

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: P1048810

Luminaire Tested: **GALN-SA9B-940-U-T4BC**

Issue Date: 07/10/2025

**Test Information**

Test Method: LM-79-08  
Report Number: P1048810  
Test Lab: INNOVATION CENTER(G3)  
Issue Date: 07/10/2025  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: MCGRAW-EDISON  
Catalog Number: GALN-SA9B-940-U-T4BC  
Description: GALLEON II AREA AND ROADWAY LUMINAIRE 800mA 9xLight Square PACKAGE  
90CRI 4000K FIXTURE w/ TYPE IV ANGLED BACKLIGHT CONTROL  
Light Source: (126) 4000K CCT, 90 CRI LEDs  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 29385.6 lumens  
Efficiency: N/A  
Efficacy: 94.0 lumens/watt  
Luminous Opening: Rectangular (W 1.5' x L: 1.5' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B0 - U0 - G5

Input Watts (W): 312.7  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.97  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT

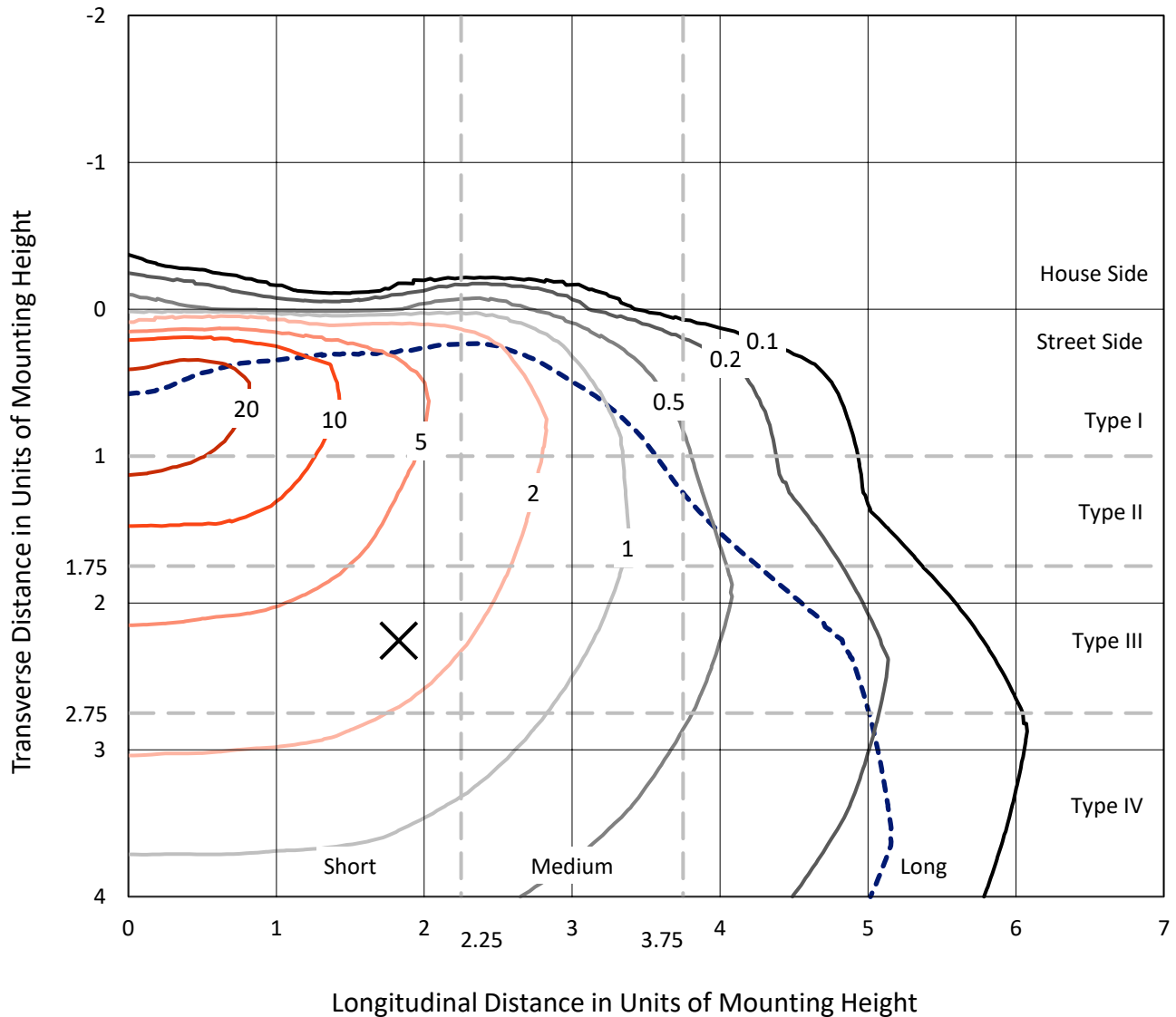


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## Iso-Footcandle Lines of Horizontal Illumination

× Max cd  
- - - 1/2 Max cd

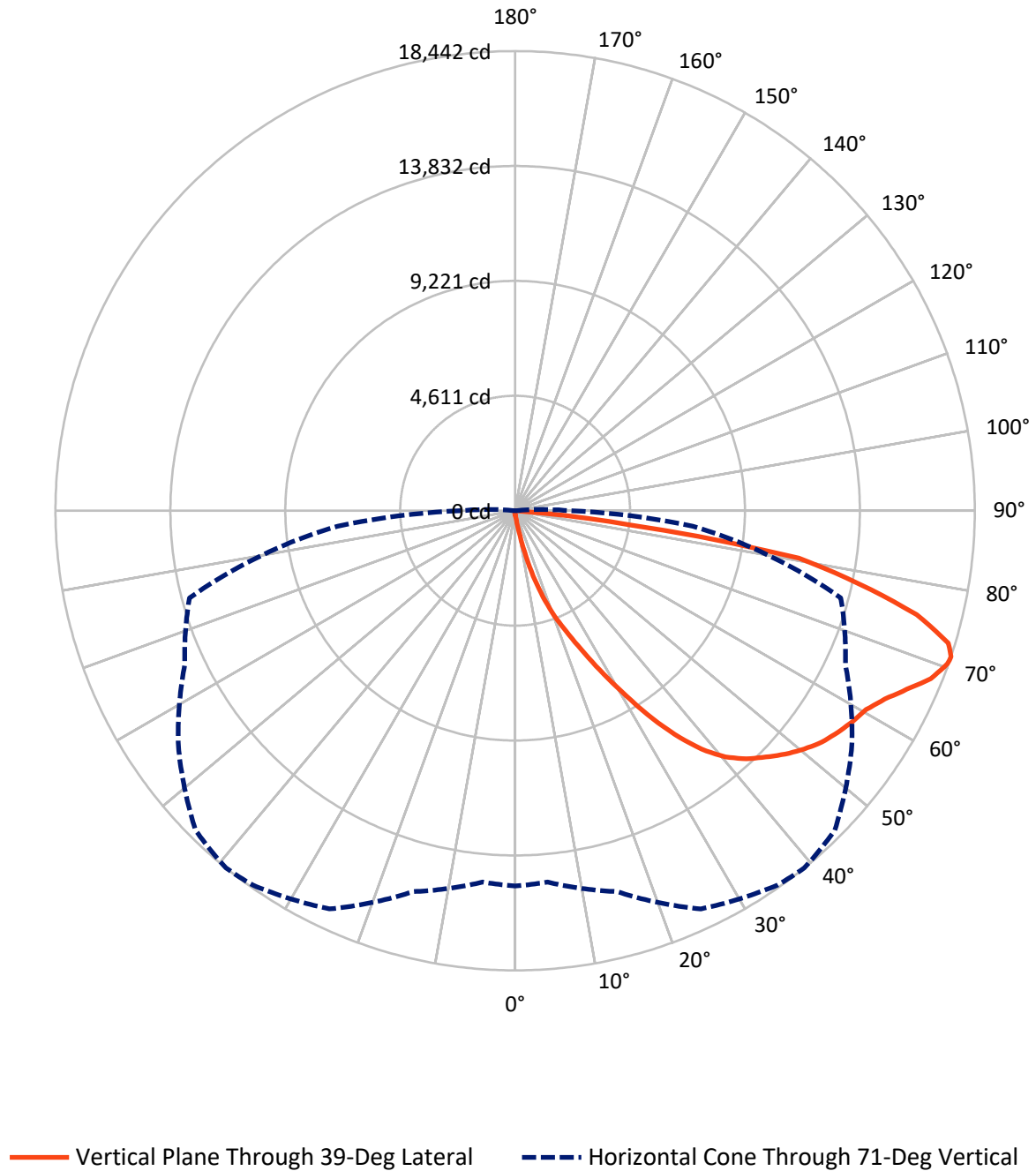


Based on 15 foot mounting height. Maximum calculated value = 30.2 fc  
Type IV - Short - N/A

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CATALOG NUMBER: GALN-SA9B-940-U-T4BC

## Luminous Intensity Polar Plot



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CATALOG NUMBER: GALN-SA9B-940-U-T4BC

**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 104.4    | 0.0    | 104.4   |
|                    | % Fixture | 0.4      | 0.0    | 0.4     |
| <b>Street Side</b> | Lumens    | 29281.2  | 0.0    | 29281.2 |
|                    | % Fixture | 99.6     | 0.0    | 99.6    |
| <b>Total</b>       | Lumens    | 29385.6  | 0.0    | 29385.6 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**Coefficient of Utilization**

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 24.6    | 0.1       |
| 10°-20°   | 314.1   | 1.1       |
| 20°-30°   | 1118.5  | 3.8       |
| 30°-40°   | 2695.7  | 9.2       |
| 40°-50°   | 4511.4  | 15.4      |
| 50°-60°   | 5794.4  | 19.7      |
| 60°-70°   | 7332.8  | 25.0      |
| 70°-80°   | 6537.5  | 22.2      |
| 80°-90°   | 1056.8  | 3.6       |
| 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°    | 29385.6 | 100.0     |
| 0°-180°   | 29385.6 | 100.0     |



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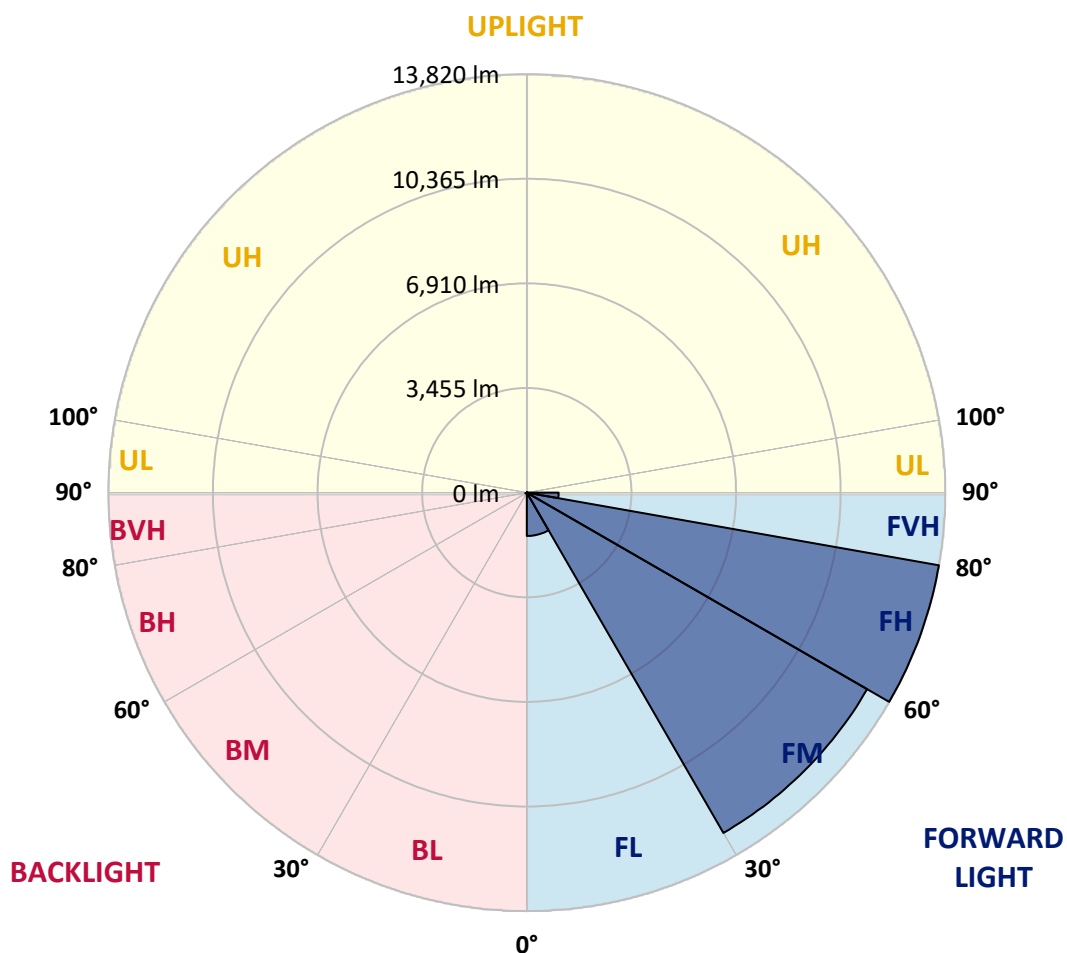
CATALOG NUMBER: GALN-SA9B-940-U-T4BC

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |        |
|------|-------------|---------|-----------|-------------------------|------|--------|
|      |             |         |           | B                       | U    | G      |
| FL   | (0°-30°)    | 1431.9  | 4.9       |                         |      |        |
| FM   | (30°-60°)   | 12977.3 | 44.2      |                         |      |        |
| FH   | (60°-80°)   | 13820.1 | 47.0      |                         |      | G5     |
| FVH  | (80°-90°)   | 1052.0  | 3.6       |                         |      | G5     |
| BL   | (0°-30°)    | 25.3    | 0.1       | B0/110                  |      |        |
| BM   | (30°-60°)   | 24.2    | 0.1       | B0/220                  |      |        |
| BH   | (60°-80°)   | 50.2    | 0.2       | B0/110                  |      | G0/110 |
| BVH  | (80°-90°)   | 4.8     | 0.0       |                         |      | G0/10  |
| UL   | (90°-100°)  | 0.0     | 0.0       |                         | U0/0 |        |
| UH   | (100°-180°) | 0.0     | 0.0       |                         | U0/0 |        |

**BUG Rating: B0-U0-G5**

Type IV Short



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 35°     | 39°     | 45°     | 55°     | 65°     | 75°     | 85°    |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|--------|
| 0°    | 161.1   | 161.1   | 161.1   | 161.1   | 161.1   | 161.1   | 161.1   | 161.1   | 161.1   | 161.1   | 161.1  |
| 2.5°  | 185.0   | 185.0   | 185.0   | 179.0   | 179.0   | 177.0   | 175.1   | 175.1   | 171.1   | 169.1   | 165.1  |
| 5°    | 280.5   | 274.5   | 260.6   | 252.6   | 236.7   | 226.8   | 216.8   | 202.9   | 189.0   | 179.0   | 167.1  |
| 7.5°  | 634.6   | 648.5   | 602.7   | 517.2   | 429.7   | 391.9   | 328.2   | 264.6   | 218.8   | 189.0   | 169.1  |
| 10°   | 1617.3  | 1609.3  | 1454.1  | 1283.1  | 990.6   | 873.3   | 684.3   | 431.7   | 282.5   | 206.9   | 171.1  |
| 12.5° | 2751.1  | 2743.2  | 2560.2  | 2327.4  | 1941.5  | 1696.8  | 1338.8  | 805.6   | 405.8   | 234.7   | 171.1  |
| 15°   | 3704.0  | 3672.2  | 3614.5  | 3383.7  | 2932.2  | 2727.3  | 2253.8  | 1424.3  | 656.5   | 282.5   | 175.1  |
| 17.5° | 4334.6  | 4306.7  | 4253.0  | 4169.5  | 3883.0  | 3640.3  | 3260.4  | 2237.9  | 1062.3  | 366.0   | 183.0  |
| 20°   | 4913.4  | 4893.5  | 4849.8  | 4833.9  | 4648.9  | 4519.6  | 4205.3  | 3172.9  | 1655.1  | 497.3   | 194.9  |
| 22.5° | 5709.1  | 5667.4  | 5685.3  | 5589.8  | 5408.8  | 5253.6  | 5060.6  | 4151.6  | 2379.1  | 716.1   | 216.8  |
| 25°   | 6683.9  | 6664.0  | 6614.2  | 6546.6  | 6296.0  | 6160.7  | 5864.3  | 5074.6  | 3188.8  | 1002.6  | 240.7  |
| 27.5° | 7861.5  | 7839.6  | 7827.7  | 7672.5  | 7384.1  | 7236.9  | 6823.1  | 5945.9  | 4099.8  | 1404.4  | 272.5  |
| 30°   | 9218.2  | 9228.1  | 9150.5  | 8951.6  | 8615.4  | 8408.6  | 7982.9  | 6858.9  | 5032.8  | 1875.9  | 306.3  |
| 32.5° | 10622.6 | 10602.7 | 10483.3 | 10248.6 | 9948.2  | 9755.3  | 9214.2  | 7859.5  | 6011.5  | 2498.5  | 346.1  |
| 35°   | 12136.4 | 12098.6 | 11784.3 | 11515.8 | 11259.1 | 11016.5 | 10523.1 | 9021.2  | 6990.2  | 3196.7  | 399.8  |
| 37.5° | 13664.1 | 13487.1 | 12856.5 | 12516.3 | 12339.3 | 12140.4 | 11680.9 | 10260.5 | 7963.0  | 3976.5  | 465.5  |
| 40°   | 14817.9 | 14680.6 | 13932.7 | 13306.1 | 13164.8 | 12995.8 | 12653.6 | 11330.8 | 8997.4  | 4814.0  | 545.1  |
| 42.5° | 15456.5 | 15380.9 | 14708.5 | 14089.8 | 13757.6 | 13608.4 | 13316.0 | 12265.7 | 10019.8 | 5739.0  | 660.4  |
| 45°   | 15729.0 | 15611.6 | 15162.0 | 14873.6 | 14344.5 | 14097.8 | 13749.7 | 12971.9 | 11088.1 | 6789.3  | 821.6  |
| 47.5° | 15645.4 | 15577.8 | 15255.5 | 15361.0 | 14977.0 | 14593.1 | 14081.9 | 13513.0 | 12001.1 | 7994.8  | 1042.4 |
| 50°   | 15120.3 | 15062.6 | 14963.1 | 15534.0 | 15486.3 | 15032.7 | 14511.6 | 13940.6 | 12747.1 | 9238.1  | 1384.5 |
| 52.5° | 14121.7 | 14097.8 | 14352.4 | 15398.8 | 15774.7 | 15420.6 | 14925.3 | 14318.6 | 13443.3 | 10537.0 | 1873.9 |
| 55°   | 12834.6 | 12932.1 | 13660.2 | 15187.9 | 15921.9 | 15707.1 | 15291.3 | 14672.7 | 14002.3 | 11698.8 | 2596.0 |
| 57.5° | 12305.5 | 12331.3 | 13240.4 | 15038.7 | 15987.6 | 15959.7 | 15647.4 | 15010.9 | 14515.5 | 12627.7 | 3698.0 |
| 60°   | 12924.1 | 12884.4 | 13363.8 | 15152.1 | 16118.9 | 16186.5 | 15963.7 | 15325.2 | 14961.1 | 13425.4 | 5166.1 |
| 62.5° | 14042.1 | 14020.2 | 14173.4 | 15635.5 | 16502.8 | 16640.1 | 16403.3 | 15551.9 | 15355.0 | 13950.6 | 6841.0 |
| 65°   | 15040.7 | 14995.0 | 15279.4 | 16492.9 | 17177.2 | 17274.6 | 17067.7 | 15939.8 | 15528.1 | 14332.5 | 8414.5 |
| 67.5° | 15472.4 | 15462.4 | 15920.0 | 17308.4 | 17885.3 | 17990.8 | 17809.7 | 16475.0 | 15488.3 | 14453.9 | 9108.8 |
| 70°   | 15275.4 | 15237.6 | 15969.7 | 17654.6 | 18285.2 | 18404.5 | 18229.5 | 16673.9 | 15056.6 | 14070.0 | 8080.3 |
| 71°   | 15058.6 | 14957.2 | 15820.5 | 17630.7 | 18340.9 | 18442.3 | 18136.0 | 16492.9 | 14623.0 | 13524.9 | 7147.4 |
| 72.5° | 14386.2 | 14404.1 | 15410.7 | 17382.0 | 18207.6 | 18177.7 | 17606.8 | 15844.4 | 14099.8 | 12287.6 | 5741.0 |
| 75°   | 12731.2 | 12836.6 | 14083.9 | 16337.7 | 17018.0 | 16638.1 | 15764.8 | 14605.1 | 13049.5 | 8810.4  | 3986.5 |
| 77.5° | 10403.8 | 10560.9 | 11931.5 | 14328.6 | 14135.6 | 14097.8 | 14062.0 | 12868.4 | 11143.8 | 4732.4  | 2773.0 |
| 80°   | 4967.2  | 5307.3  | 7197.1  | 10228.7 | 11111.9 | 11539.6 | 11271.1 | 10369.9 | 8617.4  | 2253.8  | 1657.0 |
| 82.5° | 324.2   | 320.3   | 453.5   | 859.4   | 3622.4  | 4682.7  | 7439.8  | 7411.9  | 6007.5  | 1098.1  | 676.3  |
| 85°   | 153.2   | 157.2   | 173.1   | 196.9   | 228.8   | 250.6   | 346.1   | 2029.0  | 2874.5  | 523.2   | 147.2  |
| 87.5° | 89.5    | 91.5    | 107.4   | 137.3   | 179.0   | 198.9   | 236.7   | 304.4   | 374.0   | 288.4   | 31.8   |
| 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: P1048810

CATALOG NUMBER: GALN-SA9B-940-U-T4BC

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°   | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 161.1  | 161.1 | 161.1 | 161.1 | 161.1 | 161.1 | 161.1 | 161.1 | 161.1 | 161.1 | 161.1 |
| 2.5°  | 163.1  | 161.1 | 155.2 | 149.2 | 143.2 | 139.2 | 137.3 | 139.2 | 139.2 | 141.2 | 141.2 |
| 5°    | 163.1  | 157.2 | 147.2 | 135.3 | 127.3 | 119.4 | 115.4 | 113.4 | 115.4 | 115.4 | 115.4 |
| 7.5°  | 161.1  | 151.2 | 137.3 | 123.3 | 113.4 | 103.4 | 99.5  | 97.5  | 97.5  | 99.5  | 99.5  |
| 10°   | 157.2  | 147.2 | 129.3 | 113.4 | 101.5 | 89.5  | 83.5  | 77.6  | 77.6  | 77.6  | 79.6  |
| 12.5° | 155.2  | 141.2 | 119.4 | 103.4 | 87.5  | 73.6  | 61.7  | 55.7  | 57.7  | 57.7  | 57.7  |
| 15°   | 151.2  | 135.3 | 113.4 | 93.5  | 73.6  | 55.7  | 45.8  | 39.8  | 41.8  | 43.8  | 41.8  |
| 17.5° | 151.2  | 133.3 | 105.4 | 81.6  | 57.7  | 41.8  | 33.8  | 29.8  | 29.8  | 31.8  | 31.8  |
| 20°   | 151.2  | 129.3 | 99.5  | 69.6  | 43.8  | 31.8  | 23.9  | 21.9  | 21.9  | 25.9  | 27.8  |
| 22.5° | 155.2  | 129.3 | 91.5  | 57.7  | 35.8  | 23.9  | 17.9  | 15.9  | 17.9  | 21.9  | 23.9  |
| 25°   | 161.1  | 127.3 | 83.5  | 51.7  | 29.8  | 17.9  | 13.9  | 9.9   | 11.9  | 15.9  | 17.9  |
| 27.5° | 167.1  | 125.3 | 75.6  | 45.8  | 23.9  | 13.9  | 9.9   | 8.0   | 6.0   | 8.0   | 8.0   |
| 30°   | 173.1  | 125.3 | 67.6  | 37.8  | 19.9  | 9.9   | 6.0   | 4.0   | 2.0   | 0.0   | 0.0   |
| 32.5° | 177.0  | 121.3 | 61.7  | 29.8  | 15.9  | 8.0   | 4.0   | 2.0   | 0.0   | 0.0   | 0.0   |
| 35°   | 181.0  | 117.4 | 53.7  | 23.9  | 11.9  | 6.0   | 2.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 37.5° | 185.0  | 111.4 | 45.8  | 19.9  | 9.9   | 4.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 40°   | 189.0  | 103.4 | 37.8  | 17.9  | 6.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 42.5° | 193.0  | 97.5  | 31.8  | 13.9  | 4.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 45°   | 202.9  | 93.5  | 25.9  | 11.9  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 47.5° | 220.8  | 89.5  | 23.9  | 8.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 50°   | 246.7  | 85.5  | 21.9  | 6.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 52.5° | 282.5  | 83.5  | 19.9  | 4.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 55°   | 346.1  | 81.6  | 17.9  | 4.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 57.5° | 455.5  | 79.6  | 17.9  | 4.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 60°   | 698.2  | 75.6  | 17.9  | 4.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 62.5° | 1247.3 | 73.6  | 15.9  | 4.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 65°   | 2174.2 | 75.6  | 15.9  | 4.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 67.5° | 3117.2 | 79.6  | 13.9  | 6.0   | 2.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 70°   | 2667.6 | 69.6  | 13.9  | 8.0   | 4.0   | 2.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 71°   | 2174.2 | 61.7  | 13.9  | 8.0   | 4.0   | 2.0   | 2.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 72.5° | 1398.4 | 47.7  | 11.9  | 8.0   | 4.0   | 4.0   | 2.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 75°   | 590.8  | 39.8  | 11.9  | 8.0   | 6.0   | 4.0   | 4.0   | 2.0   | 0.0   | 0.0   | 0.0   |
| 77.5° | 252.6  | 29.8  | 11.9  | 9.9   | 8.0   | 6.0   | 6.0   | 4.0   | 2.0   | 0.0   | 0.0   |
| 80°   | 95.5   | 23.9  | 13.9  | 11.9  | 9.9   | 9.9   | 8.0   | 4.0   | 2.0   | 0.0   | 0.0   |
| 82.5° | 43.8   | 19.9  | 13.9  | 11.9  | 11.9  | 9.9   | 8.0   | 6.0   | 4.0   | 0.0   | 0.0   |
| 85°   | 27.8   | 17.9  | 13.9  | 11.9  | 11.9  | 9.9   | 9.9   | 6.0   | 4.0   | 0.0   | 0.0   |
| 87.5° | 21.9   | 17.9  | 13.9  | 13.9  | 11.9  | 11.9  | 8.0   | 6.0   | 2.0   | 0.0   | 0.0   |
| 90°   | 0.0    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |

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

Report Prepared for

Cooper Lighting Solutions

McGraw-Edison

Report Number: SP1-2407-184-16

Test Date: 10/11/2024

Luminaire Tested: GSS-SB1A-940-U-5WQ

Data in this report applies to families of products including GSS-SB1A-940-U-5WQ

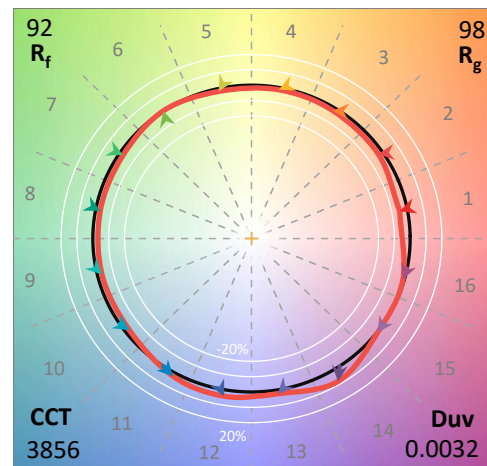
### Test Information

Test Method: LM-79-2019  
 Report Number: SP1-2407-184-16  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 10/15/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: McGraw-Edison  
 Catalog Number: **GSS-SB1A-940-U-5WQ**  
 Description: GALLEON II SITE SLIM 1SQ 350MA 5WQ HIGH DENSITY LIGHTSQUARE WITH 90 CRI  
 4000K CCT 26 LEDS

### Spectral Parameters

CCT (K): 3856  
 CIE  $u'$ : 0.2261  
 CIE  $v'$ : 0.5084  
 Duv: 0.0032  
 CIE x: 0.3896  
 CIE y: 0.3894  
 CIE z: 0.2211  
 Peak Wavelength (nm): 614  
 Dominant Wavelength (nm): 578  
 Purity: 33.77304  
 R<sub>f</sub>: 91.8  
 R<sub>g</sub>: 98.4

CRI (Ra): 92.1  
 R1: 91.8  
 R2: 94.1  
 R3: 95.3  
 R4: 92.8  
 R5: 91.0  
 R6: 91.6  
 R7: 95.0  
 R8: 85.2  
 R9: 60.7  
 R10: 85.2  
 R11: 92.4  
 R12: 74.5  
 R13: 92.3  
 R14: 97.0  
 R15: 88.5



### Test Conditions

Stabilization Time: 23M  
 Operation Time: 1H 23M  
 Sphere Temperature (°C): 25.2

REPORT NUMBER: SP1-2407-184-16

| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 6/18/2024        | 12/18/2024           |
| Power Meter                    | INXT2011004           | 2/8/2024         | 2/8/2025             |
| AC Power Source                | IN0063                | 10/24/2023       | 10/24/2024           |
| DC Power Source                | IN0208                | 10/24/2023       | 10/24/2024           |
| Sphere Thermometer             | IN0085                | 10/24/2023       | 10/24/2024           |
| Room Thermometer               | IN0046                | 10/24/2023       | 10/24/2024           |

REPORT NUMBER: SP1-2407-184-16

**CIE 1931 Chromaticity Diagram**



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



Point lies inside the ANSI 4000K 4-step quadrangle

REPORT NUMBER: SP1-2407-184-16

### Photopic Flux vs. Wavelength

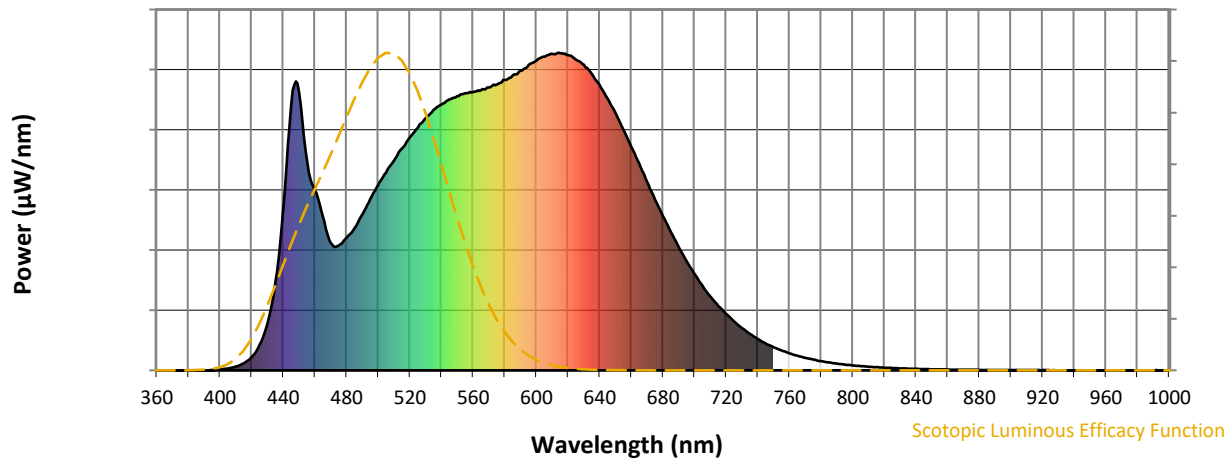


### Photopic Lumens: NR

| $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|----------------------------------------|--------------------------------|-------------------|----------------------------------------|--------------------------------|-------------------|----------------------------------------|--------------------------------|-------------------|----------------------------------------|--------------------------------|-------------------|----------------------------------------|--------------------------------|
| 360               | 0                                      | NR                             | 490               | 492                                    | NR                             | 620               | 993                                    | NR                             | 750               | 73                                     | NR                             | 880               | 1                                      | NR                             |
| 365               | 0                                      | NR                             | 495               | 539                                    | NR                             | 625               | 978                                    | NR                             | 755               | 62                                     | NR                             | 885               | 1                                      | NR                             |
| 370               | 0                                      | NR                             | 500               | 583                                    | NR                             | 630               | 962                                    | NR                             | 760               | 54                                     | NR                             | 890               | 1                                      | NR                             |
| 375               | 0                                      | NR                             | 505               | 623                                    | NR                             | 635               | 933                                    | NR                             | 765               | 46                                     | NR                             | 895               | 1                                      | NR                             |
| 380               | 0                                      | NR                             | 510               | 661                                    | NR                             | 640               | 898                                    | NR                             | 770               | 39                                     | NR                             | 900               | 1                                      | NR                             |
| 385               | 0                                      | NR                             | 515               | 698                                    | NR                             | 645               | 855                                    | NR                             | 775               | 34                                     | NR                             | 905               | 1                                      | NR                             |
| 390               | 0                                      | NR                             | 520               | 733                                    | NR                             | 650               | 810                                    | NR                             | 780               | 29                                     | NR                             | 910               | 1                                      | NR                             |
| 395               | 1                                      | NR                             | 525               | 764                                    | NR                             | 655               | 759                                    | NR                             | 785               | 25                                     | NR                             | 915               | 1                                      | NR                             |
| 400               | 3                                      | NR                             | 530               | 794                                    | NR                             | 660               | 704                                    | NR                             | 790               | 21                                     | NR                             | 920               | 1                                      | NR                             |
| 405               | 6                                      | NR                             | 535               | 820                                    | NR                             | 665               | 651                                    | NR                             | 795               | 18                                     | NR                             | 925               | 1                                      | NR                             |
| 410               | 12                                     | NR                             | 540               | 837                                    | NR                             | 670               | 592                                    | NR                             | 800               | 16                                     | NR                             | 930               | 1                                      | NR                             |
| 415               | 22                                     | NR                             | 545               | 853                                    | NR                             | 675               | 538                                    | NR                             | 805               | 13                                     | NR                             | 935               | 0                                      | NR                             |
| 420               | 42                                     | NR                             | 550               | 864                                    | NR                             | 680               | 486                                    | NR                             | 810               | 12                                     | NR                             | 940               | 0                                      | NR                             |
| 425               | 79                                     | NR                             | 555               | 872                                    | NR                             | 685               | 435                                    | NR                             | 815               | 10                                     | NR                             | 945               | 0                                      | NR                             |
| 430               | 147                                    | NR                             | 560               | 876                                    | NR                             | 690               | 389                                    | NR                             | 820               | 9                                      | NR                             | 950               | 0                                      | NR                             |
| 435               | 278                                    | NR                             | 565               | 883                                    | NR                             | 695               | 344                                    | NR                             | 825               | 7                                      | NR                             | 955               | 0                                      | NR                             |
| 440               | 515                                    | NR                             | 570               | 891                                    | NR                             | 700               | 303                                    | NR                             | 830               | 6                                      | NR                             | 960               | 0                                      | NR                             |
| 445               | 832                                    | NR                             | 575               | 900                                    | NR                             | 705               | 266                                    | NR                             | 835               | 5                                      | NR                             | 965               | 0                                      | NR                             |
| 450               | 874                                    | NR                             | 580               | 914                                    | NR                             | 710               | 233                                    | NR                             | 840               | 5                                      | NR                             | 970               | 0                                      | NR                             |
| 455               | 659                                    | NR                             | 585               | 927                                    | NR                             | 715               | 203                                    | NR                             | 845               | 4                                      | NR                             | 975               | 0                                      | NR                             |
| 460               | 567                                    | NR                             | 590               | 944                                    | NR                             | 720               | 178                                    | NR                             | 850               | 4                                      | NR                             | 980               | 0                                      | NR                             |
| 465               | 485                                    | NR                             | 595               | 961                                    | NR                             | 725               | 154                                    | NR                             | 855               | 3                                      | NR                             | 985               | 0                                      | NR                             |
| 470               | 401                                    | NR                             | 600               | 975                                    | NR                             | 730               | 133                                    | NR                             | 860               | 3                                      | NR                             | 990               | 0                                      | NR                             |
| 475               | 393                                    | NR                             | 605               | 988                                    | NR                             | 735               | 115                                    | NR                             | 865               | 2                                      | NR                             | 995               | 1                                      | NR                             |
| 480               | 417                                    | NR                             | 610               | 996                                    | NR                             | 740               | 98                                     | NR                             | 870               | 2                                      | NR                             | 1000              | 0                                      | NR                             |
| 485               | 448                                    | NR                             | 615               | 998                                    | NR                             | 745               | 85                                     | NR                             | 875               | 2                                      | NR                             |                   |                                        |                                |

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### Scotopic Flux vs. Wavelength



Scotopic Lumens: NR

S/P: 1.72

| λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(φ/nm) |
|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|
| 360       | 0                           | NR               | 490       | 492                         | NR               | 620       | 993                         | NR               | 750       | 73                          | NR               | 880       | 1                           | NR               |
| 365       | 0                           | NR               | 495       | 539                         | NR               | 625       | 978                         | NR               | 755       | 62                          | NR               | 885       | 1                           | NR               |
| 370       | 0                           | NR               | 500       | 583                         | NR               | 630       | 962                         | NR               | 760       | 54                          | NR               | 890       | 1                           | NR               |
| 375       | 0                           | NR               | 505       | 623                         | NR               | 635       | 933                         | NR               | 765       | 46                          | NR               | 895       | 1                           | NR               |
| 380       | 0                           | NR               | 510       | 661                         | NR               | 640       | 898                         | NR               | 770       | 39                          | NR               | 900       | 1                           | NR               |
| 385       | 0                           | NR               | 515       | 698                         | NR               | 645       | 855                         | NR               | 775       | 34                          | NR               | 905       | 1                           | NR               |
| 390       | 0                           | NR               | 520       | 733                         | NR               | 650       | 810                         | NR               | 780       | 29                          | NR               | 910       | 1                           | NR               |
| 395       | 1                           | NR               | 525       | 764                         | NR               | 655       | 759                         | NR               | 785       | 25                          | NR               | 915       | 1                           | NR               |
| 400       | 3                           | NR               | 530       | 794                         | NR               | 660       | 704                         | NR               | 790       | 21                          | NR               | 920       | 1                           | NR               |
| 405       | 6                           | NR               | 535       | 820                         | NR               | 665       | 651                         | NR               | 795       | 18                          | NR               | 925       | 1                           | NR               |
| 410       | 12                          | NR               | 540       | 837                         | NR               | 670       | 592                         | NR               | 800       | 16                          | NR               | 930       | 1                           | NR               |
| 415       | 22                          | NR               | 545       | 853                         | NR               | 675       | 538                         | NR               | 805       | 13                          | NR               | 935       | 0                           | NR               |
| 420       | 42                          | NR               | 550       | 864                         | NR               | 680       | 486                         | NR               | 810       | 12                          | NR               | 940       | 0                           | NR               |
| 425       | 79                          | NR               | 555       | 872                         | NR               | 685       | 435                         | NR               | 815       | 10                          | NR               | 945       | 0                           | NR               |
| 430       | 147                         | NR               | 560       | 876                         | NR               | 690       | 389                         | NR               | 820       | 9                           | NR               | 950       | 0                           | NR               |
| 435       | 278                         | NR               | 565       | 883                         | NR               | 695       | 344                         | NR               | 825       | 7                           | NR               | 955       | 0                           | NR               |
| 440       | 515                         | NR               | 570       | 891                         | NR               | 700       | 303                         | NR               | 830       | 6                           | NR               | 960       | 0                           | NR               |
| 445       | 832                         | NR               | 575       | 900                         | NR               | 705       | 266                         | NR               | 835       | 5                           | NR               | 965       | 0                           | NR               |
| 450       | 874                         | NR               | 580       | 914                         | NR               | 710       | 233                         | NR               | 840       | 5                           | NR               | 970       | 0                           | NR               |
| 455       | 659                         | NR               | 585       | 927                         | NR               | 715       | 203                         | NR               | 845       | 4                           | NR               | 975       | 0                           | NR               |
| 460       | 567                         | NR               | 590       | 944                         | NR               | 720       | 178                         | NR               | 850       | 4                           | NR               | 980       | 0                           | NR               |
| 465       | 485                         | NR               | 595       | 961                         | NR               | 725       | 154                         | NR               | 855       | 3                           | NR               | 985       | 0                           | NR               |
| 470       | 401                         | NR               | 600       | 975                         | NR               | 730       | 133                         | NR               | 860       | 3                           | NR               | 990       | 0                           | NR               |
| 475       | 393                         | NR               | 605       | 988                         | NR               | 735       | 115                         | NR               | 865       | 2                           | NR               | 995       | 1                           | NR               |
| 480       | 417                         | NR               | 610       | 996                         | NR               | 740       | 98                          | NR               | 870       | 2                           | NR               | 1000      | 0                           | NR               |
| 485       | 448                         | NR               | 615       | 998                         | NR               | 745       | 85                          | NR               | 875       | 2                           | NR               |           |                             |                  |

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### Melanopic Flux vs. Wavelength



Melanopic Lumens: NR

M/P: 3.52

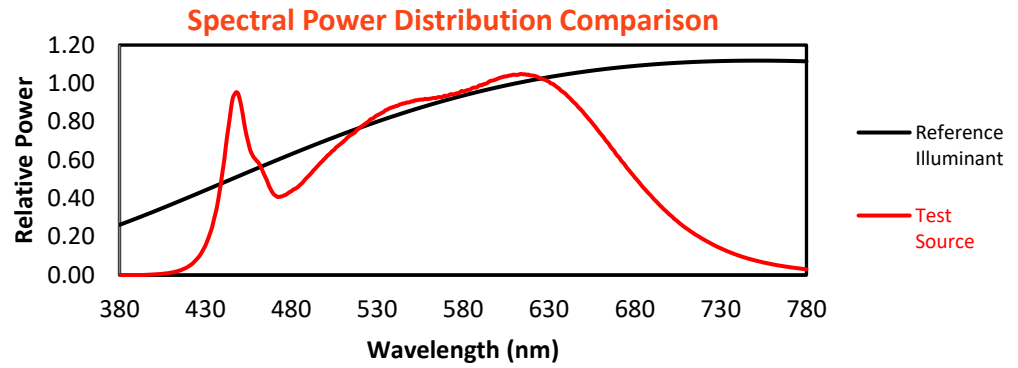
| $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|----------------------------------------|--------------------------------|-------------------|----------------------------------------|--------------------------------|-------------------|----------------------------------------|--------------------------------|-------------------|----------------------------------------|--------------------------------|-------------------|----------------------------------------|--------------------------------|
| 360               | 0                                      | NR                             | 490               | 492                                    | NR                             | 620               | 993                                    | NR                             | 750               | 73                                     | NR                             | 880               | 1                                      | NR                             |
| 365               | 0                                      | NR                             | 495               | 539                                    | NR                             | 625               | 978                                    | NR                             | 755               | 62                                     | NR                             | 885               | 1                                      | NR                             |
| 370               | 0                                      | NR                             | 500               | 583                                    | NR                             | 630               | 962                                    | NR                             | 760               | 54                                     | NR                             | 890               | 1                                      | NR                             |
| 375               | 0                                      | NR                             | 505               | 623                                    | NR                             | 635               | 933                                    | NR                             | 765               | 46                                     | NR                             | 895               | 1                                      | NR                             |
| 380               | 0                                      | NR                             | 510               | 661                                    | NR                             | 640               | 898                                    | NR                             | 770               | 39                                     | NR                             | 900               | 1                                      | NR                             |
| 385               | 0                                      | NR                             | 515               | 698                                    | NR                             | 645               | 855                                    | NR                             | 775               | 34                                     | NR                             | 905               | 1                                      | NR                             |
| 390               | 0                                      | NR                             | 520               | 733                                    | NR                             | 650               | 810                                    | NR                             | 780               | 29                                     | NR                             | 910               | 1                                      | NR                             |
| 395               | 1                                      | NR                             | 525               | 764                                    | NR                             | 655               | 759                                    | NR                             | 785               | 25                                     | NR                             | 915               | 1                                      | NR                             |
| 400               | 3                                      | NR                             | 530               | 794                                    | NR                             | 660               | 704                                    | NR                             | 790               | 21                                     | NR                             | 920               | 1                                      | NR                             |
| 405               | 6                                      | NR                             | 535               | 820                                    | NR                             | 665               | 651                                    | NR                             | 795               | 18                                     | NR                             | 925               | 1                                      | NR                             |
| 410               | 12                                     | NR                             | 540               | 837                                    | NR                             | 670               | 592                                    | NR                             | 800               | 16                                     | NR                             | 930               | 1                                      | NR                             |
| 415               | 22                                     | NR                             | 545               | 853                                    | NR                             | 675               | 538                                    | NR                             | 805               | 13                                     | NR                             | 935               | 0                                      | NR                             |
| 420               | 42                                     | NR                             | 550               | 864                                    | NR                             | 680               | 486                                    | NR                             | 810               | 12                                     | NR                             | 940               | 0                                      | NR                             |
| 425               | 79                                     | NR                             | 555               | 872                                    | NR                             | 685               | 435                                    | NR                             | 815               | 10                                     | NR                             | 945               | 0                                      | NR                             |
| 430               | 147                                    | NR                             | 560               | 876                                    | NR                             | 690               | 389                                    | NR                             | 820               | 9                                      | NR                             | 950               | 0                                      | NR                             |
| 435               | 278                                    | NR                             | 565               | 883                                    | NR                             | 695               | 344                                    | NR                             | 825               | 7                                      | NR                             | 955               | 0                                      | NR                             |
| 440               | 515                                    | NR                             | 570               | 891                                    | NR                             | 700               | 303                                    | NR                             | 830               | 6                                      | NR                             | 960               | 0                                      | NR                             |
| 445               | 832                                    | NR                             | 575               | 900                                    | NR                             | 705               | 266                                    | NR                             | 835               | 5                                      | NR                             | 965               | 0                                      | NR                             |
| 450               | 874                                    | NR                             | 580               | 914                                    | NR                             | 710               | 233                                    | NR                             | 840               | 5                                      | NR                             | 970               | 0                                      | NR                             |
| 455               | 659                                    | NR                             | 585               | 927                                    | NR                             | 715               | 203                                    | NR                             | 845               | 4                                      | NR                             | 975               | 0                                      | NR                             |
| 460               | 567                                    | NR                             | 590               | 944                                    | NR                             | 720               | 178                                    | NR                             | 850               | 4                                      | NR                             | 980               | 0                                      | NR                             |
| 465               | 485                                    | NR                             | 595               | 961                                    | NR                             | 725               | 154                                    | NR                             | 855               | 3                                      | NR                             | 985               | 0                                      | NR                             |
| 470               | 401                                    | NR                             | 600               | 975                                    | NR                             | 730               | 133                                    | NR                             | 860               | 3                                      | NR                             | 990               | 0                                      | NR                             |
| 475               | 393                                    | NR                             | 605               | 988                                    | NR                             | 735               | 115                                    | NR                             | 865               | 2                                      | NR                             | 995               | 1                                      | NR                             |
| 480               | 417                                    | NR                             | 610               | 996                                    | NR                             | 740               | 98                                     | NR                             | 870               | 2                                      | NR                             | 1000              | 0                                      | NR                             |
| 485               | 448                                    | NR                             | 615               | 998                                    | NR                             | 745               | 85                                     | NR                             | 875               | 2                                      | NR                             |                   |                                        |                                |

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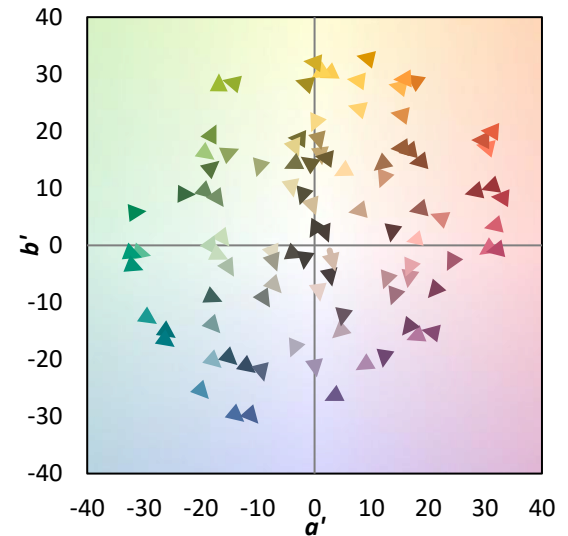
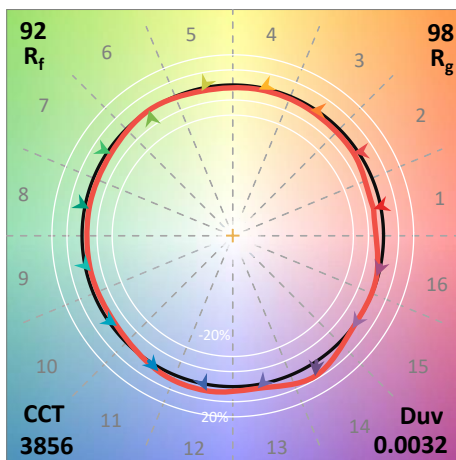
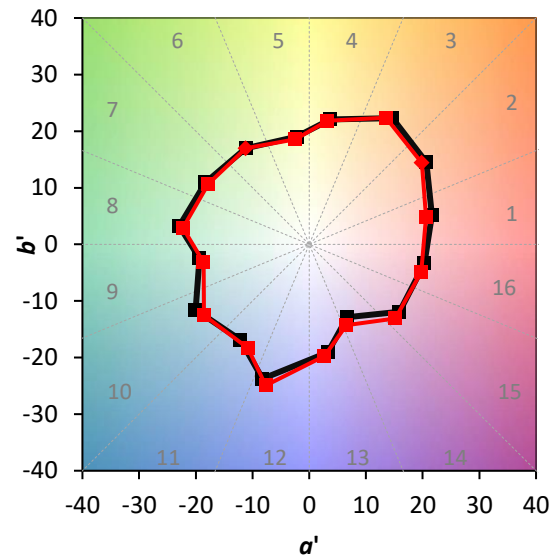
TM-30-18

### Summary

$R_f = 91.8$   
 $R_g = 98.4$   
 $CIE R_a = 92.1$   
 $R_9 = 60.7$



### Color Vector Graphics



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 94 | CES51 = 96 | CES76 = 87 |
| CES02 = 62 | CES27 = 91 | CES52 = 98 | CES77 = 90 |
| CES03 = 31 | CES28 = 96 | CES53 = 95 | CES78 = 84 |
| CES04 = 69 | CES29 = 96 | CES54 = 94 | CES79 = 96 |
| CES05 = 49 | CES30 = 93 | CES55 = 92 | CES80 = 94 |
| CES06 = 50 | CES31 = 97 | CES56 = 93 | CES81 = 89 |
| CES07 = 42 | CES32 = 92 | CES57 = 92 | CES82 = 97 |
| CES08 = 41 | CES33 = 99 | CES58 = 92 | CES83 = 98 |
| CES09 = 29 | CES34 = 94 | CES59 = 96 | CES84 = 94 |
| CES10 = 74 | CES35 = 96 | CES60 = 93 | CES85 = 85 |
| CES11 = 57 | CES36 = 82 | CES61 = 92 | CES86 = 88 |
| CES12 = 63 | CES37 = 95 | CES62 = 87 | CES87 = 92 |
| CES13 = 43 | CES38 = 88 | CES63 = 92 | CES88 = 96 |
| CES14 = 74 | CES39 = 99 | CES64 = 89 | CES89 = 87 |
| CES15 = 71 | CES40 = 98 | CES65 = 88 | CES90 = 96 |
| CES16 = 47 | CES41 = 97 | CES66 = 87 | CES91 = 74 |
| CES17 = 49 | CES42 = 96 | CES67 = 86 | CES92 = 80 |
| CES18 = 56 | CES43 = 96 | CES68 = 88 | CES93 = 88 |
| CES19 = 71 | CES44 = 99 | CES69 = 89 | CES94 = 82 |
| CES20 = 66 | CES45 = 98 | CES70 = 86 | CES95 = 83 |
| CES21 = 85 | CES46 = 97 | CES71 = 81 | CES96 = 92 |
| CES22 = 78 | CES47 = 97 | CES72 = 94 | CES97 = 95 |
| CES23 = 91 | CES48 = 91 | CES73 = 81 | CES98 = 94 |
| CES24 = 90 | CES49 = 96 | CES74 = 93 | CES99 = 91 |
| CES25 = 71 | CES50 = 97 | CES75 = 83 |            |



**Color Rendition by Hue-Angle Bin**


**Measure Comparisons**



(END OF REPORT)