

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: P321483

Luminaire Tested: **GLEON-SA9B-722-U-T2R-HSS**

Issue Date: 3/3/2020

### Test Information

Test Method: LM-79-08  
Report Number: P321483  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-9)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA9B-722-U-T2R-HSS  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(9) 70 CRI, 2200K, 800mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE II  
ROADWAY OPTICS WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

### Summary

Lumens per Lamp: N/A  
Luminaire Lumens: 30313 lumens  
Efficiency: N/A  
Efficacy: 81.1 lumens/watt  
Luminous Opening: Rectangular (W 2.5' x L: 1' x H: 0')  
IES Classification: Type II - Medium  
BUG Rating: B2 - U0 - G4

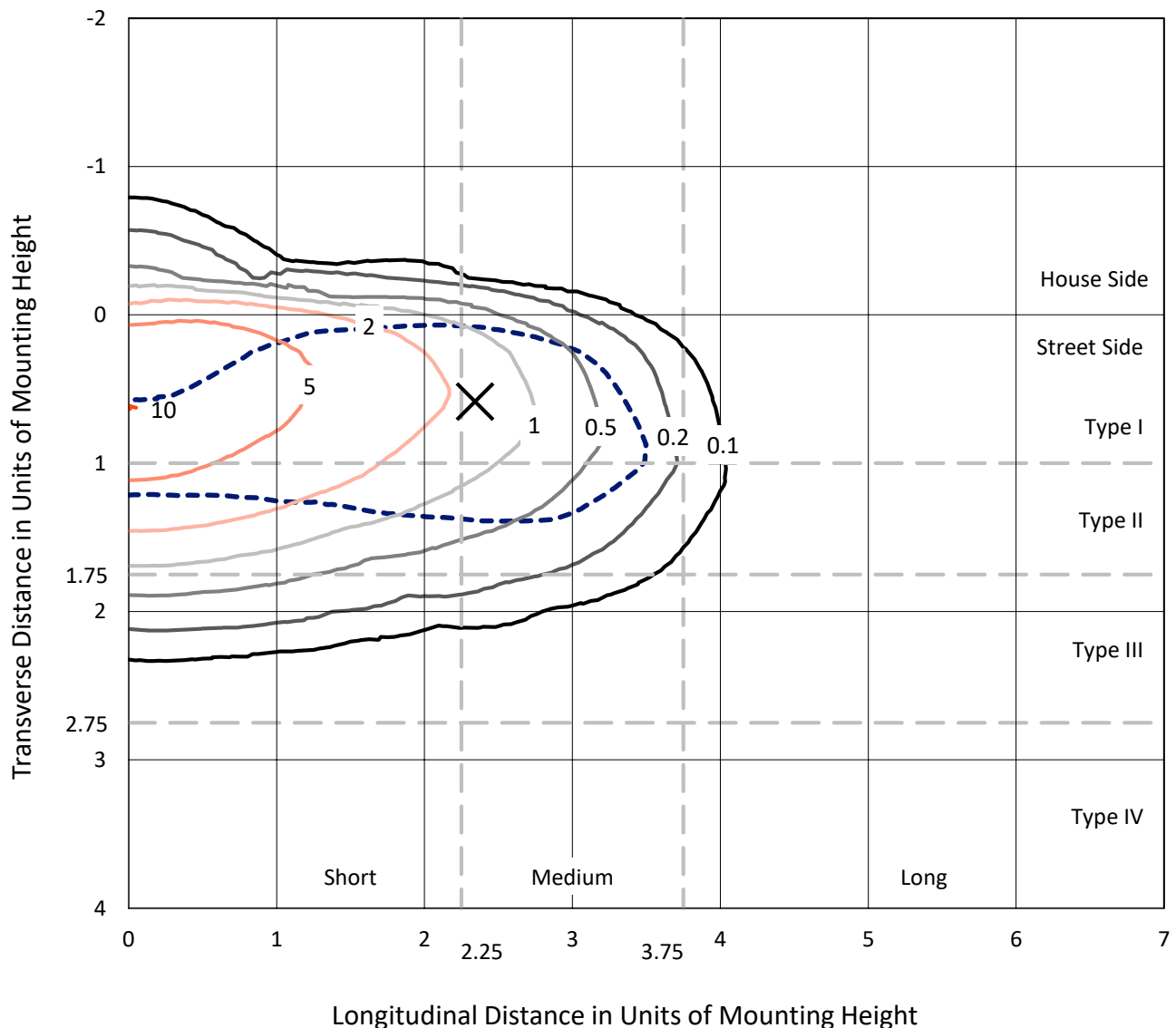
Input Watts (W): 374  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



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## Iso-Footcandle Lines of Horizontal Illumination

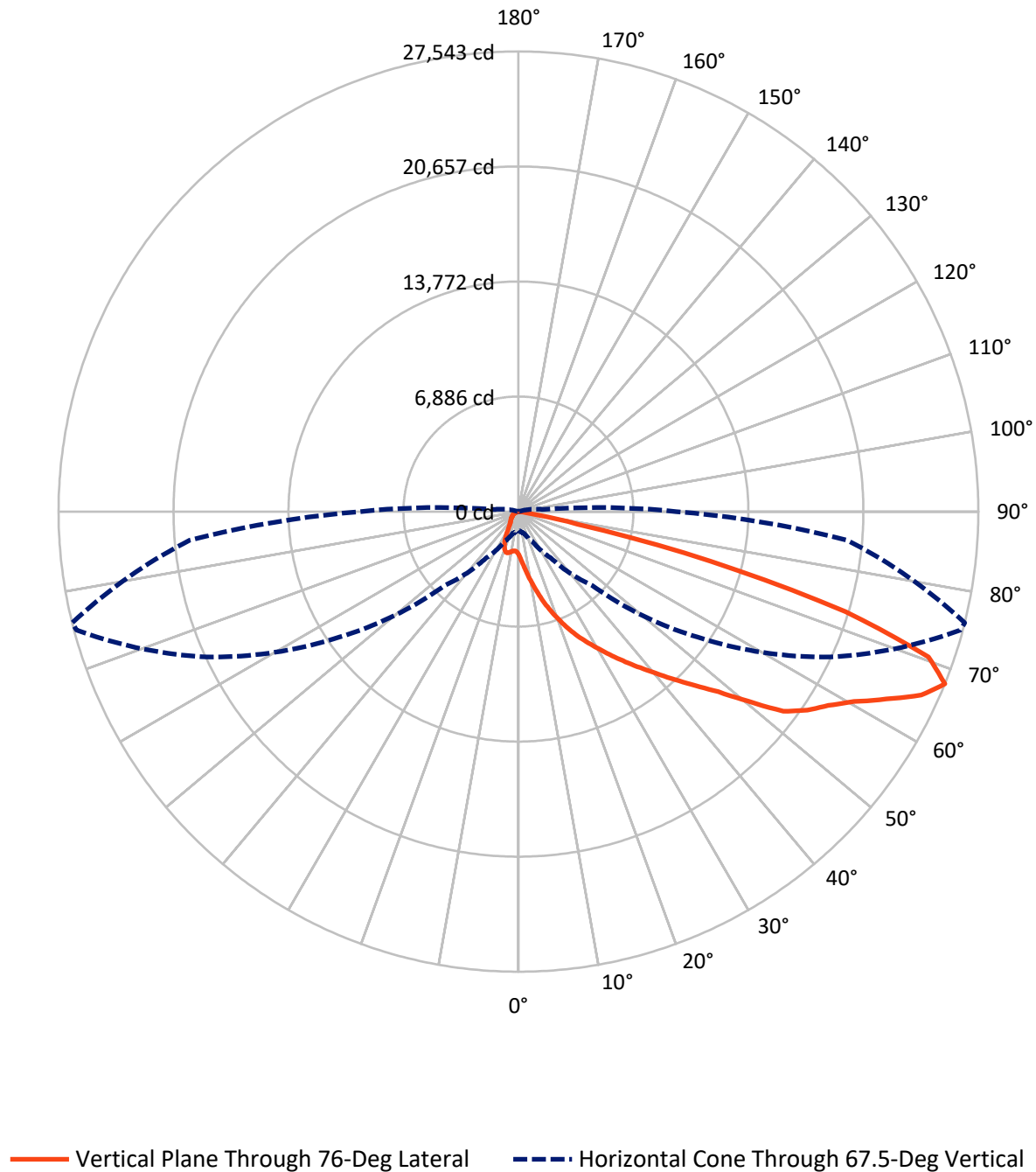
✕ Max cd  
 - - - 1/2 Max cd



Based on 30 foot mounting height. Maximum calculated value = 10.1 fc  
 Type II - Medium - N/A

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## Luminous Intensity Polar Plot



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**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 1505.3   | 0.0    | 1505.3  |
|                    | % Fixture | 5.0      | 0.0    | 5.0     |
| <b>Street Side</b> | Lumens    | 28807.8  | 0.0    | 28807.8 |
|                    | % Fixture | 95.0     | 0.0    | 95.0    |
| <b>Total</b>       | Lumens    | 30313.0  | 0.0    | 30313.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 319.8   | 1.1       |
| 10°-20°   | 1267.5  | 4.2       |
| 20°-30°   | 2579.0  | 8.5       |
| 30°-40°   | 4476.4  | 14.8      |
| 40°-50°   | 6324.5  | 20.9      |
| 50°-60°   | 7172.3  | 23.7      |
| 60°-70°   | 5948.8  | 19.6      |
| 70°-80°   | 2154.8  | 7.1       |
| 80°-90°   | 69.9    | 0.2       |
| 90°-100°  | 0.0     | 0.0       |
| 100°-110° | 0.0     | 0.0       |
| 110°-120° | 0.0     | 0.0       |
| 120°-130° | 0.0     | 0.0       |
| 130°-140° | 0.0     | 0.0       |
| 140°-150° | 0.0     | 0.0       |
| 150°-160° | 0.0     | 0.0       |
| 160°-170° | 0.0     | 0.0       |
| 170°-180° | 0.0     | 0.0       |
| 0°-90°    | 30313.0 | 100.0     |
| 0°-180°   | 30313.0 | 100.0     |

**Coefficient of Utilization**



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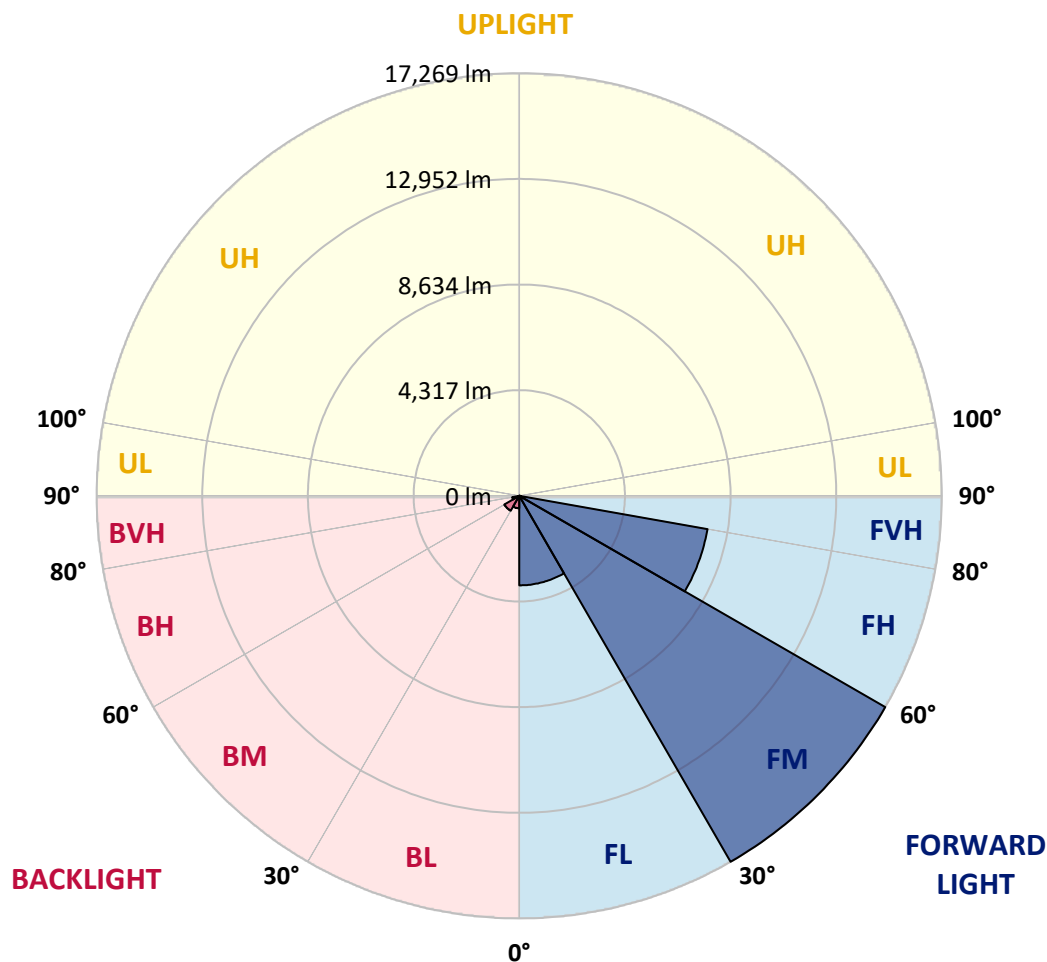
CATALOG NUMBER: GLEON-SA9B-722-U-T2R-HSS

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |          |
|------|-------------|---------|-----------|-------------------------|------|----------|
|      |             |         |           | B                       | U    | G        |
| FL   | (0°-30°)    | 3658.7  | 12.1      |                         |      |          |
| FM   | (30°-60°)   | 17268.7 | 57.0      |                         |      |          |
| FH   | (60°-80°)   | 7812.7  | 25.8      |                         |      | G4/12000 |
| FVH  | (80°-90°)   | 67.7    | 0.2       |                         |      | G1/100   |
| BL   | (0°-30°)    | 507.7   | 1.7       | B2/1000                 |      |          |
| BM   | (30°-60°)   | 704.5   | 2.3       | B1/1000                 |      |          |
| BH   | (60°-80°)   | 290.9   | 1.0       | B1/500                  |      | G1/500   |
| 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: B2-U0-G4**

Type II Medium



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 35°     | 45°     | 55°     | 65°     | 75°     | 76°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 2571.4  | 2571.4  | 2571.4  | 2571.4  | 2571.4  | 2571.4  | 2571.4  | 2571.4  | 2571.4  | 2571.4  | 2571.4  |
| 2.5°  | 3838.5  | 3752.2  | 3772.1  | 3716.3  | 3615.4  | 3408.2  | 3231.5  | 3064.2  | 2868.9  | 2862.3  | 2701.6  |
| 5°    | 5176.0  | 5103.0  | 5093.7  | 4980.8  | 4797.5  | 4445.5  | 4102.8  | 3712.4  | 3276.7  | 3244.8  | 2903.5  |
| 7.5°  | 6390.0  | 6331.6  | 6310.3  | 6176.2  | 5834.8  | 5492.2  | 5045.9  | 4472.1  | 3790.7  | 3732.3  | 3175.8  |
| 10°   | 7322.4  | 7294.5  | 7299.9  | 7204.2  | 6912.0  | 6593.2  | 6007.5  | 5275.7  | 4373.8  | 4283.5  | 3502.5  |
| 12.5° | 8029.0  | 8035.7  | 8083.5  | 8025.1  | 7861.7  | 7625.3  | 6999.7  | 6132.4  | 5019.3  | 4895.8  | 3875.7  |
| 15°   | 8548.4  | 8581.6  | 8669.2  | 8742.3  | 8730.3  | 8525.8  | 7952.0  | 7002.3  | 5704.7  | 5567.9  | 4291.5  |
| 17.5° | 8884.4  | 8921.6  | 9049.1  | 9211.2  | 9359.9  | 9312.1  | 8871.1  | 7841.8  | 6398.0  | 6239.9  | 4736.4  |
| 20°   | 9179.3  | 9223.1  | 9359.9  | 9573.8  | 9851.4  | 9911.1  | 9621.6  | 8656.0  | 7090.0  | 6897.4  | 5196.0  |
| 22.5° | 9818.2  | 9816.8  | 9900.5  | 10025.4 | 10289.7 | 10443.7 | 10260.4 | 9411.7  | 7774.0  | 7573.5  | 5664.8  |
| 25°   | 10973.7 | 10929.9 | 10900.6 | 10802.4 | 10860.8 | 10956.4 | 10854.2 | 10118.3 | 8462.0  | 8258.8  | 6140.3  |
| 27.5° | 12347.1 | 12373.6 | 12137.2 | 11872.9 | 11668.4 | 11570.1 | 11402.7 | 10773.1 | 9123.5  | 8900.4  | 6605.2  |
| 30°   | 13796.1 | 13804.1 | 13525.2 | 13187.8 | 12737.6 | 12364.3 | 12074.8 | 11398.7 | 9803.5  | 9560.5  | 7056.8  |
| 32.5° | 15103.1 | 15051.3 | 14775.0 | 14315.5 | 13747.0 | 13327.3 | 12725.6 | 12097.4 | 10523.4 | 10288.3 | 7558.9  |
| 35°   | 16139.1 | 16078.0 | 15742.0 | 15323.6 | 14733.9 | 14311.5 | 13587.6 | 12794.7 | 11280.5 | 11050.7 | 8062.3  |
| 37.5° | 16896.2 | 16824.5 | 16479.1 | 16048.8 | 15540.1 | 15294.4 | 14587.8 | 13553.1 | 12106.7 | 11859.6 | 8592.2  |
| 40°   | 17159.2 | 17096.8 | 16880.3 | 16565.5 | 16156.4 | 16100.6 | 15649.0 | 14425.7 | 13005.9 | 12742.9 | 9192.6  |
| 42.5° | 17002.5 | 16941.4 | 16864.3 | 16758.1 | 16588.1 | 16641.2 | 16650.5 | 15420.6 | 14004.7 | 13745.7 | 9855.3  |
| 45°   | 16380.9 | 16326.4 | 16406.1 | 16561.5 | 16772.7 | 17035.7 | 17564.3 | 16489.8 | 15120.4 | 14844.1 | 10621.7 |
| 47.5° | 15465.7 | 15425.9 | 15646.3 | 16034.2 | 16651.8 | 17377.0 | 18399.7 | 17613.4 | 16372.9 | 16116.5 | 11578.0 |
| 50°   | 14164.1 | 14157.4 | 14598.4 | 15306.3 | 16256.0 | 17541.7 | 19263.1 | 18891.2 | 18112.8 | 17843.2 | 12907.6 |
| 52.5° | 12137.2 | 12150.5 | 13017.8 | 14150.8 | 15561.3 | 17430.1 | 19818.3 | 20532.8 | 20137.0 | 19856.8 | 14059.1 |
| 55°   | 10207.3 | 10287.0 | 10902.0 | 12535.7 | 14496.1 | 17015.7 | 20009.5 | 21299.2 | 21254.1 | 20988.4 | 14699.3 |
| 57.5° | 8317.3  | 8462.0  | 9054.4  | 10580.5 | 12940.8 | 16060.8 | 19904.6 | 21631.3 | 22085.5 | 21882.3 | 15544.1 |
| 60°   | 6269.2  | 6335.6  | 7018.3  | 8444.8  | 10944.5 | 14318.1 | 19143.5 | 21811.9 | 23222.5 | 23081.7 | 16770.0 |
| 62.5° | 3988.6  | 4154.7  | 4760.3  | 6136.3  | 8521.8  | 11898.1 | 17860.5 | 21809.3 | 24645.0 | 24722.0 | 18351.9 |
| 65°   | 2101.2  | 2295.2  | 2616.6  | 3802.7  | 5856.1  | 9195.2  | 15930.6 | 21604.7 | 26390.3 | 26497.8 | 19588.5 |
| 67.5° | 1133.0  | 1188.8  | 1358.8  | 1973.7  | 3396.2  | 6229.3  | 13094.9 | 20595.3 | 27401.0 | 27543.2 | 19761.2 |
| 70°   | 828.8   | 859.4   | 923.1   | 1091.8  | 1709.4  | 3618.1  | 9555.2  | 18306.8 | 26098.1 | 26044.9 | 17557.6 |
| 72.5° | 636.2   | 684.0   | 731.8   | 799.6   | 982.9   | 1931.2  | 5949.1  | 14335.4 | 20823.7 | 20473.1 | 13124.1 |
| 75°   | 502.1   | 510.0   | 577.8   | 638.9   | 737.2   | 1099.8  | 2641.8  | 8349.1  | 12709.7 | 11879.5 | 6805.8  |
| 77.5° | 401.1   | 406.4   | 446.3   | 499.4   | 592.4   | 722.5   | 818.2   | 3284.7  | 4057.7  | 3620.7  | 1477.0  |
| 80°   | 237.8   | 251.0   | 332.1   | 385.2   | 491.4   | 455.6   | 298.8   | 713.3   | 633.6   | 573.8   | 248.4   |
| 82.5° | 132.8   | 143.4   | 187.3   | 304.2   | 342.7   | 217.8   | 148.8   | 192.6   | 148.8   | 144.8   | 70.4    |
| 85°   | 0.0     | 6.6     | 120.9   | 188.6   | 139.5   | 47.8    | 62.4    | 63.8    | 43.8    | 41.2    | 27.9    |
| 87.5° | 0.0     | 0.0     | 37.2    | 35.9    | 5.3     | 8.0     | 14.6    | 21.3    | 17.3    | 17.3    | 14.6    |
| 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: P321483

CATALOG NUMBER: GLEON-SA9B-722-U-T2R-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 2571.4  | 2571.4 | 2571.4 | 2571.4 | 2571.4 | 2571.4 | 2571.4 | 2571.4 | 2571.4 | 2571.4 | 2571.4 |
| 2.5°  | 2621.9  | 2550.2 | 2414.7 | 2281.9 | 2170.3 | 2078.7 | 1996.3 | 1963.1 | 1936.5 | 1932.5 | 1911.3 |
| 5°    | 2738.8  | 2594.0 | 2335.0 | 2122.5 | 1980.4 | 1879.4 | 1793.1 | 1740.0 | 1698.8 | 1682.8 | 1668.2 |
| 7.5°  | 2915.4  | 2696.3 | 2324.4 | 2080.0 | 1910.0 | 1740.0 | 1580.6 | 1407.9 | 1300.3 | 1259.1 | 1235.2 |
| 10°   | 3130.6  | 2831.8 | 2364.2 | 2068.0 | 1770.5 | 1411.9 | 1147.6 | 928.4  | 839.4  | 810.2  | 802.2  |
| 12.5° | 3381.6  | 3000.4 | 2433.3 | 1993.6 | 1473.0 | 1002.8 | 791.6  | 717.2  | 697.3  | 688.0  | 688.0  |
| 15°   | 3669.9  | 3185.1 | 2482.4 | 1778.5 | 1089.1 | 758.4  | 685.4  | 650.8  | 629.6  | 617.6  | 618.9  |
| 17.5° | 3964.7  | 3365.7 | 2458.5 | 1466.3 | 803.6  | 674.7  | 620.3  | 583.1  | 553.9  | 541.9  | 539.3  |
| 20°   | 4262.2  | 3533.0 | 2325.7 | 1091.8 | 680.0  | 612.3  | 551.2  | 510.0  | 480.8  | 468.9  | 466.2  |
| 22.5° | 4570.4  | 3675.2 | 2091.9 | 800.9  | 611.0  | 543.2  | 483.5  | 442.3  | 414.4  | 403.8  | 398.5  |
| 25°   | 4870.6  | 3790.7 | 1765.2 | 648.2  | 545.9  | 478.2  | 421.0  | 382.5  | 357.3  | 346.7  | 345.3  |
| 27.5° | 5150.8  | 3863.8 | 1386.7 | 572.5  | 488.8  | 419.7  | 367.9  | 333.4  | 312.1  | 304.2  | 302.8  |
| 30°   | 5403.2  | 3870.4 | 1025.4 | 516.7  | 438.3  | 369.2  | 321.4  | 290.9  | 272.3  | 264.3  | 261.7  |
| 32.5° | 5658.2  | 3814.6 | 746.5  | 466.2  | 391.8  | 325.4  | 278.9  | 255.0  | 241.7  | 235.1  | 235.1  |
| 35°   | 5898.6  | 3685.8 | 581.8  | 422.4  | 346.7  | 282.9  | 245.7  | 228.5  | 220.5  | 213.8  | 213.8  |
| 37.5° | 6133.7  | 3501.2 | 494.1  | 383.9  | 304.2  | 247.0  | 216.5  | 205.9  | 199.2  | 192.6  | 192.6  |
| 40°   | 6372.8  | 3268.7 | 448.9  | 348.0  | 269.6  | 219.2  | 192.6  | 183.3  | 176.7  | 171.3  | 170.0  |
| 42.5° | 6666.3  | 3000.4 | 419.7  | 314.8  | 239.1  | 193.9  | 170.0  | 159.4  | 154.1  | 148.8  | 146.1  |
| 45°   | 7006.3  | 2769.3 | 395.8  | 281.6  | 213.8  | 172.7  | 147.4  | 136.8  | 128.8  | 122.2  | 120.9  |
| 47.5° | 7496.4  | 2602.0 | 363.9  | 245.7  | 189.9  | 150.1  | 127.5  | 115.6  | 103.6  | 97.0   | 95.6   |
| 50°   | 8122.0  | 2463.8 | 322.8  | 213.8  | 166.0  | 127.5  | 106.3  | 91.6   | 81.0   | 74.4   | 74.4   |
| 52.5° | 8432.8  | 2283.2 | 285.6  | 185.9  | 139.5  | 107.6  | 86.3   | 69.1   | 63.8   | 57.1   | 57.1   |
| 55°   | 8557.7  | 2145.1 | 248.4  | 158.1  | 115.6  | 89.0   | 67.7   | 53.1   | 49.1   | 45.2   | 43.8   |
| 57.5° | 8908.3  | 2105.2 | 216.5  | 134.1  | 95.6   | 70.4   | 51.8   | 39.8   | 37.2   | 31.9   | 31.9   |
| 60°   | 9472.8  | 2125.1 | 187.3  | 114.2  | 77.0   | 54.5   | 38.5   | 30.5   | 27.9   | 22.6   | 22.6   |
| 62.5° | 10082.5 | 2099.9 | 158.1  | 98.3   | 59.8   | 39.8   | 26.6   | 22.6   | 22.6   | 13.3   | 12.0   |
| 65°   | 10199.3 | 1870.1 | 135.5  | 81.0   | 46.5   | 29.2   | 17.3   | 14.6   | 19.9   | 2.7    | 0.0    |
| 67.5° | 9466.2  | 1450.4 | 116.9  | 62.4   | 34.5   | 22.6   | 13.3   | 6.6    | 17.3   | 0.0    | 0.0    |
| 70°   | 7569.5  | 921.8  | 94.3   | 45.2   | 26.6   | 18.6   | 10.6   | 2.7    | 13.3   | 0.0    | 0.0    |
| 72.5° | 5352.7  | 535.3  | 74.4   | 31.9   | 22.6   | 14.6   | 8.0    | 0.0    | 8.0    | 0.0    | 0.0    |
| 75°   | 2706.9  | 285.6  | 46.5   | 23.9   | 17.3   | 10.6   | 5.3    | 0.0    | 1.3    | 0.0    | 0.0    |
| 77.5° | 585.7   | 132.8  | 29.2   | 17.3   | 12.0   | 6.6    | 2.7    | 0.0    | 0.0    | 0.0    | 0.0    |
| 80°   | 127.5   | 58.4   | 18.6   | 10.6   | 6.6    | 4.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 82.5° | 46.5    | 30.5   | 9.3    | 5.3    | 2.7    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 85°   | 25.2    | 15.9   | 5.3    | 2.7    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 87.5° | 13.3    | 5.3    | 1.3    | 1.3    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 90°   | 0.0     | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

LM-79-2008: Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Report Prepared for

Cooper Lighting Solutions

McGRAW-EDISON

Report Number: SP1-1908-441-10-R4

Test Date: 10/25/2019

Luminaire Tested: SA1C-722-U-5WQ

Data in this report applies to families of products SA1C-722-U-5WQ.

### Test Information

Test Method: LM-79-2008 Report  
 Number: SP1-1908-441-10-R4  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 10/28/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: MCGRAW-EDISON  
 Catalog Number: **SA1C-722-U-5WQ**  
 Description: MCGRAW EDISON ROADWAY AND AREA LUMINAIRE

\*\*\*THIS IS A REVISION OF SP1-1908-441-4-R3. TO UPDATE THE CATALOG INFORMATION.\*\*\*TESTED IN SITU. ROADWAY AND AREA LUMINAIRE. (1) 70 CRI, 5000K, 1050MA LIGHTSQUARE WITH 16 LEDS AND TYPE V WIDE OPTICS.

### Spectral Parameters

|                           |         |           |      |      |       |
|---------------------------|---------|-----------|------|------|-------|
| CCT (K):                  | 2237    | CRI (Ra): | 72.0 |      |       |
| CIE u':                   | 0.2876  | R1:       | 68.9 | R9:  | -17.4 |
| CIE v':                   | 0.5346  | R2:       | 83.0 | R10: | 61.3  |
| Duv:                      | -0.0006 | R3:       | 95.2 | R11: | 59.8  |
| CIE x:                    | 0.5005  | R4:       | 66.2 | R12: | 50.5  |
| CIE y:                    | 0.4134  | R5:       | 65.9 | R13: | 71.1  |
| CIE z:                    | 0.0860  | R6:       | 76.3 | R14: | 96.9  |
| Peak Wavelength (nm):     | 603     | R7:       | 76.7 |      |       |
| Dominant Wavelength (nm): | 587     | R8:       | 43.8 |      |       |
| Purity:                   | 74.5    |           |      |      |       |
| Rf:                       | 69.8    |           |      |      |       |
| Rg:                       | 99.2    |           |      |      |       |



### Test Conditions

Stabilization Time: 71M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.7/41%  
 Sphere Temperature (°C): 25.6

REPORT NUMBER: SP1-1908-441-10-R4

| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 6/28/2019        | 12/28/2019           |
| Power Meter                    | IN0071                | 12/5/2018        | 12/5/2019            |
| AC Power Source                | IN0063                | 12/5/2018        | 12/5/2019            |
| DC Power Source                | IN0208                | 12/5/2018        | 12/5/2019            |
| Sphere Thermometer             | IN0085                | 12/5/2018        | 12/5/2019            |
| Room Thermometer               | IN0046                | 12/5/2018        | 12/5/2019            |

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CIE 1931 Chromaticity Diagram



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



Point lies inside the ANSI 2200K 4-step quadrangle

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**Photopic Flux vs. Wavelength**



#####

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 1768             | NR               | 490       | 5206             | NR               | 620       | 130919           | NR               | 750       | 8553             | NR               | 880       | 2713             | NR               |
| 365       | 1569             | NR               | 495       | 7286             | NR               | 625       | 125335           | NR               | 755       | 7696             | NR               | 885       | 2316             | NR               |
| 370       | 1594             | NR               | 500       | 10654            | NR               | 630       | 118388           | NR               | 760       | 6978             | NR               | 890       | 2539             | NR               |
| 375       | 1744             | NR               | 505       | 15189            | NR               | 635       | 111855           | NR               | 765       | 6377             | NR               | 895       | 1933             | NR               |
| 380       | 1659             | NR               | 510       | 20541            | NR               | 640       | 104062           | NR               | 770       | 5600             | NR               | 900       | 2216             | NR               |
| 385       | 1504             | NR               | 515       | 26492            | NR               | 645       | 96365            | NR               | 775       | 5000             | NR               | 905       | 2067             | NR               |
| 390       | 1541             | NR               | 520       | 32294            | NR               | 650       | 88651            | NR               | 780       | 4709             | NR               | 910       | 1959             | NR               |
| 395       | 1355             | NR               | 525       | 38123            | NR               | 655       | 81152            | NR               | 785       | 4305             | NR               | 915       | 1874             | NR               |
| 400       | 1243             | NR               | 530       | 43232            | NR               | 660       | 73523            | NR               | 790       | 4040             | NR               | 920       | 1484             | NR               |
| 405       | 1417             | NR               | 535       | 48012            | NR               | 665       | 66123            | NR               | 795       | 3642             | NR               | 925       | 1914             | NR               |
| 410       | 2147             | NR               | 540       | 52623            | NR               | 670       | 58677            | NR               | 800       | 3594             | NR               | 930       | 1948             | NR               |
| 415       | 3837             | NR               | 545       | 57516            | NR               | 675       | 52349            | NR               | 805       | 3190             | NR               | 935       | 2079             | NR               |
| 420       | 7159             | NR               | 550       | 62613            | NR               | 680       | 46159            | NR               | 810       | 3241             | NR               | 940       | 2263             | NR               |
| 425       | 12599            | NR               | 555       | 68554            | NR               | 685       | 40525            | NR               | 815       | 2732             | NR               | 945       | 1688             | NR               |
| 430       | 19019            | NR               | 560       | 75325            | NR               | 690       | 35615            | NR               | 820       | 2612             | NR               | 950       | 1560             | NR               |
| 435       | 24875            | NR               | 565       | 82533            | NR               | 695       | 31158            | NR               | 825       | 2966             | NR               | 955       | 2826             | NR               |
| 440       | 29103            | NR               | 570       | 90909            | NR               | 700       | 27409            | NR               | 830       | 2574             | NR               | 960       | 1477             | NR               |
| 445       | 29901            | NR               | 575       | 99621            | NR               | 705       | 24204            | NR               | 835       | 2633             | NR               | 965       | 1568             | NR               |
| 450       | 24862            | NR               | 580       | 108484           | NR               | 710       | 21558            | NR               | 840       | 2526             | NR               | 970       | 2030             | NR               |
| 455       | 15942            | NR               | 585       | 116679           | NR               | 715       | 19222            | NR               | 845       | 2631             | NR               | 975       | 1986             | NR               |
| 460       | 9916             | NR               | 590       | 123752           | NR               | 720       | 17310            | NR               | 850       | 2079             | NR               | 980       | 2540             | NR               |
| 465       | 7051             | NR               | 595       | 129324           | NR               | 725       | 15280            | NR               | 855       | 2309             | NR               | 985       | 1139             | NR               |
| 470       | 5227             | NR               | 600       | 134082           | NR               | 730       | 13282            | NR               | 860       | 2528             | NR               | 990       | 2018             | NR               |
| 475       | 4257             | NR               | 605       | 135698           | NR               | 735       | 11753            | NR               | 865       | 2121             | NR               | 995       | 3445             | NR               |
| 480       | 4052             | NR               | 610       | 135144           | NR               | 740       | 10654            | NR               | 870       | 2751             | NR               | 1000      | 3704             | NR               |
| 485       | 4298             | NR               | 615       | 134180           | NR               | 745       | 9451             | NR               | 875       | 2317             | NR               |           |                  |                  |

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**Scotopic Flux vs. Wavelength**



**Scotopic Lumens: 4696.9**

**S/P: 0.85**

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 1768             | NR               | 490       | 5206             | NR               | 620       | 130919           | NR               | 750       | 8553             | NR               | 880       | 2713             | NR               |
| 365       | 1569             | NR               | 495       | 7286             | NR               | 625       | 125335           | NR               | 755       | 7696             | NR               | 885       | 2316             | NR               |
| 370       | 1594             | NR               | 500       | 10654            | NR               | 630       | 118388           | NR               | 760       | 6978             | NR               | 890       | 2539             | NR               |
| 375       | 1744             | NR               | 505       | 15189            | NR               | 635       | 111855           | NR               | 765       | 6377             | NR               | 895       | 1933             | NR               |
| 380       | 1659             | NR               | 510       | 20541            | NR               | 640       | 104062           | NR               | 770       | 5600             | NR               | 900       | 2216             | NR               |
| 385       | 1504             | NR               | 515       | 26492            | NR               | 645       | 96365            | NR               | 775       | 5000             | NR               | 905       | 2067             | NR               |
| 390       | 1541             | NR               | 520       | 32294            | NR               | 650       | 88651            | NR               | 780       | 4709             | NR               | 910       | 1959             | NR               |
| 395       | 1355             | NR               | 525       | 38123            | NR               | 655       | 81152            | NR               | 785       | 4305             | NR               | 915       | 1874             | NR               |
| 400       | 1243             | NR               | 530       | 43232            | NR               | 660       | 73523            | NR               | 790       | 4040             | NR               | 920       | 1484             | NR               |
| 405       | 1417             | NR               | 535       | 48012            | NR               | 665       | 66123            | NR               | 795       | 3642             | NR               | 925       | 1914             | NR               |
| 410       | 2147             | NR               | 540       | 52623            | NR               | 670       | 58677            | NR               | 800       | 3594             | NR               | 930       | 1948             | NR               |
| 415       | 3837             | NR               | 545       | 57516            | NR               | 675       | 52349            | NR               | 805       | 3190             | NR               | 935       | 2079             | NR               |
| 420       | 7159             | NR               | 550       | 62613            | NR               | 680       | 46159            | NR               | 810       | 3241             | NR               | 940       | 2263             | NR               |
| 425       | 12599            | NR               | 555       | 68554            | NR               | 685       | 40525            | NR               | 815       | 2732             | NR               | 945       | 1688             | NR               |
| 430       | 19019            | NR               | 560       | 75325            | NR               | 690       | 35615            | NR               | 820       | 2612             | NR               | 950       | 1560             | NR               |
| 435       | 24875            | NR               | 565       | 82533            | NR               | 695       | 31158            | NR               | 825       | 2966             | NR               | 955       | 2826             | NR               |
| 440       | 29103            | NR               | 570       | 90909            | NR               | 700       | 27409            | NR               | 830       | 2574             | NR               | 960       | 1477             | NR               |
| 445       | 29901            | NR               | 575       | 99621            | NR               | 705       | 24204            | NR               | 835       | 2633             | NR               | 965       | 1568             | NR               |
| 450       | 24862            | NR               | 580       | 108484           | NR               | 710       | 21558            | NR               | 840       | 2526             | NR               | 970       | 2030             | NR               |
| 455       | 15942            | NR               | 585       | 116679           | NR               | 715       | 19222            | NR               | 845       | 2631             | NR               | 975       | 1986             | NR               |
| 460       | 9916             | NR               | 590       | 123752           | NR               | 720       | 17310            | NR               | 850       | 2079             | NR               | 980       | 2540             | NR               |
| 465       | 7051             | NR               | 595       | 129324           | NR               | 725       | 15280            | NR               | 855       | 2309             | NR               | 985       | 1139             | NR               |
| 470       | 5227             | NR               | 600       | 134082           | NR               | 730       | 13282            | NR               | 860       | 2528             | NR               | 990       | 2018             | NR               |
| 475       | 4257             | NR               | 605       | 135698           | NR               | 735       | 11753            | NR               | 865       | 2121             | NR               | 995       | 3445             | NR               |
| 480       | 4052             | NR               | 610       | 135144           | NR               | 740       | 10654            | NR               | 870       | 2751             | NR               | 1000      | 3704             | NR               |
| 485       | 4298             | NR               | 615       | 134180           | NR               | 745       | 9451             | NR               | 875       | 2317             | NR               |           |                  |                  |

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**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 1470.8 M/P: 0.27**

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 1768             | NR               | 490       | 5206             | NR               | 620       | 130919           | NR               | 750       | 8553             | NR               | 880       | 2713             | NR               |
| 365       | 1569             | NR               | 495       | 7286             | NR               | 625       | 125335           | NR               | 755       | 7696             | NR               | 885       | 2316             | NR               |
| 370       | 1594             | NR               | 500       | 10654            | NR               | 630       | 118388           | NR               | 760       | 6978             | NR               | 890       | 2539             | NR               |
| 375       | 1744             | NR               | 505       | 15189            | NR               | 635       | 111855           | NR               | 765       | 6377             | NR               | 895       | 1933             | NR               |
| 380       | 1659             | NR               | 510       | 20541            | NR               | 640       | 104062           | NR               | 770       | 5600             | NR               | 900       | 2216             | NR               |
| 385       | 1504             | NR               | 515       | 26492            | NR               | 645       | 96365            | NR               | 775       | 5000             | NR               | 905       | 2067             | NR               |
| 390       | 1541             | NR               | 520       | 32294            | NR               | 650       | 88651            | NR               | 780       | 4709             | NR               | 910       | 1959             | NR               |
| 395       | 1355             | NR               | 525       | 38123            | NR               | 655       | 81152            | NR               | 785       | 4305             | NR               | 915       | 1874             | NR               |
| 400       | 1243             | NR               | 530       | 43232            | NR               | 660       | 73523            | NR               | 790       | 4040             | NR               | 920       | 1484             | NR               |
| 405       | 1417             | NR               | 535       | 48012            | NR               | 665       | 66123            | NR               | 795       | 3642             | NR               | 925       | 1914             | NR               |
| 410       | 2147             | NR               | 540       | 52623            | NR               | 670       | 58677            | NR               | 800       | 3594             | NR               | 930       | 1948             | NR               |
| 415       | 3837             | NR               | 545       | 57516            | NR               | 675       | 52349            | NR               | 805       | 3190             | NR               | 935       | 2079             | NR               |
| 420       | 7159             | NR               | 550       | 62613            | NR               | 680       | 46159            | NR               | 810       | 3241             | NR               | 940       | 2263             | NR               |
| 425       | 12599            | NR               | 555       | 68554            | NR               | 685       | 40525            | NR               | 815       | 2732             | NR               | 945       | 1688             | NR               |
| 430       | 19019            | NR               | 560       | 75325            | NR               | 690       | 35615            | NR               | 820       | 2612             | NR               | 950       | 1560             | NR               |
| 435       | 24875            | NR               | 565       | 82533            | NR               | 695       | 31158            | NR               | 825       | 2966             | NR               | 955       | 2826             | NR               |
| 440       | 29103            | NR               | 570       | 90909            | NR               | 700       | 27409            | NR               | 830       | 2574             | NR               | 960       | 1477             | NR               |
| 445       | 29901            | NR               | 575       | 99621            | NR               | 705       | 24204            | NR               | 835       | 2633             | NR               | 965       | 1568             | NR               |
| 450       | 24862            | NR               | 580       | 108484           | NR               | 710       | 21558            | NR               | 840       | 2526             | NR               | 970       | 2030             | NR               |
| 455       | 15942            | NR               | 585       | 116679           | NR               | 715       | 19222            | NR               | 845       | 2631             | NR               | 975       | 1986             | NR               |
| 460       | 9916             | NR               | 590       | 123752           | NR               | 720       | 17310            | NR               | 850       | 2079             | NR               | 980       | 2540             | NR               |
| 465       | 7051             | NR               | 595       | 129324           | NR               | 725       | 15280            | NR               | 855       | 2309             | NR               | 985       | 1139             | NR               |
| 470       | 5227             | NR               | 600       | 134082           | NR               | 730       | 13282            | NR               | 860       | 2528             | NR               | 990       | 2018             | NR               |
| 475       | 4257             | NR               | 605       | 135698           | NR               | 735       | 11753            | NR               | 865       | 2121             | NR               | 995       | 3445             | NR               |
| 480       | 4052             | NR               | 610       | 135144           | NR               | 740       | 10654            | NR               | 870       | 2751             | NR               | 1000      | 3704             | NR               |
| 485       | 4298             | NR               | 615       | 134180           | NR               | 745       | 9451             | NR               | 875       | 2317             | NR               |           |                  |                  |

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### Summary

$R_f = 69.8$   
 $R_g = 99.2$   
 CIE  $R_a = 72.0$   
 $R_g = -17.4$



### Color Vector Graphics



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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 87 | CES26 = 56 | CES51 = 74 | CES76 = 56 |
| CES02 = 65 | CES27 = 76 | CES52 = 76 | CES77 = 81 |
| CES03 = 32 | CES28 = 83 | CES53 = 65 | CES78 = 63 |
| CES04 = 72 | CES29 = 46 | CES54 = 78 | CES79 = 84 |
| CES05 = 52 | CES30 = 48 | CES55 = 75 | CES80 = 84 |
| CES06 = 52 | CES31 = 51 | CES56 = 65 | CES81 = 63 |
| CES07 = 44 | CES32 = 51 | CES57 = 62 | CES82 = 92 |
| CES08 = 42 | CES33 = 53 | CES58 = 66 | CES83 = 83 |
| CES09 = 29 | CES34 = 70 | CES59 = 84 | CES84 = 92 |
| CES10 = 78 | CES35 = 85 | CES60 = 90 | CES85 = 81 |
| CES11 = 61 | CES36 = 78 | CES61 = 84 | CES86 = 56 |
| CES12 = 68 | CES37 = 80 | CES62 = 70 | CES87 = 78 |
| CES13 = 45 | CES38 = 53 | CES63 = 68 | CES88 = 72 |
| CES14 = 75 | CES39 = 90 | CES64 = 69 | CES89 = 62 |
| CES15 = 72 | CES40 = 84 | CES65 = 67 | CES90 = 67 |
| CES16 = 49 | CES41 = 75 | CES66 = 64 | CES91 = 90 |
| CES17 = 51 | CES42 = 79 | CES67 = 63 | CES92 = 67 |
| CES18 = 57 | CES43 = 64 | CES68 = 69 | CES93 = 79 |
| CES19 = 74 | CES44 = 98 | CES69 = 80 | CES94 = 52 |
| CES20 = 68 | CES45 = 73 | CES70 = 63 | CES95 = 76 |
| CES21 = 89 | CES46 = 67 | CES71 = 63 | CES96 = 78 |
| CES22 = 81 | CES47 = 60 | CES72 = 87 | CES97 = 77 |
| CES23 = 92 | CES48 = 48 | CES73 = 56 | CES98 = 71 |
| CES24 = 92 | CES49 = 64 | CES74 = 87 | CES99 = 65 |
| CES25 = 74 | CES50 = 74 | CES75 = 66 |            |



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Color Rendition by Hue-Angle Bin



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**Measure Comparisons**



(END OF REPORT)