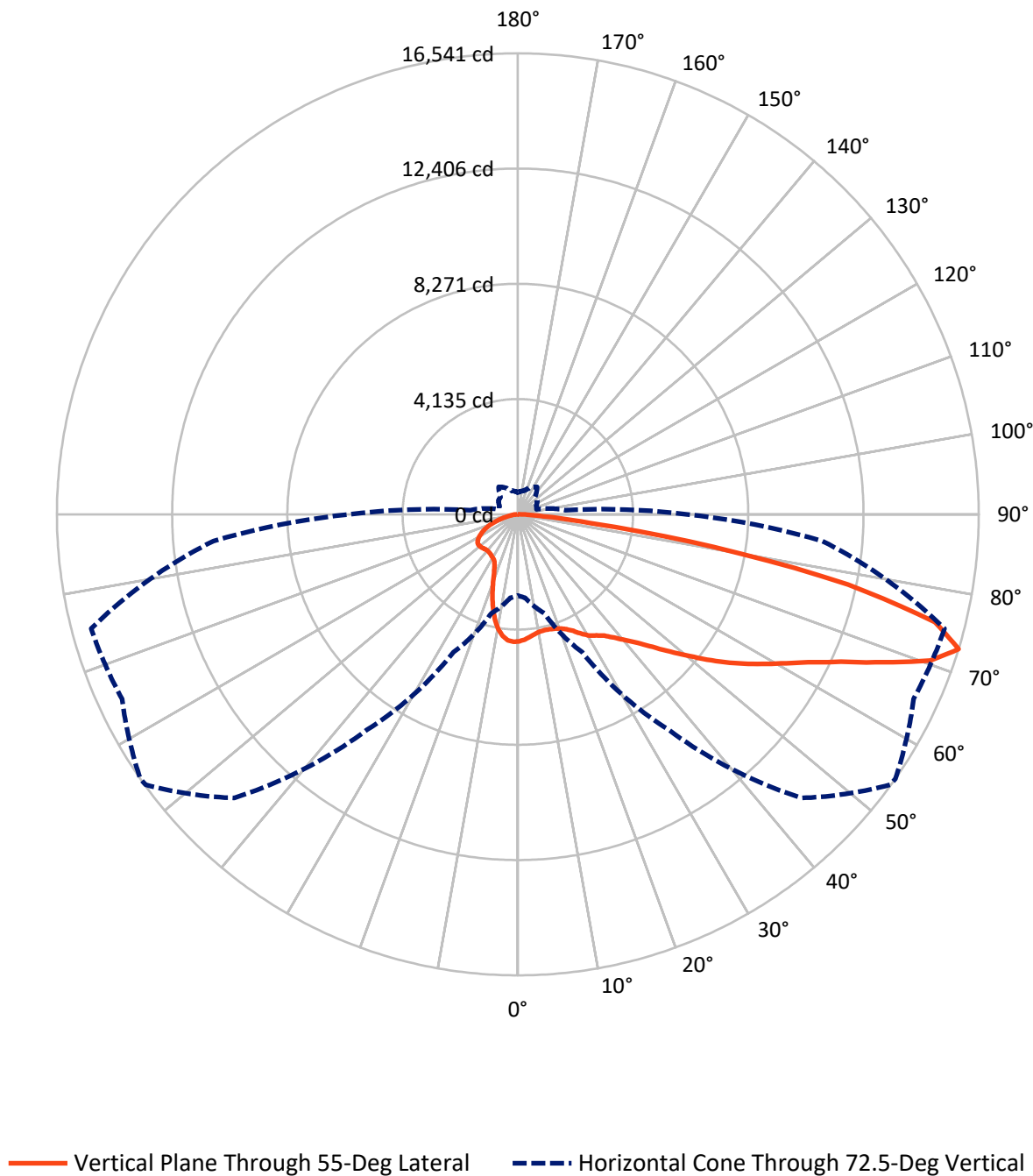
× Max cd  
 - - - 1/2 Max cd



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

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## Luminous Intensity Polar Plot



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CATALOG NUMBER: NVN-SA6B-827-U-T3R

**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 4806.2   | 0.0    | 4806.2  |
|                    | % Fixture | 18.6     | 0.0    | 18.6    |
| <b>Street Side</b> | Lumens    | 21051.8  | 0.0    | 21051.8 |
|                    | % Fixture | 81.4     | 0.0    | 81.4    |
| <b>Total</b>       | Lumens    | 25858.0  | 0.0    | 25858.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 412.7   | 1.6       |
| 10°-20°   | 1098.8  | 4.2       |
| 20°-30°   | 1811.6  | 7.0       |
| 30°-40°   | 2679.8  | 10.4      |
| 40°-50°   | 3740.4  | 14.5      |
| 50°-60°   | 4870.1  | 18.8      |
| 60°-70°   | 5985.2  | 23.1      |
| 70°-80°   | 4691.7  | 18.1      |
| 80°-90°   | 567.8   | 2.2       |
| 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°    | 25858.0 | 100.0     |
| 0°-180°   | 25858.0 | 100.0     |

**Coefficient of Utilization**



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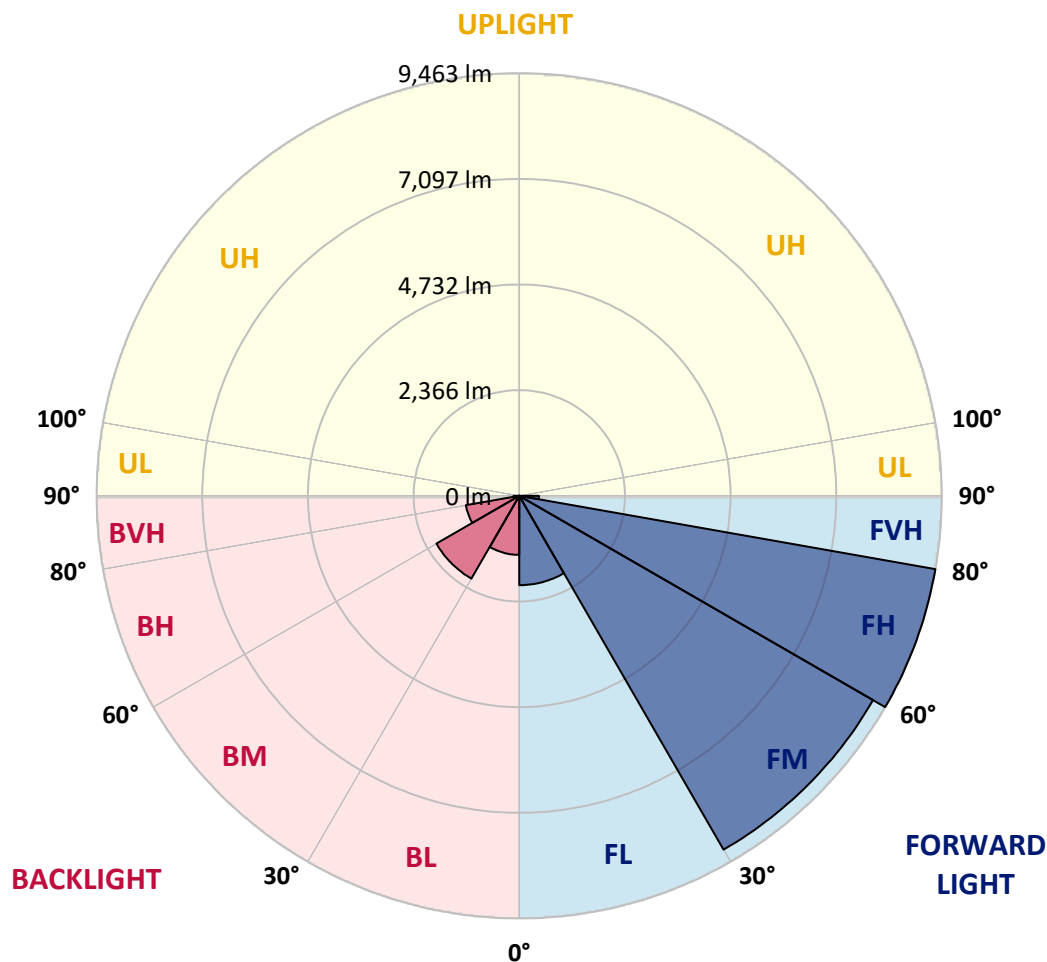
CATALOG NUMBER: NVN-SA6B-827-U-T3R

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |          |
|------|-------------|--------|-----------|-------------------------|------|----------|
|      |             |        |           | B                       | U    | G        |
| FL   | (0°-30°)    | 2000.7 | 7.7       |                         |      |          |
| FM   | (30°-60°)   | 9149.1 | 35.4      |                         |      |          |
| FH   | (60°-80°)   | 9463.2 | 36.6      |                         |      | G4/12000 |
| FVH  | (80°-90°)   | 439.0  | 1.7       |                         |      | G3/500   |
| BL   | (0°-30°)    | 1322.4 | 5.1       | B3/2500                 |      |          |
| BM   | (30°-60°)   | 2141.2 | 8.3       | B2/2500                 |      |          |
| BH   | (60°-80°)   | 1213.8 | 4.7       | B3/2500                 |      | G3/2500  |
| BVH  | (80°-90°)   | 128.8  | 0.5       |                         |      | 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 IV Medium





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°     | 45°     | 54°     | 55°     | 65°     | 75°     | 85°     |
|-------|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 4560.8 | 4560.8 | 4560.8 | 4560.8 | 4560.8  | 4560.8  | 4560.8  | 4560.8  | 4560.8  | 4560.8  | 4560.8  |
| 2.5°  | 4412.3 | 4401.8 | 4414.9 | 4433.3 | 4453.4  | 4480.4  | 4496.2  | 4503.2  | 4530.2  | 4540.7  | 4563.4  |
| 5°    | 4207.9 | 4202.7 | 4224.5 | 4256.0 | 4300.5  | 4363.4  | 4414.1  | 4423.7  | 4495.3  | 4545.9  | 4592.2  |
| 7.5°  | 4059.5 | 4059.5 | 4084.8 | 4122.4 | 4172.1  | 4256.9  | 4328.5  | 4341.6  | 4463.0  | 4572.1  | 4657.7  |
| 10°   | 3941.6 | 3945.9 | 3975.6 | 4020.2 | 4078.7  | 4168.6  | 4263.8  | 4278.7  | 4454.2  | 4633.3  | 4769.5  |
| 12.5° | 3863.0 | 3873.4 | 3900.5 | 3940.7 | 4013.2  | 4122.4  | 4242.9  | 4263.0  | 4472.6  | 4720.6  | 4904.0  |
| 15°   | 3912.7 | 3930.2 | 3932.8 | 3949.4 | 3989.6  | 4108.4  | 4255.1  | 4276.1  | 4511.9  | 4809.7  | 5056.9  |
| 17.5° | 4131.1 | 4137.2 | 4110.1 | 4075.2 | 4056.0  | 4132.0  | 4291.8  | 4313.6  | 4559.0  | 4897.9  | 5203.6  |
| 20°   | 4463.0 | 4459.5 | 4401.0 | 4306.6 | 4208.8  | 4221.0  | 4352.1  | 4374.8  | 4622.8  | 4975.7  | 5350.3  |
| 22.5° | 4882.2 | 4870.0 | 4780.0 | 4606.2 | 4439.4  | 4369.5  | 4457.7  | 4477.0  | 4718.9  | 5086.6  | 5507.5  |
| 25°   | 5390.5 | 5363.4 | 5244.7 | 5011.5 | 4766.0  | 4586.1  | 4616.7  | 4635.0  | 4858.6  | 5210.6  | 5651.6  |
| 27.5° | 5926.8 | 5899.7 | 5748.6 | 5466.5 | 5139.8  | 4859.5  | 4835.9  | 4851.6  | 5017.6  | 5302.3  | 5758.2  |
| 30°   | 6487.5 | 6458.7 | 6320.7 | 6004.5 | 5536.4  | 5142.5  | 5040.3  | 5046.4  | 5129.4  | 5352.1  | 5845.5  |
| 32.5° | 7050.8 | 7023.7 | 6869.1 | 6502.3 | 5966.9  | 5446.4  | 5187.9  | 5180.0  | 5196.6  | 5403.6  | 5944.2  |
| 35°   | 7622.0 | 7632.5 | 7451.7 | 7045.6 | 6443.8  | 5784.4  | 5362.6  | 5346.0  | 5309.3  | 5509.3  | 6084.0  |
| 37.5° | 8233.4 | 8226.4 | 7992.3 | 7567.8 | 6942.5  | 6151.2  | 5613.2  | 5610.6  | 5484.0  | 5709.3  | 6303.2  |
| 40°   | 8642.1 | 8646.5 | 8504.1 | 8102.4 | 7446.4  | 6557.3  | 5934.6  | 5928.5  | 5762.6  | 6008.9  | 6590.5  |
| 42.5° | 8801.9 | 8830.8 | 8867.4 | 8612.4 | 7974.0  | 7028.1  | 6318.0  | 6309.3  | 6151.2  | 6438.6  | 6928.5  |
| 45°   | 8813.3 | 8870.9 | 9098.0 | 9065.7 | 8508.5  | 7567.0  | 6808.0  | 6783.5  | 6670.0  | 7009.8  | 7332.0  |
| 47.5° | 8715.5 | 8774.9 | 9152.2 | 9335.6 | 8986.2  | 8135.5  | 7380.9  | 7361.7  | 7263.9  | 7724.2  | 7768.7  |
| 50°   | 8501.5 | 8558.3 | 9040.4 | 9467.4 | 9379.2  | 8682.3  | 8041.2  | 7990.6  | 7938.2  | 8549.5  | 8268.3  |
| 52.5° | 8100.6 | 8209.8 | 8891.0 | 9498.9 | 9614.2  | 9167.9  | 8735.6  | 8702.4  | 8731.2  | 9420.3  | 8768.7  |
| 55°   | 7151.2 | 7273.5 | 8505.9 | 9472.7 | 9788.0  | 9575.7  | 9429.9  | 9428.1  | 9577.5  | 10333.8 | 9305.9  |
| 57.5° | 6619.4 | 6705.8 | 7721.6 | 9428.1 | 9994.1  | 9981.0  | 10117.2 | 10133.8 | 10424.7 | 11328.6 | 9868.3  |
| 60°   | 6318.9 | 6409.7 | 7324.2 | 9263.1 | 10313.8 | 10505.0 | 10818.6 | 10851.8 | 11285.8 | 12430.0 | 10545.2 |
| 62.5° | 6045.5 | 6145.1 | 7077.9 | 8926.8 | 10690.2 | 11254.4 | 11658.8 | 11688.5 | 12197.6 | 13561.9 | 11199.4 |
| 65°   | 5578.3 | 5690.9 | 6717.2 | 8705.9 | 11032.5 | 12231.7 | 12726.9 | 12747.0 | 13244.8 | 14747.9 | 11699.8 |
| 67.5° | 4918.0 | 5021.1 | 6036.8 | 8217.6 | 11285.8 | 13418.6 | 14147.0 | 14158.4 | 14283.3 | 15585.5 | 11955.7 |
| 70°   | 4146.8 | 4186.1 | 5067.4 | 7209.8 | 10986.3 | 14528.7 | 15703.4 | 15706.0 | 15230.0 | 16121.7 | 11913.8 |
| 72.5° | 2913.6 | 3006.2 | 3678.7 | 5457.8 | 9441.2  | 14393.3 | 16511.3 | 16541.0 | 15670.2 | 15851.0 | 10961.8 |
| 75°   | 1786.9 | 1884.8 | 2307.5 | 3307.5 | 5989.6  | 11319.9 | 15255.3 | 15461.5 | 14844.9 | 14133.0 | 8954.8  |
| 77.5° | 1194.8 | 1231.5 | 1505.7 | 1928.4 | 2713.6  | 6512.8  | 11728.6 | 12116.4 | 12332.1 | 10306.8 | 5726.8  |
| 80°   | 666.4  | 736.3  | 998.3  | 1198.3 | 1207.0  | 2587.8  | 7032.5  | 7123.3  | 6861.3  | 4104.0  | 1766.8  |
| 82.5° | 352.8  | 391.3  | 666.4  | 703.9  | 658.5   | 866.4   | 2621.0  | 2623.6  | 2192.2  | 1100.5  | 524.9   |
| 85°   | 273.4  | 305.7  | 456.8  | 429.7  | 336.3   | 384.3   | 864.6   | 911.8   | 745.9   | 450.7   | 171.2   |
| 87.5° | 136.2  | 169.4  | 310.1  | 272.5  | 131.9   | 110.0   | 309.2   | 330.1   | 294.3   | 176.4   | 62.0    |
| 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-T3R

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 4560.8 | 4560.8 | 4560.8 | 4560.8 | 4560.8 | 4560.8 | 4560.8 | 4560.8 | 4560.8 | 4560.8 | 4560.8 |
| 2.5°  | 4572.1 | 4580.0 | 4589.6 | 4579.1 | 4575.6 | 4561.7 | 4538.1 | 4532.8 | 4520.6 | 4521.5 | 4528.5 |
| 5°    | 4612.3 | 4625.4 | 4620.2 | 4580.0 | 4532.0 | 4464.7 | 4394.9 | 4335.5 | 4296.2 | 4293.5 | 4290.9 |
| 7.5°  | 4689.2 | 4697.9 | 4656.9 | 4542.5 | 4408.0 | 4252.5 | 4105.8 | 3977.4 | 3899.6 | 3880.4 | 3876.1 |
| 10°   | 4809.7 | 4808.0 | 4695.3 | 4464.7 | 4196.6 | 3918.9 | 3683.0 | 3504.9 | 3400.9 | 3370.4 | 3362.5 |
| 12.5° | 4944.2 | 4924.1 | 4708.4 | 4323.2 | 3897.9 | 3512.7 | 3214.0 | 3015.8 | 2907.5 | 2872.5 | 2863.8 |
| 15°   | 5083.1 | 5033.3 | 4676.1 | 4111.9 | 3531.1 | 3075.2 | 2761.6 | 2578.2 | 2519.7 | 2500.5 | 2497.0 |
| 17.5° | 5212.3 | 5116.3 | 4583.5 | 3825.4 | 3112.7 | 2639.4 | 2394.8 | 2321.4 | 2335.4 | 2360.7 | 2361.6 |
| 20°   | 5339.0 | 5172.2 | 4435.0 | 3463.8 | 2671.7 | 2280.4 | 2197.4 | 2251.6 | 2318.0 | 2369.5 | 2376.5 |
| 22.5° | 5463.9 | 5211.5 | 4243.8 | 3046.4 | 2276.9 | 2078.6 | 2137.2 | 2235.9 | 2311.8 | 2367.7 | 2377.3 |
| 25°   | 5568.7 | 5221.1 | 3980.0 | 2600.9 | 2002.7 | 2002.7 | 2108.3 | 2201.8 | 2276.9 | 2331.9 | 2341.5 |
| 27.5° | 5607.1 | 5156.4 | 3607.9 | 2188.7 | 1864.7 | 1967.7 | 2068.2 | 2145.9 | 2209.7 | 2268.2 | 2278.7 |
| 30°   | 5622.0 | 5036.8 | 3178.2 | 1857.7 | 1807.9 | 1930.2 | 2014.0 | 2080.4 | 2140.7 | 2195.7 | 2205.3 |
| 32.5° | 5624.6 | 4892.7 | 2722.3 | 1669.9 | 1768.6 | 1890.9 | 1946.8 | 2005.3 | 2069.9 | 2091.7 | 2095.2 |
| 35°   | 5641.2 | 4722.4 | 2242.0 | 1573.8 | 1731.9 | 1854.2 | 1898.7 | 1940.7 | 1835.8 | 1843.7 | 1850.7 |
| 37.5° | 5689.2 | 4553.8 | 1840.2 | 1519.7 | 1708.3 | 1835.0 | 1888.2 | 1736.3 | 1654.2 | 1635.0 | 1632.3 |
| 40°   | 5779.2 | 4373.9 | 1542.4 | 1476.0 | 1699.6 | 1844.6 | 1821.0 | 1621.0 | 1479.5 | 1373.8 | 1358.1 |
| 42.5° | 5904.1 | 4180.0 | 1352.0 | 1447.2 | 1705.7 | 1890.9 | 1727.5 | 1510.1 | 1275.1 | 1207.0 | 1198.3 |
| 45°   | 6044.7 | 3976.5 | 1248.9 | 1427.1 | 1726.7 | 1926.7 | 1708.3 | 1362.5 | 1179.9 | 1128.4 | 1124.0 |
| 47.5° | 6180.9 | 3727.6 | 1195.7 | 1418.4 | 1755.5 | 1897.9 | 1627.1 | 1317.1 | 1134.5 | 1107.4 | 1110.1 |
| 50°   | 6337.3 | 3503.1 | 1163.3 | 1408.8 | 1780.8 | 1879.5 | 1535.4 | 1293.5 | 1117.1 | 1150.2 | 1185.2 |
| 52.5° | 6469.1 | 3270.8 | 1134.5 | 1389.5 | 1790.4 | 1847.2 | 1511.8 | 1297.8 | 1117.1 | 1180.8 | 1214.0 |
| 55°   | 6625.5 | 3095.3 | 1101.3 | 1349.4 | 1772.1 | 1755.5 | 1495.2 | 1324.0 | 1130.2 | 1090.0 | 1093.5 |
| 57.5° | 6827.2 | 3037.6 | 1064.7 | 1286.5 | 1711.0 | 1621.9 | 1487.4 | 1349.4 | 1122.3 | 1097.0 | 1105.7 |
| 60°   | 7106.7 | 3098.8 | 1049.8 | 1204.4 | 1615.8 | 1517.1 | 1488.2 | 1336.3 | 1067.3 | 1023.6 | 1024.5 |
| 62.5° | 7373.1 | 3166.9 | 1048.9 | 1152.9 | 1498.7 | 1423.6 | 1468.2 | 1293.5 | 1039.3 | 1014.0 | 1023.6 |
| 65°   | 7460.4 | 3097.9 | 1007.0 | 1095.2 | 1366.8 | 1311.8 | 1431.5 | 1248.1 | 1018.4 | 979.9  | 978.2  |
| 67.5° | 7343.4 | 2883.9 | 922.3  | 1001.8 | 1215.7 | 1181.7 | 1383.4 | 1193.9 | 985.2  | 953.7  | 948.5  |
| 70°   | 6995.8 | 2406.2 | 817.5  | 878.6  | 1043.7 | 1035.0 | 1307.5 | 1131.0 | 940.6  | 913.6  | 890.8  |
| 72.5° | 6060.4 | 1714.4 | 689.1  | 731.0  | 849.8  | 877.7  | 1202.6 | 1048.9 | 877.7  | 819.2  | 784.3  |
| 75°   | 4977.4 | 1269.0 | 566.0  | 574.7  | 645.4  | 721.4  | 1058.5 | 952.9  | 803.5  | 703.9  | 676.9  |
| 77.5° | 3048.1 | 776.4  | 450.7  | 454.2  | 462.9  | 575.6  | 871.6  | 845.4  | 709.2  | 586.9  | 567.7  |
| 80°   | 986.9  | 423.6  | 325.8  | 342.4  | 316.2  | 421.8  | 674.3  | 719.7  | 608.7  | 490.8  | 469.9  |
| 82.5° | 375.6  | 247.2  | 220.1  | 231.4  | 219.2  | 283.0  | 491.7  | 576.4  | 498.7  | 403.5  | 328.4  |
| 85°   | 181.7  | 139.7  | 130.1  | 145.9  | 135.4  | 145.0  | 314.4  | 424.5  | 378.2  | 262.9  | 244.5  |
| 87.5° | 64.6   | 62.0   | 49.8   | 67.3   | 57.6   | 51.5   | 96.1   | 214.0  | 249.8  | 180.8  | 161.6  |
| 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 (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         | 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 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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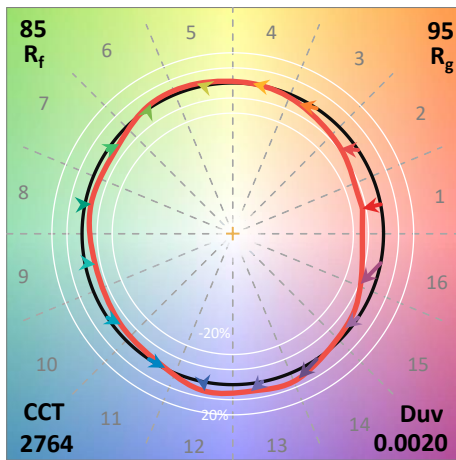
TM-30-18

### 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)