

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: P323103

Luminaire Tested: **GLEON-SA9D-722-U-T4W-HSS**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P323103  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-19)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA9D-722-U-T4W-HSS  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(9) 70 CRI, 2200K, 1200mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE IV WIDE OPTICS WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 36959 lumens  
Efficiency: N/A  
Efficacy: 64.3 lumens/watt  
Luminous Opening: Rectangular (W 2.5' x L: 1' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B2 - U0 - G5

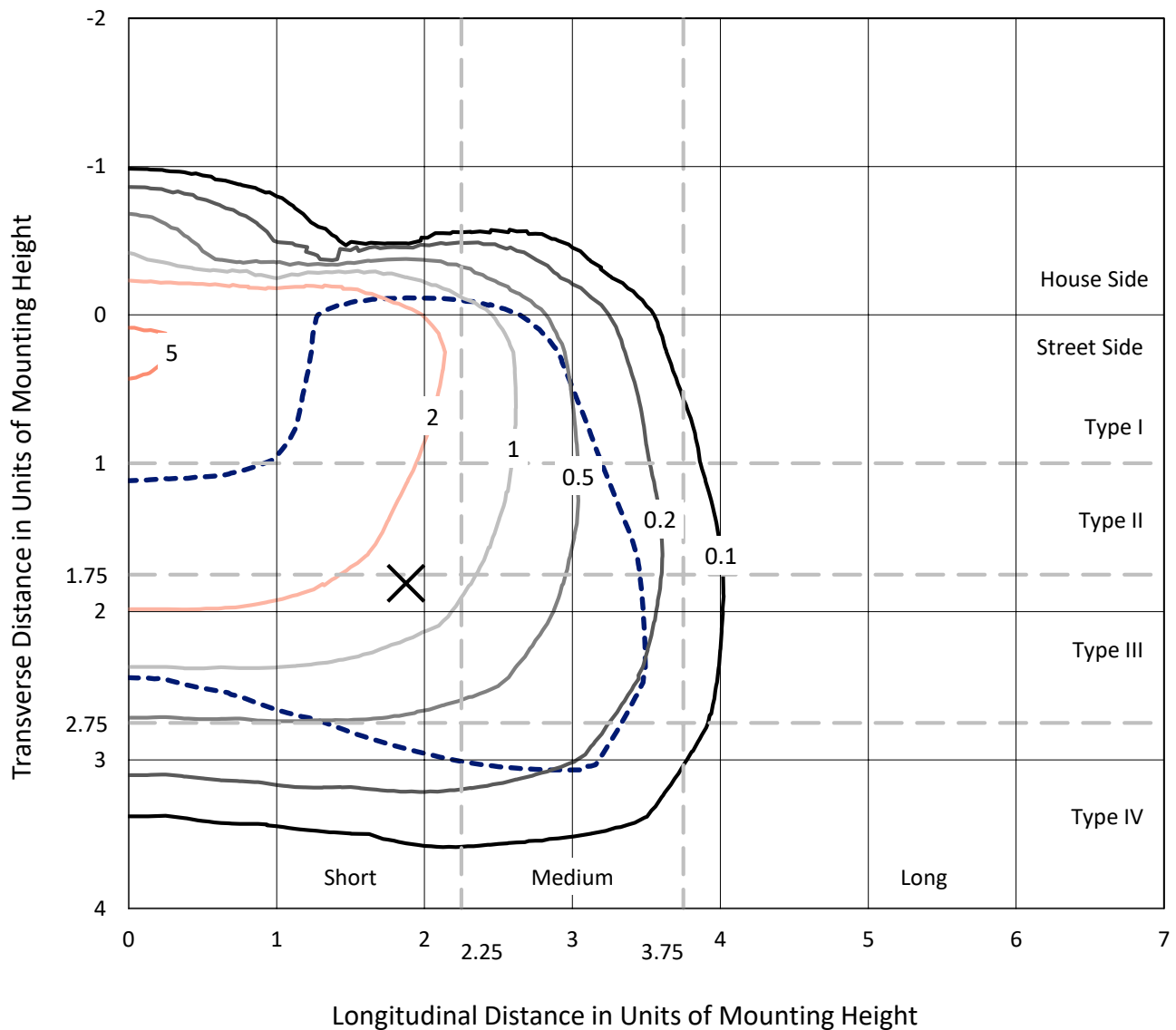
Input Watts (W): 575  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



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## Iso-Footcandle Lines of Horizontal Illumination

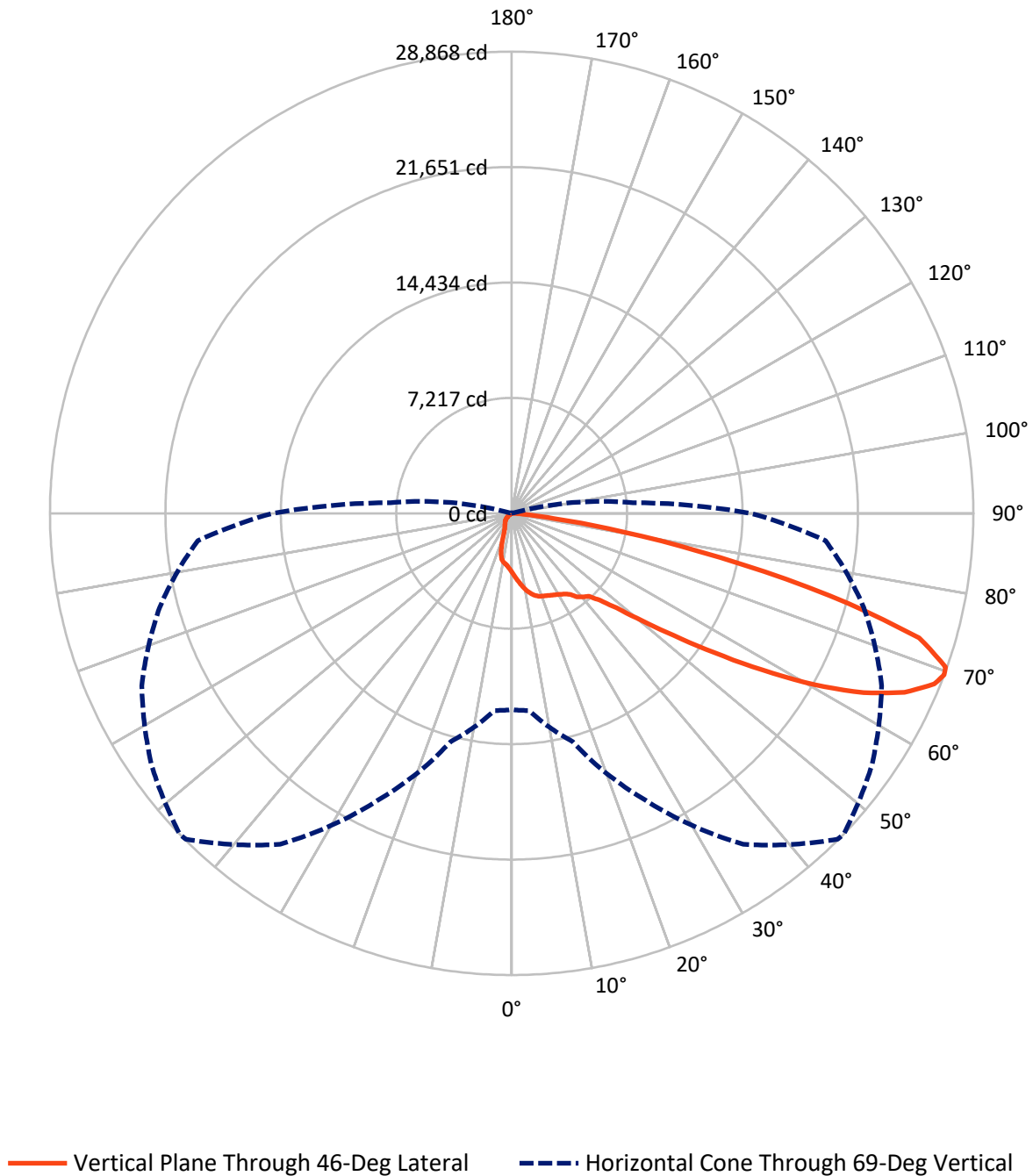
✕ Max cd  
 - - - 1/2 Max cd



Based on 30 foot mounting height. Maximum calculated value = 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    | 3793.0   | 0.0    | 3793.0  |
|                    | % Fixture | 10.3     | 0.0    | 10.3    |
| <b>Street Side</b> | Lumens    | 33166.0  | 0.0    | 33166.0 |
|                    | % Fixture | 89.7     | 0.0    | 89.7    |
| <b>Total</b>       | Lumens    | 36959.0  | 0.0    | 36959.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 368.6   | 1.0       |
| 10°-20°   | 1118.2  | 3.0       |
| 20°-30°   | 1758.6  | 4.8       |
| 30°-40°   | 2521.8  | 6.8       |
| 40°-50°   | 4358.7  | 11.8      |
| 50°-60°   | 8610.9  | 23.3      |
| 60°-70°   | 12034.5 | 32.6      |
| 70°-80°   | 5814.0  | 15.7      |
| 80°-90°   | 373.7   | 1.0       |
| 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°    | 36959.0 | 100.0     |
| 0°-180°   | 36959.0 | 100.0     |

**Coefficient of Utilization**



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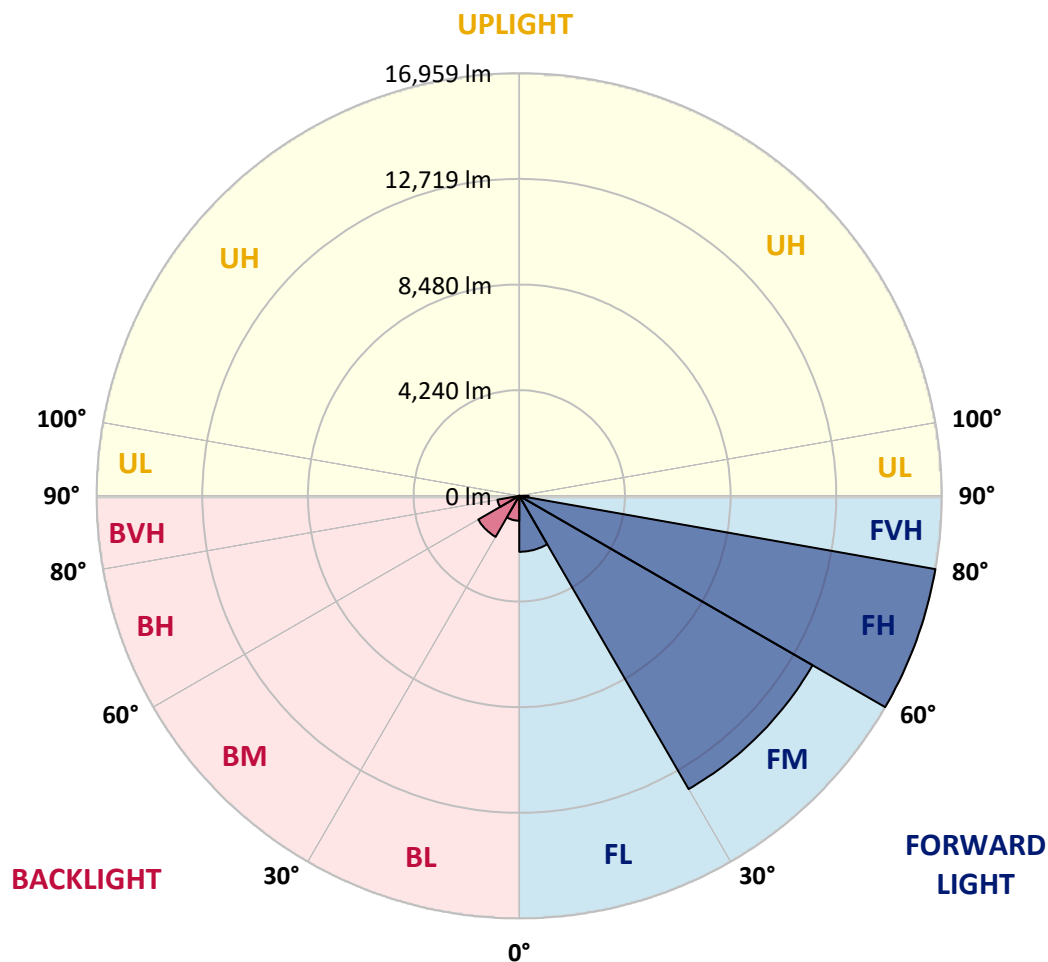
CATALOG NUMBER: GLEON-SA9D-722-U-T4W-HSS

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|---------|-----------|-------------------------|------|---------|
|      |             |         |           | B                       | U    | G       |
| FL   | (0°-30°)    | 2245.7  | 6.1       |                         |      |         |
| FM   | (30°-60°)   | 13590.6 | 36.8      |                         |      |         |
| FH   | (60°-80°)   | 16959.1 | 45.9      |                         |      | G5      |
| FVH  | (80°-90°)   | 370.5   | 1.0       |                         |      | G3/500  |
| BL   | (0°-30°)    | 999.7   | 2.7       | B2/1000                 |      |         |
| BM   | (30°-60°)   | 1900.8  | 5.1       | B2/2500                 |      |         |
| BH   | (60°-80°)   | 889.4   | 2.4       | B2/1000                 |      | G2/1000 |
| BVH  | (80°-90°)   | 3.1     | 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-G5**

Type IV Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 35°     | 45°     | 46°     | 55°     | 65°     | 75°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 3703.2  | 3703.2  | 3703.2  | 3703.2  | 3703.2  | 3703.2  | 3703.2  | 3703.2  | 3703.2  | 3703.2  | 3703.2  |
| 2.5°  | 4113.8  | 4108.6  | 4084.4  | 4074.0  | 4015.1  | 3980.4  | 3966.6  | 3923.2  | 3860.8  | 3798.5  | 3729.1  |
| 5°    | 4581.7  | 4580.0  | 4534.9  | 4491.6  | 4380.7  | 4276.7  | 4257.7  | 4157.2  | 4016.8  | 3885.1  | 3753.4  |
| 7.5°  | 5060.0  | 5037.5  | 4992.4  | 4909.2  | 4748.1  | 4581.7  | 4566.1  | 4424.0  | 4224.7  | 4034.1  | 3845.2  |
| 10°   | 5465.5  | 5451.6  | 5392.7  | 5266.2  | 5077.3  | 4888.4  | 4869.4  | 4694.4  | 4469.1  | 4235.1  | 3994.3  |
| 12.5° | 5780.9  | 5770.5  | 5692.5  | 5534.8  | 5333.8  | 5138.0  | 5112.0  | 4956.0  | 4715.2  | 4453.5  | 4169.3  |
| 15°   | 5973.2  | 5968.0  | 5872.7  | 5704.6  | 5507.1  | 5337.3  | 5314.7  | 5177.8  | 4954.3  | 4680.5  | 4359.9  |
| 17.5° | 6018.3  | 6020.0  | 5921.2  | 5751.4  | 5588.5  | 5467.2  | 5449.9  | 5345.9  | 5158.8  | 4886.7  | 4550.5  |
| 20°   | 5917.8  | 5938.6  | 5850.2  | 5702.9  | 5602.4  | 5538.3  | 5524.4  | 5462.0  | 5304.3  | 5047.9  | 4703.0  |
| 22.5° | 5775.7  | 5786.1  | 5725.4  | 5626.6  | 5585.1  | 5597.2  | 5590.3  | 5555.6  | 5422.2  | 5186.5  | 4853.8  |
| 25°   | 5689.0  | 5689.0  | 5652.6  | 5569.5  | 5597.2  | 5671.7  | 5673.4  | 5666.5  | 5560.8  | 5356.3  | 5037.5  |
| 27.5° | 5685.6  | 5675.2  | 5633.6  | 5571.2  | 5647.4  | 5761.8  | 5768.7  | 5815.5  | 5749.7  | 5562.5  | 5266.2  |
| 30°   | 5824.2  | 5812.1  | 5723.7  | 5642.2  | 5739.3  | 5862.3  | 5879.6  | 5981.9  | 5949.0  | 5786.1  | 5520.9  |
| 32.5° | 6148.2  | 6104.9  | 5909.1  | 5775.7  | 5848.5  | 5995.7  | 6018.3  | 6181.2  | 6233.2  | 6061.6  | 5767.0  |
| 35°   | 6591.9  | 6455.0  | 6172.5  | 6028.7  | 6035.6  | 6189.8  | 6210.6  | 6449.8  | 6604.0  | 6314.6  | 5957.6  |
| 37.5° | 7203.6  | 7136.0  | 6676.8  | 6292.1  | 6323.3  | 6557.2  | 6617.8  | 6877.8  | 6834.5  | 6453.2  | 6174.2  |
| 40°   | 8544.8  | 8439.1  | 7950.4  | 7030.3  | 6598.8  | 6855.3  | 6874.3  | 7012.9  | 7016.4  | 6766.9  | 6624.8  |
| 42.5° | 10371.3 | 10327.9 | 9813.3  | 8369.8  | 7141.2  | 7054.5  | 7089.2  | 7323.1  | 7584.8  | 7428.8  | 7421.9  |
| 45°   | 12393.5 | 12371.0 | 11825.1 | 10147.7 | 8238.1  | 7707.8  | 7751.1  | 8064.8  | 8565.6  | 8600.3  | 8820.3  |
| 47.5° | 14020.7 | 14010.3 | 13696.6 | 12131.9 | 9917.2  | 8815.1  | 8829.0  | 9161.7  | 10042.0 | 10477.0 | 10828.7 |
| 50°   | 15504.0 | 15554.3 | 15306.5 | 14278.9 | 12204.6 | 10549.7 | 10516.8 | 10738.6 | 12152.7 | 12864.9 | 13301.5 |
| 52.5° | 17566.2 | 17637.2 | 16942.3 | 16282.1 | 14604.7 | 12702.0 | 12676.0 | 12908.2 | 14689.6 | 15223.3 | 15301.3 |
| 55°   | 19387.4 | 19266.1 | 18716.8 | 18526.2 | 17531.5 | 15360.2 | 15353.3 | 15557.8 | 17143.3 | 17370.3 | 17514.2 |
| 57.5° | 20191.5 | 20144.7 | 20409.8 | 20846.5 | 20597.0 | 18501.9 | 18486.3 | 18330.4 | 19338.9 | 19363.1 | 19805.0 |
| 60°   | 20699.2 | 20756.4 | 21569.1 | 22915.5 | 23537.6 | 21882.7 | 21782.2 | 20830.9 | 21435.7 | 21381.9 | 21855.0 |
| 62.5° | 20318.0 | 20430.6 | 21893.1 | 24137.2 | 25738.4 | 24833.8 | 24691.7 | 23121.7 | 23227.5 | 23042.0 | 23482.2 |
| 65°   | 18294.0 | 18469.0 | 20865.5 | 23906.7 | 26830.1 | 27140.3 | 26996.5 | 25144.0 | 24650.1 | 24345.2 | 24100.8 |
| 67.5° | 14854.2 | 14958.2 | 17460.4 | 21901.8 | 26338.0 | 28516.2 | 28486.7 | 26916.7 | 25724.5 | 24125.1 | 22229.3 |
| 69°   | 12275.7 | 12377.9 | 14786.6 | 19791.2 | 25254.9 | 28810.8 | 28868.0 | 27485.1 | 25520.0 | 22787.3 | 19695.9 |
| 70°   | 10397.2 | 10506.4 | 12750.5 | 17982.0 | 23998.6 | 28673.9 | 28776.1 | 27431.4 | 24934.3 | 21238.1 | 17472.6 |
| 72.5° | 5453.4  | 5546.9  | 7849.9  | 12388.3 | 19564.2 | 26329.3 | 26639.5 | 25112.8 | 21135.9 | 15424.3 | 10331.4 |
| 75°   | 1713.8  | 1767.5  | 3065.5  | 6475.8  | 13395.1 | 20472.2 | 20543.2 | 19699.3 | 15008.4 | 8484.2  | 4302.7  |
| 77.5° | 653.3   | 637.7   | 1020.7  | 2386.2  | 6772.1  | 12890.9 | 13325.8 | 12310.3 | 7875.9  | 2999.6  | 992.9   |
| 80°   | 351.8   | 353.5   | 530.3   | 987.7   | 2897.4  | 6624.8  | 6992.2  | 5966.3  | 2798.6  | 935.8   | 228.7   |
| 82.5° | 152.5   | 159.4   | 298.1   | 523.3   | 1330.8  | 2443.4  | 2627.0  | 2186.9  | 1069.2  | 629.0   | 84.9    |
| 85°   | 32.9    | 36.4    | 143.8   | 284.2   | 542.4   | 686.2   | 719.1   | 708.7   | 681.0   | 488.7   | 32.9    |
| 87.5° | 0.0     | 0.0     | 64.1    | 102.2   | 136.9   | 156.0   | 136.9   | 178.5   | 376.0   | 329.2   | 17.3    |
| 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: P323103

CATALOG NUMBER: GLEON-SA9D-722-U-T4W-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°     | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|---------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 3703.2  | 3703.2  | 3703.2 | 3703.2 | 3703.2 | 3703.2 | 3703.2 | 3703.2 | 3703.2 | 3703.2 | 3703.2 |
| 2.5°  | 3706.6  | 3675.4  | 3621.7 | 3562.8 | 3521.2 | 3477.9 | 3443.2 | 3427.6 | 3410.3 | 3398.2 | 3413.8 |
| 5°    | 3699.7  | 3639.0  | 3535.1 | 3434.6 | 3361.8 | 3302.9 | 3254.3 | 3235.3 | 3216.2 | 3202.4 | 3200.6 |
| 7.5°  | 3760.3  | 3675.4  | 3516.0 | 3368.7 | 3256.1 | 3176.4 | 3110.5 | 3082.8 | 3060.3 | 3049.9 | 3041.2 |
| 10°   | 3876.4  | 3767.3  | 3554.1 | 3361.8 | 3216.2 | 3081.1 | 2939.0 | 2829.8 | 2758.7 | 2725.8 | 2713.7 |
| 12.5° | 4027.2  | 3890.3  | 3626.9 | 3398.2 | 3186.8 | 2926.8 | 2625.3 | 2365.4 | 2197.3 | 2141.8 | 2108.9 |
| 15°   | 4204.0  | 4034.1  | 3722.2 | 3445.0 | 3079.3 | 2604.5 | 2093.3 | 1753.7 | 1597.7 | 1566.5 | 1531.9 |
| 17.5° | 4373.8  | 4186.6  | 3836.6 | 3453.6 | 2843.6 | 2081.2 | 1533.6 | 1303.1 | 1242.5 | 1263.3 | 1268.5 |
| 20°   | 4522.8  | 4337.4  | 3949.2 | 3377.4 | 2415.6 | 1561.3 | 1187.0 | 1129.8 | 1152.4 | 1192.2 | 1199.1 |
| 22.5° | 4673.6  | 4482.9  | 4053.2 | 3176.4 | 1868.0 | 1185.3 | 1069.2 | 1083.0 | 1105.6 | 1145.4 | 1152.4 |
| 25°   | 4857.2  | 4659.7  | 4150.2 | 2807.3 | 1401.9 | 1008.5 | 1015.5 | 1036.3 | 1058.8 | 1095.2 | 1098.6 |
| 27.5° | 5068.7  | 4883.2  | 4214.4 | 2327.3 | 1039.7 | 927.1  | 949.6  | 980.8  | 1003.3 | 1038.0 | 1044.9 |
| 30°   | 5349.4  | 5177.8  | 4235.1 | 1829.9 | 871.6  | 854.3  | 864.7  | 902.8  | 935.8  | 966.9  | 972.1  |
| 32.5° | 5612.8  | 5469.0  | 4165.8 | 1381.1 | 807.5  | 786.7  | 786.7  | 809.3  | 847.4  | 876.8  | 883.8  |
| 35°   | 5855.4  | 5761.8  | 3944.0 | 1010.3 | 759.0  | 724.3  | 707.0  | 707.0  | 731.3  | 755.5  | 762.5  |
| 37.5° | 6176.0  | 6172.5  | 3585.3 | 805.8  | 712.2  | 672.4  | 636.0  | 608.2  | 599.6  | 604.8  | 608.2  |
| 40°   | 6725.3  | 6730.5  | 3117.4 | 722.6  | 672.4  | 618.6  | 563.2  | 512.9  | 466.1  | 450.5  | 448.8  |
| 42.5° | 7583.1  | 7505.1  | 2627.0 | 682.8  | 637.7  | 563.2  | 480.0  | 412.4  | 339.6  | 317.1  | 315.4  |
| 45°   | 8945.1  | 8482.4  | 2107.2 | 646.4  | 601.3  | 500.8  | 396.8  | 305.0  | 246.1  | 228.7  | 228.7  |
| 47.5° | 10929.2 | 9766.5  | 1632.4 | 606.5  | 552.8  | 429.8  | 299.8  | 220.1  | 180.2  | 171.6  | 173.3  |
| 50°   | 12981.0 | 11024.6 | 1251.1 | 556.3  | 493.9  | 355.2  | 221.8  | 159.4  | 136.9  | 136.9  | 138.6  |
| 52.5° | 14800.5 | 11946.4 | 975.6  | 502.5  | 421.1  | 279.0  | 168.1  | 124.8  | 114.4  | 112.6  | 114.4  |
| 55°   | 16503.9 | 12540.8 | 746.9  | 440.2  | 334.4  | 207.9  | 128.2  | 102.2  | 95.3   | 91.8   | 90.1   |
| 57.5° | 18146.7 | 12835.4 | 559.7  | 355.2  | 242.6  | 150.8  | 102.2  | 86.6   | 79.7   | 74.5   | 72.8   |
| 60°   | 19240.1 | 12596.3 | 384.7  | 261.7  | 168.1  | 109.2  | 84.9   | 74.5   | 65.8   | 60.7   | 58.9   |
| 62.5° | 19857.0 | 11943.0 | 247.8  | 188.9  | 119.6  | 81.4   | 67.6   | 62.4   | 50.3   | 45.1   | 45.1   |
| 65°   | 19607.5 | 10865.1 | 173.3  | 135.2  | 86.6   | 60.7   | 50.3   | 50.3   | 36.4   | 29.5   | 27.7   |
| 67.5° | 17375.5 | 9179.0  | 131.7  | 100.5  | 62.4   | 45.1   | 38.1   | 43.3   | 22.5   | 13.9   | 13.9   |
| 69°   | 14949.5 | 7607.3  | 112.6  | 83.2   | 52.0   | 36.4   | 32.9   | 39.9   | 15.6   | 10.4   | 8.7    |
| 70°   | 12993.1 | 6562.4  | 102.2  | 72.8   | 43.3   | 31.2   | 29.5   | 38.1   | 15.6   | 8.7    | 6.9    |
| 72.5° | 7773.7  | 3659.8  | 78.0   | 52.0   | 27.7   | 24.3   | 24.3   | 43.3   | 15.6   | 8.7    | 6.9    |
| 75°   | 3141.7  | 1289.3  | 57.2   | 36.4   | 20.8   | 20.8   | 29.5   | 55.5   | 13.9   | 6.9    | 5.2    |
| 77.5° | 712.2   | 282.5   | 32.9   | 22.5   | 13.9   | 20.8   | 34.7   | 43.3   | 8.7    | 3.5    | 0.0    |
| 80°   | 173.3   | 69.3    | 20.8   | 13.9   | 8.7    | 15.6   | 26.0   | 24.3   | 1.7    | 0.0    | 0.0    |
| 82.5° | 57.2    | 24.3    | 8.7    | 6.9    | 1.7    | 5.2    | 12.1   | 6.9    | 0.0    | 0.0    | 0.0    |
| 85°   | 24.3    | 13.9    | 3.5    | 1.7    | 0.0    | 0.0    | 1.7    | 0.0    | 0.0    | 0.0    | 0.0    |
| 87.5° | 15.6    | 5.2     | 0.0    | 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)