

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: P322403

Luminaire Tested: **GLEON-SA9B-830-U-T3-HSS**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P322403  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-15)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA9B-830-U-T3-HSS  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(9) 80 CRI, 3000K, 800mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III  
OPTICS WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 29585 lumens  
Efficiency: N/A  
Efficacy: 79.1 lumens/watt  
Luminous Opening: Rectangular (W 2.5' x L: 1' x H: 0')  
IES Classification: Type III - Short  
BUG Rating: B3 - U0 - G4

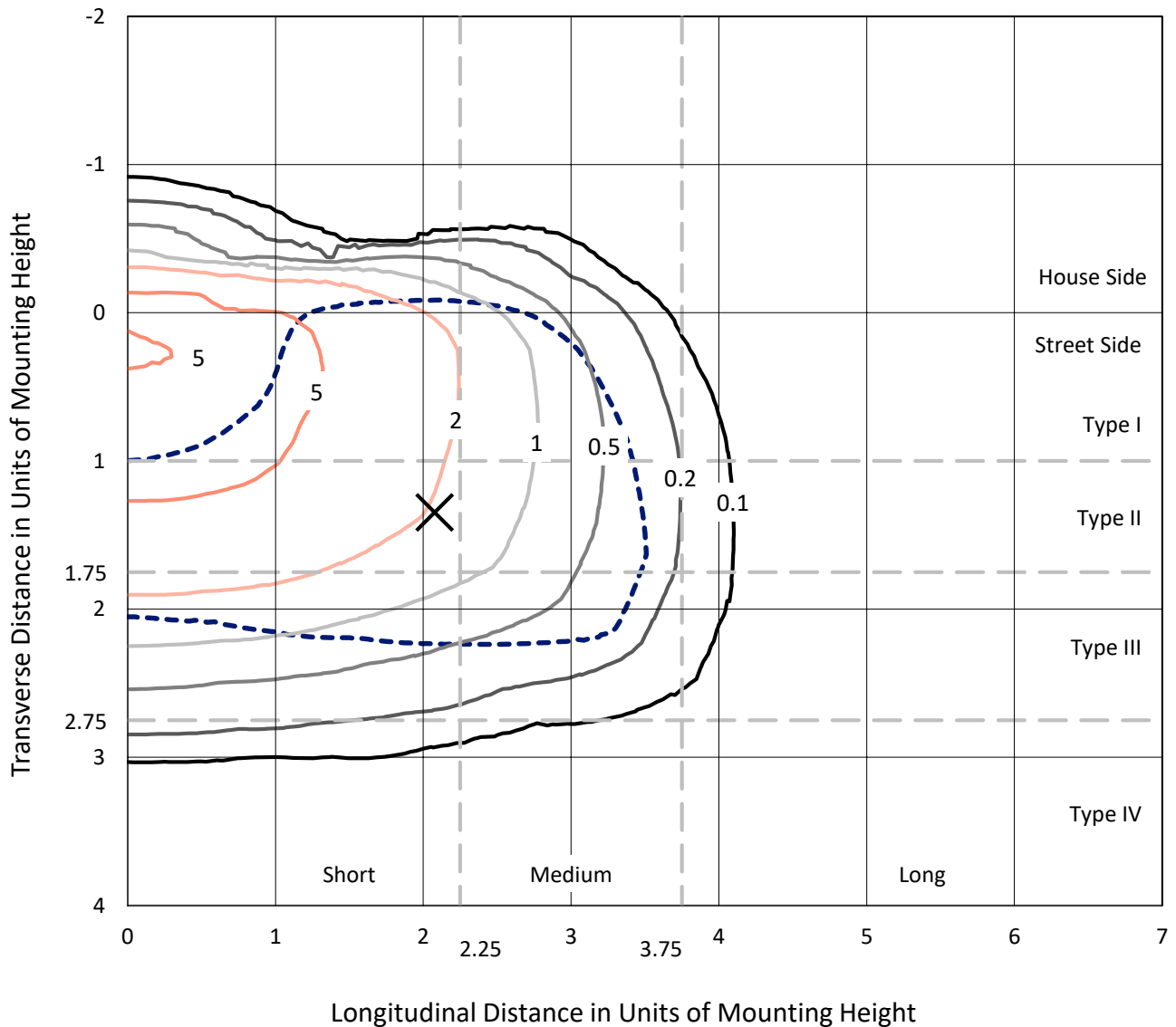
Input Watts (W): 374  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



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### Iso-Footcandle Lines of Horizontal Illumination

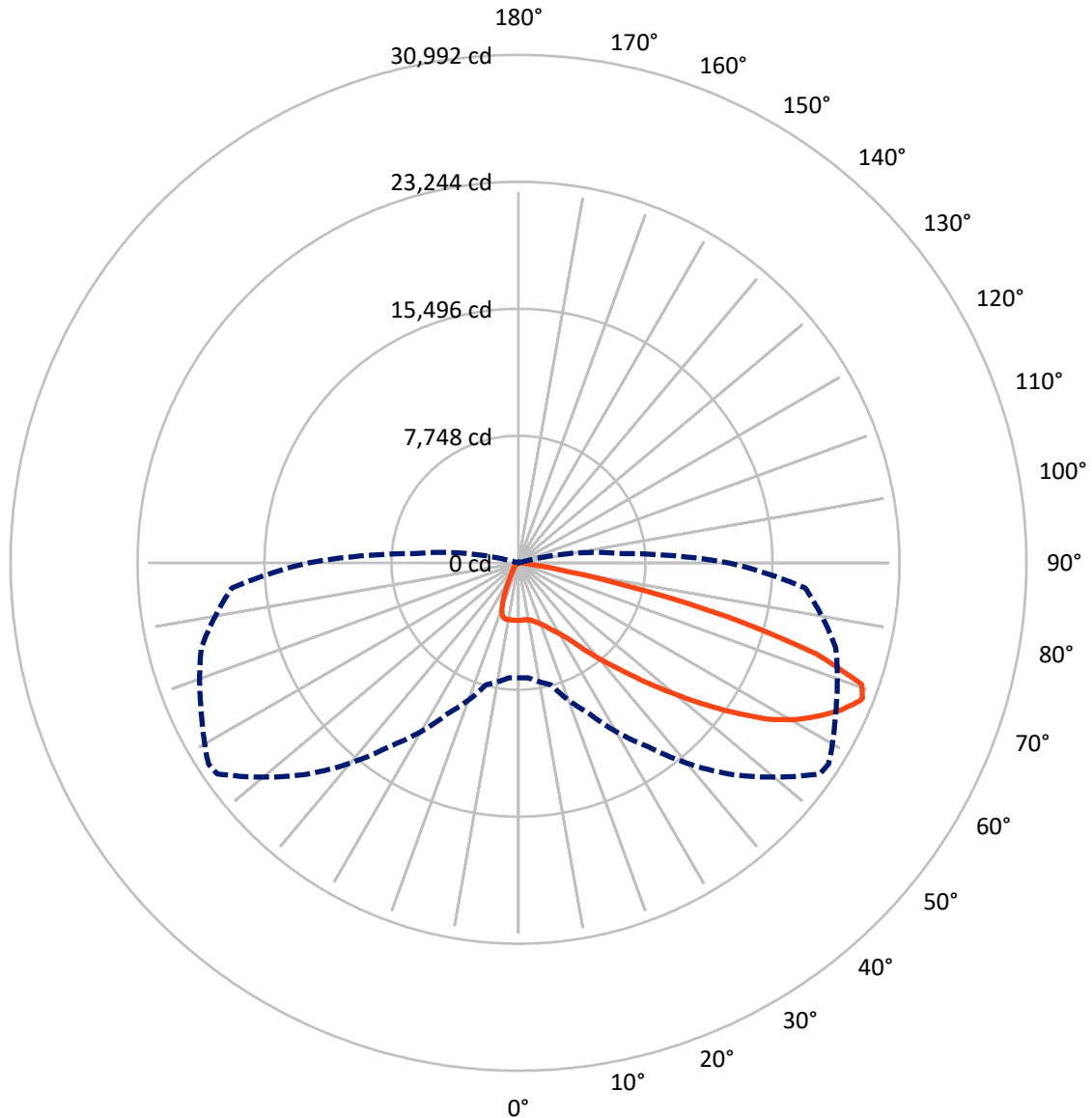
✕ Max cd  
 - - - 1/2 Max cd



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

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### Luminous Intensity Polar Plot



— Vertical Plane Through 57-Deg Lateral      - - - Horizontal Cone Through 68-Deg Vertical

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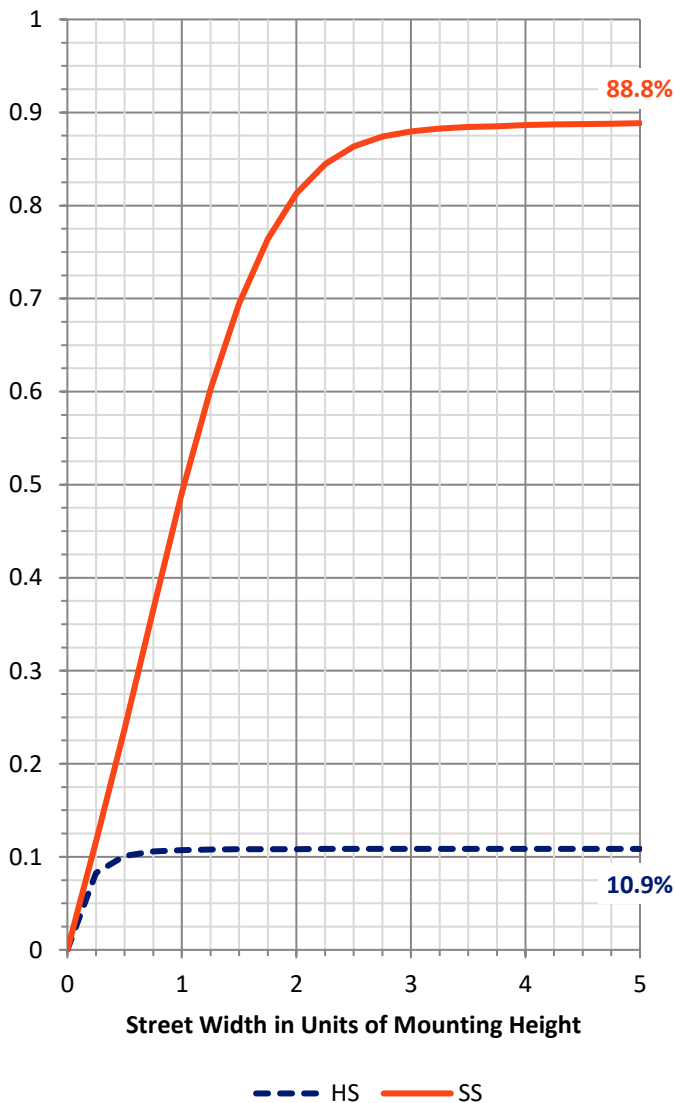
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 3244.2   | 0.0    | 3244.2  |
|                    | % Fixture | 11.0     | 0.0    | 11.0    |
| <b>Street Side</b> | Lumens    | 26340.8  | 0.0    | 26340.8 |
|                    | % Fixture | 89.0     | 0.0    | 89.0    |
| <b>Total</b>       | Lumens    | 29585.0  | 0.0    | 29585.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 329.0   | 1.1       |
| 10°-20°   | 911.7   | 3.1       |
| 20°-30°   | 1572.7  | 5.3       |
| 30°-40°   | 2714.4  | 9.2       |
| 40°-50°   | 4643.1  | 15.7      |
| 50°-60°   | 7428.6  | 25.1      |
| 60°-70°   | 8582.9  | 29.0      |
| 70°-80°   | 3279.6  | 11.1      |
| 80°-90°   | 122.9   | 0.4       |
| 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°    | 29585.0 | 100.0     |
| 0°-180°   | 29585.0 | 100.0     |

**Coefficient of Utilization**

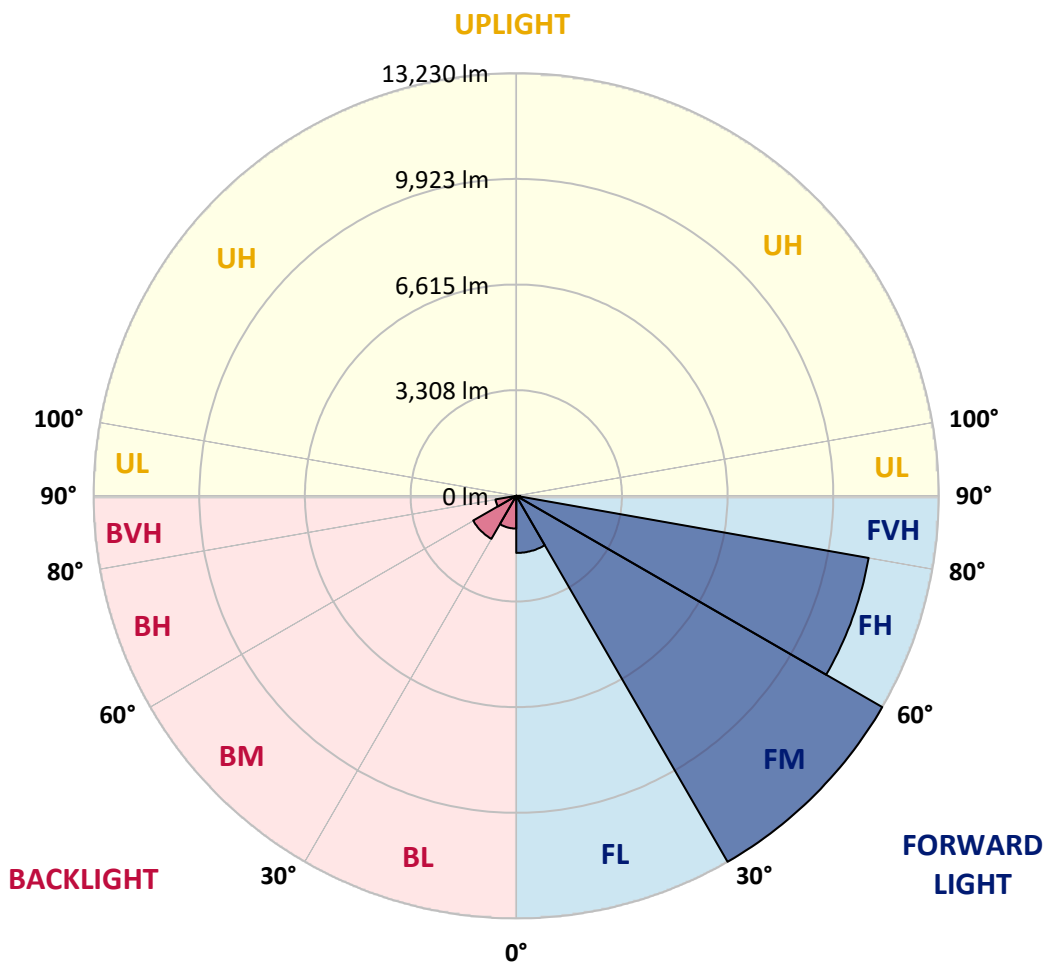


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**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone           | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |          |
|----------------|---------|-----------|-------------------------|------|----------|
|                |         |           | B                       | U    | G        |
| FL (0°-30°)    | 1788.1  | 6.0       |                         |      |          |
| FM (30°-60°)   | 13230.2 | 44.7      |                         |      |          |
| FH (60°-80°)   | 11201.8 | 37.9      |                         |      | G4/12000 |
| FVH (80°-90°)  | 120.7   | 0.4       |                         |      | G2/225   |
| BL (0°-30°)    | 1025.3  | 3.5       | B3/2500                 |      |          |
| BM (30°-60°)   | 1556.0  | 5.3       | B2/2500                 |      |          |
| BH (60°-80°)   | 660.7   | 2.2       | B2/1000                 |      | G2/1000  |
| BVH (80°-90°)  | 2.2     | 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-G4**  
 Type III Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 35°     | 45°     | 55°     | 57°     | 65°     | 75°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 3515.5  | 3515.5  | 3515.5  | 3515.5  | 3515.5  | 3515.5  | 3515.5  | 3515.5  | 3515.5  | 3515.5  | 3515.5  |
| 2.5°  | 3432.9  | 3448.3  | 3459.5  | 3466.5  | 3474.9  | 3493.1  | 3498.7  | 3507.1  | 3511.3  | 3511.3  | 3521.1  |
| 5°    | 3297.2  | 3314.0  | 3337.8  | 3357.4  | 3396.6  | 3446.9  | 3483.3  | 3497.3  | 3522.5  | 3544.9  | 3557.4  |
| 7.5°  | 3171.3  | 3190.9  | 3218.9  | 3265.1  | 3332.2  | 3413.4  | 3488.9  | 3508.5  | 3557.4  | 3605.0  | 3628.8  |
| 10°   | 3090.2  | 3105.6  | 3142.0  | 3207.7  | 3295.8  | 3409.2  | 3515.5  | 3539.3  | 3623.2  | 3702.9  | 3747.7  |
| 12.5° | 3062.2  | 3076.2  | 3114.0  | 3188.1  | 3297.2  | 3430.1  | 3577.0  | 3612.0  | 3735.1  | 3851.2  | 3914.2  |
| 15°   | 3102.8  | 3105.6  | 3146.2  | 3216.1  | 3323.8  | 3481.9  | 3679.2  | 3721.1  | 3876.4  | 4027.5  | 4105.8  |
| 17.5° | 3259.5  | 3246.9  | 3267.9  | 3298.6  | 3384.0  | 3550.5  | 3786.9  | 3849.8  | 4056.9  | 4234.5  | 4308.7  |
| 20°   | 3651.2  | 3651.2  | 3603.6  | 3519.7  | 3521.1  | 3656.8  | 3932.4  | 4003.7  | 4256.9  | 4462.5  | 4529.7  |
| 22.5° | 4321.3  | 4308.7  | 4213.5  | 4007.9  | 3819.0  | 3840.0  | 4110.0  | 4202.3  | 4497.5  | 4717.1  | 4739.5  |
| 25°   | 5127.0  | 5111.6  | 4964.8  | 4675.2  | 4347.8  | 4136.6  | 4350.6  | 4456.9  | 4784.3  | 4978.7  | 4932.6  |
| 27.5° | 5980.4  | 5967.8  | 5822.3  | 5462.8  | 4996.9  | 4609.4  | 4637.4  | 4738.1  | 5076.7  | 5268.3  | 5121.4  |
| 30°   | 6807.1  | 6811.3  | 6667.2  | 6297.9  | 5770.5  | 5212.4  | 5001.1  | 5059.9  | 5360.6  | 5555.1  | 5345.3  |
| 32.5° | 7593.3  | 7598.9  | 7474.4  | 7061.7  | 6569.3  | 5913.2  | 5504.7  | 5489.3  | 5690.8  | 5882.4  | 5641.8  |
| 35°   | 8294.2  | 8308.2  | 8222.8  | 7902.5  | 7380.7  | 6693.8  | 6158.0  | 6121.7  | 6159.4  | 6376.3  | 6096.5  |
| 37.5° | 8969.9  | 8978.2  | 8913.9  | 8643.9  | 8207.4  | 7551.4  | 6983.4  | 6931.6  | 6850.5  | 7017.0  | 6696.6  |
| 40°   | 9709.9  | 9688.9  | 9614.8  | 9369.9  | 8995.0  | 8498.4  | 7870.3  | 7780.8  | 7639.5  | 7787.8  | 7485.6  |
| 42.5° | 10398.1 | 10374.4 | 10387.0 | 10110.0 | 9793.8  | 9472.1  | 8904.1  | 8750.2  | 8667.7  | 8838.4  | 8453.7  |
| 45°   | 11258.5 | 11245.9 | 11287.9 | 11047.2 | 10791.2 | 10557.6 | 10089.0 | 9921.1  | 9884.7  | 10084.8 | 9624.5  |
| 47.5° | 12107.6 | 12138.4 | 12268.5 | 12166.4 | 12062.9 | 11857.2 | 11343.8 | 11268.3 | 11290.7 | 11532.7 | 10859.8 |
| 50°   | 12815.5 | 12851.8 | 13208.6 | 13326.1 | 13475.8 | 13355.5 | 12840.7 | 12794.5 | 12882.6 | 13100.9 | 12188.8 |
| 52.5° | 13327.5 | 13401.6 | 13845.1 | 14386.5 | 14932.0 | 15013.2 | 14499.8 | 14457.8 | 14576.7 | 14610.3 | 13215.6 |
| 55°   | 13682.8 | 13748.6 | 14250.8 | 15241.2 | 16351.9 | 16701.7 | 16382.7 | 16220.4 | 16198.1 | 15866.5 | 14295.5 |
| 57.5° | 13745.8 | 13738.8 | 14460.6 | 15793.8 | 17465.5 | 18367.8 | 18166.3 | 18006.9 | 17548.0 | 17027.6 | 15533.6 |
| 60°   | 13390.4 | 13431.0 | 14269.0 | 15985.4 | 18164.9 | 19628.2 | 19643.6 | 19436.6 | 18721.7 | 18156.5 | 16733.8 |
| 62.5° | 12296.5 | 12461.6 | 13307.9 | 15483.2 | 18156.5 | 20136.0 | 20726.4 | 20568.3 | 19713.5 | 19081.2 | 17950.9 |
| 65°   | 10522.7 | 10581.4 | 11388.6 | 13762.5 | 16929.7 | 19923.4 | 21701.4 | 21642.6 | 20607.4 | 19979.3 | 18576.2 |
| 67.5° | 7684.3  | 7556.9  | 8404.7  | 10837.4 | 14333.3 | 18683.9 | 22400.9 | 22475.0 | 21297.1 | 20164.0 | 17910.3 |
| 68°   | 7012.8  | 7050.5  | 7710.8  | 10114.2 | 13653.4 | 18246.1 | 22447.0 | 22560.3 | 21365.7 | 20043.7 | 17546.6 |
| 70°   | 4180.0  | 4252.7  | 4841.7  | 6963.8  | 10387.0 | 15768.6 | 21949.0 | 22207.8 | 20957.2 | 18802.8 | 15176.8 |
| 72.5° | 1067.4  | 1154.1  | 1710.9  | 3116.8  | 5932.8  | 11110.2 | 18528.7 | 18966.5 | 18195.7 | 15253.8 | 10245.7 |
| 75°   | 439.3   | 461.6   | 611.3   | 1026.8  | 2210.3  | 5005.3  | 12212.5 | 13149.8 | 12614.0 | 9132.1  | 4630.4  |
| 77.5° | 303.6   | 319.0   | 393.1   | 569.4   | 956.9   | 1696.9  | 5987.4  | 6664.4  | 6004.2  | 3116.8  | 1010.0  |
| 80°   | 218.2   | 230.8   | 281.2   | 379.1   | 549.8   | 605.7   | 1951.5  | 2256.5  | 1792.0  | 684.1   | 250.4   |
| 82.5° | 130.1   | 139.9   | 209.8   | 270.0   | 334.3   | 289.6   | 485.4   | 551.2   | 519.0   | 339.9   | 111.9   |
| 85°   | 64.4    | 75.5    | 141.3   | 193.1   | 180.5   | 121.7   | 148.3   | 165.1   | 204.2   | 207.0   | 60.2    |
| 87.5° | 4.2     | 8.4     | 82.5    | 116.1   | 50.4    | 28.0    | 43.4    | 53.2    | 72.7    | 102.1   | 25.2    |
| 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: P322403

CATALOG NUMBER: GLEON-SA9B-830-U-T3-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 3515.5  | 3515.5 | 3515.5 | 3515.5 | 3515.5 | 3515.5 | 3515.5 | 3515.5 | 3515.5 | 3515.5 | 3515.5 |
| 2.5°  | 3525.3  | 3526.7 | 3516.9 | 3512.7 | 3515.5 | 3498.7 | 3491.7 | 3494.5 | 3494.5 | 3498.7 | 3491.7 |
| 5°    | 3560.2  | 3560.2 | 3543.5 | 3521.1 | 3508.5 | 3476.3 | 3455.3 | 3449.7 | 3445.5 | 3442.7 | 3437.1 |
| 7.5°  | 3635.8  | 3627.4 | 3598.0 | 3549.1 | 3507.1 | 3437.1 | 3384.0 | 3356.0 | 3342.0 | 3336.4 | 3332.2 |
| 10°   | 3757.5  | 3742.1 | 3693.1 | 3602.2 | 3505.7 | 3381.2 | 3265.1 | 3182.5 | 3114.0 | 3086.0 | 3069.2 |
| 12.5° | 3921.2  | 3898.8 | 3816.2 | 3665.2 | 3495.9 | 3266.5 | 3014.7 | 2772.7 | 2547.4 | 2455.1 | 2408.9 |
| 15°   | 4110.0  | 4077.8 | 3947.7 | 3718.3 | 3438.5 | 3007.7 | 2460.7 | 2036.8 | 1724.9 | 1607.4 | 1557.0 |
| 17.5° | 4301.7  | 4259.7 | 4062.5 | 3751.9 | 3266.5 | 2471.9 | 1726.3 | 1303.8 | 1095.4 | 1039.4 | 1019.8 |
| 20°   | 4494.7  | 4433.2 | 4161.8 | 3726.7 | 2877.6 | 1782.2 | 1138.7 | 952.7  | 892.5  | 875.7  | 870.1  |
| 22.5° | 4678.0  | 4582.9 | 4251.3 | 3628.8 | 2278.8 | 1196.1 | 900.9  | 842.1  | 822.6  | 812.8  | 810.0  |
| 25°   | 4837.5  | 4704.6 | 4329.6 | 3326.6 | 1613.0 | 903.7  | 811.4  | 791.8  | 766.6  | 748.4  | 749.8  |
| 27.5° | 4987.1  | 4826.3 | 4377.2 | 2828.6 | 1075.8 | 772.2  | 751.2  | 724.6  | 678.5  | 651.9  | 651.9  |
| 30°   | 5167.6  | 4988.5 | 4412.2 | 2176.7 | 791.8  | 682.7  | 665.9  | 625.3  | 562.4  | 527.4  | 527.4  |
| 32.5° | 5439.0  | 5234.7 | 4389.8 | 1527.6 | 656.1  | 600.1  | 561.0  | 505.0  | 436.5  | 402.9  | 401.5  |
| 35°   | 5854.5  | 5615.3 | 4230.3 | 1001.6 | 579.2  | 521.8  | 458.8  | 390.3  | 330.1  | 302.2  | 300.8  |
| 37.5° | 6414.0  | 6124.5 | 3872.2 | 716.2  | 519.0  | 449.1  | 373.5  | 298.0  | 253.2  | 235.0  | 233.6  |
| 40°   | 7140.1  | 6716.2 | 3360.2 | 580.6  | 463.0  | 379.1  | 288.2  | 230.8  | 200.0  | 186.1  | 187.5  |
| 42.5° | 8011.6  | 7349.9 | 2746.1 | 500.8  | 408.5  | 312.0  | 225.2  | 181.9  | 162.3  | 152.5  | 149.7  |
| 45°   | 8979.6  | 7975.2 | 2102.6 | 446.3  | 353.9  | 251.8  | 176.3  | 144.1  | 128.7  | 123.1  | 123.1  |
| 47.5° | 10044.2 | 8583.8 | 1538.8 | 398.7  | 295.2  | 194.4  | 141.3  | 117.5  | 104.9  | 100.7  | 99.3   |
| 50°   | 11010.9 | 9006.2 | 1109.3 | 348.3  | 242.0  | 153.9  | 114.7  | 97.9   | 89.5   | 83.9   | 83.9   |
| 52.5° | 11816.7 | 9139.1 | 817.0  | 293.8  | 195.8  | 123.1  | 95.1   | 83.9   | 75.5   | 71.3   | 71.3   |
| 55°   | 12525.9 | 9084.6 | 607.1  | 242.0  | 158.1  | 100.7  | 81.1   | 71.3   | 64.4   | 60.2   | 60.2   |
| 57.5° | 13205.8 | 8908.3 | 453.2  | 197.2  | 127.3  | 81.1   | 68.5   | 60.2   | 53.2   | 50.4   | 50.4   |
| 60°   | 13761.1 | 8614.5 | 337.1  | 159.5  | 102.1  | 65.7   | 57.4   | 49.0   | 43.4   | 39.2   | 39.2   |
| 62.5° | 14211.6 | 8290.0 | 247.6  | 131.5  | 81.1   | 51.8   | 44.8   | 40.6   | 32.2   | 28.0   | 28.0   |
| 65°   | 14214.4 | 7751.4 | 186.1  | 109.1  | 63.0   | 40.6   | 33.6   | 32.2   | 21.0   | 16.8   | 15.4   |
| 67.5° | 13186.2 | 6682.6 | 142.7  | 93.7   | 49.0   | 30.8   | 25.2   | 26.6   | 11.2   | 7.0    | 5.6    |
| 68°   | 12812.7 | 6411.2 | 134.3  | 92.3   | 46.2   | 29.4   | 23.8   | 26.6   | 9.8    | 5.6    | 4.2    |
| 70°   | 10802.4 | 5100.5 | 107.7  | 89.5   | 40.6   | 22.4   | 19.6   | 26.6   | 8.4    | 4.2    | 2.8    |
| 72.5° | 6909.3  | 2960.1 | 79.7   | 71.3   | 30.8   | 16.8   | 12.6   | 23.8   | 8.4    | 2.8    | 1.4    |
| 75°   | 2940.5  | 917.7  | 54.6   | 50.4   | 18.2   | 12.6   | 8.4    | 15.4   | 5.6    | 1.4    | 0.0    |
| 77.5° | 619.7   | 207.0  | 32.2   | 30.8   | 12.6   | 8.4    | 5.6    | 4.2    | 1.4    | 0.0    | 0.0    |
| 80°   | 159.5   | 60.2   | 16.8   | 15.4   | 7.0    | 4.2    | 2.8    | 0.0    | 0.0    | 0.0    | 0.0    |
| 82.5° | 50.4    | 23.8   | 9.8    | 7.0    | 2.8    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 85°   | 25.2    | 14.0   | 5.6    | 2.8    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 87.5° | 14.0    | 4.2    | 1.4    | 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    |



Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



LM-79-2019: Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Report Prepared for

Cooper Lighting Solutions

MCGRAW EDISON

Report Number: SP1-2408-195-9

Test Date: 08/07/2024

Luminaire Tested: GALN-SB1A-830-U-5WQ

Data in this report applies to families of products including GALN-SB1A-830-U-5WQ.

**Test Information**

Test Method: LM-79-2019  
 Report Number: SP1-2408-195-9  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry: 4π  
 Issue Date: 08/07/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: MCGRAW EDISON  
 Catalog Number: **GALN-SB1A-830-U-5WQ**  
 Description: GALLEON AREA AND ROADWAY LUMINAIRE. (1) 80 CRI, 3000K, 350MA HIGH DENSITY LIGHTSQUARE WITH 26 LEDS AND TYPE V WIDE OPTICS

**Spectral Parameters**

CCT (K): 3050  
 CIE u': 0.2476  
 CIE v': 0.5251  
 Duv: 0.0034  
 CIE x: 0.4383  
 CIE y: 0.4131  
 CIE z: 0.1487  
 Peak Wavelength (nm): 603  
 Dominant Wavelength (nm): 581  
 Purity: 55.55201  
 Rf: 81.5  
 Rg: 99.2

|           |      |      |      |
|-----------|------|------|------|
| CRI (Ra): | 81.0 |      |      |
| R1:       | 79.6 | R9:  | 7.1  |
| R2:       | 85.6 | R10: | 67.0 |
| R3:       | 92.0 | R11: | 82.7 |
| R4:       | 82.6 | R12: | 63.2 |
| R5:       | 78.9 | R13: | 80.3 |
| R6:       | 81.7 | R14: | 95.0 |
| R7:       | 85.2 | R15: | 71.7 |
| R8:       | 62.0 |      |      |



**Test Conditions**

Stabilization Time: 20M  
 Operation Time: 1H 20M  
 Sphere Temperature (°C): 24.2

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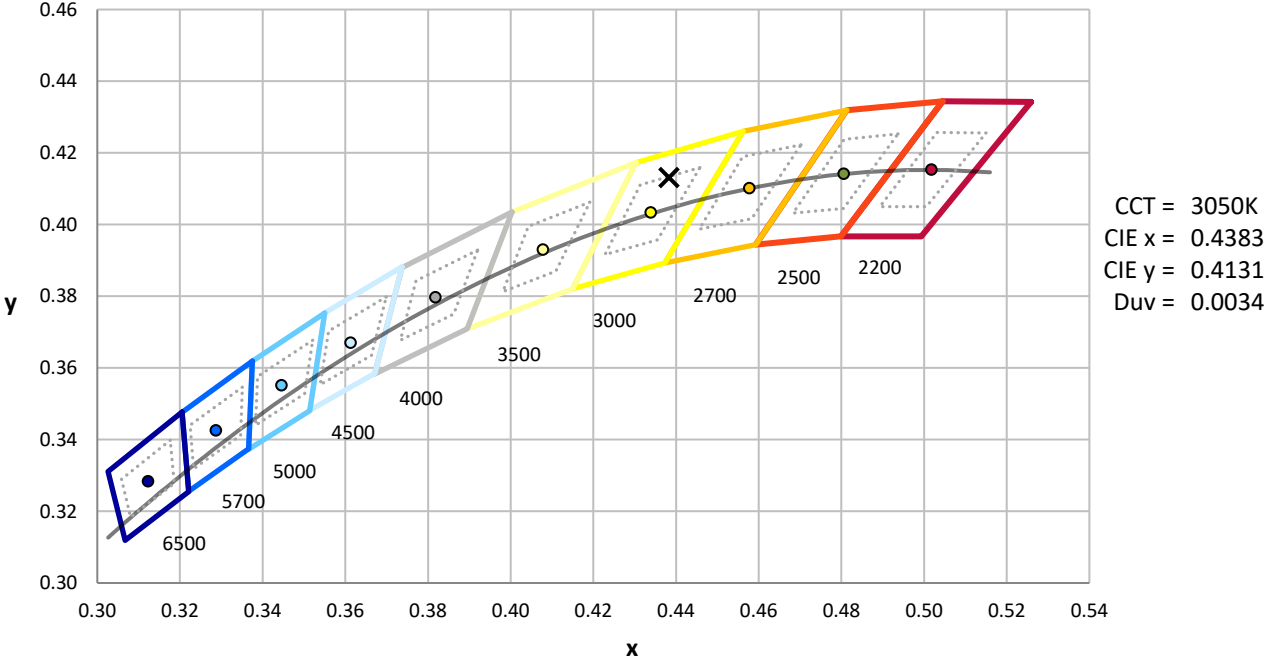
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| 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 3000K 4-step quadrangle

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**Photopic Flux vs. Wavelength**

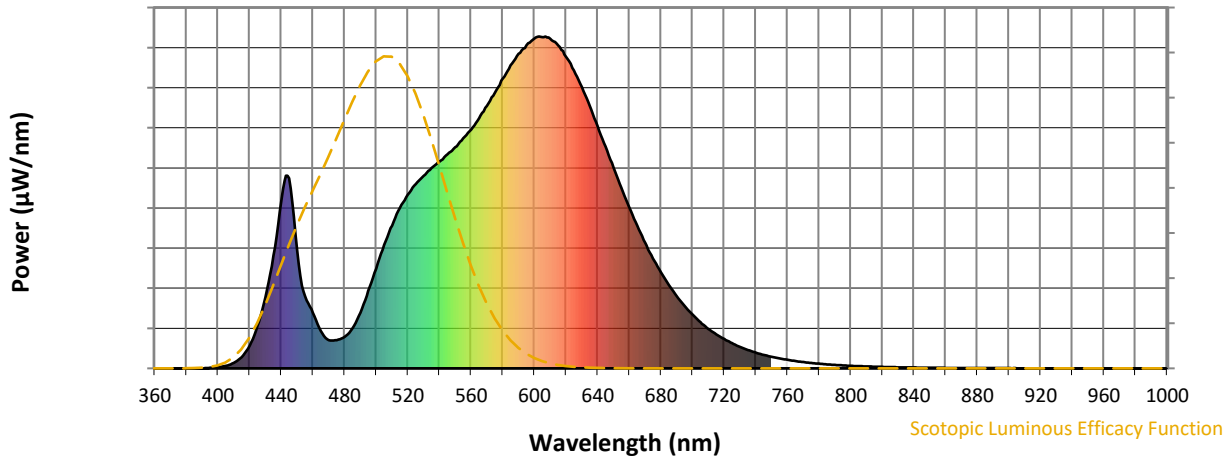


**Photopic Lumens: NR**

| $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) |
|-------------------|-----------------------------|-------------------------|-------------------|-----------------------------|-------------------------|-------------------|-----------------------------|-------------------------|-------------------|-----------------------------|-------------------------|-------------------|-----------------------------|-------------------------|
| 360               | 0                           | NR                      | 490               | 168                         | NR                      | 620               | 940                         | NR                      | 750               | 35                          | NR                      | 880               | 1                           | NR                      |
| 365               | 0                           | NR                      | 495               | 233                         | NR                      | 625               | 897                         | NR                      | 755               | 30                          | NR                      | 885               | 1                           | NR                      |
| 370               | 0                           | NR                      | 500               | 300                         | NR                      | 630               | 847                         | NR                      | 760               | 26                          | NR                      | 890               | 1                           | NR                      |
| 375               | 0                           | NR                      | 505               | 372                         | NR                      | 635               | 790                         | NR                      | 765               | 22                          | NR                      | 895               | 1                           | NR                      |
| 380               | 0                           | NR                      | 510               | 430                         | NR                      | 640               | 730                         | NR                      | 770               | 19                          | NR                      | 900               | 1                           | NR                      |
| 385               | 0                           | NR                      | 515               | 483                         | NR                      | 645               | 668                         | NR                      | 775               | 16                          | NR                      | 905               | 1                           | NR                      |
| 390               | 0                           | NR                      | 520               | 524                         | NR                      | 650               | 605                         | NR                      | 780               | 14                          | NR                      | 910               | 0                           | NR                      |
| 395               | 2                           | NR                      | 525               | 555                         | NR                      | 655               | 545                         | NR                      | 785               | 12                          | NR                      | 915               | 0                           | NR                      |
| 400               | 4                           | NR                      | 530               | 581                         | NR                      | 660               | 485                         | NR                      | 790               | 10                          | NR                      | 920               | 0                           | NR                      |
| 405               | 7                           | NR                      | 535               | 604                         | NR                      | 665               | 430                         | NR                      | 795               | 9                           | NR                      | 925               | 0                           | NR                      |
| 410               | 17                          | NR                      | 540               | 623                         | NR                      | 670               | 378                         | NR                      | 800               | 8                           | NR                      | 930               | 0                           | NR                      |
| 415               | 34                          | NR                      | 545               | 645                         | NR                      | 675               | 331                         | NR                      | 805               | 7                           | NR                      | 935               | 0                           | NR                      |
| 420               | 68                          | NR                      | 550               | 667                         | NR                      | 680               | 290                         | NR                      | 810               | 6                           | NR                      | 940               | 0                           | NR                      |
| 425               | 128                         | NR                      | 555               | 693                         | NR                      | 685               | 251                         | NR                      | 815               | 5                           | NR                      | 945               | 0                           | NR                      |
| 430               | 214                         | NR                      | 560               | 719                         | NR                      | 690               | 218                         | NR                      | 820               | 4                           | NR                      | 950               | 0                           | NR                      |
| 435               | 339                         | NR                      | 565               | 754                         | NR                      | 695               | 188                         | NR                      | 825               | 4                           | NR                      | 955               | 0                           | NR                      |
| 440               | 507                         | NR                      | 570               | 791                         | NR                      | 700               | 162                         | NR                      | 830               | 3                           | NR                      | 960               | 0                           | NR                      |
| 445               | 573                         | NR                      | 575               | 830                         | NR                      | 705               | 139                         | NR                      | 835               | 3                           | NR                      | 965               | 0                           | NR                      |
| 450               | 356                         | NR                      | 580               | 873                         | NR                      | 710               | 119                         | NR                      | 840               | 3                           | NR                      | 970               | 0                           | NR                      |
| 455               | 217                         | NR                      | 585               | 913                         | NR                      | 715               | 102                         | NR                      | 845               | 2                           | NR                      | 975               | 0                           | NR                      |
| 460               | 168                         | NR                      | 590               | 948                         | NR                      | 720               | 88                          | NR                      | 850               | 2                           | NR                      | 980               | 0                           | NR                      |
| 465               | 113                         | NR                      | 595               | 974                         | NR                      | 725               | 76                          | NR                      | 855               | 2                           | NR                      | 985               | 0                           | NR                      |
| 470               | 85                          | NR                      | 600               | 994                         | NR                      | 730               | 65                          | NR                      | 860               | 1                           | NR                      | 990               | 0                           | NR                      |
| 475               | 85                          | NR                      | 605               | 998                         | NR                      | 735               | 55                          | NR                      | 865               | 1                           | NR                      | 995               | 0                           | NR                      |
| 480               | 94                          | NR                      | 610               | 994                         | NR                      | 740               | 47                          | NR                      | 870               | 1                           | NR                      | 1000              | 0                           | NR                      |
| 485               | 120                         | NR                      | 615               | 973                         | NR                      | 745               | 41                          | NR                      | 875               | 1                           | NR                      |                   |                             |                         |

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**Scotopic Flux vs. Wavelength**



**Scotopic Lumens: NR**

**S/P: 1.27**

| λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360    | 0                        | NR            | 490    | 168                      | NR            | 620    | 940                      | NR            | 750    | 35                       | NR            | 880    | 1                        | NR            |
| 365    | 0                        | NR            | 495    | 233                      | NR            | 625    | 897                      | NR            | 755    | 30                       | NR            | 885    | 1                        | NR            |
| 370    | 0                        | NR            | 500    | 300                      | NR            | 630    | 847                      | NR            | 760    | 26                       | NR            | 890    | 1                        | NR            |
| 375    | 0                        | NR            | 505    | 372                      | NR            | 635    | 790                      | NR            | 765    | 22                       | NR            | 895    | 1                        | NR            |
| 380    | 0                        | NR            | 510    | 430                      | NR            | 640    | 730                      | NR            | 770    | 19                       | NR            | 900    | 1                        | NR            |
| 385    | 0                        | NR            | 515    | 483                      | NR            | 645    | 668                      | NR            | 775    | 16                       | NR            | 905    | 1                        | NR            |
| 390    | 0                        | NR            | 520    | 524                      | NR            | 650    | 605                      | NR            | 780    | 14                       | NR            | 910    | 0                        | NR            |
| 395    | 2                        | NR            | 525    | 555                      | NR            | 655    | 545                      | NR            | 785    | 12                       | NR            | 915    | 0                        | NR            |
| 400    | 4                        | NR            | 530    | 581                      | NR            | 660    | 485                      | NR            | 790    | 10                       | NR            | 920    | 0                        | NR            |
| 405    | 7                        | NR            | 535    | 604                      | NR            | 665    | 430                      | NR            | 795    | 9                        | NR            | 925    | 0                        | NR            |
| 410    | 17                       | NR            | 540    | 623                      | NR            | 670    | 378                      | NR            | 800    | 8                        | NR            | 930    | 0                        | NR            |
| 415    | 34                       | NR            | 545    | 645                      | NR            | 675    | 331                      | NR            | 805    | 7                        | NR            | 935    | 0                        | NR            |
| 420    | 68                       | NR            | 550    | 667                      | NR            | 680    | 290                      | NR            | 810    | 6                        | NR            | 940    | 0                        | NR            |
| 425    | 128                      | NR            | 555    | 693                      | NR            | 685    | 251                      | NR            | 815    | 5                        | NR            | 945    | 0                        | NR            |
| 430    | 214                      | NR            | 560    | 719                      | NR            | 690    | 218                      | NR            | 820    | 4                        | NR            | 950    | 0                        | NR            |
| 435    | 339                      | NR            | 565    | 754                      | NR            | 695    | 188                      | NR            | 825    | 4                        | NR            | 955    | 0                        | NR            |
| 440    | 507                      | NR            | 570    | 791                      | NR            | 700    | 162                      | NR            | 830    | 3                        | NR            | 960    | 0                        | NR            |
| 445    | 573                      | NR            | 575    | 830                      | NR            | 705    | 139                      | NR            | 835    | 3                        | NR            | 965    | 0                        | NR            |
| 450    | 356                      | NR            | 580    | 873                      | NR            | 710    | 119                      | NR            | 840    | 3                        | NR            | 970    | 0                        | NR            |
| 455    | 217                      | NR            | 585    | 913                      | NR            | 715    | 102                      | NR            | 845    | 2                        | NR            | 975    | 0                        | NR            |
| 460    | 168                      | NR            | 590    | 948                      | NR            | 720    | 88                       | NR            | 850    | 2                        | NR            | 980    | 0                        | NR            |
| 465    | 113                      | NR            | 595    | 974                      | NR            | 725    | 76                       | NR            | 855    | 2                        | NR            | 985    | 0                        | NR            |
| 470    | 85                       | NR            | 600    | 994                      | NR            | 730    | 65                       | NR            | 860    | 1                        | NR            | 990    | 0                        | NR            |
| 475    | 85                       | NR            | 605    | 998                      | NR            | 735    | 55                       | NR            | 865    | 1                        | NR            | 995    | 0                        | NR            |
| 480    | 94                       | NR            | 610    | 994                      | NR            | 740    | 47                       | NR            | 870    | 1                        | NR            | 1000   | 0                        | NR            |
| 485    | 120                      | NR            | 615    | 973                      | NR            | 745    | 41                       | NR            | 875    | 1                        | NR            |        |                          |               |

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**Melanopic Flux vs. Wavelength**



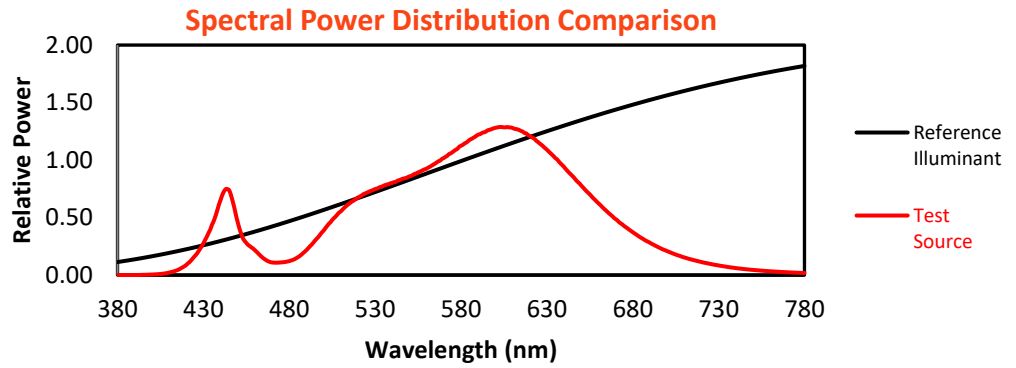
**Melanopic Lumens: NR**

**M/P: 2.32**

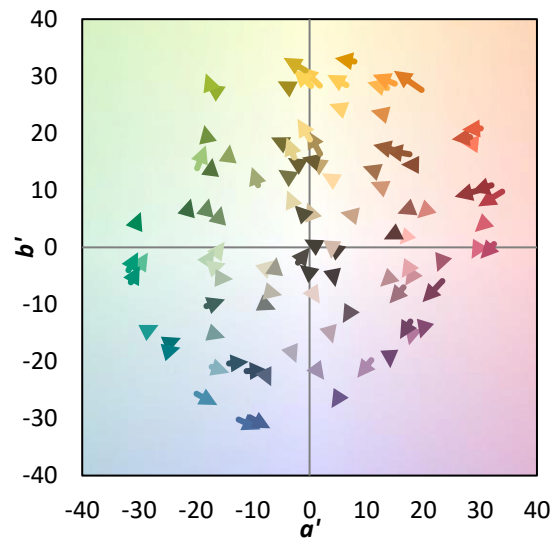
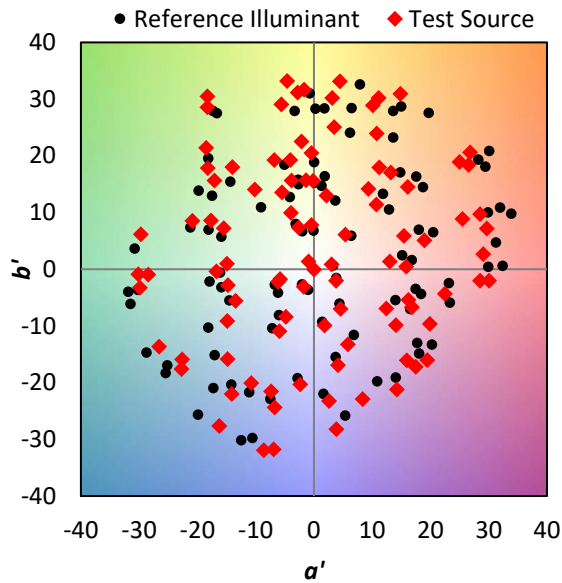
| λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360    | 0                        | NR            | 490    | 168                      | NR            | 620    | 940                      | NR            | 750    | 35                       | NR            | 880    | 1                        | NR            |
| 365    | 0                        | NR            | 495    | 233                      | NR            | 625    | 897                      | NR            | 755    | 30                       | NR            | 885    | 1                        | NR            |
| 370    | 0                        | NR            | 500    | 300                      | NR            | 630    | 847                      | NR            | 760    | 26                       | NR            | 890    | 1                        | NR            |
| 375    | 0                        | NR            | 505    | 372                      | NR            | 635    | 790                      | NR            | 765    | 22                       | NR            | 895    | 1                        | NR            |
| 380    | 0                        | NR            | 510    | 430                      | NR            | 640    | 730                      | NR            | 770    | 19                       | NR            | 900    | 1                        | NR            |
| 385    | 0                        | NR            | 515    | 483                      | NR            | 645    | 668                      | NR            | 775    | 16                       | NR            | 905    | 1                        | NR            |
| 390    | 0                        | NR            | 520    | 524                      | NR            | 650    | 605                      | NR            | 780    | 14                       | NR            | 910    | 0                        | NR            |
| 395    | 2                        | NR            | 525    | 555                      | NR            | 655    | 545                      | NR            | 785    | 12                       | NR            | 915    | 0                        | NR            |
| 400    | 4                        | NR            | 530    | 581                      | NR            | 660    | 485                      | NR            | 790    | 10                       | NR            | 920    | 0                        | NR            |
| 405    | 7                        | NR            | 535    | 604                      | NR            | 665    | 430                      | NR            | 795    | 9                        | NR            | 925    | 0                        | NR            |
| 410    | 17                       | NR            | 540    | 623                      | NR            | 670    | 378                      | NR            | 800    | 8                        | NR            | 930    | 0                        | NR            |
| 415    | 34                       | NR            | 545    | 645                      | NR            | 675    | 331                      | NR            | 805    | 7                        | NR            | 935    | 0                        | NR            |
| 420    | 68                       | NR            | 550    | 667                      | NR            | 680    | 290                      | NR            | 810    | 6                        | NR            | 940    | 0                        | NR            |
| 425    | 128                      | NR            | 555    | 693                      | NR            | 685    | 251                      | NR            | 815    | 5                        | NR            | 945    | 0                        | NR            |
| 430    | 214                      | NR            | 560    | 719                      | NR            | 690    | 218                      | NR            | 820    | 4                        | NR            | 950    | 0                        | NR            |
| 435    | 339                      | NR            | 565    | 754                      | NR            | 695    | 188                      | NR            | 825    | 4                        | NR            | 955    | 0                        | NR            |
| 440    | 507                      | NR            | 570    | 791                      | NR            | 700    | 162                      | NR            | 830    | 3                        | NR            | 960    | 0                        | NR            |
| 445    | 573                      | NR            | 575    | 830                      | NR            | 705    | 139                      | NR            | 835    | 3                        | NR            | 965    | 0                        | NR            |
| 450    | 356                      | NR            | 580    | 873                      | NR            | 710    | 119                      | NR            | 840    | 3                        | NR            | 970    | 0                        | NR            |
| 455    | 217                      | NR            | 585    | 913                      | NR            | 715    | 102                      | NR            | 845    | 2                        | NR            | 975    | 0                        | NR            |
| 460    | 168                      | NR            | 590    | 948                      | NR            | 720    | 88                       | NR            | 850    | 2                        | NR            | 980    | 0                        | NR            |
| 465    | 113                      | NR            | 595    | 974                      | NR            | 725    | 76                       | NR            | 855    | 2                        | NR            | 985    | 0                        | NR            |
| 470    | 85                       | NR            | 600    | 994                      | NR            | 730    | 65                       | NR            | 860    | 1                        | NR            | 990    | 0                        | NR            |
| 475    | 85                       | NR            | 605    | 998                      | NR            | 735    | 55                       | NR            | 865    | 1                        | NR            | 995    | 0                        | NR            |
| 480    | 94                       | NR            | 610    | 994                      | NR            | 740    | 47                       | NR            | 870    | 1                        | NR            | 1000   | 0                        | NR            |
| 485    | 120                      | NR            | 615    | 973                      | NR            | 745    | 41                       | NR            | 875    | 1                        | NR            |        |                          |               |

**Summary**

$R_f = 81.5$   
 $R_g = 99.2$   
 $CIE R_a = 81.0$   
 $R_9 = 7.1$



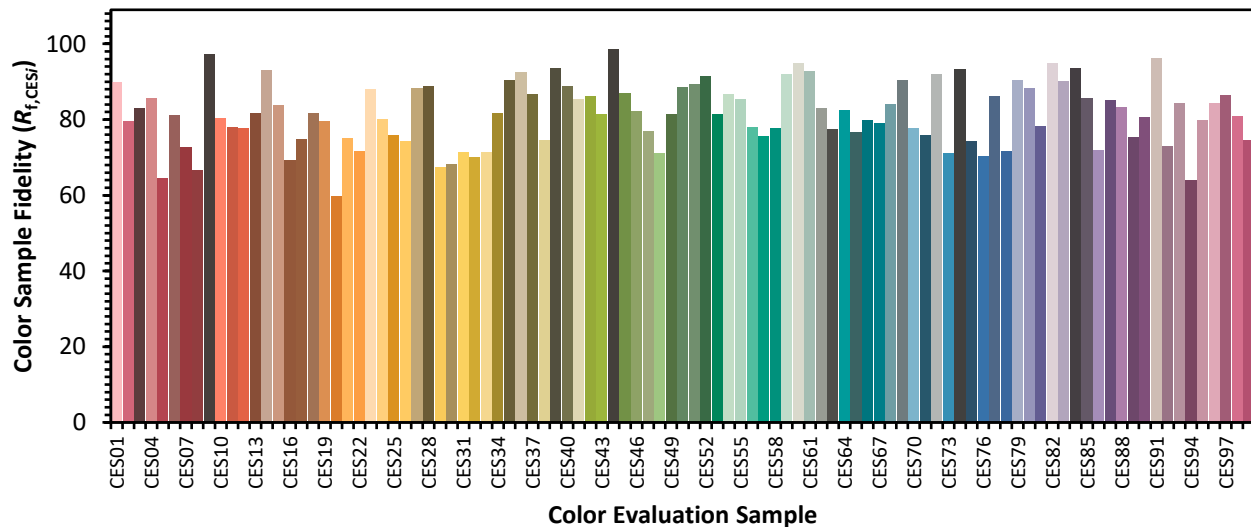
**Color Vector Graphics**



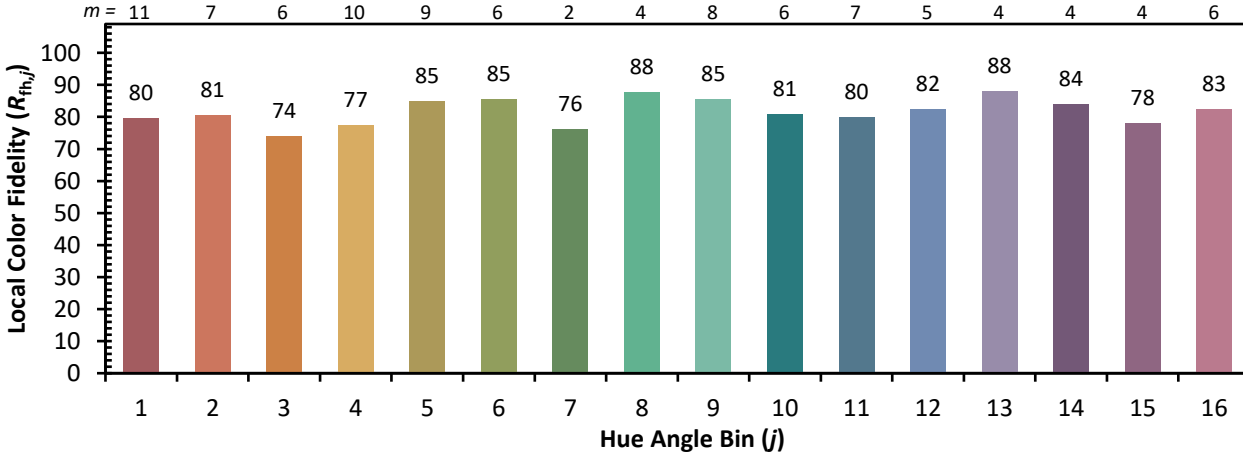


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 74 | CES51 = 89 | CES76 = 70 |
| CES02 = 63 | CES27 = 88 | CES52 = 92 | CES77 = 86 |
| CES03 = 31 | CES28 = 89 | CES53 = 81 | CES78 = 72 |
| CES04 = 70 | CES29 = 67 | CES54 = 87 | CES79 = 90 |
| CES05 = 50 | CES30 = 68 | CES55 = 85 | CES80 = 88 |
| CES06 = 51 | CES31 = 71 | CES56 = 78 | CES81 = 78 |
| CES07 = 42 | CES32 = 70 | CES57 = 76 | CES82 = 95 |
| CES08 = 41 | CES33 = 71 | CES58 = 78 | CES83 = 90 |
| CES09 = 29 | CES34 = 82 | CES59 = 92 | CES84 = 94 |
| CES10 = 76 | CES35 = 90 | CES60 = 95 | CES85 = 86 |
| CES11 = 59 | CES36 = 93 | CES61 = 93 | CES86 = 72 |
| CES12 = 65 | CES37 = 87 | CES62 = 83 | CES87 = 85 |
| CES13 = 43 | CES38 = 75 | CES63 = 77 | CES88 = 83 |
| CES14 = 74 | CES39 = 94 | CES64 = 83 | CES89 = 75 |
| CES15 = 71 | CES40 = 89 | CES65 = 77 | CES90 = 81 |
| CES16 = 47 | CES41 = 85 | CES66 = 80 | CES91 = 96 |
| CES17 = 50 | CES42 = 86 | CES67 = 79 | CES92 = 73 |
| CES18 = 56 | CES43 = 81 | CES68 = 84 | CES93 = 84 |
| CES19 = 72 | CES44 = 99 | CES69 = 91 | CES94 = 64 |
| CES20 = 66 | CES45 = 87 | CES70 = 78 | CES95 = 80 |
| CES21 = 87 | CES46 = 82 | CES71 = 76 | CES96 = 84 |
| CES22 = 79 | CES47 = 77 | CES72 = 92 | CES97 = 87 |
| CES23 = 92 | CES48 = 71 | CES73 = 71 | CES98 = 81 |
| CES24 = 91 | CES49 = 81 | CES74 = 93 | CES99 = 74 |
| CES25 = 72 | CES50 = 89 | CES75 = 74 |            |



Color Rendition by Hue-Angle Bin



Measure Comparisons



(END OF REPORT)