

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: P318654

Luminaire Tested: **GLEON-SA0C-727-U-T4FT**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P318654  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-16)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA0C-727-U-T4FT  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(10) 70 CRI, 2700K, 1050mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE IV  
FORWARD THROW OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 58899 lumens  
Efficiency: N/A  
Efficacy: 105.6 lumens/watt  
Luminous Opening: Rectangular (W 2.5' x L: 1' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B4 - U0 - G5

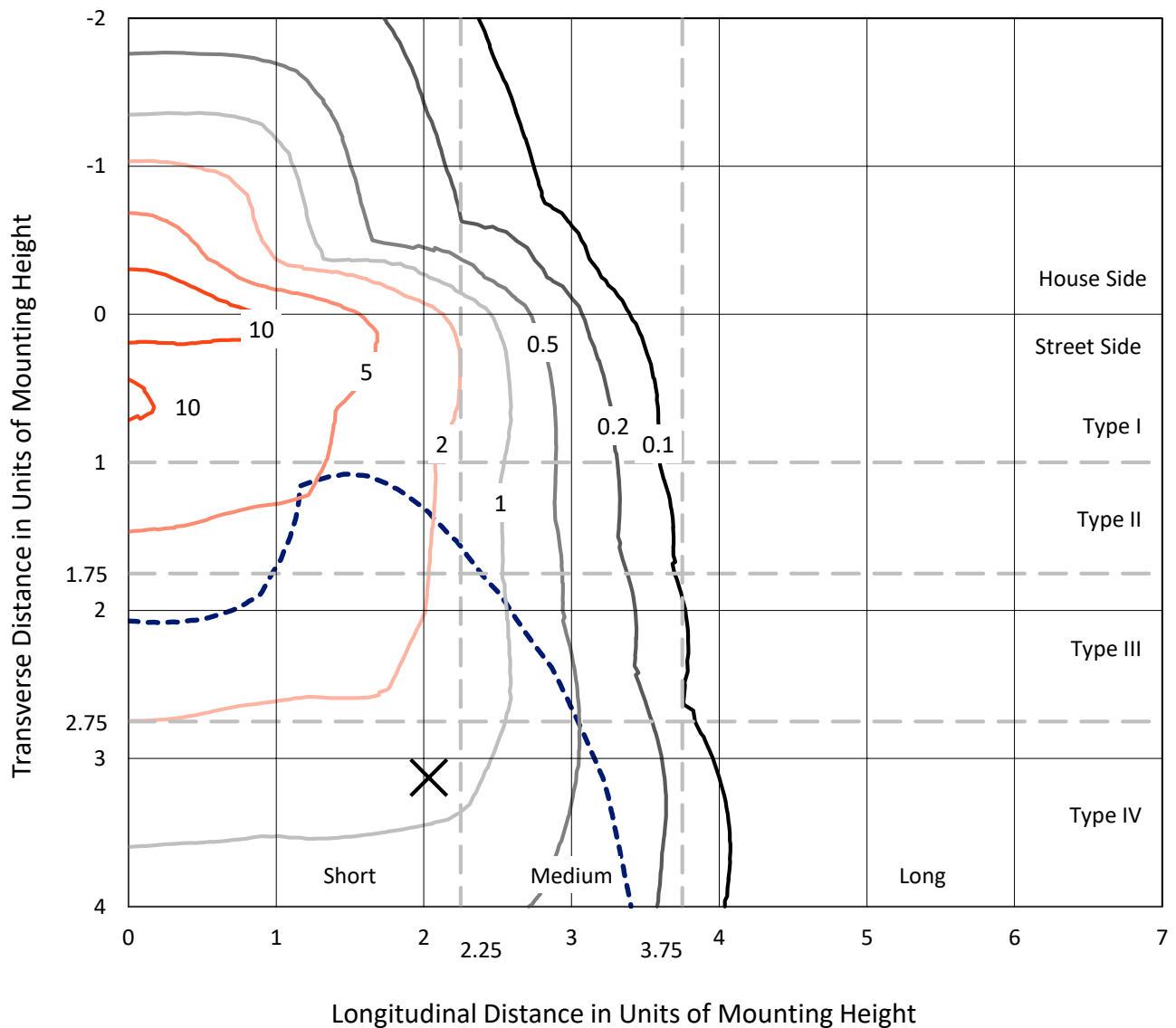
Input Watts (W): 558  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



REPORT NUMBER: P318654  
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### Iso-Footcandle Lines of Horizontal Illumination

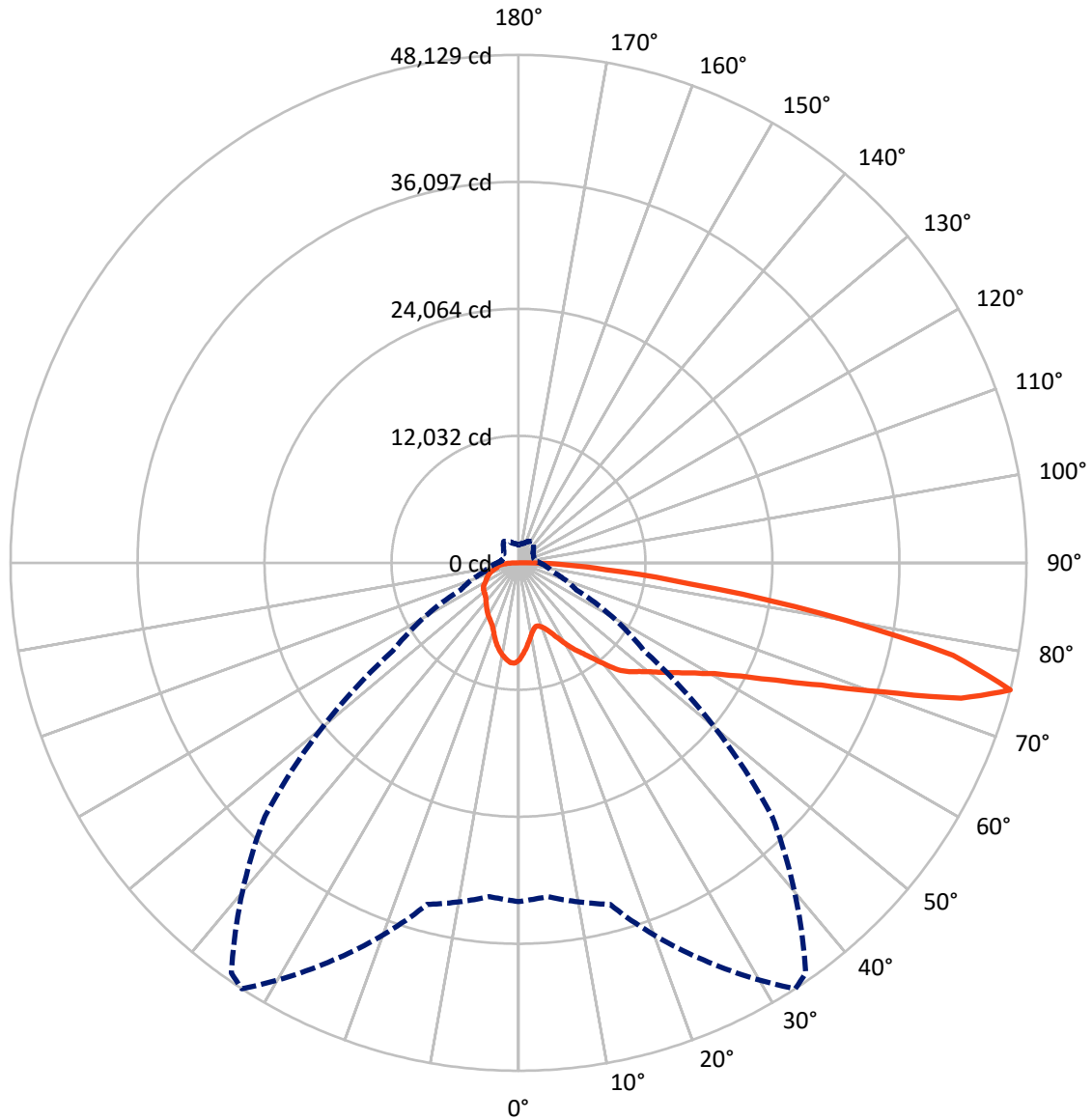
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 14.7 fc  
 Type IV - Short - N/A

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### Luminous Intensity Polar Plot



— Vertical Plane Through 33-Deg Lateral      - - - Horizontal Cone Through 75-Deg Vertical

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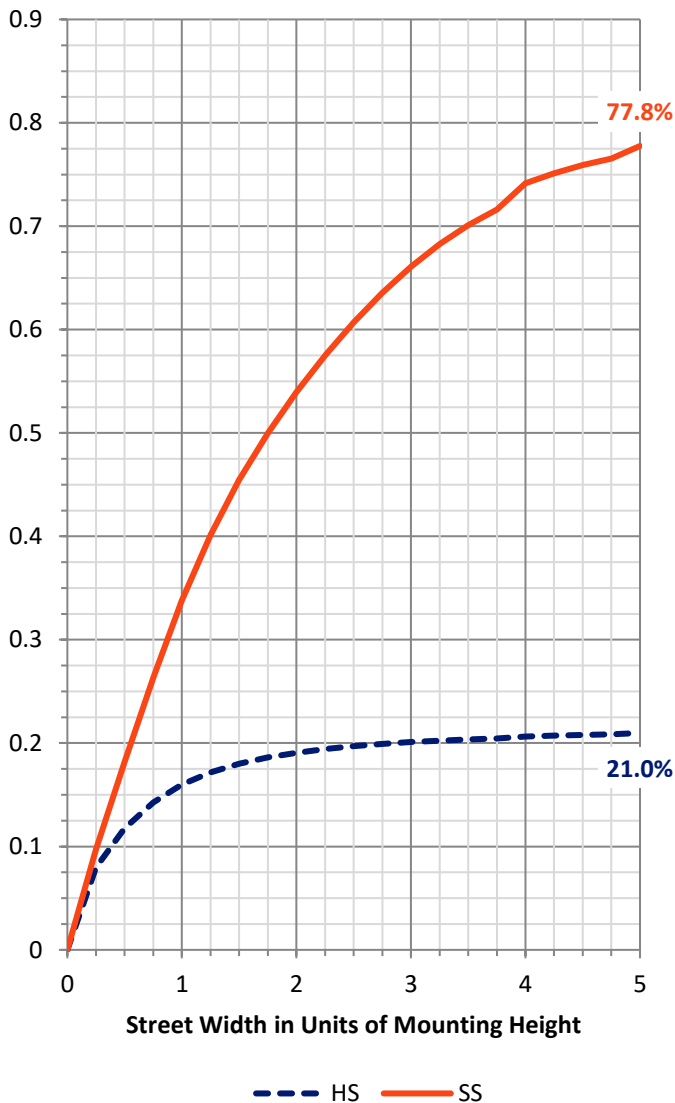
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 12647.2  | 0.0    | 12647.2 |
|                    | % Fixture | 21.5     | 0.0    | 21.5    |
| <b>Street Side</b> | Lumens    | 46251.8  | 0.0    | 46251.8 |
|                    | % Fixture | 78.5     | 0.0    | 78.5    |
| <b>Total</b>       | Lumens    | 58899.0  | 0.0    | 58899.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**Coefficient of Utilization**

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 832.6   | 1.4       |
| 10°-20°   | 2255.0  | 3.8       |
| 20°-30°   | 3682.8  | 6.3       |
| 30°-40°   | 5484.5  | 9.3       |
| 40°-50°   | 7866.2  | 13.4      |
| 50°-60°   | 10799.1 | 18.3      |
| 60°-70°   | 13520.0 | 23.0      |
| 70°-80°   | 12230.9 | 20.8      |
| 80°-90°   | 2227.9  | 3.8       |
| 90°-100°  | 0.0     | 0.0       |
| 100°-110° | 0.0     | 0.0       |
| 110°-120° | 0.0     | 0.0       |
| 120°-130° | 0.0     | 0.0       |
| 130°-140° | 0.0     | 0.0       |
| 140°-150° | 0.0     | 0.0       |
| 150°-160° | 0.0     | 0.0       |
| 160°-170° | 0.0     | 0.0       |
| 170°-180° | 0.0     | 0.0       |
| 0°-90°    | 58899.0 | 100.0     |
| 0°-180°   | 58899.0 | 100.0     |

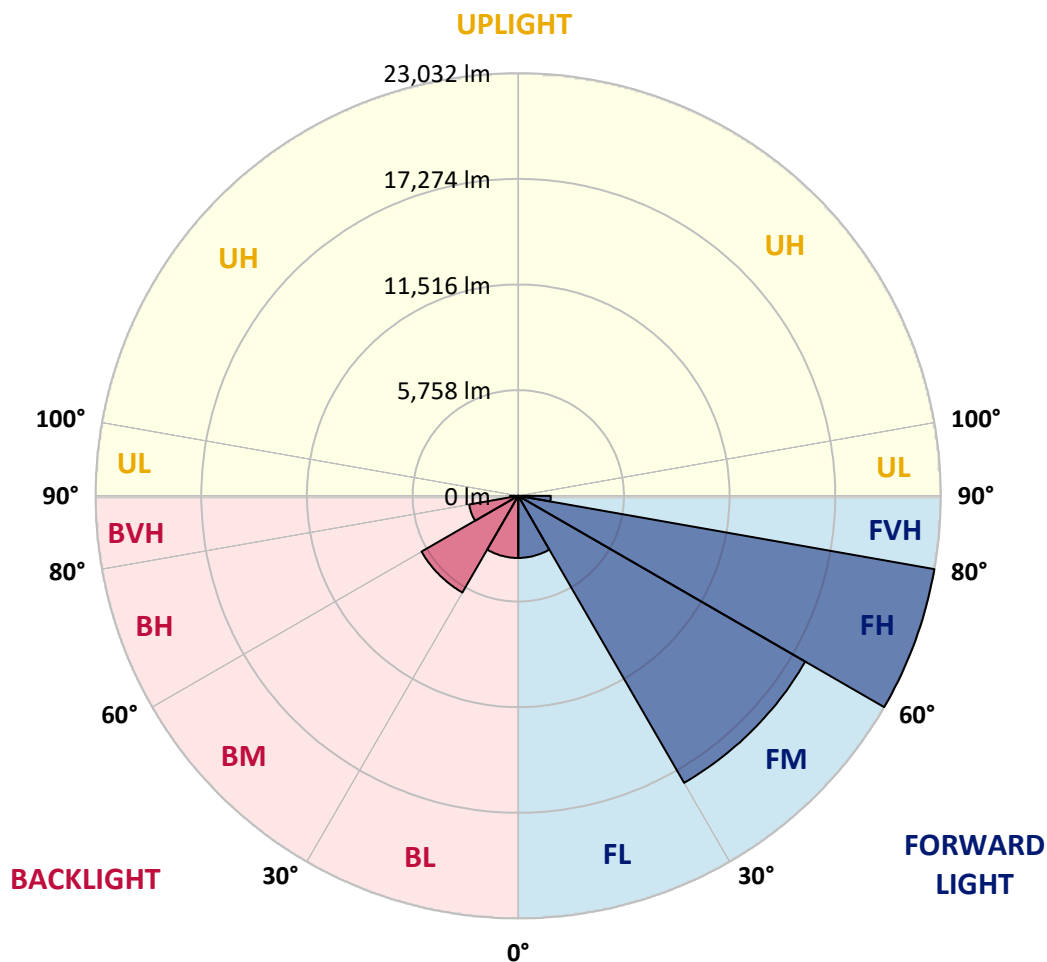


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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone           | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|---------|-----------|-------------------------|------|---------|
|                |         |           | B                       | U    | G       |
| FL (0°-30°)    | 3382.8  | 5.7       |                         |      |         |
| FM (30°-60°)   | 18063.1 | 30.7      |                         |      |         |
| FH (60°-80°)   | 23031.6 | 39.1      |                         |      | G5      |
| FVH (80°-90°)  | 1774.3  | 3.0       |                         |      | G5      |
| BL (0°-30°)    | 3387.5  | 5.8       | B4/5000                 |      |         |
| BM (30°-60°)   | 6086.7  | 10.3      | B4/8500                 |      |         |
| BH (60°-80°)   | 2719.4  | 4.6       | B4/5000                 |      | G4/5000 |
| BVH (80°-90°)  | 453.6   | 0.8       |                         |      | G3/500  |
| UL (90°-100°)  | 0.0     | 0.0       |                         | U0/0 |         |
| UH (100°-180°) | 0.0     | 0.0       |                         | U0/0 |         |

**BUG Rating: B4-U0-G5**  
 Type IV Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 33°     | 35°     | 45°     | 55°     | 65°     | 75°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 9206.2  | 9206.2  | 9206.2  | 9206.2  | 9206.2  | 9206.2  | 9206.2  | 9206.2  | 9206.2  | 9206.2  | 9206.2  |
| 2.5°  | 8549.1  | 8516.5  | 8577.6  | 8585.7  | 8638.6  | 8659.0  | 8732.2  | 8846.1  | 8939.7  | 9047.6  | 9145.2  |
| 5°    | 7773.9  | 7751.6  | 7837.0  | 7898.0  | 8014.0  | 8062.8  | 8235.8  | 8477.9  | 8693.5  | 8937.7  | 9159.4  |
| 7.5°  | 7037.4  | 7025.2  | 7120.9  | 7259.2  | 7393.5  | 7460.6  | 7759.7  | 8111.7  | 8471.8  | 8866.5  | 9206.2  |
| 10°   | 6416.9  | 6412.8  | 6504.4  | 6640.7  | 6838.1  | 6913.3  | 7299.9  | 7763.8  | 8268.3  | 8811.5  | 9285.6  |
| 12.5° | 6069.0  | 6083.2  | 6126.0  | 6239.9  | 6423.0  | 6498.3  | 6927.6  | 7472.8  | 8097.4  | 8793.2  | 9401.6  |
| 15°   | 6154.5  | 6176.8  | 6103.6  | 6099.5  | 6229.7  | 6288.7  | 6691.6  | 7265.3  | 7975.4  | 8823.8  | 9570.4  |
| 17.5° | 6518.6  | 6522.7  | 6329.4  | 6207.3  | 6286.7  | 6317.2  | 6618.3  | 7147.3  | 7904.1  | 8892.9  | 9782.0  |
| 20°   | 7031.3  | 7021.2  | 6679.4  | 6475.9  | 6518.6  | 6526.8  | 6722.1  | 7149.3  | 7898.0  | 9013.0  | 10056.7 |
| 22.5° | 7710.9  | 7635.6  | 7175.8  | 6899.1  | 6888.9  | 6876.7  | 6988.6  | 7299.9  | 7987.6  | 9208.3  | 10384.2 |
| 25°   | 8597.9  | 8526.7  | 7894.0  | 7515.6  | 7434.2  | 7403.7  | 7419.9  | 7621.3  | 8164.6  | 9417.8  | 10750.5 |
| 27.5° | 9584.7  | 9460.6  | 8850.2  | 8315.1  | 8146.3  | 8103.5  | 8005.9  | 8075.0  | 8357.8  | 9619.3  | 11185.8 |
| 30°   | 10410.7 | 10343.5 | 9810.5  | 9175.7  | 8976.3  | 8915.3  | 8659.0  | 8583.7  | 8636.6  | 9893.9  | 11735.2 |
| 32.5° | 10872.5 | 10827.8 | 10504.3 | 9991.6  | 9806.4  | 9721.0  | 9358.8  | 9208.3  | 9084.2  | 10327.3 | 12479.8 |
| 35°   | 11432.0 | 11403.5 | 11208.2 | 10835.9 | 10561.2 | 10471.7 | 10191.0 | 10034.3 | 9714.9  | 10923.4 | 13442.1 |
| 37.5° | 12144.1 | 12113.6 | 12117.7 | 11816.5 | 11489.0 | 11405.6 | 11220.4 | 11055.6 | 10532.8 | 11706.7 | 14487.9 |
| 40°   | 12949.8 | 12890.8 | 12868.4 | 12854.2 | 12646.6 | 12599.8 | 12502.2 | 12278.4 | 11558.2 | 12642.6 | 15519.4 |
| 42.5° | 14162.4 | 13952.8 | 13505.2 | 13674.1 | 13879.6 | 13855.1 | 13934.5 | 13613.0 | 12697.5 | 13749.3 | 16526.5 |
| 45°   | 15332.2 | 14988.4 | 14215.3 | 14251.9 | 14701.5 | 14837.8 | 15431.9 | 15204.0 | 13932.5 | 14961.9 | 17568.2 |
| 47.5° | 15865.3 | 15604.8 | 14947.7 | 14949.7 | 15395.3 | 15678.1 | 16980.2 | 16817.4 | 15230.5 | 16339.3 | 18839.7 |
| 50°   | 16461.4 | 16201.0 | 15610.9 | 15832.7 | 16221.3 | 16522.4 | 18475.6 | 18392.1 | 16465.4 | 17846.9 | 20363.6 |
| 52.5° | 17112.4 | 16670.9 | 16296.6 | 16693.3 | 17238.6 | 17588.5 | 19973.0 | 19745.1 | 17598.7 | 19364.6 | 22115.3 |
| 55°   | 17120.6 | 17000.5 | 17285.4 | 17576.3 | 18392.1 | 18821.4 | 21541.6 | 20939.4 | 18522.4 | 20856.0 | 23541.5 |
| 57.5° | 18095.1 | 17899.8 | 18504.0 | 18638.3 | 19704.4 | 20188.6 | 23102.1 | 21979.0 | 19462.3 | 21999.4 | 24310.6 |
| 60°   | 19385.0 | 19218.2 | 19712.6 | 20066.6 | 21328.0 | 21974.9 | 24768.4 | 23047.1 | 20200.8 | 22862.0 | 24274.0 |
| 62.5° | 21612.8 | 21423.6 | 21417.5 | 21913.9 | 23612.7 | 24365.5 | 26638.1 | 24094.9 | 20493.8 | 23032.9 | 23238.4 |
| 65°   | 24874.2 | 24573.0 | 24005.4 | 24241.4 | 26768.3 | 27519.0 | 28727.6 | 24853.8 | 20107.3 | 22117.4 | 20571.1 |
| 67.5° | 28048.0 | 28037.8 | 27340.0 | 27824.2 | 30935.0 | 31537.2 | 31107.9 | 24929.1 | 18900.8 | 18929.3 | 15838.8 |
| 70°   | 31211.7 | 31252.4 | 31134.4 | 32819.0 | 36564.6 | 37191.2 | 33643.0 | 23917.9 | 16188.7 | 13670.0 | 9489.0  |
| 72.5° | 33718.2 | 33708.1 | 34302.2 | 38645.9 | 43870.5 | 43730.2 | 35779.2 | 20853.9 | 11623.3 | 7379.2  | 4535.0  |
| 75°   | 32094.7 | 31740.7 | 33510.7 | 41530.8 | 48128.8 | 47443.2 | 33962.4 | 14546.9 | 6032.4  | 3359.0  | 2441.4  |
| 77.5° | 20933.3 | 21269.0 | 23867.1 | 34308.3 | 42098.5 | 41264.3 | 24916.9 | 6787.2  | 2842.2  | 2203.4  | 1770.0  |
| 80°   | 7580.7  | 7934.7  | 11175.7 | 19433.8 | 29004.2 | 28867.9 | 12270.2 | 2789.3  | 1922.6  | 1664.2  | 1289.9  |
| 82.5° | 2608.3  | 2738.5  | 4408.8  | 8630.5  | 16375.9 | 16986.3 | 4616.3  | 1584.9  | 1397.7  | 1180.0  | 883.0   |
| 85°   | 1023.4  | 1171.9  | 2016.2  | 4152.5  | 8260.2  | 8321.2  | 1869.7  | 948.1   | 972.5   | 773.1   | 484.2   |
| 87.5° | 388.6   | 472.0   | 964.4   | 1928.7  | 3772.0  | 3464.8  | 669.4   | 451.7   | 553.4   | 459.8   | 229.9   |
| 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: P318654  
 CATALOG NUMBER: GLEON-SA0C-727-U-T4FT

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°     | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|---------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 9206.2  | 9206.2  | 9206.2 | 9206.2 | 9206.2 | 9206.2 | 9206.2 | 9206.2 | 9206.2 | 9206.2 | 9206.2 |
| 2.5°  | 9220.5  | 9263.2  | 9352.7 | 9413.8 | 9478.9 | 9497.2 | 9505.3 | 9521.6 | 9537.9 | 9531.8 | 9533.8 |
| 5°    | 9277.5  | 9360.9  | 9505.3 | 9566.4 | 9594.8 | 9562.3 | 9499.2 | 9448.4 | 9411.7 | 9391.4 | 9385.3 |
| 7.5°  | 9371.0  | 9489.0  | 9643.7 | 9633.5 | 9568.4 | 9423.9 | 9261.2 | 9139.1 | 9037.4 | 9000.8 | 8980.4 |
| 10°   | 9495.1  | 9633.5  | 9741.3 | 9625.4 | 9436.1 | 9185.9 | 8941.8 | 8752.5 | 8600.0 | 8541.0 | 8530.8 |
| 12.5° | 9653.8  | 9794.2  | 9814.6 | 9568.4 | 9255.1 | 8913.3 | 8581.6 | 8331.4 | 8103.5 | 8030.3 | 8014.0 |
| 15°   | 9859.3  | 9991.6  | 9865.4 | 9468.7 | 9031.3 | 8571.5 | 8142.2 | 7802.4 | 7562.3 | 7472.8 | 7440.3 |
| 17.5° | 10075.0 | 10201.1 | 9875.6 | 9303.9 | 8738.3 | 8166.6 | 7627.4 | 7279.5 | 7004.9 | 6901.1 | 6888.9 |
| 20°   | 10333.4 | 10390.3 | 9832.9 | 9067.9 | 8335.5 | 7641.7 | 7074.1 | 6746.5 | 6600.0 | 6526.8 | 6518.6 |
| 22.5° | 10652.8 | 10591.8 | 9735.2 | 8748.5 | 7824.8 | 7035.4 | 6573.6 | 6421.0 | 6384.4 | 6368.1 | 6374.2 |
| 25°   | 10990.5 | 10803.3 | 9590.8 | 8331.4 | 7179.9 | 6429.1 | 6207.3 | 6250.1 | 6298.9 | 6292.8 | 6292.8 |
| 27.5° | 11362.8 | 11019.0 | 9369.0 | 7778.0 | 6465.7 | 5932.7 | 5959.1 | 6115.8 | 6189.0 | 6187.0 | 6185.0 |
| 30°   | 11841.0 | 11263.2 | 9086.2 | 7112.7 | 5798.4 | 5582.7 | 5743.5 | 5934.7 | 6034.4 | 6030.3 | 6032.4 |
| 32.5° | 12428.9 | 11531.7 | 8701.7 | 6370.1 | 5316.2 | 5324.4 | 5509.5 | 5698.7 | 5814.7 | 5804.5 | 5806.5 |
| 35°   | 13116.6 | 11832.8 | 8180.8 | 5637.7 | 4996.8 | 5118.9 | 5265.4 | 5397.6 | 5507.5 | 5493.2 | 5479.0 |
| 37.5° | 13865.3 | 12127.8 | 7489.1 | 4982.6 | 4736.4 | 4927.6 | 5049.7 | 5072.1 | 5122.9 | 5086.3 | 5059.9 |
| 40°   | 14577.4 | 12353.7 | 6598.0 | 4445.4 | 4473.9 | 4764.9 | 4844.2 | 4754.7 | 4663.1 | 4650.9 | 4614.3 |
| 42.5° | 15197.9 | 12428.9 | 5696.7 | 4016.2 | 4197.2 | 4594.0 | 4642.8 | 4455.6 | 4290.8 | 4213.5 | 4181.0 |
| 45°   | 15853.1 | 12455.4 | 4856.4 | 3656.0 | 3930.7 | 4441.4 | 4494.3 | 4244.0 | 4012.1 | 3845.3 | 3790.3 |
| 47.5° | 16709.6 | 12646.6 | 4203.3 | 3389.5 | 3727.3 | 4339.7 | 4414.9 | 4075.2 | 3774.1 | 3536.0 | 3485.1 |
| 50°   | 17830.6 | 13025.1 | 3672.3 | 3186.1 | 3595.0 | 4272.5 | 4358.0 | 3910.4 | 3578.7 | 3291.9 | 3241.0 |
| 52.5° | 19075.7 | 13373.0 | 3243.0 | 3021.3 | 3466.8 | 4154.5 | 4284.7 | 3792.4 | 3395.6 | 3066.0 | 3011.1 |
| 55°   | 19946.5 | 13106.4 | 2897.2 | 2850.4 | 3300.0 | 3985.6 | 4183.0 | 3692.7 | 3133.2 | 2846.3 | 2797.5 |
| 57.5° | 20113.4 | 12195.0 | 2634.7 | 2673.4 | 3098.6 | 3774.1 | 4026.3 | 3470.9 | 2990.8 | 2750.7 | 2699.8 |
| 60°   | 19657.6 | 10925.4 | 2439.4 | 2510.6 | 2882.9 | 3507.5 | 3733.4 | 3314.2 | 2854.4 | 2649.0 | 2606.2 |
| 62.5° | 18512.2 | 9625.4  | 2294.9 | 2364.1 | 2681.5 | 3236.9 | 3550.3 | 3149.5 | 2716.1 | 2533.0 | 2490.3 |
| 65°   | 16198.9 | 8081.1  | 2156.6 | 2233.9 | 2494.3 | 3003.0 | 3385.5 | 2996.9 | 2579.8 | 2439.4 | 2398.7 |
| 67.5° | 12227.5 | 6052.7  | 2026.4 | 2095.6 | 2327.5 | 2799.5 | 3206.4 | 2846.3 | 2447.5 | 2358.0 | 2309.2 |
| 70°   | 7200.2  | 3790.3  | 1877.9 | 1951.1 | 2152.5 | 2587.9 | 3015.2 | 2681.5 | 2282.7 | 2242.1 | 2179.0 |
| 72.5° | 3350.9  | 2280.7  | 1709.0 | 1780.2 | 1932.8 | 2305.1 | 2769.0 | 2465.8 | 2087.4 | 1997.9 | 1912.5 |
| 75°   | 1999.9  | 1668.3  | 1509.6 | 1572.7 | 1680.5 | 2004.0 | 2459.7 | 2246.1 | 1902.3 | 1784.3 | 1694.8 |
| 77.5° | 1495.4  | 1275.6  | 1289.9 | 1357.0 | 1444.5 | 1753.8 | 2179.0 | 2073.2 | 1759.9 | 1668.3 | 1607.3 |
| 80°   | 1076.3  | 968.4   | 1051.9 | 1125.1 | 1216.6 | 1595.1 | 2087.4 | 1916.5 | 1591.0 | 1468.9 | 1412.0 |
| 82.5° | 718.2   | 695.8   | 791.4  | 866.7  | 956.2  | 1395.7 | 1961.3 | 1678.5 | 1359.1 | 1204.4 | 1078.3 |
| 85°   | 396.7   | 419.1   | 533.0  | 565.6  | 642.9  | 982.7  | 1607.3 | 1348.9 | 1023.4 | 824.0  | 787.4  |
| 87.5° | 164.8   | 193.3   | 286.9  | 276.7  | 341.8  | 585.9  | 1058.0 | 813.8  | 651.0  | 486.3  | 378.4  |
| 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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LM-79-2008: Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Report Prepared for

Cooper Lighting Solutions

McGRAW-EDISON

Report Number: SP1-1908-441-1-R4

Test Date: 08/20/2019

Luminaire Tested: SA1C-727-U-5WQ

**Test Information**

Test Method: LM-79-2008  
 Report Number: SP1-1908-441-1-R4  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry: 4π  
 Issue Date: 10/28/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: McGRAW-EDISON  
 Catalog Number: **SA1C-727-U-5WQ**  
 Description: McGRAW EDISON ROADWAY AND AREA LUMINAIRE

\*\*\*THIS IS A REVISION OF SP1-1908-441-1-R3. TO UPDATE THE CATALOG NUMBER.\*\*\*TESTED IN  
 SITU. (1) 70 CRI, 2700K, 1050MA LIGHTSQUARE WITH 16 LEDS AND TYPE V WIDE OPTICS.

**Spectral Parameters**

CCT (K): 2741  
 CIE u': 0.2605  
 CIE v': 0.5272  
 Duv: 0.0005  
 CIE x: 0.4573  
 CIE y: 0.4113  
 CIE z: 0.1313  
 Peak Wavelength (nm): 602  
 Dominant Wavelength (nm): 583  
 Purity: 61.2

|           |      |      |       |
|-----------|------|------|-------|
| CRI (Ra): | 71.5 |      |       |
| R1:       | 69.2 | R9:  | -16.1 |
| R2:       | 79.4 | R10: | 51.4  |
| R3:       | 87.8 | R11: | 63.1  |
| R4:       | 69.4 | R12: | 42.0  |
| R5:       | 66.4 | R13: | 70.2  |
| R6:       | 69.8 | R14: | 92.4  |
| R7:       | 79.8 |      |       |
| R8:       | 50.1 |      |       |

Rf: 69.9  
 Rg: 98.3



**Test Conditions**

Stabilization Time: 56M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.3./42%  
 Sphere Temperature (°C): 25.7

REPORT NUMBER: SP1-1908-441-1-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 2700K 4-step quadrangle

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**Photopic Flux vs. Wavelength**



**Photopic Lumens: 6211.7**

| $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) |
|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|
| 360            | 2044                              | 0.0                         | 490            | 7179                              | 1.0                         | 620            | 118034                            | 30.7                        | 750            | 8362                              | 0.0                         | 880            | 3128                              | 0.0                         |
| 365            | 2016                              | 0.0                         | 495            | 10476                             | 1.9                         | 625            | 111884                            | 24.7                        | 755            | 7635                              | 0.0                         | 885            | 3110                              | 0.0                         |
| 370            | 2020                              | 0.0                         | 500            | 15549                             | 3.4                         | 630            | 106119                            | 19.2                        | 760            | 6582                              | 0.0                         | 890            | 2632                              | 0.0                         |
| 375            | 2137                              | 0.0                         | 505            | 22477                             | 6.3                         | 635            | 99706                             | 15.0                        | 765            | 5777                              | 0.0                         | 895            | 2709                              | 0.0                         |
| 380            | 2046                              | 0.0                         | 510            | 30417                             | 10.4                        | 640            | 92142                             | 11.0                        | 770            | 5474                              | 0.0                         | 900            | 2016                              | 0.0                         |
| 385            | 1925                              | 0.0                         | 515            | 39274                             | 16.3                        | 645            | 84987                             | 8.2                         | 775            | 4977                              | 0.0                         | 905            | 1748                              | 0.0                         |
| 390            | 1893                              | 0.0                         | 520            | 47282                             | 22.9                        | 650            | 78016                             | 5.7                         | 780            | 4723                              | 0.0                         | 910            | 2046                              | 0.0                         |
| 395            | 1695                              | 0.0                         | 525            | 55413                             | 29.7                        | 655            | 71541                             | 4.1                         | 785            | 4219                              | 0.0                         | 915            | 1844                              | 0.0                         |
| 400            | 1633                              | 0.0                         | 530            | 62377                             | 36.7                        | 660            | 64863                             | 2.7                         | 790            | 3969                              | 0.0                         | 920            | 2734                              | 0.0                         |
| 405            | 2065                              | 0.0                         | 535            | 68520                             | 42.5                        | 665            | 58485                             | 1.9                         | 795            | 4122                              | 0.0                         | 925            | 2307                              | 0.0                         |
| 410            | 3449                              | 0.0                         | 540            | 73435                             | 47.8                        | 670            | 51641                             | 1.1                         | 800            | 2864                              | 0.0                         | 930            | 2039                              | 0.0                         |
| 415            | 7117                              | 0.0                         | 545            | 78677                             | 52.4                        | 675            | 46030                             | 0.8                         | 805            | 3151                              | 0.0                         | 935            | 1784                              | 0.0                         |
| 420            | 13992                             | 0.0                         | 550            | 83331                             | 56.6                        | 680            | 40590                             | 0.5                         | 810            | 3022                              | 0.0                         | 940            | 2464                              | 0.0                         |
| 425            | 25176                             | 0.1                         | 555            | 89120                             | 60.9                        | 685            | 35691                             | 0.3                         | 815            | 3471                              | 0.0                         | 945            | 2794                              | 0.0                         |
| 430            | 38151                             | 0.3                         | 560            | 94613                             | 64.3                        | 690            | 31631                             | 0.2                         | 820            | 2749                              | 0.0                         | 950            | 3090                              | 0.0                         |
| 435            | 49673                             | 0.6                         | 565            | 99818                             | 66.4                        | 695            | 27437                             | 0.1                         | 825            | 2729                              | 0.0                         | 955            | 1866                              | 0.0                         |
| 440            | 57273                             | 0.9                         | 570            | 106526                            | 69.3                        | 700            | 24589                             | 0.1                         | 830            | 2282                              | 0.0                         | 960            | 3110                              | 0.0                         |
| 445            | 54802                             | 1.1                         | 575            | 111610                            | 69.4                        | 705            | 21832                             | 0.0                         | 835            | 3140                              | 0.0                         | 965            | 3880                              | 0.0                         |
| 450            | 39184                             | 1.0                         | 580            | 117163                            | 69.6                        | 710            | 19500                             | 0.0                         | 840            | 2365                              | 0.0                         | 970            | 3243                              | 0.0                         |
| 455            | 22506                             | 0.8                         | 585            | 122201                            | 67.9                        | 715            | 17870                             | 0.0                         | 845            | 3024                              | 0.0                         | 975            | 2014                              | 0.0                         |
| 460            | 13692                             | 0.6                         | 590            | 125662                            | 65.0                        | 720            | 15924                             | 0.0                         | 850            | 2510                              | 0.0                         | 980            | 1688                              | 0.0                         |
| 465            | 9446                              | 0.5                         | 595            | 127415                            | 60.4                        | 725            | 14268                             | 0.0                         | 855            | 2739                              | 0.0                         | 985            | 2827                              | 0.0                         |
| 470            | 6698                              | 0.4                         | 600            | 129155                            | 55.7                        | 730            | 12438                             | 0.0                         | 860            | 3515                              | 0.0                         | 990            | 4172                              | 0.0                         |
| 475            | 5328                              | 0.4                         | 605            | 128057                            | 49.6                        | 735            | 11255                             | 0.0                         | 865            | 3600                              | 0.0                         | 995            | 3177                              | 0.0                         |
| 480            | 5081                              | 0.5                         | 610            | 126031                            | 43.3                        | 740            | 9951                              | 0.0                         | 870            | 3609                              | 0.0                         | 1000           | 3241                              | 0.0                         |
| 485            | 5579                              | 0.7                         | 615            | 123059                            | 37.1                        | 745            | 8870                              | 0.0                         | 875            | 3208                              | 0.0                         |                |                                   |                             |

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Scotopic Flux vs. Wavelength



Scotopic Lumens: 6474.3 S/P: 1.04

| 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    | 2044          | 0.0           | 490    | 7179          | 6.0           | 620    | 118034        | 0.1           | 750    | 8362          | 0.0           | 880    | 3128          | 0.0           |
| 365    | 2016          | 0.0           | 495    | 10476         | 8.6           | 625    | 111884        | 0.1           | 755    | 7635          | 0.0           | 885    | 3110          | 0.0           |
| 370    | 2020          | 0.0           | 500    | 15549         | 12.5          | 630    | 106119        | 0.0           | 760    | 6582          | 0.0           | 890    | 2632          | 0.0           |
| 375    | 2137          | 0.0           | 505    | 22477         | 17.3          | 635    | 99706         | 0.0           | 765    | 5777          | 0.0           | 895    | 2709          | 0.0           |
| 380    | 2046          | 0.0           | 510    | 30417         | 21.8          | 640    | 92142         | 0.0           | 770    | 5474          | 0.0           | 900    | 2016          | 0.0           |
| 385    | 1925          | 0.0           | 515    | 39274         | 25.7          | 645    | 84987         | 0.0           | 775    | 4977          | 0.0           | 905    | 1748          | 0.0           |
| 390    | 1893          | 0.0           | 520    | 47282         | 27.5          | 650    | 78016         | 0.0           | 780    | 4723          | 0.0           | 910    | 2046          | 0.0           |
| 395    | 1695          | 0.0           | 525    | 55413         | 28.1          | 655    | 71541         | 0.0           | 785    | 4219          | 0.0           | 915    | 1844          | 0.0           |
| 400    | 1633          | 0.0           | 530    | 62377         | 27.0          | 660    | 64863         | 0.0           | 790    | 3969          | 0.0           | 920    | 2734          | 0.0           |
| 405    | 2065          | 0.0           | 535    | 68520         | 24.7          | 665    | 58485         | 0.0           | 795    | 4122          | 0.0           | 925    | 2307          | 0.0           |
| 410    | 3449          | 0.1           | 540    | 73435         | 21.5          | 670    | 51641         | 0.0           | 800    | 2864          | 0.0           | 930    | 2039          | 0.0           |
| 415    | 7117          | 0.5           | 545    | 78677         | 18.3          | 675    | 46030         | 0.0           | 805    | 3151          | 0.0           | 935    | 1784          | 0.0           |
| 420    | 13992         | 1.6           | 550    | 83331         | 15.0          | 680    | 40590         | 0.0           | 810    | 3022          | 0.0           | 940    | 2464          | 0.0           |
| 425    | 25176         | 3.9           | 555    | 89120         | 12.0          | 685    | 35691         | 0.0           | 815    | 3471          | 0.0           | 945    | 2794          | 0.0           |
| 430    | 38151         | 8.1           | 560    | 94613         | 9.3           | 690    | 31631         | 0.0           | 820    | 2749          | 0.0           | 950    | 3090          | 0.0           |
| 435    | 49673         | 13.3          | 565    | 99818         | 7.0           | 695    | 27437         | 0.0           | 825    | 2729          | 0.0           | 955    | 1866          | 0.0           |
| 440    | 57273         | 19.1          | 570    | 106526        | 5.2           | 700    | 24589         | 0.0           | 830    | 2282          | 0.0           | 960    | 3110          | 0.0           |
| 445    | 54802         | 21.6          | 575    | 111610        | 3.7           | 705    | 21832         | 0.0           | 835    | 3140          | 0.0           | 965    | 3880          | 0.0           |
| 450    | 39184         | 18.1          | 580    | 117163        | 2.6           | 710    | 19500         | 0.0           | 840    | 2365          | 0.0           | 970    | 3243          | 0.0           |
| 455    | 22506         | 11.8          | 585    | 122201        | 1.8           | 715    | 17870         | 0.0           | 845    | 3024          | 0.0           | 975    | 2014          | 0.0           |
| 460    | 13692         | 8.1           | 590    | 125662        | 1.2           | 720    | 15924         | 0.0           | 850    | 2510          | 0.0           | 980    | 1688          | 0.0           |
| 465    | 9446          | 6.2           | 595    | 127415        | 0.8           | 725    | 14268         | 0.0           | 855    | 2739          | 0.0           | 985    | 2827          | 0.0           |
| 470    | 6698          | 4.8           | 600    | 129155        | 0.5           | 730    | 12438         | 0.0           | 860    | 3515          | 0.0           | 990    | 4172          | 0.0           |
| 475    | 5328          | 4.1           | 605    | 128057        | 0.4           | 735    | 11255         | 0.0           | 865    | 3600          | 0.0           | 995    | 3177          | 0.0           |
| 480    | 5081          | 4.1           | 610    | 126031        | 0.2           | 740    | 9951          | 0.0           | 870    | 3609          | 0.0           | 1000   | 3241          | 0.0           |
| 485    | 5579          | 4.6           | 615    | 123059        | 0.1           | 745    | 8870          | 0.0           | 875    | 3208          | 0.0           |        |               |               |

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**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 2145.7 M/P: 0.35**

| $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) |
|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|
| 360            | 2044                              | 0.0                         | 490            | 7179                              | 11.1                        | 620            | 118034                            | 1.5                         | 750            | 8362                              | 0.0                         | 880            | 3128                              | 0.0                         |
| 365            | 2016                              | 0.0                         | 495            | 10476                             | 16.9                        | 625            | 111884                            | 0.9                         | 755            | 7635                              | 0.0                         | 885            | 3110                              | 0.0                         |
| 370            | 2020                              | 0.0                         | 500            | 15549                             | 26.0                        | 630            | 106119                            | 0.6                         | 760            | 6582                              | 0.0                         | 890            | 2632                              | 0.0                         |
| 375            | 2137                              | 0.0                         | 505            | 22477                             | 38.2                        | 635            | 99706                             | 0.4                         | 765            | 5777                              | 0.0                         | 895            | 2709                              | 0.0                         |
| 380            | 2046                              | 0.0                         | 510            | 30417                             | 51.6                        | 640            | 92142                             | 0.2                         | 770            | 5474                              | 0.0                         | 900            | 2016                              | 0.0                         |
| 385            | 1925                              | 0.0                         | 515            | 39274                             | 65.1                        | 645            | 84987                             | 0.1                         | 775            | 4977                              | 0.0                         | 905            | 1748                              | 0.0                         |
| 390            | 1893                              | 0.0                         | 520            | 47282                             | 75.2                        | 650            | 78016                             | 0.1                         | 780            | 4723                              | 0.0                         | 910            | 2046                              | 0.0                         |
| 395            | 1695                              | 0.0                         | 525            | 55413                             | 82.9                        | 655            | 71541                             | 0.1                         | 785            | 4219                              | 0.0                         | 915            | 1844                              | 0.0                         |
| 400            | 1633                              | 0.0                         | 530            | 62377                             | 86.0                        | 660            | 64863                             | 0.0                         | 790            | 3969                              | 0.0                         | 920            | 2734                              | 0.0                         |
| 405            | 2065                              | 0.1                         | 535            | 68520                             | 85.4                        | 665            | 58485                             | 0.0                         | 795            | 4122                              | 0.0                         | 925            | 2307                              | 0.0                         |
| 410            | 3449                              | 0.2                         | 540            | 73435                             | 81.1                        | 670            | 51641                             | 0.0                         | 800            | 2864                              | 0.0                         | 930            | 2039                              | 0.0                         |
| 415            | 7117                              | 0.7                         | 545            | 78677                             | 75.4                        | 675            | 46030                             | 0.0                         | 805            | 3151                              | 0.0                         | 935            | 1784                              | 0.0                         |
| 420            | 13992                             | 2.3                         | 550            | 83331                             | 68.1                        | 680            | 40590                             | 0.0                         | 810            | 3022                              | 0.0                         | 940            | 2464                              | 0.0                         |
| 425            | 25176                             | 6.2                         | 555            | 89120                             | 60.9                        | 685            | 35691                             | 0.0                         | 815            | 3471                              | 0.0                         | 945            | 2794                              | 0.0                         |
| 430            | 38151                             | 13.0                        | 560            | 94613                             | 52.9                        | 690            | 31631                             | 0.0                         | 820            | 2749                              | 0.0                         | 950            | 3090                              | 0.0                         |
| 435            | 49673                             | 22.2                        | 565            | 99818                             | 44.8                        | 695            | 27437                             | 0.0                         | 825            | 2729                              | 0.0                         | 955            | 1866                              | 0.0                         |
| 440            | 57273                             | 32.0                        | 570            | 106526                            | 37.6                        | 700            | 24589                             | 0.0                         | 830            | 2282                              | 0.0                         | 960            | 3110                              | 0.0                         |
| 445            | 54802                             | 36.7                        | 575            | 111610                            | 30.4                        | 705            | 21832                             | 0.0                         | 835            | 3140                              | 0.0                         | 965            | 3880                              | 0.0                         |
| 450            | 39184                             | 30.4                        | 580            | 117163                            | 24.1                        | 710            | 19500                             | 0.0                         | 840            | 2365                              | 0.0                         | 970            | 3243                              | 0.0                         |
| 455            | 22506                             | 19.7                        | 585            | 122201                            | 18.7                        | 715            | 17870                             | 0.0                         | 845            | 3024                              | 0.0                         | 975            | 2014                              | 0.0                         |
| 460            | 13692                             | 13.2                        | 590            | 125662                            | 14.0                        | 720            | 15924                             | 0.0                         | 850            | 2510                              | 0.0                         | 980            | 1688                              | 0.0                         |
| 465            | 9446                              | 10.0                        | 595            | 127415                            | 10.2                        | 725            | 14268                             | 0.0                         | 855            | 2739                              | 0.0                         | 985            | 2827                              | 0.0                         |
| 470            | 6698                              | 7.7                         | 600            | 129155                            | 7.3                         | 730            | 12438                             | 0.0                         | 860            | 3515                              | 0.0                         | 990            | 4172                              | 0.0                         |
| 475            | 5328                              | 6.7                         | 605            | 128057                            | 5.0                         | 735            | 11255                             | 0.0                         | 865            | 3600                              | 0.0                         | 995            | 3177                              | 0.0                         |
| 480            | 5081                              | 6.9                         | 610            | 126031                            | 3.4                         | 740            | 9951                              | 0.0                         | 870            | 3609                              | 0.0                         | 1000           | 3241                              | 0.0                         |
| 485            | 5579                              | 8.1                         | 615            | 123059                            | 2.3                         | 745            | 8870                              | 0.0                         | 875            | 3208                              | 0.0                         |                |                                   |                             |

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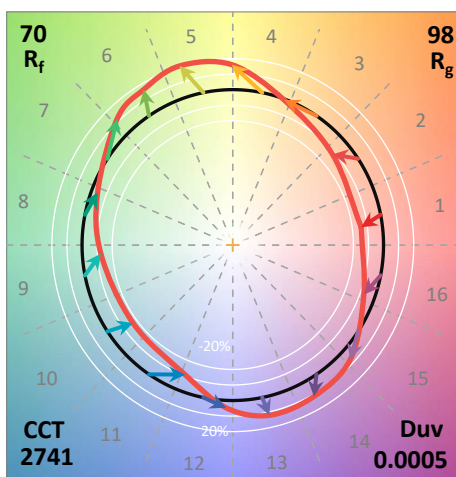
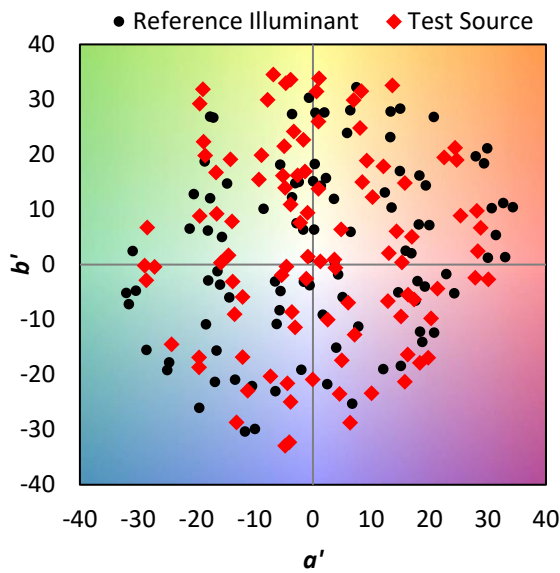
TM-30-18

**Summary**

$R_f = 69.9$   
 $R_g = 98.3$   
 CIE  $R_a = 71.5$   
 $R_9 = -16.1$



**Color Vector Graphics**





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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 54 | CES51 = 77 | CES76 = 48 |
| CES02 = 63 | CES27 = 74 | CES52 = 80 | CES77 = 75 |
| CES03 = 31 | CES28 = 80 | CES53 = 66 | CES78 = 56 |
| CES04 = 71 | CES29 = 44 | CES54 = 77 | CES79 = 81 |
| CES05 = 50 | CES30 = 46 | CES55 = 74 | CES80 = 80 |
| CES06 = 52 | CES31 = 50 | CES56 = 63 | CES81 = 73 |
| CES07 = 42 | CES32 = 49 | CES57 = 60 | CES82 = 91 |
| CES08 = 41 | CES33 = 53 | CES58 = 63 | CES83 = 84 |
| CES09 = 29 | CES34 = 66 | CES59 = 85 | CES84 = 90 |
| CES10 = 77 | CES35 = 82 | CES60 = 89 | CES85 = 87 |
| CES11 = 60 | CES36 = 78 | CES61 = 85 | CES86 = 65 |
| CES12 = 66 | CES37 = 75 | CES62 = 69 | CES87 = 78 |
| CES13 = 43 | CES38 = 53 | CES63 = 68 | CES88 = 73 |
| CES14 = 74 | CES39 = 91 | CES64 = 68 | CES89 = 68 |
| CES15 = 71 | CES40 = 85 | CES65 = 65 | CES90 = 68 |
| CES16 = 48 | CES41 = 76 | CES66 = 62 | CES91 = 91 |
| CES17 = 50 | CES42 = 76 | CES67 = 60 | CES92 = 71 |
| CES18 = 57 | CES43 = 65 | CES68 = 68 | CES93 = 82 |
| CES19 = 73 | CES44 = 98 | CES69 = 77 | CES94 = 57 |
| CES20 = 67 | CES45 = 75 | CES70 = 60 | CES95 = 78 |
| CES21 = 88 | CES46 = 70 | CES71 = 57 | CES96 = 80 |
| CES22 = 80 | CES47 = 63 | CES72 = 86 | CES97 = 79 |
| CES23 = 92 | CES48 = 51 | CES73 = 52 | CES98 = 71 |
| CES24 = 91 | CES49 = 68 | CES74 = 90 | CES99 = 64 |
| CES25 = 73 | CES50 = 77 | CES75 = 58 |            |



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Color Rendition by Hue-Angle Bin



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Measure Comparisons



(END OF REPORT)