

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: P322754

Luminaire Tested: **GLEON-SA0A-722-U-T4FT-HSS**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P322754  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-17)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA0A-722-U-T4FT-HSS  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(10) 70 CRI, 2200K, 615mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE IV  
FORWARD THROW OPTICS WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 24081 lumens  
Efficiency: N/A  
Efficacy: 74.6 lumens/watt  
Luminous Opening: Rectangular (W 2.5' x L: 1' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B2 - U0 - G4

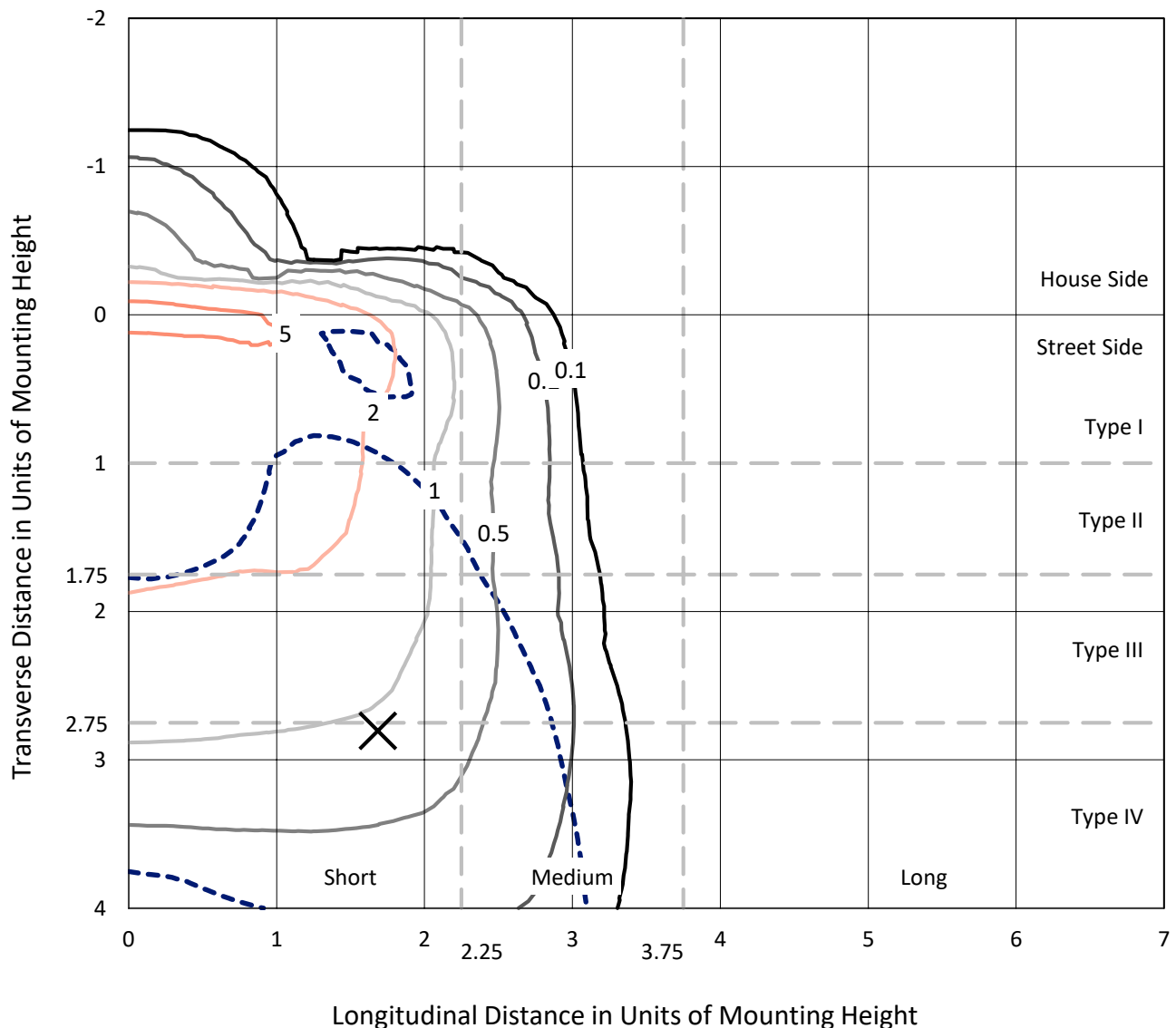
Input Watts (W): 323  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



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## Iso-Footcandle Lines of Horizontal Illumination

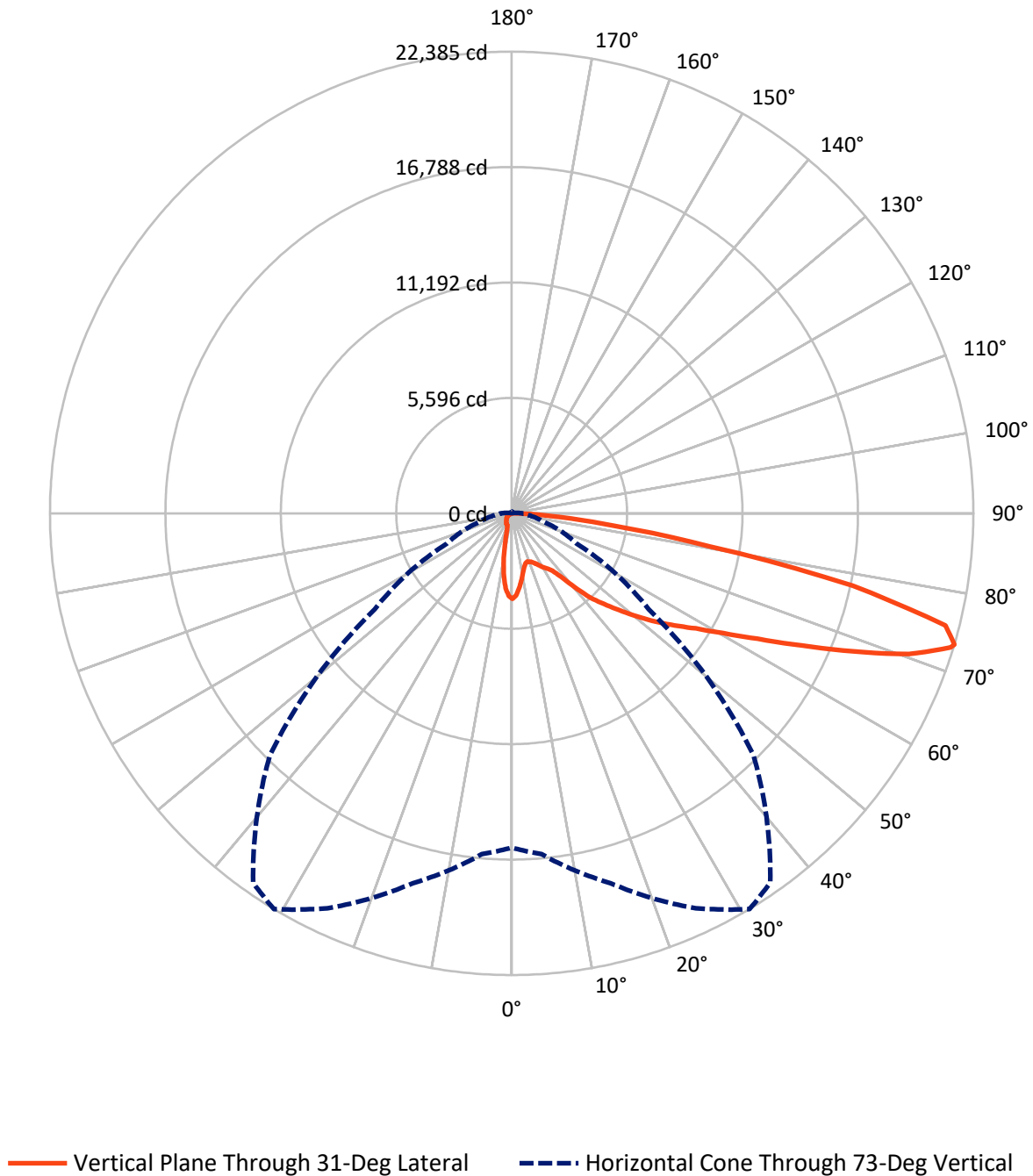
× Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 6.6 fc  
 Type IV - Short - N/A

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## Luminous Intensity Polar Plot



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**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 2195.1   | 0.0    | 2195.1  |
|                    | % Fixture | 9.1      | 0.0    | 9.1     |
| <b>Street Side</b> | Lumens    | 21885.9  | 0.0    | 21885.9 |
|                    | % Fixture | 90.9     | 0.0    | 90.9    |
| <b>Total</b>       | Lumens    | 24081.0  | 0.0    | 24081.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 343.5   | 1.4       |
| 10°-20°   | 745.9   | 3.1       |
| 20°-30°   | 1117.6  | 4.6       |
| 30°-40°   | 1778.1  | 7.4       |
| 40°-50°   | 3175.1  | 13.2      |
| 50°-60°   | 4926.9  | 20.5      |
| 60°-70°   | 6549.6  | 27.2      |
| 70°-80°   | 4926.6  | 20.5      |
| 80°-90°   | 517.7   | 2.1       |
| 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°    | 24081.0 | 100.0     |
| 0°-180°   | 24081.0 | 100.0     |

**Coefficient of Utilization**



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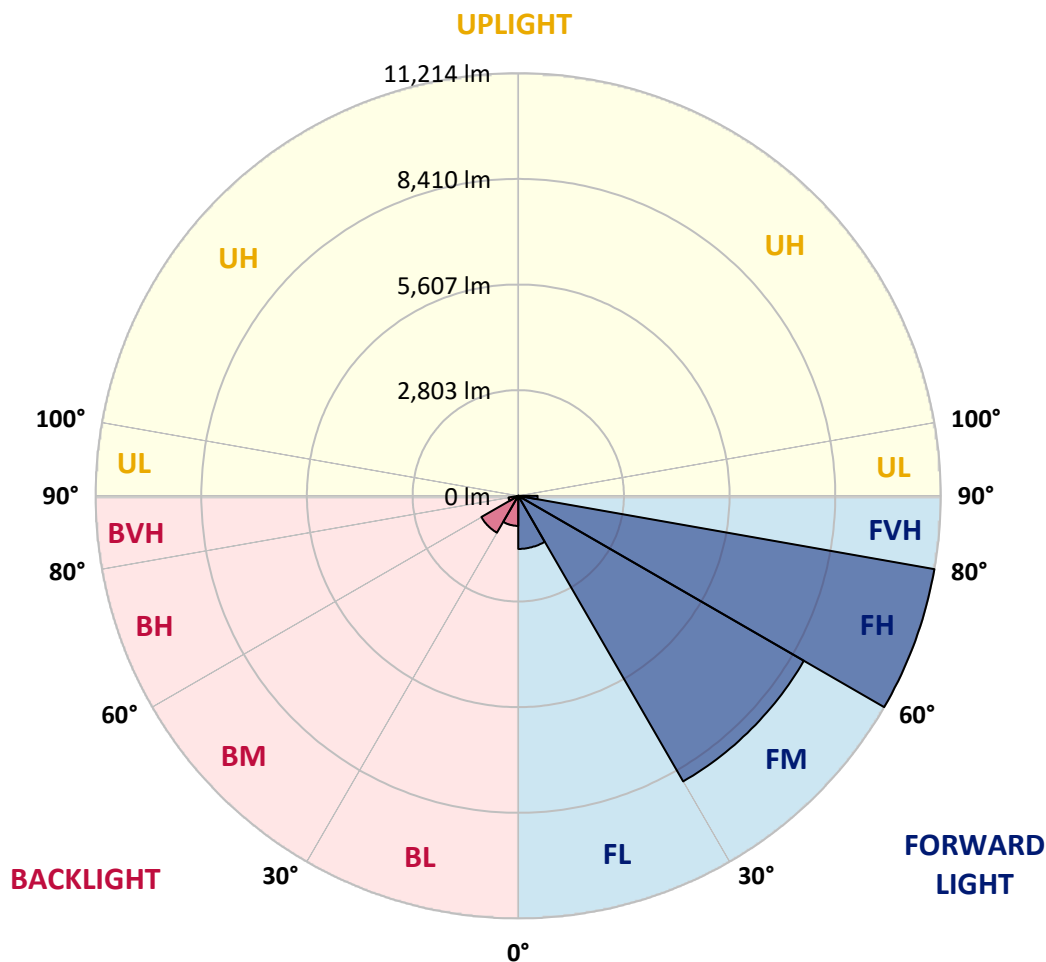
CATALOG NUMBER: GLEON-SA0A-722-U-T4FT-HSS

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |          |
|------|-------------|---------|-----------|-------------------------|------|----------|
|      |             |         |           | B                       | U    | G        |
| FL   | (0°-30°)    | 1408.8  | 5.9       |                         |      |          |
| FM   | (30°-60°)   | 8750.2  | 36.3      |                         |      |          |
| FH   | (60°-80°)   | 11213.6 | 46.6      |                         |      | G4/12000 |
| FVH  | (80°-90°)   | 513.3   | 2.1       |                         |      | G4/750   |
| BL   | (0°-30°)    | 798.2   | 3.3       | B2/1000                 |      |          |
| BM   | (30°-60°)   | 1129.9  | 4.7       | B2/2500                 |      |          |
| BH   | (60°-80°)   | 262.6   | 1.1       | B1/500                  |      | G1/500   |
| BVH  | (80°-90°)   | 4.4     | 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 IV Short



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 31°     | 35°     | 45°     | 55°     | 65°     | 75°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 4143.2  | 4143.2  | 4143.2  | 4143.2  | 4143.2  | 4143.2  | 4143.2  | 4143.2  | 4143.2  | 4143.2  | 4143.2  |
| 2.5°  | 3926.4  | 3942.9  | 3960.5  | 3964.1  | 3993.5  | 3994.7  | 4037.1  | 4068.9  | 4100.8  | 4131.4  | 4142.0  |
| 5°    | 3523.4  | 3550.5  | 3582.3  | 3614.1  | 3676.5  | 3701.3  | 3805.0  | 3911.0  | 4012.4  | 4109.0  | 4156.1  |
| 7.5°  | 3093.2  | 3123.9  | 3168.7  | 3247.6  | 3317.1  | 3365.5  | 3529.2  | 3717.8  | 3906.3  | 4084.3  | 4186.8  |
| 10°   | 2700.8  | 2729.1  | 2776.3  | 2859.9  | 2967.2  | 3033.2  | 3253.5  | 3515.1  | 3792.0  | 4061.9  | 4232.7  |
| 12.5° | 2451.0  | 2466.4  | 2492.3  | 2581.8  | 2678.5  | 2752.7  | 3011.9  | 3336.0  | 3697.8  | 4060.7  | 4307.0  |
| 15°   | 2405.1  | 2409.8  | 2388.6  | 2428.6  | 2504.1  | 2575.9  | 2838.7  | 3191.1  | 3625.9  | 4079.6  | 4403.6  |
| 17.5° | 2478.1  | 2475.8  | 2405.1  | 2400.4  | 2460.5  | 2519.4  | 2753.9  | 3090.9  | 3575.2  | 4123.2  | 4528.5  |
| 20°   | 2588.9  | 2580.7  | 2458.1  | 2435.7  | 2499.3  | 2554.7  | 2748.0  | 3053.2  | 3556.4  | 4196.2  | 4680.5  |
| 22.5° | 2736.2  | 2722.1  | 2530.0  | 2506.4  | 2574.8  | 2632.5  | 2821.0  | 3089.7  | 3572.8  | 4294.0  | 4857.3  |
| 25°   | 2918.8  | 2897.6  | 2653.7  | 2627.8  | 2697.3  | 2755.1  | 2951.8  | 3194.6  | 3622.3  | 4413.0  | 5081.2  |
| 27.5° | 3125.1  | 3094.4  | 2851.7  | 2784.5  | 2863.5  | 2923.6  | 3126.2  | 3354.8  | 3700.1  | 4539.1  | 5355.7  |
| 30°   | 3319.5  | 3279.4  | 3060.3  | 2949.5  | 3046.1  | 3113.3  | 3314.8  | 3545.7  | 3825.0  | 4733.6  | 5731.6  |
| 32.5° | 3515.1  | 3470.3  | 3246.4  | 3114.5  | 3201.7  | 3274.7  | 3509.2  | 3808.5  | 4059.5  | 5030.5  | 6231.3  |
| 35°   | 3965.2  | 3918.1  | 3643.6  | 3425.6  | 3424.4  | 3465.6  | 3781.4  | 4167.9  | 4369.4  | 5444.1  | 6827.5  |
| 37.5° | 4722.9  | 4695.8  | 4434.2  | 4020.6  | 3909.9  | 3863.9  | 4152.6  | 4596.9  | 4814.9  | 6013.3  | 7500.4  |
| 40°   | 5552.5  | 5529.0  | 5235.5  | 4860.8  | 4692.3  | 4579.2  | 4685.2  | 5194.3  | 5444.1  | 6708.5  | 8187.4  |
| 42.5° | 6489.3  | 6377.4  | 5854.2  | 5742.2  | 5591.4  | 5505.4  | 5409.9  | 5930.8  | 6217.1  | 7465.0  | 8868.5  |
| 45°   | 7340.1  | 7151.6  | 6472.8  | 6303.2  | 6269.0  | 6290.2  | 6343.2  | 6920.6  | 7086.8  | 8364.1  | 9547.2  |
| 47.5° | 7846.8  | 7698.4  | 7177.5  | 7014.9  | 7005.5  | 7145.7  | 7546.3  | 8038.9  | 7952.9  | 9147.8  | 10144.7 |
| 50°   | 8328.8  | 8194.5  | 7762.0  | 7802.1  | 7845.7  | 8036.6  | 8912.1  | 9189.0  | 8743.6  | 9858.3  | 10692.6 |
| 52.5° | 8718.8  | 8513.8  | 8287.5  | 8512.6  | 8727.1  | 9034.6  | 10321.4 | 10221.3 | 9304.5  | 10424.0 | 11161.6 |
| 55°   | 8943.9  | 8850.8  | 8960.4  | 9186.7  | 9589.7  | 10089.3 | 11651.8 | 11080.3 | 9714.6  | 10940.1 | 11473.9 |
| 57.5° | 9768.8  | 9586.1  | 9804.1  | 9999.7  | 10525.3 | 11224.1 | 12791.3 | 11720.2 | 10010.3 | 11259.4 | 11545.8 |
| 60°   | 10766.9 | 10619.6 | 10748.0 | 11073.2 | 11782.6 | 12604.0 | 13856.6 | 12242.2 | 10164.7 | 11464.5 | 11359.6 |
| 62.5° | 12355.3 | 12160.9 | 12080.8 | 12444.9 | 13385.2 | 14282.0 | 14664.9 | 12604.0 | 10130.5 | 11373.7 | 10720.9 |
| 65°   | 14483.5 | 14282.0 | 13923.7 | 14253.7 | 15449.7 | 16082.5 | 15568.8 | 12680.6 | 9894.9  | 10639.6 | 9106.5  |
| 67.5° | 16663.5 | 16517.4 | 16211.0 | 16767.2 | 17846.6 | 18050.4 | 16524.4 | 12494.4 | 9136.0  | 8626.9  | 6434.0  |
| 70°   | 18103.5 | 18041.0 | 18240.1 | 19470.4 | 20433.1 | 20374.2 | 17401.1 | 11493.9 | 7121.0  | 5305.1  | 3182.8  |
| 72.5° | 17065.3 | 17364.6 | 18835.2 | 21065.9 | 22241.9 | 21761.2 | 16951.0 | 8826.1  | 4070.1  | 2041.0  | 920.3   |
| 73°   | 16205.1 | 16588.1 | 18567.7 | 21126.0 | 22384.5 | 21857.8 | 16572.7 | 8101.4  | 3469.2  | 1610.8  | 697.6   |
| 75°   | 11273.6 | 11743.7 | 15372.0 | 19675.4 | 21717.6 | 20825.5 | 13814.2 | 4958.6  | 1607.3  | 714.1   | 281.6   |
| 77.5° | 5473.6  | 5821.2  | 8464.3  | 14216.0 | 16889.7 | 16271.1 | 8599.8  | 1847.7  | 725.9   | 446.6   | 129.6   |
| 80°   | 2043.3  | 2271.9  | 3674.2  | 7235.3  | 9760.5  | 10016.2 | 3782.6  | 698.8   | 483.1   | 359.4   | 66.0    |
| 82.5° | 535.0   | 596.3   | 1355.1  | 3226.4  | 5002.2  | 5235.5  | 1192.5  | 352.3   | 353.5   | 295.8   | 40.1    |
| 85°   | 170.9   | 195.6   | 423.0   | 1448.2  | 2356.8  | 2069.2  | 311.1   | 170.9   | 256.9   | 220.4   | 22.4    |
| 87.5° | 21.2    | 27.1    | 134.3   | 340.6   | 519.7   | 288.7   | 48.3    | 50.7    | 109.6   | 122.6   | 13.0    |
| 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: P322754

CATALOG NUMBER: GLEON-SA0A-722-U-T4FT-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 4143.2 | 4143.2 | 4143.2 | 4143.2 | 4143.2 | 4143.2 | 4143.2 | 4143.2 | 4143.2 | 4143.2 | 4143.2 |
| 2.5°  | 4152.6 | 4146.7 | 4147.9 | 4117.3 | 4097.2 | 4057.2 | 4015.9 | 3997.1 | 3977.0 | 3968.8 | 3977.0 |
| 5°    | 4173.8 | 4163.2 | 4132.6 | 4038.3 | 3938.1 | 3808.5 | 3687.2 | 3595.2 | 3479.8 | 3447.9 | 3480.9 |
| 7.5°  | 4206.8 | 4185.6 | 4096.1 | 3904.0 | 3681.3 | 3433.8 | 3155.7 | 2953.0 | 2786.9 | 2679.6 | 2718.5 |
| 10°   | 4255.1 | 4215.1 | 4034.8 | 3708.4 | 3310.1 | 2871.7 | 2477.0 | 2169.4 | 1951.4 | 1861.8 | 1858.3 |
| 12.5° | 4336.4 | 4261.0 | 3959.4 | 3453.8 | 2856.4 | 2271.9 | 1754.6 | 1421.1 | 1244.4 | 1130.1 | 1127.7 |
| 15°   | 4426.0 | 4315.2 | 3863.9 | 3148.6 | 2328.5 | 1627.3 | 1130.1 | 876.7  | 762.4  | 725.9  | 721.2  |
| 17.5° | 4535.6 | 4377.7 | 3740.2 | 2772.7 | 1775.8 | 1078.2 | 737.7  | 664.6  | 659.9  | 656.4  | 656.4  |
| 20°   | 4673.5 | 4451.9 | 3581.1 | 2342.6 | 1259.7 | 720.0  | 626.9  | 631.6  | 634.0  | 629.3  | 630.4  |
| 22.5° | 4833.7 | 4527.3 | 3391.4 | 1880.7 | 852.0  | 602.2  | 599.8  | 605.7  | 608.0  | 605.7  | 606.9  |
| 25°   | 5019.9 | 4614.5 | 3160.4 | 1396.4 | 615.1  | 571.5  | 577.4  | 585.7  | 591.5  | 591.5  | 591.5  |
| 27.5° | 5250.9 | 4720.6 | 2882.3 | 974.5  | 531.4  | 539.7  | 556.2  | 571.5  | 579.8  | 582.1  | 582.1  |
| 30°   | 5551.3 | 4852.6 | 2548.8 | 668.1  | 483.1  | 497.3  | 527.9  | 557.4  | 572.7  | 575.0  | 576.2  |
| 32.5° | 5930.8 | 5001.0 | 2162.3 | 493.7  | 441.9  | 452.5  | 485.5  | 535.0  | 564.4  | 569.2  | 569.2  |
| 35°   | 6365.6 | 5173.1 | 1746.4 | 430.1  | 412.4  | 416.0  | 441.9  | 498.5  | 550.3  | 563.3  | 564.4  |
| 37.5° | 6841.7 | 5342.8 | 1328.0 | 401.8  | 387.7  | 387.7  | 406.5  | 454.9  | 516.1  | 556.2  | 560.9  |
| 40°   | 7285.9 | 5445.3 | 930.9  | 379.4  | 365.3  | 365.3  | 381.8  | 417.1  | 474.9  | 535.0  | 547.9  |
| 42.5° | 7696.0 | 5480.6 | 648.1  | 358.2  | 344.1  | 347.6  | 361.8  | 390.0  | 433.6  | 493.7  | 505.5  |
| 45°   | 8117.9 | 5474.8 | 472.5  | 333.5  | 322.9  | 333.5  | 344.1  | 365.3  | 397.1  | 431.3  | 433.6  |
| 47.5° | 8436.0 | 5425.3 | 374.7  | 309.9  | 302.8  | 317.0  | 326.4  | 340.6  | 358.2  | 355.9  | 355.9  |
| 50°   | 8734.2 | 5305.1 | 301.7  | 278.1  | 282.8  | 299.3  | 304.0  | 308.7  | 309.9  | 287.5  | 285.2  |
| 52.5° | 8960.4 | 5117.7 | 241.6  | 243.9  | 262.8  | 279.3  | 274.6  | 267.5  | 255.7  | 228.6  | 223.9  |
| 55°   | 9035.8 | 4757.1 | 189.7  | 201.5  | 233.3  | 254.5  | 236.9  | 221.5  | 199.1  | 176.8  | 172.0  |
| 57.5° | 8899.1 | 4291.7 | 154.4  | 156.7  | 196.8  | 214.5  | 194.4  | 176.8  | 152.0  | 133.2  | 129.6  |
| 60°   | 8609.2 | 3774.4 | 127.3  | 117.8  | 152.0  | 167.3  | 154.4  | 136.7  | 114.3  | 100.2  | 99.0   |
| 62.5° | 8034.2 | 3222.9 | 104.9  | 91.9   | 115.5  | 128.4  | 120.2  | 107.2  | 88.4   | 79.0   | 77.8   |
| 65°   | 6825.2 | 2578.3 | 84.8   | 74.2   | 89.6   | 100.2  | 93.1   | 83.7   | 69.5   | 62.5   | 61.3   |
| 67.5° | 4764.2 | 1742.8 | 69.5   | 61.3   | 70.7   | 79.0   | 73.1   | 68.3   | 55.4   | 54.2   | 55.4   |
| 70°   | 2297.8 | 840.2  | 57.7   | 49.5   | 55.4   | 61.3   | 58.9   | 55.4   | 53.0   | 61.3   | 70.7   |
| 72.5° | 658.7  | 281.6  | 46.0   | 41.2   | 44.8   | 48.3   | 50.7   | 49.5   | 57.7   | 74.2   | 86.0   |
| 73°   | 506.7  | 227.4  | 43.6   | 38.9   | 42.4   | 47.1   | 49.5   | 48.3   | 58.9   | 75.4   | 86.0   |
| 75°   | 216.8  | 109.6  | 33.0   | 31.8   | 35.4   | 41.2   | 43.6   | 43.6   | 58.9   | 76.6   | 82.5   |
| 77.5° | 97.8   | 58.9   | 21.2   | 24.7   | 30.6   | 33.0   | 36.5   | 36.5   | 47.1   | 58.9   | 58.9   |
| 80°   | 55.4   | 31.8   | 16.5   | 18.9   | 22.4   | 22.4   | 22.4   | 20.0   | 21.2   | 23.6   | 25.9   |
| 82.5° | 35.4   | 21.2   | 13.0   | 15.3   | 14.1   | 11.8   | 9.4    | 9.4    | 8.2    | 9.4    | 11.8   |
| 85°   | 20.0   | 11.8   | 11.8   | 9.4    | 5.9    | 4.7    | 5.9    | 4.7    | 1.2    | 0.0    | 1.2    |
| 87.5° | 11.8   | 7.1    | 3.5    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

LM-79-2008: 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

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| 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)