

Signify Classified - Internal  
Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



Scaled data based on original data using  
LM-79-08 Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Test Report Prepared for  
Cooper Lighting Solutions  
(formerly Eaton)

Brand: McGRAW-EDISON

Report Number: P323024

Luminaire Tested: **GLEON-SA0D-827-U-T4W-HSS**

Issue Date: 3/3/2020

### Test Information

Test Method: LM-79-08  
Report Number: P323024  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-19)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA0D-827-U-T4W-HSS  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(10) 80 CRI, 2700K, 1200mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE IV  
WIDE OPTICS WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

### Summary

Lumens per Lamp: N/A  
Luminaire Lumens: 40919 lumens  
Efficiency: N/A  
Efficacy: 63.9 lumens/watt  
Luminous Opening: Rectangular (W 2.5' x L: 1' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B3 - U0 - G5

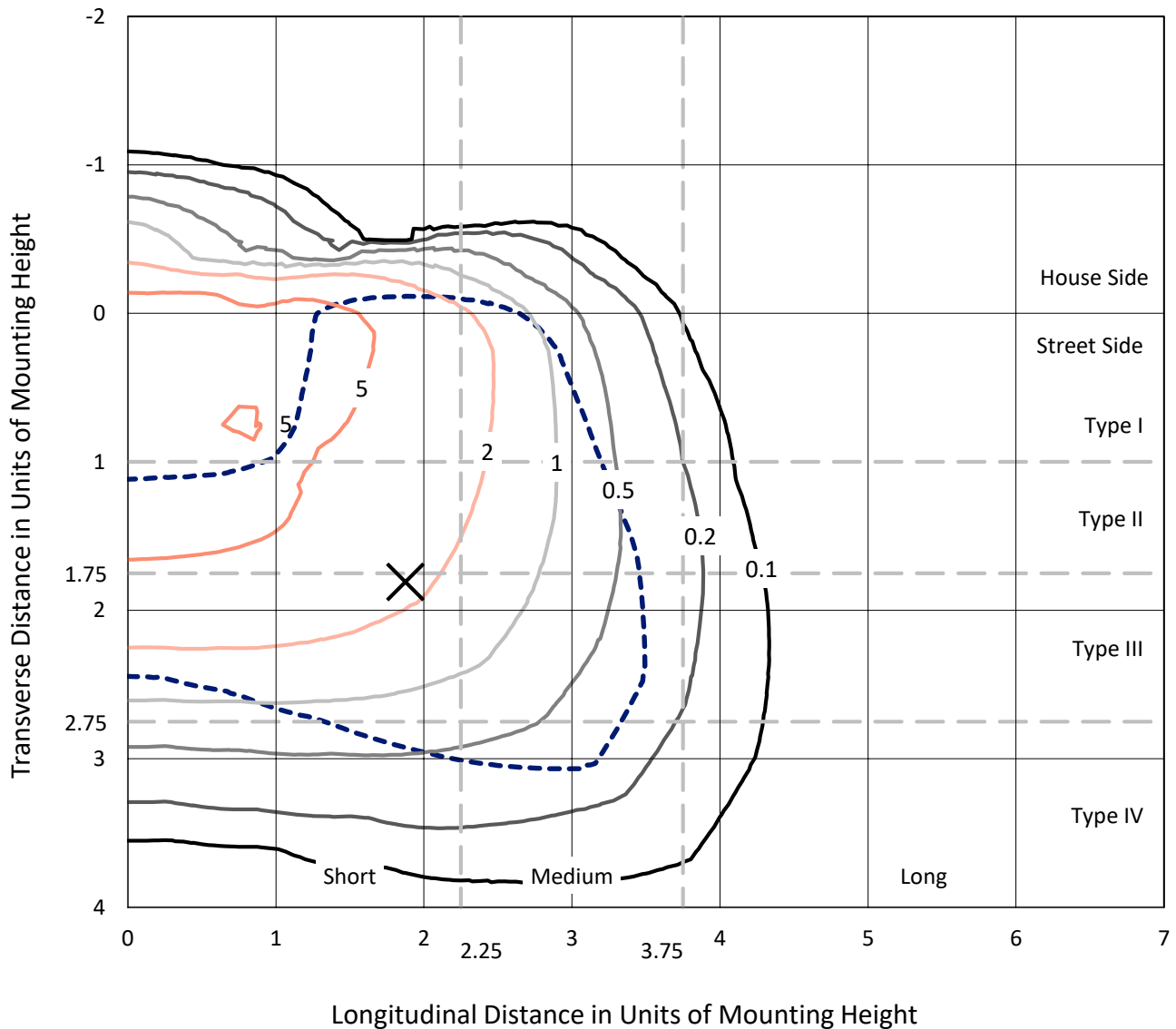
Input Watts (W): 640  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



REPORT NUMBER: P323024  
CATALOG NUMBER: GLEON-SA0D-827-U-T4W-HSS

## Iso-Footcandle Lines of Horizontal Illumination

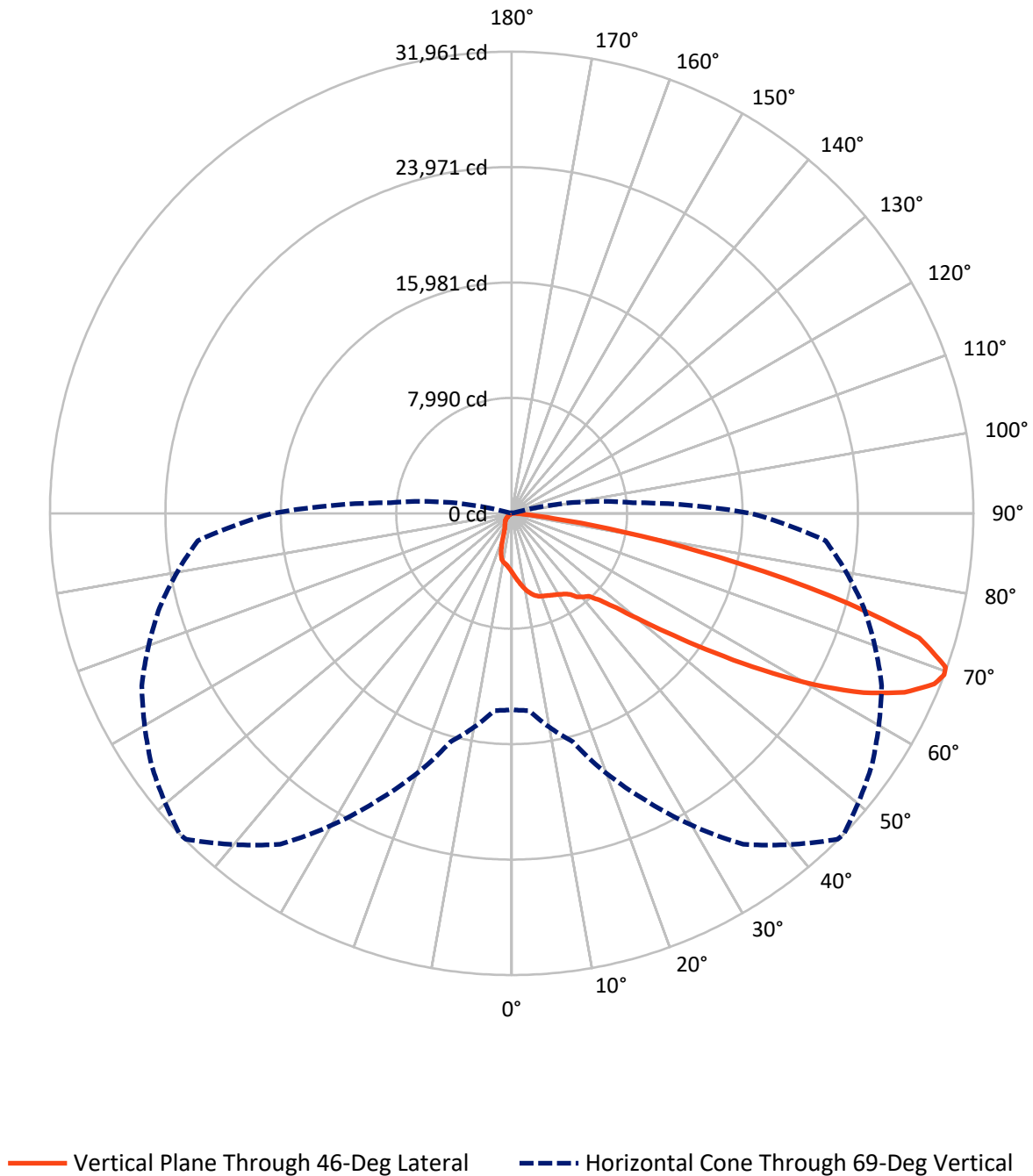
× Max cd  
- - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 9.5 fc  
Type IV - Short - N/A

REPORT NUMBER: P323024  
CATALOG NUMBER: GLEON-SA0D-827-U-T4W-HSS

## Luminous Intensity Polar Plot



REPORT NUMBER: P323024

CATALOG NUMBER: GLEON-SA0D-827-U-T4W-HSS

**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 4199.4   | 0.0    | 4199.4  |
|                    | % Fixture | 10.3     | 0.0    | 10.3    |
| <b>Street Side</b> | Lumens    | 36719.6  | 0.0    | 36719.6 |
|                    | % Fixture | 89.7     | 0.0    | 89.7    |
| <b>Total</b>       | Lumens    | 40919.0  | 0.0    | 40919.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 408.1   | 1.0       |
| 10°-20°   | 1238.0  | 3.0       |
| 20°-30°   | 1947.0  | 4.8       |
| 30°-40°   | 2792.0  | 6.8       |
| 40°-50°   | 4825.7  | 11.8      |
| 50°-60°   | 9533.6  | 23.3      |
| 60°-70°   | 13324.0 | 32.6      |
| 70°-80°   | 6436.9  | 15.7      |
| 80°-90°   | 413.7   | 1.0       |
| 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°    | 40919.0 | 100.0     |
| 0°-180°   | 40919.0 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P323024

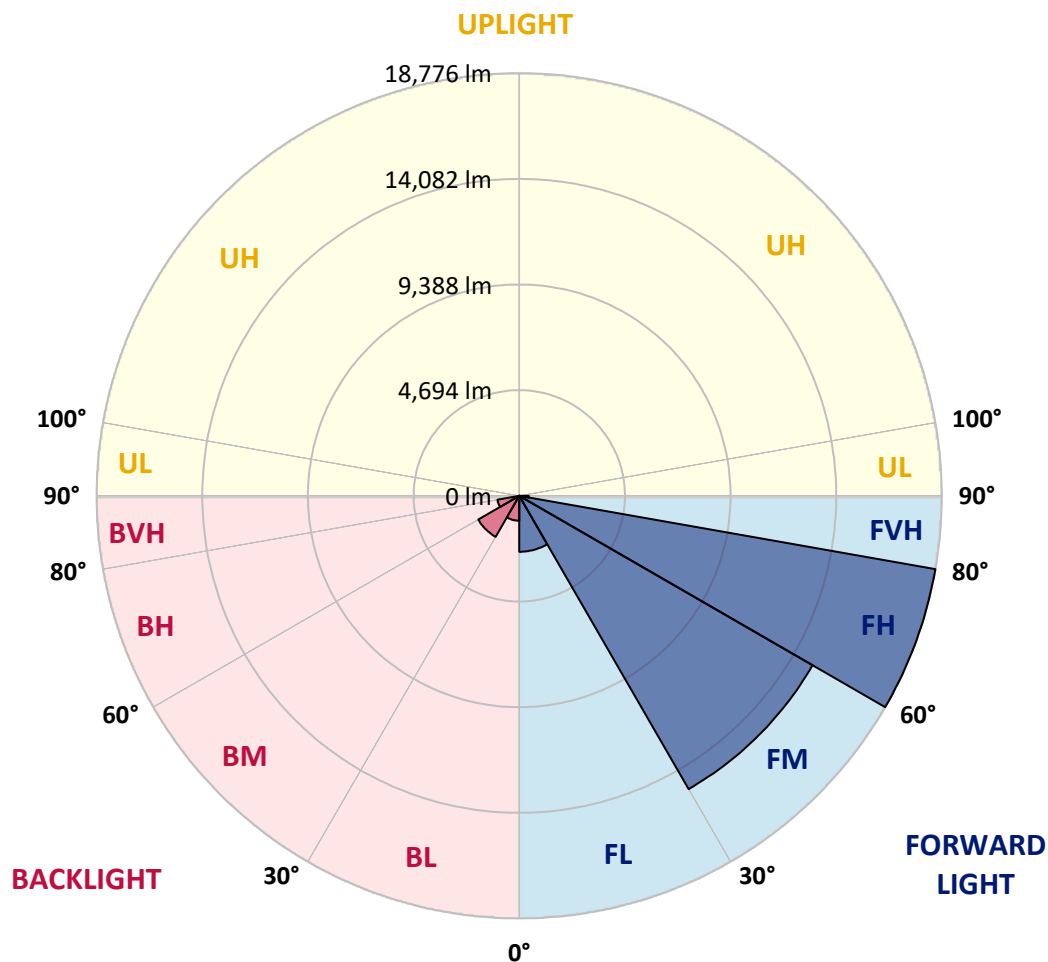
CATALOG NUMBER: GLEON-SA0D-827-U-T4W-HSS

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|---------|-----------|-------------------------|------|---------|
|      |             |         |           | B                       | U    | G       |
| FL   | (0°-30°)    | 2486.3  | 6.1       |                         |      |         |
| FM   | (30°-60°)   | 15046.8 | 36.8      |                         |      |         |
| FH   | (60°-80°)   | 18776.2 | 45.9      |                         |      | G5      |
| FVH  | (80°-90°)   | 410.2   | 1.0       |                         |      | G3/500  |
| BL   | (0°-30°)    | 1106.8  | 2.7       | B3/2500                 |      |         |
| BM   | (30°-60°)   | 2104.4  | 5.1       | B2/2500                 |      |         |
| BH   | (60°-80°)   | 984.7   | 2.4       | B2/1000                 |      | G2/1000 |
| BVH  | (80°-90°)   | 3.5     | 0.0       |                         |      | G0/10   |
| 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: P323024

CATALOG NUMBER: GLEON-SA0D-827-U-T4W-HSS

**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 35°     | 45°     | 46°     | 55°     | 65°     | 75°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 4099.9  | 4099.9  | 4099.9  | 4099.9  | 4099.9  | 4099.9  | 4099.9  | 4099.9  | 4099.9  | 4099.9  | 4099.9  |
| 2.5°  | 4554.6  | 4548.9  | 4522.0  | 4510.5  | 4445.3  | 4406.9  | 4391.5  | 4343.6  | 4274.5  | 4205.5  | 4128.7  |
| 5°    | 5072.6  | 5070.7  | 5020.8  | 4972.9  | 4850.1  | 4735.0  | 4713.9  | 4602.6  | 4447.2  | 4301.4  | 4155.6  |
| 7.5°  | 5602.2  | 5577.2  | 5527.3  | 5435.2  | 5256.8  | 5072.6  | 5055.4  | 4898.0  | 4677.4  | 4466.4  | 4257.3  |
| 10°   | 6051.1  | 6035.7  | 5970.5  | 5830.5  | 5621.3  | 5412.2  | 5391.1  | 5197.3  | 4947.9  | 4688.9  | 4422.2  |
| 12.5° | 6400.3  | 6388.8  | 6302.4  | 6127.8  | 5905.3  | 5688.5  | 5659.7  | 5487.0  | 5220.4  | 4930.7  | 4616.0  |
| 15°   | 6613.2  | 6607.5  | 6501.9  | 6315.9  | 6097.1  | 5909.1  | 5884.2  | 5732.6  | 5485.1  | 5182.0  | 4827.1  |
| 17.5° | 6663.1  | 6665.0  | 6555.7  | 6367.7  | 6187.3  | 6053.0  | 6033.8  | 5918.7  | 5711.5  | 5410.3  | 5038.1  |
| 20°   | 6551.8  | 6574.9  | 6477.0  | 6313.9  | 6202.7  | 6131.7  | 6116.3  | 6047.3  | 5872.7  | 5588.7  | 5206.9  |
| 22.5° | 6394.5  | 6406.0  | 6338.9  | 6229.5  | 6183.5  | 6196.9  | 6189.2  | 6150.9  | 6003.1  | 5742.2  | 5373.8  |
| 25°   | 6298.6  | 6298.6  | 6258.3  | 6166.2  | 6196.9  | 6279.4  | 6281.3  | 6273.6  | 6156.6  | 5930.2  | 5577.2  |
| 27.5° | 6294.7  | 6283.2  | 6237.2  | 6168.1  | 6252.5  | 6379.2  | 6386.8  | 6438.6  | 6365.7  | 6158.5  | 5830.5  |
| 30°   | 6448.2  | 6434.8  | 6337.0  | 6246.8  | 6354.2  | 6490.4  | 6509.6  | 6622.8  | 6586.4  | 6406.0  | 6112.5  |
| 32.5° | 6807.0  | 6759.0  | 6542.2  | 6394.5  | 6475.1  | 6638.2  | 6663.1  | 6843.5  | 6901.0  | 6711.1  | 6384.9  |
| 35°   | 7298.1  | 7146.6  | 6833.9  | 6674.6  | 6682.3  | 6853.0  | 6876.1  | 7140.8  | 7311.6  | 6991.2  | 6596.0  |
| 37.5° | 7975.4  | 7900.6  | 7392.2  | 6966.2  | 7000.8  | 7259.8  | 7326.9  | 7614.7  | 7566.7  | 7144.7  | 6835.8  |
| 40°   | 9460.3  | 9343.3  | 8802.3  | 7783.5  | 7305.8  | 7589.8  | 7610.9  | 7764.4  | 7768.2  | 7491.9  | 7334.6  |
| 42.5° | 11482.5 | 11434.5 | 10864.7 | 9266.6  | 7906.3  | 7810.4  | 7848.8  | 8107.8  | 8397.5  | 8224.8  | 8217.1  |
| 45°   | 13721.4 | 13696.5 | 13092.2 | 11235.0 | 9120.8  | 8533.7  | 8581.7  | 8928.9  | 9483.4  | 9521.7  | 9765.4  |
| 47.5° | 15522.9 | 15511.4 | 15164.2 | 13431.7 | 10979.8 | 9759.6  | 9775.0  | 10143.3 | 11118.0 | 11599.5 | 11989.0 |
| 50°   | 17165.2 | 17220.9 | 16946.5 | 15808.8 | 13512.3 | 11680.1 | 11643.7 | 11889.2 | 13454.8 | 14243.3 | 14726.8 |
| 52.5° | 19448.3 | 19527.0 | 18757.6 | 18026.6 | 16169.5 | 14062.9 | 14034.2 | 14291.2 | 16263.5 | 16854.4 | 16940.8 |
| 55°   | 21464.7 | 21330.4 | 20722.2 | 20511.2 | 19409.9 | 17006.0 | 16998.3 | 17224.7 | 18980.2 | 19231.5 | 19390.7 |
| 57.5° | 22354.9 | 22303.1 | 22596.6 | 23080.1 | 22803.8 | 20484.3 | 20467.0 | 20294.4 | 21411.0 | 21437.8 | 21927.1 |
| 60°   | 22917.0 | 22980.3 | 23880.1 | 25370.8 | 26059.6 | 24227.4 | 24116.1 | 23062.8 | 23732.4 | 23672.9 | 24196.7 |
| 62.5° | 22494.9 | 22619.6 | 24238.9 | 26723.4 | 28496.2 | 27494.7 | 27337.3 | 25599.1 | 25716.2 | 25510.9 | 25998.2 |
| 65°   | 20254.1 | 20447.9 | 23101.2 | 26468.2 | 29704.8 | 30048.3 | 29889.0 | 27838.1 | 27291.3 | 26953.6 | 26683.1 |
| 67.5° | 16445.8 | 16560.9 | 19331.3 | 24248.5 | 29160.0 | 31571.6 | 31539.0 | 29800.8 | 28480.8 | 26710.0 | 24611.1 |
| 69°   | 13591.0 | 13704.2 | 16370.9 | 21911.7 | 27960.9 | 31897.7 | 31961.0 | 30430.0 | 28254.4 | 25228.9 | 21806.2 |
| 70°   | 11511.3 | 11632.1 | 14116.7 | 19908.7 | 26569.9 | 31746.2 | 31859.4 | 30370.6 | 27605.9 | 23513.7 | 19344.7 |
| 72.5° | 6037.7  | 6141.3  | 8691.0  | 13715.7 | 21660.4 | 29150.4 | 29493.8 | 27803.6 | 23400.5 | 17077.0 | 11438.4 |
| 75°   | 1897.4  | 1956.9  | 3393.9  | 7169.6  | 14830.4 | 22665.7 | 22744.4 | 21810.0 | 16616.5 | 9393.2  | 4763.7  |
| 77.5° | 723.3   | 706.0   | 1130.0  | 2641.8  | 7497.7  | 14272.1 | 14753.6 | 13629.3 | 8719.8  | 3321.0  | 1099.3  |
| 80°   | 389.5   | 391.4   | 587.1   | 1093.6  | 3207.8  | 7334.6  | 7741.3  | 6605.6  | 3098.5  | 1036.0  | 253.2   |
| 82.5° | 168.8   | 176.5   | 330.0   | 579.4   | 1473.4  | 2705.1  | 2908.5  | 2421.2  | 1183.7  | 696.4   | 94.0    |
| 85°   | 36.5    | 40.3    | 159.2   | 314.6   | 600.5   | 759.7   | 796.2   | 784.7   | 754.0   | 541.0   | 36.5    |
| 87.5° | 0.0     | 0.0     | 71.0    | 113.2   | 151.6   | 172.7   | 151.6   | 197.6   | 416.3   | 364.5   | 19.2    |
| 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: P323024

CATALOG NUMBER: GLEON-SA0D-827-U-T4W-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°     | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|---------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 4099.9  | 4099.9  | 4099.9 | 4099.9 | 4099.9 | 4099.9 | 4099.9 | 4099.9 | 4099.9 | 4099.9 | 4099.9 |
| 2.5°  | 4103.8  | 4069.2  | 4009.8 | 3944.5 | 3898.5 | 3850.5 | 3812.1 | 3794.9 | 3775.7 | 3762.3 | 3779.5 |
| 5°    | 4096.1  | 4028.9  | 3913.8 | 3802.6 | 3722.0 | 3656.7 | 3603.0 | 3581.9 | 3560.8 | 3545.5 | 3543.6 |
| 7.5°  | 4163.2  | 4069.2  | 3892.7 | 3729.7 | 3604.9 | 3516.7 | 3443.8 | 3413.1 | 3388.2 | 3376.6 | 3367.0 |
| 10°   | 4291.8  | 4170.9  | 3934.9 | 3722.0 | 3560.8 | 3411.2 | 3253.9 | 3133.0 | 3054.3 | 3017.9 | 3004.4 |
| 12.5° | 4458.7  | 4307.1  | 4015.5 | 3762.3 | 3528.2 | 3240.4 | 2906.6 | 2618.8 | 2432.7 | 2371.3 | 2334.9 |
| 15°   | 4654.4  | 4466.4  | 4121.0 | 3814.1 | 3409.3 | 2883.6 | 2317.6 | 1941.6 | 1768.9 | 1734.4 | 1696.0 |
| 17.5° | 4842.4  | 4635.2  | 4247.7 | 3823.7 | 3148.3 | 2304.2 | 1697.9 | 1442.7 | 1375.6 | 1398.6 | 1404.4 |
| 20°   | 5007.4  | 4802.1  | 4372.4 | 3739.2 | 2674.5 | 1728.6 | 1314.2 | 1250.9 | 1275.8 | 1320.0 | 1327.6 |
| 22.5° | 5174.3  | 4963.3  | 4487.5 | 3516.7 | 2068.2 | 1312.3 | 1183.7 | 1199.1 | 1224.0 | 1268.2 | 1275.8 |
| 25°   | 5377.7  | 5159.0  | 4594.9 | 3108.0 | 1552.1 | 1116.6 | 1124.3 | 1147.3 | 1172.2 | 1212.5 | 1216.4 |
| 27.5° | 5611.7  | 5406.5  | 4665.9 | 2576.6 | 1151.1 | 1026.4 | 1051.4 | 1085.9 | 1110.8 | 1149.2 | 1156.9 |
| 30°   | 5922.5  | 5732.6  | 4688.9 | 2026.0 | 965.0  | 945.8  | 957.4  | 999.6  | 1036.0 | 1070.5 | 1076.3 |
| 32.5° | 6214.2  | 6054.9  | 4612.2 | 1529.1 | 894.0  | 871.0  | 871.0  | 896.0  | 938.2  | 970.8  | 978.5  |
| 35°   | 6482.8  | 6379.2  | 4366.6 | 1118.5 | 840.3  | 802.0  | 782.8  | 782.8  | 809.6  | 836.5  | 844.2  |
| 37.5° | 6837.7  | 6833.9  | 3969.5 | 892.1  | 788.5  | 744.4  | 704.1  | 673.4  | 663.8  | 669.6  | 673.4  |
| 40°   | 7445.9  | 7451.6  | 3451.5 | 800.0  | 744.4  | 684.9  | 623.5  | 567.9  | 516.1  | 498.8  | 496.9  |
| 42.5° | 8395.6  | 8309.2  | 2908.5 | 755.9  | 706.0  | 623.5  | 531.4  | 456.6  | 376.0  | 351.1  | 349.2  |
| 45°   | 9903.5  | 9391.3  | 2333.0 | 715.6  | 665.7  | 554.5  | 439.3  | 337.7  | 272.4  | 253.2  | 253.2  |
| 47.5° | 12100.3 | 10812.9 | 1807.3 | 671.5  | 612.0  | 475.8  | 331.9  | 243.7  | 199.5  | 189.9  | 191.9  |
| 50°   | 14371.8 | 12205.8 | 1385.2 | 615.9  | 546.8  | 393.3  | 245.6  | 176.5  | 151.6  | 151.6  | 153.5  |
| 52.5° | 16386.3 | 13226.4 | 1080.1 | 556.4  | 466.2  | 308.9  | 186.1  | 138.1  | 126.6  | 124.7  | 126.6  |
| 55°   | 18272.2 | 13884.5 | 826.9  | 487.3  | 370.3  | 230.2  | 142.0  | 113.2  | 105.5  | 101.7  | 99.8   |
| 57.5° | 20091.0 | 14210.7 | 619.7  | 393.3  | 268.6  | 166.9  | 113.2  | 95.9   | 88.3   | 82.5   | 80.6   |
| 60°   | 21301.6 | 13945.9 | 425.9  | 289.7  | 186.1  | 120.9  | 94.0   | 82.5   | 72.9   | 67.1   | 65.2   |
| 62.5° | 21984.6 | 13222.6 | 274.4  | 209.1  | 132.4  | 90.2   | 74.8   | 69.1   | 55.6   | 49.9   | 49.9   |
| 65°   | 21708.3 | 12029.3 | 191.9  | 149.6  | 95.9   | 67.1   | 55.6   | 55.6   | 40.3   | 32.6   | 30.7   |
| 67.5° | 19237.3 | 10162.5 | 145.8  | 111.3  | 69.1   | 49.9   | 42.2   | 48.0   | 24.9   | 15.3   | 15.3   |
| 69°   | 16551.3 | 8422.4  | 124.7  | 92.1   | 57.6   | 40.3   | 36.5   | 44.1   | 17.3   | 11.5   | 9.6    |
| 70°   | 14385.3 | 7265.5  | 113.2  | 80.6   | 48.0   | 34.5   | 32.6   | 42.2   | 17.3   | 9.6    | 7.7    |
| 72.5° | 8606.6  | 4052.0  | 86.3   | 57.6   | 30.7   | 26.9   | 26.9   | 48.0   | 17.3   | 9.6    | 7.7    |
| 75°   | 3478.3  | 1427.4  | 63.3   | 40.3   | 23.0   | 23.0   | 32.6   | 61.4   | 15.3   | 7.7    | 5.8    |
| 77.5° | 788.5   | 312.7   | 36.5   | 24.9   | 15.3   | 23.0   | 38.4   | 48.0   | 9.6    | 3.8    | 0.0    |
| 80°   | 191.9   | 76.7    | 23.0   | 15.3   | 9.6    | 17.3   | 28.8   | 26.9   | 1.9    | 0.0    | 0.0    |
| 82.5° | 63.3    | 26.9    | 9.6    | 7.7    | 1.9    | 5.8    | 13.4   | 7.7    | 0.0    | 0.0    | 0.0    |
| 85°   | 26.9    | 15.3    | 3.8    | 1.9    | 0.0    | 0.0    | 1.9    | 0.0    | 0.0    | 0.0    | 0.0    |
| 87.5° | 17.3    | 5.8     | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 90°   | 0.0     | 0.0     | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

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           |

REPORT NUMBER: SP1-2407-157-9

**CIE 1931 Chromaticity Diagram**



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



REPORT NUMBER: SP1-2407-157-9

### 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           |        |               |               |

REPORT NUMBER: SP1-2407-157-9

### Scotopic Flux vs. Wavelength



Scotopic Lumens: 5286.7

S/P: 1.22

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 0                | 0.0              | 490       | 18018            | 75.9             | 620       | 87426            | 0.4              | 750       | 2680             | 0.0              | 880       | 58               | 0.0              |
| 365       | 0                | 0.0              | 495       | 22295            | 93.2             | 625       | 83013            | 0.2              | 755       | 2287             | 0.0              | 885       | 46               | 0.0              |
| 370       | 0                | 0.0              | 500       | 26478            | 107.8            | 630       | 78077            | 0.1              | 760       | 1944             | 0.0              | 890       | 45               | 0.0              |
| 375       | 0                | 0.0              | 505       | 30524            | 118.7            | 635       | 72080            | 0.1              | 765       | 1653             | 0.0              | 895       | 41               | 0.0              |
| 380       | 0                | 0.0              | 510       | 33611            | 122.2            | 640       | 66249            | 0.1              | 770       | 1413             | 0.0              | 900       | 38               | 0.0              |
| 385       | 0                | 0.0              | 515       | 36490            | 120.8            | 645       | 59973            | 0.0              | 775       | 1198             | 0.0              | 905       | 33               | 0.0              |
| 390       | 0                | 0.0              | 520       | 38610            | 113.9            | 650       | 53972            | 0.0              | 780       | 1025             | 0.0              | 910       | 30               | 0.0              |
| 395       | 0                | 0.0              | 525       | 40511            | 104.1            | 655       | 48369            | 0.0              | 785       | 874              | 0.0              | 915       | 23               | 0.0              |
| 400       | 48               | 0.0              | 530       | 42223            | 92.4             | 660       | 42641            | 0.0              | 790       | 747              | 0.0              | 920       | 24               | 0.0              |
| 405       | 201              | 0.0              | 535       | 44137            | 80.5             | 665       | 37602            | 0.0              | 795       | 639              | 0.0              | 925       | 22               | 0.0              |
| 410       | 457              | 0.1              | 540       | 46032            | 68.2             | 670       | 32798            | 0.0              | 800       | 547              | 0.0              | 930       | 22               | 0.0              |
| 415       | 925              | 0.3              | 545       | 48553            | 57.1             | 675       | 28558            | 0.0              | 805       | 473              | 0.0              | 935       | 17               | 0.0              |
| 420       | 1816             | 1.1              | 550       | 51408            | 46.7             | 680       | 24782            | 0.0              | 810       | 401              | 0.0              | 940       | 13               | 0.0              |
| 425       | 3217             | 2.5              | 555       | 54711            | 37.4             | 685       | 21386            | 0.0              | 815       | 351              | 0.0              | 945       | 6                | 0.0              |
| 430       | 5520             | 5.9              | 560       | 58847            | 29.4             | 690       | 18413            | 0.0              | 820       | 307              | 0.0              | 950       | 10               | 0.0              |
| 435       | 9225             | 12.5             | 565       | 63386            | 22.5             | 695       | 15721            | 0.0              | 825       | 261              | 0.0              | 955       | 11               | 0.0              |
| 440       | 15522            | 26.3             | 570       | 68196            | 16.9             | 700       | 13432            | 0.0              | 830       | 228              | 0.0              | 960       | 8                | 0.0              |
| 445       | 27642            | 55.2             | 575       | 73613            | 12.4             | 705       | 11513            | 0.0              | 835       | 193              | 0.0              | 965       | 12               | 0.0              |
| 450       | 36602            | 85.4             | 580       | 79207            | 9.0              | 710       | 9780             | 0.0              | 840       | 174              | 0.0              | 970       | 3                | 0.0              |
| 455       | 28292            | 75.1             | 585       | 84248            | 6.3              | 715       | 8356             | 0.0              | 845       | 151              | 0.0              | 975       | 8                | 0.0              |
| 460       | 21166            | 63.2             | 590       | 88397            | 4.4              | 720       | 7161             | 0.0              | 850       | 123              | 0.0              | 980       | 2                | 0.0              |
| 465       | 19092            | 63.2             | 595       | 91428            | 3.0              | 725       | 6067             | 0.0              | 855       | 106              | 0.0              | 985       | 13               | 0.0              |
| 470       | 14951            | 54.2             | 600       | 93452            | 2.0              | 730       | 5164             | 0.0              | 860       | 95               | 0.0              | 990       | 16               | 0.0              |
| 475       | 12606            | 48.8             | 605       | 93959            | 1.3              | 735       | 4393             | 0.0              | 865       | 82               | 0.0              | 995       | 20               | 0.0              |
| 480       | 13323            | 54.2             | 610       | 93079            | 0.9              | 740       | 3694             | 0.0              | 870       | 77               | 0.0              | 1000      | 0                | 0.0              |
| 485       | 15164            | 63.3             | 615       | 90707            | 0.5              | 745       | 3157             | 0.0              | 875       | 65               | 0.0              |           |                  |                  |

REPORT NUMBER: SP1-2407-157-9

### Melanopic Flux vs. Wavelength



**Melanopic Lumens: 9797**

**M/P: 2.26**

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 0                | 0.0              | 490       | 18018            | 27.7             | 620       | 87426            | 1.1              | 750       | 2680             | 0.0              | 880       | 58               | 0.0              |
| 365       | 0                | 0.0              | 495       | 22295            | 36.0             | 625       | 83013            | 0.7              | 755       | 2287             | 0.0              | 885       | 46               | 0.0              |
| 370       | 0                | 0.0              | 500       | 26478            | 44.2             | 630       | 78077            | 0.4              | 760       | 1944             | 0.0              | 890       | 45               | 0.0              |
| 375       | 0                | 0.0              | 505       | 30524            | 51.8             | 635       | 72080            | 0.3              | 765       | 1653             | 0.0              | 895       | 41               | 0.0              |
| 380       | 0                | 0.0              | 510       | 33611            | 57.0             | 640       | 66249            | 0.2              | 770       | 1413             | 0.0              | 900       | 38               | 0.0              |
| 385       | 0                | 0.0              | 515       | 36490            | 60.5             | 645       | 59973            | 0.1              | 775       | 1198             | 0.0              | 905       | 33               | 0.0              |
| 390       | 0                | 0.0              | 520       | 38610            | 61.4             | 650       | 53972            | 0.1              | 780       | 1025             | 0.0              | 910       | 30               | 0.0              |
| 395       | 0                | 0.0              | 525       | 40511            | 60.6             | 655       | 48369            | 0.0              | 785       | 874              | 0.0              | 915       | 23               | 0.0              |
| 400       | 48               | 0.0              | 530       | 42223            | 58.2             | 660       | 42641            | 0.0              | 790       | 747              | 0.0              | 920       | 24               | 0.0              |
| 405       | 201              | 0.0              | 535       | 44137            | 55.0             | 665       | 37602            | 0.0              | 795       | 639              | 0.0              | 925       | 22               | 0.0              |
| 410       | 457              | 0.0              | 540       | 46032            | 50.9             | 670       | 32798            | 0.0              | 800       | 547              | 0.0              | 930       | 22               | 0.0              |
| 415       | 925              | 0.1              | 545       | 48553            | 46.6             | 675       | 28558            | 0.0              | 805       | 473              | 0.0              | 935       | 17               | 0.0              |
| 420       | 1816             | 0.3              | 550       | 51408            | 42.0             | 680       | 24782            | 0.0              | 810       | 401              | 0.0              | 940       | 13               | 0.0              |
| 425       | 3217             | 0.8              | 555       | 54711            | 37.4             | 685       | 21386            | 0.0              | 815       | 351              | 0.0              | 945       | 6                | 0.0              |
| 430       | 5520             | 1.9              | 560       | 58847            | 32.9             | 690       | 18413            | 0.0              | 820       | 307              | 0.0              | 950       | 10               | 0.0              |
| 435       | 9225             | 4.1              | 565       | 63386            | 28.4             | 695       | 15721            | 0.0              | 825       | 261              | 0.0              | 955       | 11               | 0.0              |
| 440       | 15522            | 8.7              | 570       | 68196            | 24.1             | 700       | 13432            | 0.0              | 830       | 228              | 0.0              | 960       | 8                | 0.0              |
| 445       | 27642            | 18.5             | 575       | 73613            | 20.0             | 705       | 11513            | 0.0              | 835       | 193              | 0.0              | 965       | 12               | 0.0              |
| 450       | 36602            | 28.3             | 580       | 79207            | 16.3             | 710       | 9780             | 0.0              | 840       | 174              | 0.0              | 970       | 3                | 0.0              |
| 455       | 28292            | 24.7             | 585       | 84248            | 12.9             | 715       | 8356             | 0.0              | 845       | 151              | 0.0              | 975       | 8                | 0.0              |
| 460       | 21166            | 20.4             | 590       | 88397            | 9.8              | 720       | 7161             | 0.0              | 850       | 123              | 0.0              | 980       | 2                | 0.0              |
| 465       | 19092            | 20.1             | 595       | 91428            | 7.3              | 725       | 6067             | 0.0              | 855       | 106              | 0.0              | 985       | 13               | 0.0              |
| 470       | 14951            | 17.2             | 600       | 93452            | 5.3              | 730       | 5164             | 0.0              | 860       | 95               | 0.0              | 990       | 16               | 0.0              |
| 475       | 12606            | 15.7             | 605       | 93959            | 3.7              | 735       | 4393             | 0.0              | 865       | 82               | 0.0              | 995       | 20               | 0.0              |
| 480       | 13323            | 18.0             | 610       | 93079            | 2.5              | 740       | 3694             | 0.0              | 870       | 77               | 0.0              | 1000      | 0                | 0.0              |
| 485       | 15164            | 21.9             | 615       | 90707            | 1.7              | 745       | 3157             | 0.0              | 875       | 65               | 0.0              |           |                  |                  |

REPORT NUMBER: SP1-2407-157-9

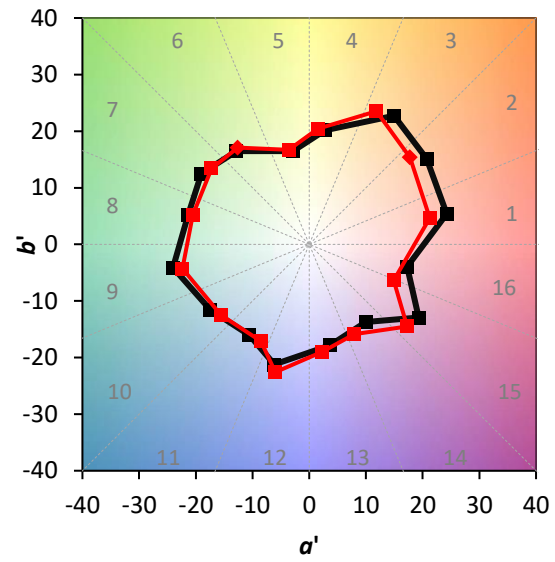
TM-30-18

### 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)