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

Scaled data based on original data using

LM-79-08 Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Test Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

Brand: LUMARK

Report Number: P979174

Luminaire Tested: **WPLLED38S-120W-3500K**

Issue Date: 03/31/2025

Report Generated By 670245763

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

Scaled Data Report

**Test Information**

| | |
|---|---|
| Test Method: | LM-79-08 |
| Report Number: | P979174 |
| Test Lab: | Cooper Lighting Solutions |
| Issue Date: | 03/31/2025 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS (FORMERLY EATON) |
| Product Line: | LUMARK |
| Catalog Number: | WPLLED38S-120W-3500K |
| Description: | LUMARK WALL PACK LED LARGE 80CRI CCT AND LUMEN SELECTIVE FIXTURE OPERATING @120W-3500K |
| Light Source: | 3500K CCT, 80 CRI LEDS |
| Ballast/Driver: | ELECTRONIC DRIVER |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 17150.7 lumens |
| Efficiency: | N/A |
| Efficacy: | 146.6 lumens/watt |
| Luminous Opening: | Rectangular w/ Sides (W: 1.25' x L: 0.33' x H: 0.58') |
| IES Classification: | Type IV - Short |
| BUG Rating: | B3 - U5 - G5 |

| | |
|---|---|
| Input Watts (W): | 117 |
| Input Voltage (V): | 120 |
| 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: | 28.75 FT |

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REPORT NUMBER: P979174
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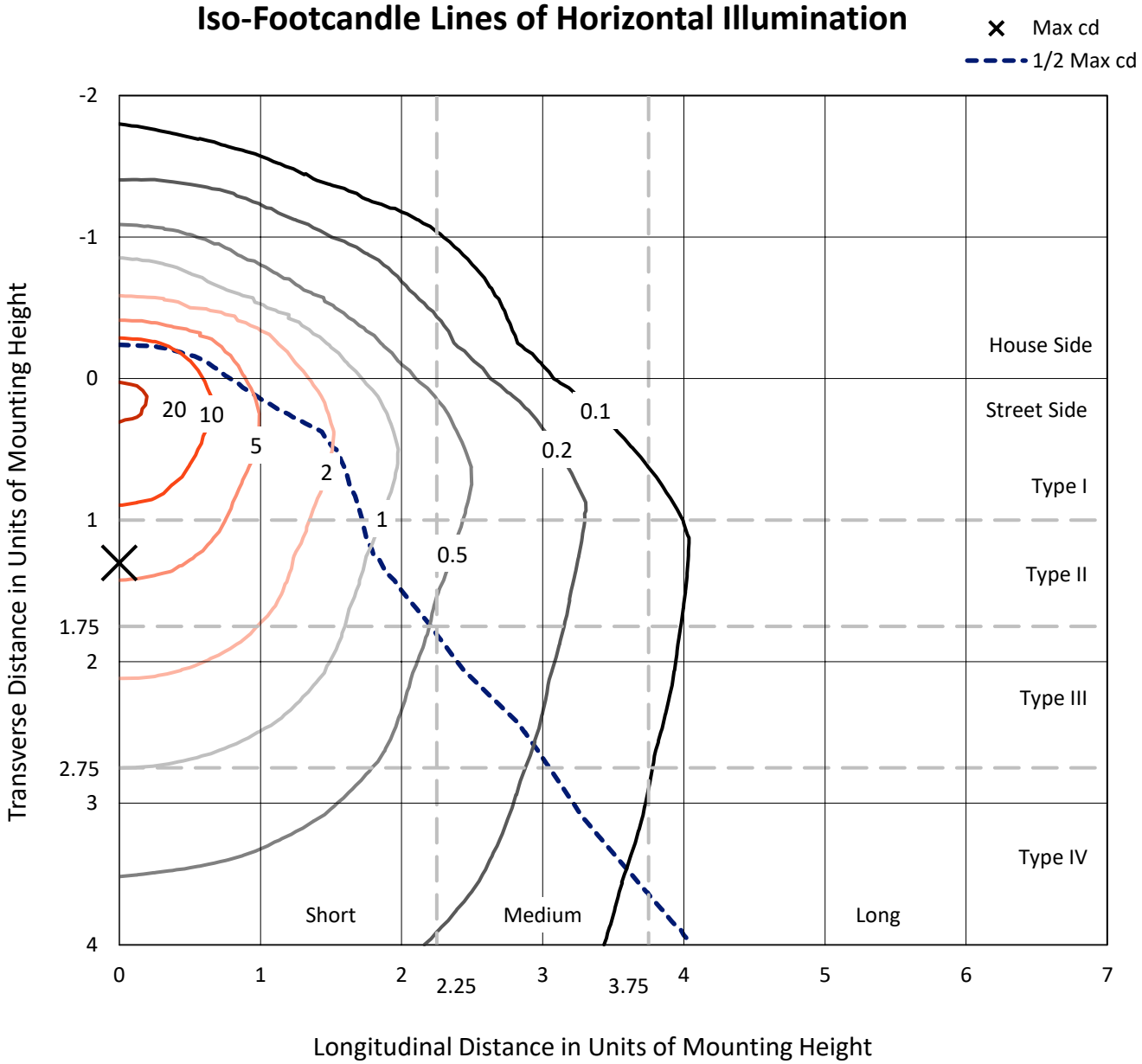
## Iso-Footcandle Lines of Horizontal Illumination




Based on 15 foot mounting height. Maximum calculated value = 21.6 fc
Type IV - Short - N/A

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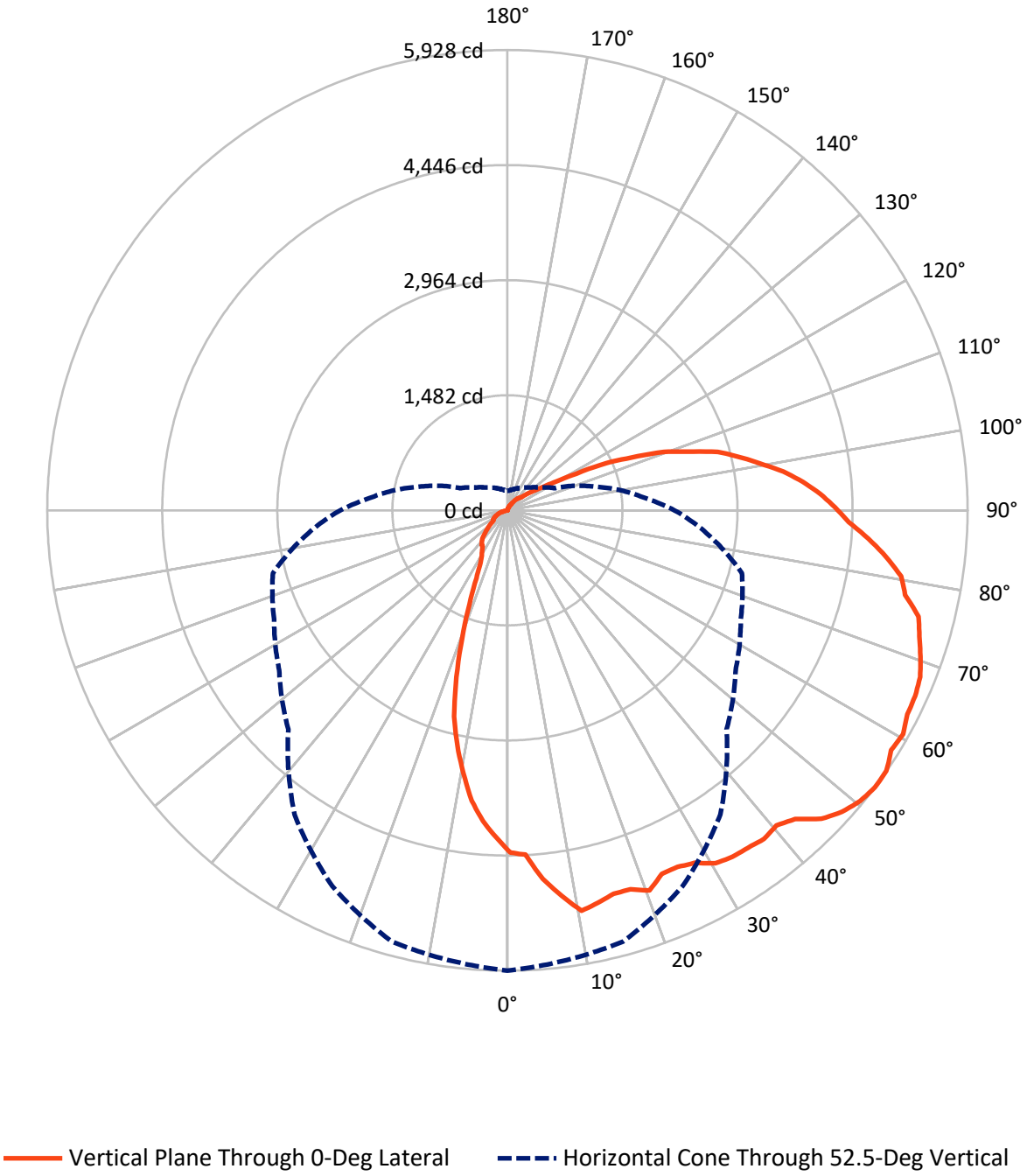
## Luminous Intensity Polar Plot



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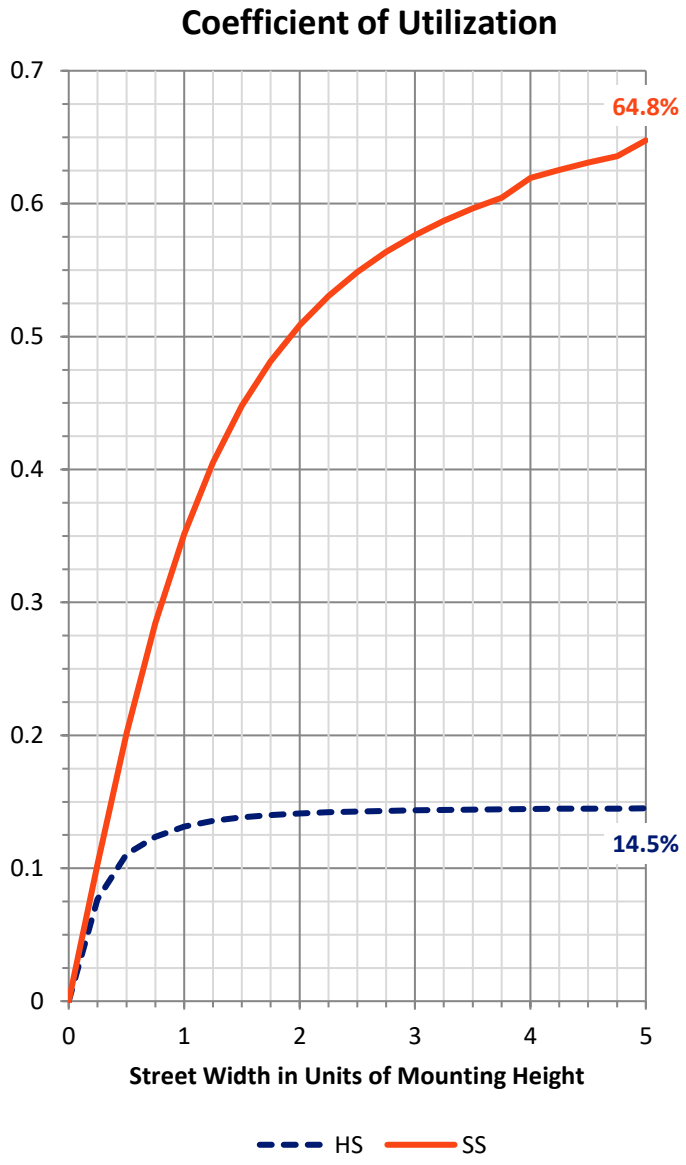
**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 2524.6 | 97.2 | 2621.8 |
| | % Fixture | 14.7 | 0.6 | 15.3 |
| **Street Side** | Lumens | 12180.4 | 2348.5 | 14528.9 |
| | % Fixture | 71.0 | 13.7 | 84.7 |
| **Total** | Lumens | 14705.0 | 2445.7 | 17150.7 |
| | % Fixture | 85.7 | 14.3 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 417.1 | 2.4 |
| 10°-20° | 1160.2 | 6.8 |
| 20°-30° | 1597.3 | 9.3 |
| 30°-40° | 1850.4 | 10.8 |
| 40°-50° | 2021.1 | 11.8 |
| 50°-60° | 2136.4 | 12.5 |
| 60°-70° | 2112.4 | 12.3 |
| 70°-80° | 1890.9 | 11.0 |
| 80°-90° | 1519.3 | 8.9 |
| 90°-100° | 1128.4 | 6.6 |
| 100°-110° | 725.2 | 4.2 |
| 110°-120° | 331.4 | 1.9 |
| 120°-130° | 134.3 | 0.8 |
| 130°-140° | 70.4 | 0.4 |
| 140°-150° | 35.6 | 0.2 |
| 150°-160° | 14.0 | 0.1 |
| 160°-170° | 4.9 | 0.0 |
| 170°-180° | 1.4 | 0.0 |
| 0°-90° | 14705.0 | 85.7 |
| 0°-180° | 17150.7 | 100.0 |



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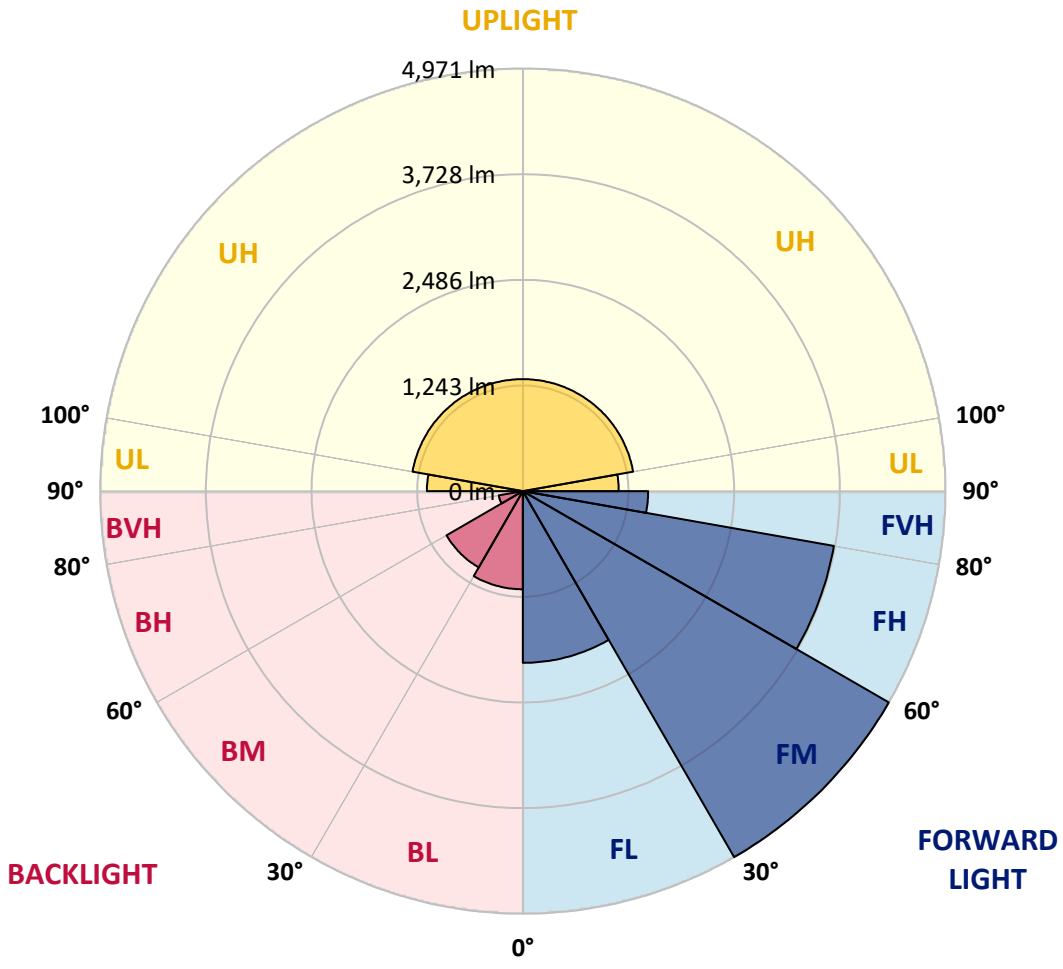
## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 2019.9 | 11.8 | | | |
| FM | (30°-60°) | 4971.2 | 29.0 | | | |
| FH | (60°-80°) | 3715.6 | 21.7 | | | G2/5000 |
| FVH | (80°-90°) | 1473.7 | 8.6 | | | G5 |
| BL | (0°-30°) | 1154.6 | 6.7 | B3/2500 | | |
| BM | (30°-60°) | 1036.6 | 6.0 | B2/2500 | | |
| BH | (60°-80°) | 287.7 | 1.7 | B1/500 | | G1/500 |
| BVH | (80°-90°) | 45.6 | 0.3 | | | G1/100 |
| UL | (90°-100°) | 1128.4 | 6.6 | | U5 | |
| UH | (100°-180°) | 1317.2 | 7.7 | | U5 | |

**BUG Rating: B3-U5-G5**
Type IV Short



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CATALOG NUMBER: WPLLED38S-120W-3500K

**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 65° | 75° | 85° | 90° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 4407.5 | 4407.5 | 4407.5 | 4407.5 | 4407.5 | 4407.5 | 4407.5 | 4407.5 | 4407.5 | 4407.5 | 4407.5 |
| 2.5° | 4440.9 | 4567.2 | 4627.3 | 4506.3 | 4585.0 | 4521.9 | 4469.9 | 4443.1 | 4449.8 | 4414.2 | 4475.1 |
| 5° | 4768.4 | 4697.1 | 4699.4 | 4643.7 | 4639.9 | 4527.1 | 4557.5 | 4512.2 | 4487.7 | 4418.6 | 4420.1 |
| 7.5° | 5013.5 | 4983.0 | 4973.4 | 4816.7 | 4796.6 | 4786.2 | 4622.1 | 4582.8 | 4521.1 | 4445.4 | 4420.1 |
| 10° | 5245.2 | 5236.3 | 5217.0 | 5085.5 | 5179.1 | 4993.4 | 4766.9 | 4686.7 | 4510.7 | 4416.4 | 4400.8 |
| 12.5° | 5186.5 | 5210.3 | 5138.2 | 5143.4 | 5175.4 | 5123.4 | 4874.6 | 4674.8 | 4549.3 | 4333.2 | 4314.7 |
| 15° | 5124.1 | 5164.2 | 5054.3 | 5128.6 | 5189.5 | 5107.8 | 5026.1 | 4769.2 | 4495.9 | 4295.4 | 4325.8 |
| 17.5° | 5130.1 | 5116.0 | 5082.5 | 5136.8 | 5059.5 | 5113.7 | 5058.8 | 4771.4 | 4515.9 | 4270.9 | 4148.3 |
| 20° | 5226.6 | 5036.5 | 5099.6 | 5041.7 | 5003.8 | 5008.3 | 4948.9 | 4905.1 | 4454.3 | 4158.7 | 4078.5 |
| 22.5° | 5087.0 | 5063.2 | 5101.9 | 5039.5 | 4990.5 | 4839.7 | 4956.3 | 4851.6 | 4518.9 | 4133.5 | 3971.6 |
| 25° | 5087.7 | 5158.3 | 5136.8 | 5003.1 | 4890.9 | 4818.2 | 4738.0 | 4723.9 | 4385.2 | 4011.7 | 3869.8 |
| 27.5° | 5141.2 | 5210.3 | 5092.2 | 5016.5 | 4844.2 | 4768.4 | 4651.8 | 4619.1 | 4351.8 | 3937.4 | 3705.7 |
| 30° | 5277.1 | 5264.5 | 5200.6 | 5062.5 | 4841.2 | 4703.1 | 4570.1 | 4460.2 | 4267.9 | 3791.9 | 3595.8 |
| 32.5° | 5320.9 | 5351.4 | 5339.5 | 5098.1 | 4902.8 | 4608.0 | 4386.7 | 4302.0 | 4145.4 | 3617.3 | 3406.4 |
| 35° | 5337.3 | 5377.4 | 5401.1 | 5054.3 | 4874.6 | 4521.1 | 4215.2 | 4081.5 | 4036.2 | 3475.5 | 3182.9 |
| 37.5° | 5370.7 | 5390.7 | 5335.8 | 5105.6 | 4848.6 | 4423.1 | 4156.5 | 3988.7 | 3878.7 | 3284.6 | 3003.2 |
| 40° | 5335.8 | 5271.9 | 5271.9 | 5033.5 | 4775.8 | 4309.5 | 4071.1 | 3788.1 | 3673.8 | 3089.3 | 2841.3 |
| 42.5° | 5433.8 | 5422.7 | 5371.4 | 5089.2 | 4706.0 | 4321.4 | 3946.3 | 3698.3 | 3517.1 | 2931.2 | 2643.0 |
| 45° | 5669.2 | 5777.6 | 5522.9 | 5180.6 | 4668.9 | 4215.2 | 3918.8 | 3605.5 | 3379.7 | 2799.7 | 2469.2 |
| 47.5° | 5802.2 | 5811.1 | 5770.2 | 5284.5 | 4703.8 | 4156.5 | 3737.6 | 3529.7 | 3259.4 | 2682.4 | 2347.4 |
| 50° | 5886.1 | 5894.2 | 5723.4 | 5330.6 | 4738.0 | 3988.7 | 3688.6 | 3441.3 | 3165.1 | 2545.7 | 2202.6 |
| 52.5° | 5928.4 | 5871.2 | 5751.7 | 5340.2 | 4781.0 | 3992.4 | 3588.4 | 3316.6 | 3127.2 | 2482.6 | 2152.9 |
| 55° | 5924.7 | 5883.8 | 5805.9 | 5417.5 | 4745.4 | 3908.5 | 3390.1 | 3249.7 | 3021.0 | 2422.5 | 2030.3 |
| 57.5° | 5828.9 | 5817.0 | 5573.4 | 5427.9 | 4752.1 | 3901.0 | 3308.4 | 3090.8 | 2941.6 | 2296.2 | 1887.8 |
| 60° | 5854.9 | 5867.5 | 5584.6 | 5329.1 | 4647.4 | 3706.5 | 3238.6 | 3003.2 | 2865.8 | 2201.9 | 1751.9 |
| 62.5° | 5782.8 | 5826.7 | 5600.9 | 5312.0 | 4699.4 | 3672.3 | 3103.4 | 2902.9 | 2729.2 | 2104.6 | 1594.4 |
| 65° | 5771.0 | 5802.2 | 5659.6 | 5320.9 | 4628.8 | 3569.8 | 2977.2 | 2766.3 | 2646.0 | 1934.5 | 1369.4 |
| 67.5° | 5734.6 | 5683.3 | 5528.9 | 5246.7 | 4568.6 | 3546.8 | 2871.0 | 2638.6 | 2513.1 | 1709.5 | 1179.3 |
| 70° | 5644.7 | 5625.4 | 5486.5 | 5161.3 | 4475.1 | 3435.4 | 2752.9 | 2487.1 | 2366.0 | 1465.9 | 914.9 |
| 72.5° | 5549.7 | 5492.5 | 5434.6 | 5104.8 | 4435.7 | 3270.5 | 2639.3 | 2322.2 | 2145.5 | 1206.8 | 719.6 |
| 75° | 5470.9 | 5350.6 | 5280.8 | 4953.3 | 4302.8 | 3267.6 | 2555.4 | 2174.4 | 1939.7 | 946.9 | 525.0 |
| 77.5° | 5238.5 | 5109.3 | 5048.4 | 4777.3 | 4079.3 | 3074.5 | 2403.1 | 1999.2 | 1688.0 | 701.8 | 401.8 |
| 80° | 5141.2 | 4969.7 | 4862.0 | 4599.8 | 4052.5 | 2995.8 | 2268.7 | 1849.9 | 1409.5 | 497.6 | 326.8 |
| 82.5° | 4914.0 | 4820.4 | 4710.5 | 4482.5 | 3817.1 | 2768.5 | 2155.8 | 1697.6 | 1169.6 | 378.0 | 268.8 |
| 85° | 4665.9 | 4569.4 | 4470.6 | 4178.0 | 3609.9 | 2605.1 | 2000.6 | 1515.0 | 951.3 | 284.4 | 228.0 |
| 87.5° | 4400.8 | 4376.3 | 4283.5 | 3950.0 | 3420.5 | 2499.7 | 1855.8 | 1384.3 | 755.3 | 228.0 | 186.4 |
| 90° | 4220.4 | 4207.0 | 4057.7 | 3751.0 | 3184.4 | 2283.6 | 1701.4 | 1202.3 | 591.1 | 202.0 | 164.1 |
| 92.5° | 4036.2 | 3938.2 | 3782.9 | 3578.7 | 2946.7 | 2090.5 | 1541.7 | 1032.3 | 472.3 | 180.5 | 150.0 |
| 95° | 3823.1 | 3757.0 | 3589.1 | 3329.9 | 2690.5 | 1905.6 | 1393.9 | 882.2 | 379.5 | 161.9 | 142.6 |
| 97.5° | 3589.1 | 3537.1 | 3361.1 | 3054.4 | 2490.8 | 1790.5 | 1240.9 | 759.7 | 326.0 | 151.5 | 134.4 |
| 100° | 3307.7 | 3294.3 | 3139.8 | 2819.8 | 2229.4 | 1557.3 | 1065.7 | 616.4 | 271.1 | 146.3 | 130.7 |
| 102.5° | 3060.4 | 2995.0 | 2896.3 | 2559.8 | 1982.1 | 1363.5 | 886.0 | 490.1 | 236.9 | 141.1 | 129.2 |
| 105° | 2813.1 | 2766.3 | 2617.8 | 2261.3 | 1705.8 | 1153.3 | 730.7 | 407.7 | 213.1 | 141.8 | 127.0 |
| 107.5° | 2441.0 | 2449.9 | 2297.7 | 1940.5 | 1411.0 | 958.0 | 574.8 | 335.7 | 197.5 | 139.6 | 122.5 |
| 110° | 2149.9 | 2098.7 | 1930.1 | 1578.8 | 1163.0 | 779.8 | 469.3 | 277.7 | 178.2 | 136.6 | 117.3 |

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**CANDELA DISTRIBUTION (continued):**

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 65° | 75° | 85° | 90° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 112.5° | *1739.2* | 1729.6 | 1570.7 | 1249.1 | 902.3 | 604.5 | 379.5 | 239.1 | 168.6 | 127.7 | 111.4 |
| 115° | *1412.5* | 1352.3 | 1193.4 | 951.3 | 694.4 | 482.0 | 312.6 | 210.9 | 160.4 | 125.5 | 104.7 |
| 117.5° | *1006.3* | 1004.0 | 871.8 | 727.0 | 554.7 | 397.3 | 267.3 | 185.7 | 150.8 | 115.9 | 100.3 |
| 120° | *728.5* | 718.1 | 649.8 | 551.8 | 464.9 | 343.1 | 233.9 | 173.0 | 142.6 | 104.7 | 90.6 |
| 122.5° | *559.9* | 553.3 | 513.2 | 450.0 | 401.8 | 297.1 | 205.7 | 157.4 | 132.9 | 94.3 | 80.9 |
| 125° | *448.5* | 454.5 | 422.6 | 387.7 | 339.4 | 256.2 | 189.4 | 144.8 | 118.1 | 85.4 | 72.0 |
| 127.5° | *376.5* | 373.5 | 350.5 | 325.3 | 291.1 | 232.4 | 176.0 | 139.6 | 105.5 | 75.0 | 65.4 |
| 130° | *314.1* | 300.8 | 292.6 | 279.2 | 257.7 | 210.2 | 167.8 | 132.2 | 95.8 | 65.4 | 57.2 |
| 132.5° | *252.5* | 254.0 | 250.3 | 239.9 | 230.2 | 196.1 | 161.9 | 121.8 | 83.2 | 58.7 | 51.2 |
| 135° | *225.0* | 224.3 | 217.6 | 212.4 | 205.0 | 181.9 | 151.5 | 110.7 | 72.8 | 53.5 | 46.8 |
| 137.5° | *210.9* | 205.7 | 196.1 | 185.7 | 183.4 | 171.5 | 138.1 | 99.5 | 63.1 | 48.3 | 43.8 |
| 140° | *191.6* | 189.4 | 177.5 | 169.3 | 164.1 | 154.5 | 126.2 | 86.1 | 56.4 | 43.8 | 41.6 |
| 142.5° | *159.7* | 159.7 | 155.2 | 146.3 | 143.3 | 135.2 | 109.2 | 74.3 | 48.3 | 41.6 | 37.9 |
| 145° | *128.5* | 125.5 | 125.5 | 122.5 | 118.8 | 114.4 | 90.6 | 63.1 | 43.1 | 37.1 | 36.4 |
| 147.5° | *97.3* | 97.3 | 98.0 | 98.0 | 94.3 | 92.8 | 75.7 | 50.5 | 37.9 | 34.2 | 32.7 |
| 150° | *81.7* | 82.4 | 81.7 | 78.0 | 78.0 | 73.5 | 62.4 | 42.3 | 33.4 | 32.7 | 31.2 |
| 152.5° | *66.8* | 66.1 | 66.8 | 66.1 | 62.4 | 57.2 | 48.3 | 34.9 | 31.2 | 31.2 | 30.4 |
| 155° | *54.2* | 55.0 | 54.2 | 51.2 | 49.0 | 43.8 | 37.9 | 29.7 | 29.0 | 29.0 | 28.2 |
| 157.5° | *42.3* | 43.8 | 42.3 | 42.3 | 40.1 | 34.9 | 29.7 | 26.7 | 27.5 | 27.5 | 27.5 |
| 160° | *32.7* | 32.7 | 33.4 | 32.7 | 29.7 | 26.0 | 24.5 | 24.5 | 26.0 | 26.7 | 27.5 |
| 162.5° | *22.3* | 23.8 | 23.8 | 23.0 | 21.5 | 19.3 | 20.1 | 23.0 | 25.2 | 25.2 | 26.7 |
| 165° | *13.4* | 13.4 | 14.9 | 15.6 | 14.9 | 15.6 | 18.6 | 20.8 | 23.0 | 25.2 | 25.2 |
| 167.5° | *6.7* | 7.4 | 8.9 | 10.4 | 11.9 | 13.4 | 18.6 | 21.5 | 23.8 | 25.2 | 25.2 |
| 170° | *3.0* | 3.0 | 5.2 | 8.2 | 11.1 | 14.1 | 19.3 | 22.3 | 23.8 | 25.2 | 24.5 |
| 172.5° | *3.0* | 3.0 | 5.2 | 8.9 | 11.1 | 14.1 | 20.1 | 20.8 | 24.5 | 26.0 | 25.2 |
| 175° | *2.2* | 3.7 | 5.2 | 8.9 | 11.9 | 14.9 | 20.1 | 23.0 | 23.8 | 26.0 | 26.0 |
| 177.5° | *2.2* | 3.7 | 5.9 | 8.9 | 11.9 | 14.9 | 19.3 | 23.0 | 24.5 | 25.2 | 26.7 |
| 180° | *15.6* | 15.6 | 15.6 | 15.6 | 15.6 | 15.6 | 15.6 | 15.6 | 15.6 | 15.6 | 15.6 |

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**CANDELA DISTRIBUTION (continued):**

| | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 4407.5 | 4407.5 | 4407.5 | 4407.5 | 4407.5 | 4407.5 | 4407.5 | 4407.5 | 4407.5 | 4407.5 |
| 2.5° | 4383.0 | 4397.1 | 4331.0 | 4302.0 | 4218.9 | 4178.0 | 4290.2 | 4334.0 | 4252.3 | 4213.7 |
| 5° | 4291.6 | 4319.1 | 4261.2 | 4204.0 | 4149.1 | 4043.6 | 4111.9 | 4005.0 | 4006.5 | 4014.6 |
| 7.5° | 4415.7 | 4238.2 | 4127.5 | 3955.2 | 3956.0 | 3879.5 | 3846.8 | 3751.0 | 3756.2 | 3767.4 |
| 10° | 4308.0 | 4134.2 | 4022.1 | 3898.1 | 3831.2 | 3663.4 | 3560.2 | 3545.3 | 3485.2 | 3430.2 |
| 12.5° | 4158.7 | 4083.0 | 3833.4 | 3754.0 | 3595.8 | 3369.3 | 3269.0 | 3231.2 | 3123.5 | 3099.0 |
| 15° | 4132.7 | 3922.6 | 3757.0 | 3532.7 | 3334.4 | 3098.2 | 2908.1 | 2874.7 | 2755.2 | 2744.0 |
| 17.5° | 4096.3 | 3829.7 | 3612.9 | 3281.7 | 3038.8 | 2764.8 | 2513.1 | 2371.2 | 2224.9 | 2245.0 |
| 20° | 3937.4 | 3635.2 | 3391.6 | 3080.4 | 2752.2 | 2392.0 | 2096.4 | 1841.0 | 1764.5 | 1747.4 |
| 22.5° | 3869.1 | 3512.6 | 3186.6 | 2787.8 | 2400.9 | 1933.1 | 1609.3 | 1413.2 | 1344.9 | 1303.3 |
| 25° | 3703.5 | 3263.9 | 2957.9 | 2519.0 | 1952.4 | 1559.5 | 1219.4 | 1038.2 | 981.0 | 960.2 |
| 27.5° | 3519.3 | 3177.0 | 2675.7 | 2201.2 | 1610.0 | 1186.0 | 949.8 | 806.5 | 773.1 | 767.1 |
| 30° | 3372.3 | 2970.5 | 2475.2 | 1829.1 | 1308.5 | 926.8 | 773.8 | 701.0 | 672.1 | 671.3 |
| 32.5° | 3182.9 | 2758.1 | 2211.5 | 1531.3 | 1030.0 | 779.8 | 678.0 | 637.2 | 600.8 | 615.6 |
| 35° | 2980.2 | 2554.6 | 1969.5 | 1277.3 | 842.1 | 681.7 | 626.0 | 583.7 | 580.0 | 564.4 |
| 37.5° | 2733.6 | 2271.7 | 1717.0 | 1067.2 | 730.7 | 634.2 | 582.2 | 561.4 | 562.9 | 551.0 |
| 40° | 2566.5 | 2114.3 | 1468.9 | 896.4 | 641.6 | 583.7 | 548.1 | 516.9 | 510.2 | 516.9 |
| 42.5° | 2369.0 | 1915.2 | 1256.5 | 763.4 | 588.2 | 536.2 | 496.8 | 479.7 | 467.9 | 476.8 |
| 45° | 2255.4 | 1751.1 | 1056.8 | 660.9 | 539.1 | 483.5 | 452.3 | 426.3 | 412.9 | 414.4 |
| 47.5° | 2080.1 | 1592.2 | 891.2 | 600.0 | 490.9 | 445.6 | 404.7 | 363.9 | 353.5 | 353.5 |
| 50° | 1937.5 | 1372.4 | 764.2 | 554.0 | 447.8 | 395.8 | 350.5 | 319.3 | 299.3 | 311.2 |
| 52.5° | *1786.8* | *1173.4* | *672.1* | *508.7* | *415.1* | *356.5* | *312.6* | *278.5* | *255.5* | *250.3* |
| 55° | 1649.4 | 1010.0 | 623.1 | 476.8 | 365.4 | 317.8 | 270.3 | 243.6 | 223.5 | 220.6 |
| 57.5° | 1518.7 | 883.0 | 577.8 | 438.2 | 329.0 | 277.7 | 239.9 | 216.1 | 213.9 | 217.6 |
| 60° | 1318.9 | 761.2 | 542.1 | 389.9 | 292.6 | 240.6 | 208.7 | 192.3 | 196.8 | 201.3 |
| 62.5° | 1160.0 | 689.2 | 516.1 | 351.3 | 253.2 | 207.9 | 184.9 | 171.5 | 179.0 | 183.4 |
| 65° | 954.3 | 622.3 | 482.0 | 314.1 | 219.8 | 178.2 | 157.4 | 156.0 | 162.6 | 167.1 |
| 67.5° | 785.0 | 577.8 | 436.7 | 277.0 | 191.6 | 148.5 | 136.6 | 138.9 | 145.6 | 144.1 |
| 70° | 631.2 | 519.1 | 380.2 | 234.7 | 158.2 | 121.8 | 117.3 | 115.9 | 118.1 | 120.3 |
| 72.5° | 524.3 | 468.6 | 331.2 | 203.5 | 132.9 | 104.0 | 97.3 | 95.1 | 92.8 | 96.5 |
| 75° | 433.7 | 423.3 | 287.4 | 170.8 | 107.7 | 84.7 | 74.3 | 70.5 | 64.6 | 66.8 |
| 77.5° | 381.0 | 355.0 | 233.2 | 136.6 | 85.4 | 63.9 | 49.8 | 42.3 | 38.6 | 40.8 |
| 80° | 330.5 | 294.1 | 196.8 | 108.4 | 65.4 | 40.8 | 23.8 | 14.1 | 11.1 | 11.1 |
| 82.5° | 274.8 | 242.1 | 168.6 | 89.1 | 46.8 | 23.0 | 5.2 | 0.7 | 0.0 | 0.0 |
| 85° | 234.7 | 205.7 | 143.3 | 75.0 | 39.4 | 19.3 | 7.4 | 1.5 | 0.7 | 0.0 |
| 87.5° | 196.8 | 173.0 | 121.8 | 65.4 | 35.6 | 18.6 | 6.7 | 2.2 | 1.5 | 1.5 |
| 90° | 169.3 | 150.8 | 111.4 | 58.7 | 31.9 | 17.8 | 7.4 | 3.0 | 2.2 | 2.2 |
| 92.5° | 153.0 | 134.4 | 101.0 | 52.7 | 29.7 | 16.3 | 6.7 | 3.7 | 3.0 | 3.7 |
| 95° | 141.8 | 122.5 | 91.3 | 50.5 | 28.2 | 17.1 | 7.4 | 5.2 | 3.7 | 4.5 |
| 97.5° | 128.5 | 113.6 | 82.4 | 45.3 | 25.2 | 14.9 | 7.4 | 5.2 | 3.7 | 3.0 |
| 100° | 121.0 | 106.2 | 75.0 | 43.8 | 26.0 | 16.3 | 8.2 | 5.9 | 5.2 | 4.5 |
| 102.5° | 115.9 | 101.7 | 70.5 | 41.6 | 26.0 | 17.1 | 9.7 | 6.7 | 5.9 | 5.2 |
| 105° | 111.4 | 96.5 | 65.4 | 39.4 | 23.8 | 15.6 | 8.9 | 6.7 | 5.2 | 5.2 |
| 107.5° | 106.9 | 92.1 | 60.9 | 37.1 | 23.0 | 15.6 | 8.9 | 6.7 | 5.2 | 4.5 |
| 110° | 102.5 | 86.1 | 55.7 | 34.9 | 22.3 | 14.1 | 8.9 | 6.7 | 4.5 | 5.9 |

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

Scaled Data Report

REPORT NUMBER: P979174
CATALOG NUMBER: WPLLED38S-120W-3500K

**CANDELA DISTRIBUTION (continued):**

| | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|
| 112.5° | 98.0 | 78.7 | 51.2 | 32.7 | 21.5 | 13.4 | 7.4 | 5.9 | 3.7 | 3.7 |
| 115° | 91.3 | 69.1 | 47.5 | 30.4 | 20.1 | 12.6 | 7.4 | 5.2 | 3.7 | 3.7 |
| 117.5° | 83.9 | 60.9 | 43.1 | 29.7 | 19.3 | 11.9 | 7.4 | 5.2 | 3.7 | 3.7 |
| 120° | 78.7 | 55.0 | 40.1 | 27.5 | 17.8 | 11.1 | 8.2 | 4.5 | 3.7 | 3.0 |
| 122.5° | 69.8 | 49.8 | 37.1 | 26.7 | 18.6 | 10.4 | 7.4 | 4.5 | 3.7 | 3.0 |
| 125° | 60.9 | 43.8 | 34.9 | 26.0 | 17.8 | 10.4 | 6.7 | 4.5 | 3.0 | 3.0 |
| 127.5° | 55.0 | 41.6 | 32.7 | 26.0 | 17.1 | 11.1 | 7.4 | 3.7 | 3.0 | 3.0 |
| 130° | 49.8 | 38.6 | 31.9 | 24.5 | 16.3 | 11.1 | 7.4 | 4.5 | 3.0 | 3.0 |
| 132.5° | 45.3 | 37.9 | 31.2 | 25.2 | 16.3 | 10.4 | 8.2 | 4.5 | 3.7 | 2.2 |
| 135° | 43.1 | 34.9 | 29.0 | 23.8 | 15.6 | 10.4 | 8.2 | 5.2 | 3.7 | 3.0 |
| 137.5° | 39.4 | 34.2 | 29.7 | 23.8 | 16.3 | 11.1 | 8.2 | 5.2 | 4.5 | 3.7 |
| 140° | 37.9 | 32.7 | 28.2 | 23.0 | 15.6 | 11.1 | 8.9 | 5.2 | 3.7 | 3.7 |
| 142.5° | 35.6 | 31.2 | 28.2 | 22.3 | 16.3 | 11.9 | 9.7 | 5.9 | 4.5 | 4.5 |
| 145° | 34.2 | 31.2 | 27.5 | 21.5 | 14.9 | 11.9 | 8.9 | 5.9 | 4.5 | 4.5 |
| 147.5° | 31.2 | 29.7 | 25.2 | 20.1 | 14.9 | 10.4 | 8.2 | 4.5 | 3.7 | 3.7 |
| 150° | 31.9 | 27.5 | 24.5 | 20.1 | 14.9 | 11.9 | 9.7 | 5.2 | 3.7 | 3.7 |
| 152.5° | 29.0 | 27.5 | 24.5 | 20.1 | 14.1 | 11.9 | 8.9 | 5.9 | 3.7 | 3.7 |
| 155° | 27.5 | 26.0 | 24.5 | 20.1 | 14.1 | 11.1 | 8.9 | 5.2 | 3.7 | 3.7 |
| 157.5° | 26.7 | 25.2 | 23.0 | 20.1 | 14.9 | 11.9 | 8.2 | 5.2 | 3.7 | 3.0 |
| 160° | 26.7 | 25.2 | 23.0 | 20.1 | 14.1 | 11.9 | 8.9 | 5.9 | 3.7 | 3.7 |
| 162.5° | 25.2 | 23.8 | 22.3 | 19.3 | 14.1 | 11.9 | 8.9 | 5.2 | 3.7 | 3.7 |
| 165° | 25.2 | 23.8 | 21.5 | 17.8 | 13.4 | 10.4 | 7.4 | 4.5 | 3.0 | 2.2 |
| 167.5° | 26.0 | 23.8 | 22.3 | 19.3 | 13.4 | 11.1 | 7.4 | 4.5 | 3.0 | 2.2 |
| 170° | 26.0 | 23.8 | 23.0 | 19.3 | 14.1 | 11.1 | 7.4 | 3.7 | 2.2 | 2.2 |
| 172.5° | 26.0 | 24.5 | 22.3 | 19.3 | 14.1 | 11.1 | 7.4 | 3.7 | 3.0 | 2.2 |
| 175° | 26.7 | 24.5 | 22.3 | 19.3 | 14.1 | 10.4 | 7.4 | 3.7 | 2.2 | 2.2 |
| 177.5° | 26.0 | 23.8 | 22.3 | 19.3 | 14.1 | 10.4 | 7.4 | 3.7 | 2.2 | 2.2 |
| 180° | 15.6 | 15.6 | 15.6 | 15.6 | 15.6 | 15.6 | 15.6 | 15.6 | 15.6 | 15.6 |

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

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

Report Prepared for

Cooper Lighting Solutions

Lumark

Report Number: SP1-2407-168-2

Test Date: 08/08/2024

Luminaire Tested: LSDL-92S-100W 3500k

Data in this report applies to families of products including LSDL-92S-100W 3500k.

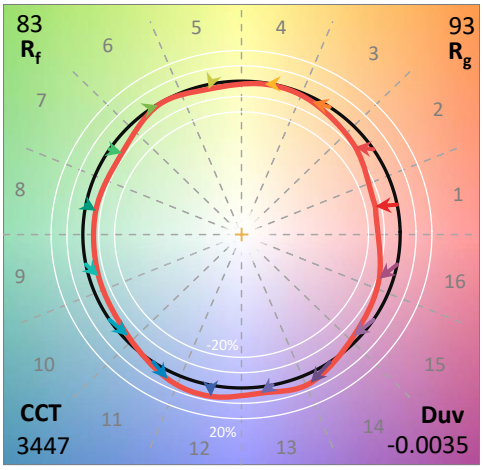
Report Generated By FNC07603 / LDUCLS01DT446
Version: v7.04

## Test Information

| | |
|---|---|
| Test Method: | LM-79-2019 |
| Report Number: | SP1-2407-168-2 |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Photometer: | SP1 - 76IN SPHERE |
| Measurement Geometry: | 4π |
| Issue Date: | 08/12/2024 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS |
| Product Line: | Lumark |
| Catalog Number: | **LSDL-92S-100W 3500k** |
| Description: | Lumark Wallpack 100W |

## Spectral Parameters

| | | | | | |
|---|---|---|---|---|---|
| CCT (K): | 3447 | CRI (Ra): | 81.3 | | |
| CIE u': | 0.2387 | R1: | 80.7 | R9: | -0.6 |
| CIE v': | 0.5076 | R2: | 93.3 | R10: | 84.3 |
| Duv: | -0.0035 | R3: | 92.2 | R11: | 76.0 |
| CIE x: | 0.4046 | R4: | 77.2 | R12: | 69.4 |
| CIE y: | 0.3824 | R5: | 81.3 | R13: | 84.3 |
| CIE z: | 0.2130 | R6: | 90.3 | R14: | 96.4 |
| Peak Wavelength (nm): | 597 | R7: | 79.5 | R15: | 73.7 |
| Dominant Wavelength (nm): | 582 | R8: | 55.9 | | |
| Purity: | 36.18615 | | | | |
| Rf: | 82.6 | | | | |
| Rg: | 93 | | | | |




## Test Conditions

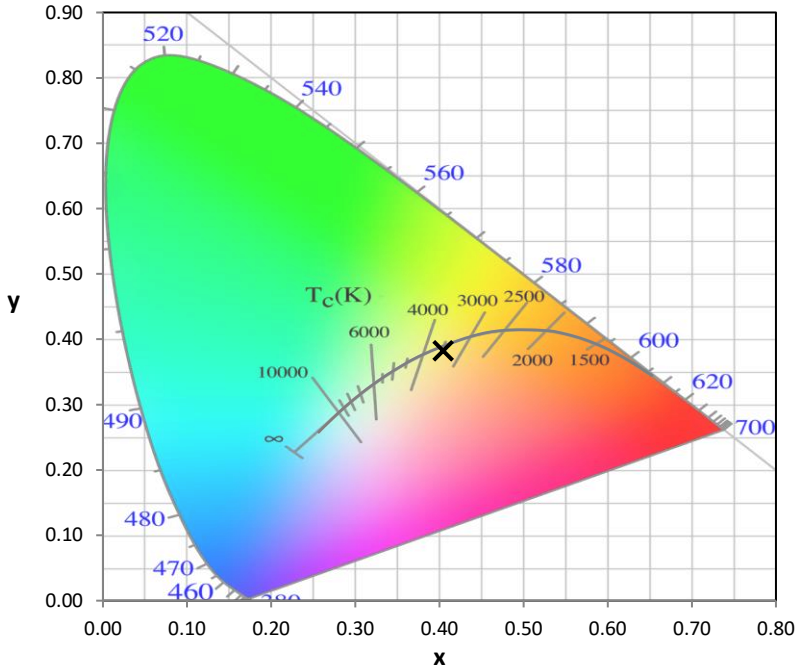
| | |
|---|---|
| Stabilization Time: | 20M |
| Operation Time: | 1H 20M |
| Sphere Temperature (°C): | 24.2 |

REPORT NUMBER: SP1-2407-168-2

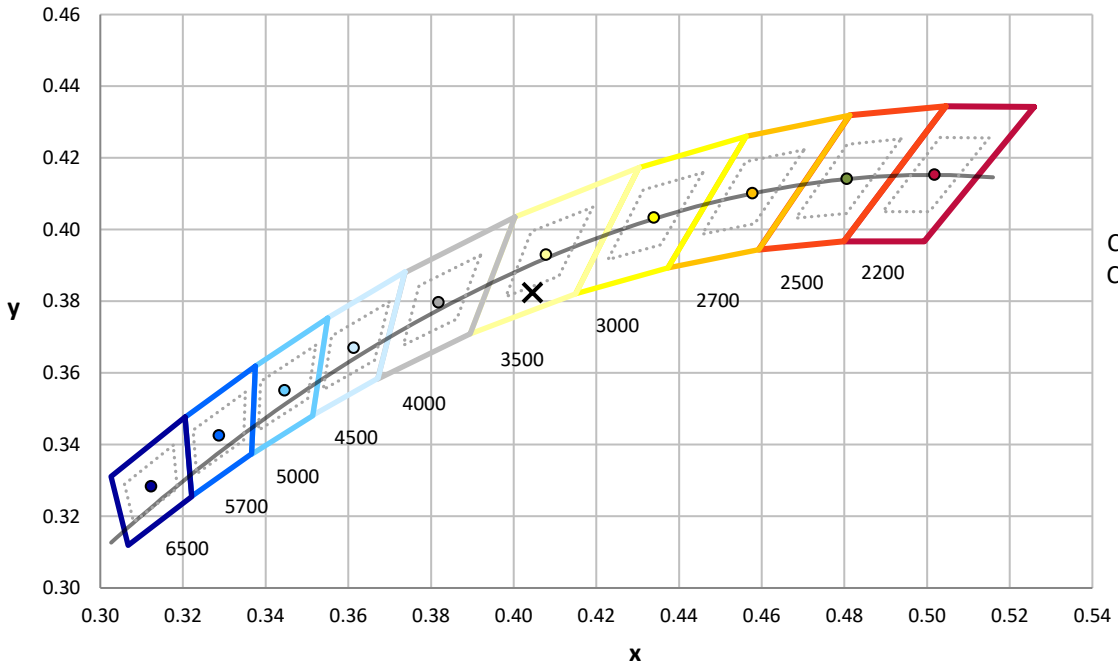
| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 6/18/2024 | 12/18/2024 |
| Power Meter | INXT2011004 | 2/8/2024 | 2/8/2025 |
| AC Power Source | IN0063 | 10/24/2023 | 10/24/2024 |
| DC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

REPORT NUMBER: SP1-2407-168-2

**CIE 1931 Chromaticity Diagram**




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

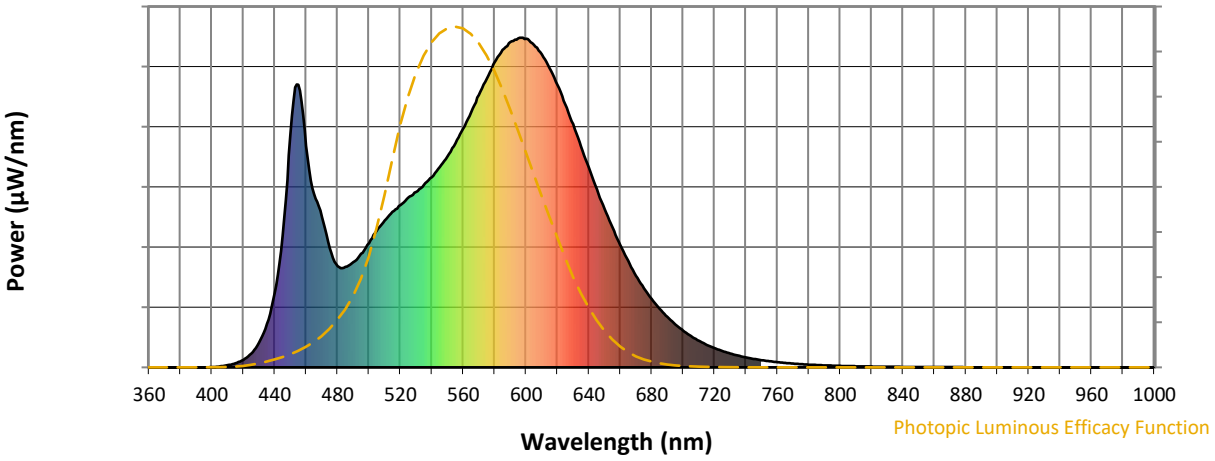



CCT = 3447K
CIE x = 0.4046
CIE y = 0.3824
Duv = -0.0035

Point lies inside the ANSI 3500K 7-step quadrangle

REPORT NUMBER: SP1-2407-168-2

## Photopic Flux vs. Wavelength

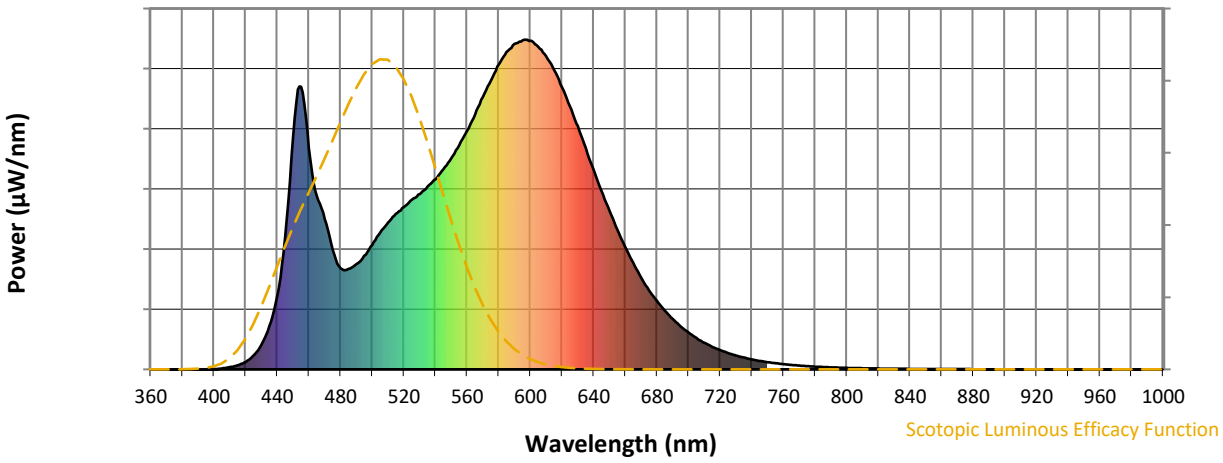



## Photopic Lumens: NR

| λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 360 | 0 | NR | 490 | 319 | NR | 620 | 856 | NR | 750 | 22 | NR | 880 | 1 | NR |
| 365 | 0 | NR | 495 | 344 | NR | 625 | 798 | NR | 755 | 18 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 377 | NR | 630 | 738 | NR | 760 | 16 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 415 | NR | 635 | 671 | NR | 765 | 13 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 445 | NR | 640 | 606 | NR | 770 | 11 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 472 | NR | 645 | 541 | NR | 775 | 10 | NR | 905 | 0 | NR |
| 390 | 0 | NR | 520 | 492 | NR | 650 | 481 | NR | 780 | 8 | NR | 910 | 0 | NR |
| 395 | 0 | NR | 525 | 514 | NR | 655 | 424 | NR | 785 | 7 | NR | 915 | 0 | NR |
| 400 | 1 | NR | 530 | 532 | NR | 660 | 371 | NR | 790 | 6 | NR | 920 | 0 | NR |
| 405 | 3 | NR | 535 | 554 | NR | 665 | 323 | NR | 795 | 5 | NR | 925 | 0 | NR |
| 410 | 6 | NR | 540 | 577 | NR | 670 | 278 | NR | 800 | 4 | NR | 930 | 0 | NR |
| 415 | 12 | NR | 545 | 608 | NR | 675 | 240 | NR | 805 | 4 | NR | 935 | 0 | NR |
| 420 | 23 | NR | 550 | 640 | NR | 680 | 207 | NR | 810 | 3 | NR | 940 | 0 | NR |
| 425 | 42 | NR | 555 | 680 | NR | 685 | 178 | NR | 815 | 3 | NR | 945 | 0 | NR |
| 430 | 75 | NR | 560 | 725 | NR | 690 | 154 | NR | 820 | 3 | NR | 950 | 0 | NR |
| 435 | 132 | NR | 565 | 774 | NR | 695 | 131 | NR | 825 | 2 | NR | 955 | 0 | NR |
| 440 | 225 | NR | 570 | 826 | NR | 700 | 111 | NR | 830 | 2 | NR | 960 | 0 | NR |
| 445 | 400 | NR | 575 | 875 | NR | 705 | 95 | NR | 835 | 2 | NR | 965 | 0 | NR |
| 450 | 706 | NR | 580 | 925 | NR | 710 | 80 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 858 | NR | 585 | 963 | NR | 715 | 68 | NR | 845 | 1 | NR | 975 | 0 | NR |
| 460 | 672 | NR | 590 | 987 | NR | 720 | 58 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 526 | NR | 595 | 998 | NR | 725 | 49 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 456 | NR | 600 | 997 | NR | 730 | 42 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 363 | NR | 605 | 978 | NR | 735 | 36 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 307 | NR | 610 | 950 | NR | 740 | 30 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 305 | NR | 615 | 908 | NR | 745 | 26 | NR | 875 | 1 | NR | | | |

REPORT NUMBER: SP1-2407-168-2

## Scotopic Flux vs. Wavelength

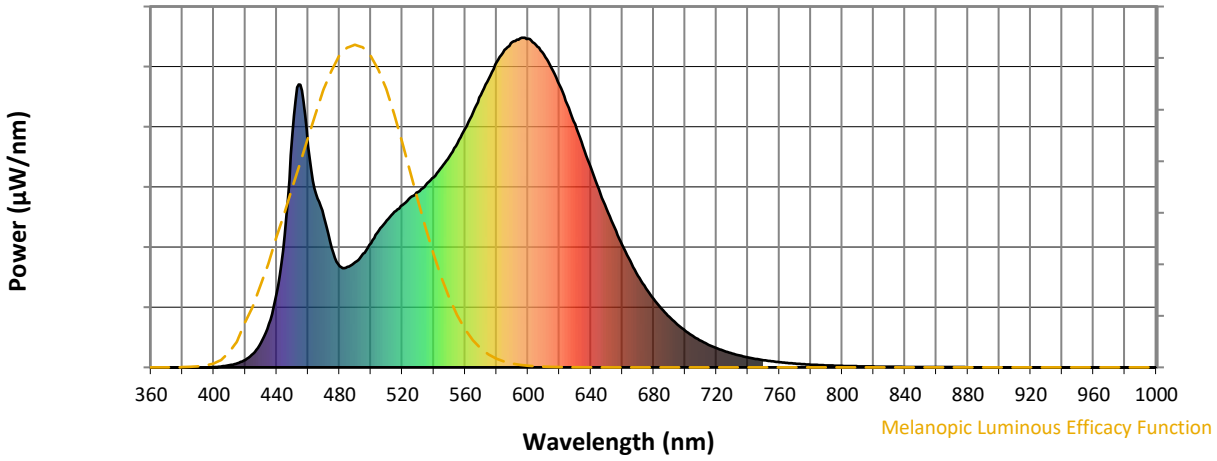



**Scotopic Lumens: NR** **S/P: 1.56**

| λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 360 | 0 | NR | 490 | 319 | NR | 620 | 856 | NR | 750 | 22 | NR | 880 | 1 | NR |
| 365 | 0 | NR | 495 | 344 | NR | 625 | 798 | NR | 755 | 18 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 377 | NR | 630 | 738 | NR | 760 | 16 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 415 | NR | 635 | 671 | NR | 765 | 13 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 445 | NR | 640 | 606 | NR | 770 | 11 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 472 | NR | 645 | 541 | NR | 775 | 10 | NR | 905 | 0 | NR |
| 390 | 0 | NR | 520 | 492 | NR | 650 | 481 | NR | 780 | 8 | NR | 910 | 0 | NR |
| 395 | 0 | NR | 525 | 514 | NR | 655 | 424 | NR | 785 | 7 | NR | 915 | 0 | NR |
| 400 | 1 | NR | 530 | 532 | NR | 660 | 371 | NR | 790 | 6 | NR | 920 | 0 | NR |
| 405 | 3 | NR | 535 | 554 | NR | 665 | 323 | NR | 795 | 5 | NR | 925 | 0 | NR |
| 410 | 6 | NR | 540 | 577 | NR | 670 | 278 | NR | 800 | 4 | NR | 930 | 0 | NR |
| 415 | 12 | NR | 545 | 608 | NR | 675 | 240 | NR | 805 | 4 | NR | 935 | 0 | NR |
| 420 | 23 | NR | 550 | 640 | NR | 680 | 207 | NR | 810 | 3 | NR | 940 | 0 | NR |
| 425 | 42 | NR | 555 | 680 | NR | 685 | 178 | NR | 815 | 3 | NR | 945 | 0 | NR |
| 430 | 75 | NR | 560 | 725 | NR | 690 | 154 | NR | 820 | 3 | NR | 950 | 0 | NR |
| 435 | 132 | NR | 565 | 774 | NR | 695 | 131 | NR | 825 | 2 | NR | 955 | 0 | NR |
| 440 | 225 | NR | 570 | 826 | NR | 700 | 111 | NR | 830 | 2 | NR | 960 | 0 | NR |
| 445 | 400 | NR | 575 | 875 | NR | 705 | 95 | NR | 835 | 2 | NR | 965 | 0 | NR |
| 450 | 706 | NR | 580 | 925 | NR | 710 | 80 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 858 | NR | 585 | 963 | NR | 715 | 68 | NR | 845 | 1 | NR | 975 | 0 | NR |
| 460 | 672 | NR | 590 | 987 | NR | 720 | 58 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 526 | NR | 595 | 998 | NR | 725 | 49 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 456 | NR | 600 | 997 | NR | 730 | 42 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 363 | NR | 605 | 978 | NR | 735 | 36 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 307 | NR | 610 | 950 | NR | 740 | 30 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 305 | NR | 615 | 908 | NR | 745 | 26 | NR | 875 | 1 | NR | | | |

REPORT NUMBER: SP1-2407-168-2

## Melanopic Flux vs. Wavelength




**Melanopic Lumens: NR** **M/P: 3.22**

| λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 360 | 0 | NR | 490 | 319 | NR | 620 | 856 | NR | 750 | 22 | NR | 880 | 1 | NR |
| 365 | 0 | NR | 495 | 344 | NR | 625 | 798 | NR | 755 | 18 | NR | 885 | 0 | NR |
| 370 | 0 | NR | 500 | 377 | NR | 630 | 738 | NR | 760 | 16 | NR | 890 | 0 | NR |
| 375 | 0 | NR | 505 | 415 | NR | 635 | 671 | NR | 765 | 13 | NR | 895 | 0 | NR |
| 380 | 0 | NR | 510 | 445 | NR | 640 | 606 | NR | 770 | 11 | NR | 900 | 0 | NR |
| 385 | 0 | NR | 515 | 472 | NR | 645 | 541 | NR | 775 | 10 | NR | 905 | 0 | NR |
| 390 | 0 | NR | 520 | 492 | NR | 650 | 481 | NR | 780 | 8 | NR | 910 | 0 | NR |
| 395 | 0 | NR | 525 | 514 | NR | 655 | 424 | NR | 785 | 7 | NR | 915 | 0 | NR |
| 400 | 1 | NR | 530 | 532 | NR | 660 | 371 | NR | 790 | 6 | NR | 920 | 0 | NR |
| 405 | 3 | NR | 535 | 554 | NR | 665 | 323 | NR | 795 | 5 | NR | 925 | 0 | NR |
| 410 | 6 | NR | 540 | 577 | NR | 670 | 278 | NR | 800 | 4 | NR | 930 | 0 | NR |
| 415 | 12 | NR | 545 | 608 | NR | 675 | 240 | NR | 805 | 4 | NR | 935 | 0 | NR |
| 420 | 23 | NR | 550 | 640 | NR | 680 | 207 | NR | 810 | 3 | NR | 940 | 0 | NR |
| 425 | 42 | NR | 555 | 680 | NR | 685 | 178 | NR | 815 | 3 | NR | 945 | 0 | NR |
| 430 | 75 | NR | 560 | 725 | NR | 690 | 154 | NR | 820 | 3 | NR | 950 | 0 | NR |
| 435 | 132 | NR | 565 | 774 | NR | 695 | 131 | NR | 825 | 2 | NR | 955 | 0 | NR |
| 440 | 225 | NR | 570 | 826 | NR | 700 | 111 | NR | 830 | 2 | NR | 960 | 0 | NR |
| 445 | 400 | NR | 575 | 875 | NR | 705 | 95 | NR | 835 | 2 | NR | 965 | 0 | NR |
| 450 | 706 | NR | 580 | 925 | NR | 710 | 80 | NR | 840 | 1 | NR | 970 | 0 | NR |
| 455 | 858 | NR | 585 | 963 | NR | 715 | 68 | NR | 845 | 1 | NR | 975 | 0 | NR |
| 460 | 672 | NR | 590 | 987 | NR | 720 | 58 | NR | 850 | 1 | NR | 980 | 0 | NR |
| 465 | 526 | NR | 595 | 998 | NR | 725 | 49 | NR | 855 | 1 | NR | 985 | 0 | NR |
| 470 | 456 | NR | 600 | 997 | NR | 730 | 42 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 363 | NR | 605 | 978 | NR | 735 | 36 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 307 | NR | 610 | 950 | NR | 740 | 30 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 305 | NR | 615 | 908 | NR | 745 | 26 | NR | 875 | 1 | NR | | | |

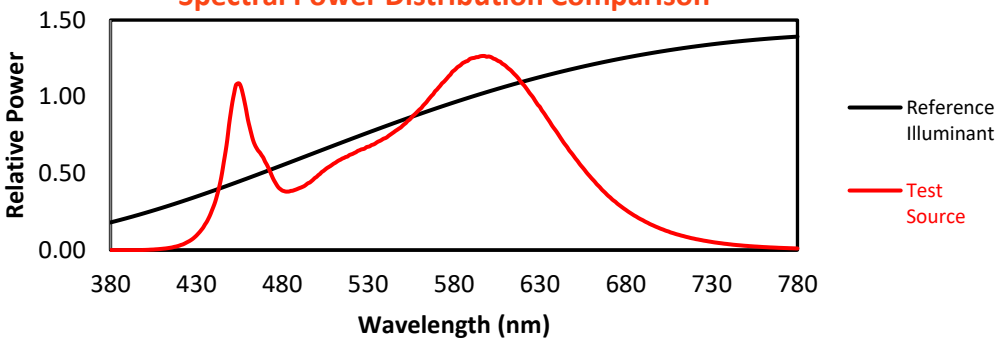
REPORT NUMBER: SP1-2407-168-2

# TM-30-18

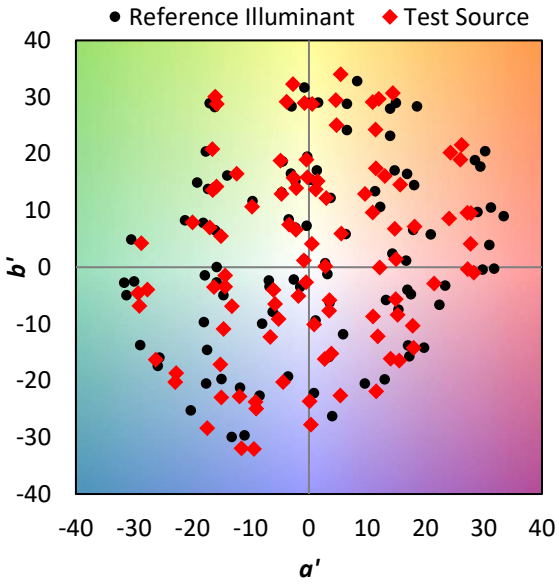
## Summary

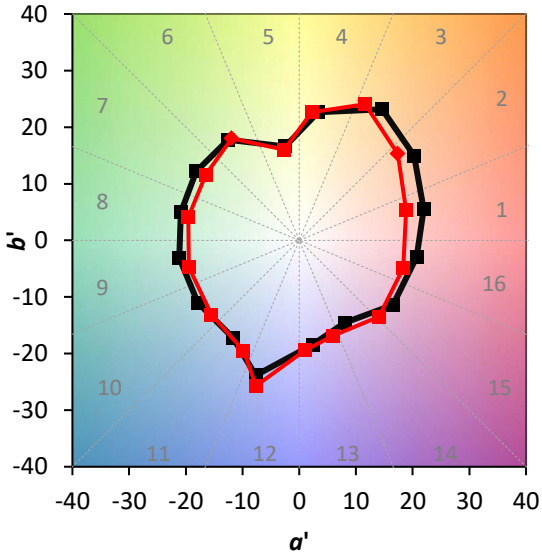
$R_f$ = 82.6
$R_g$ = 93
CIE $R_a$ = 81.3
$R_9$ = -0.6

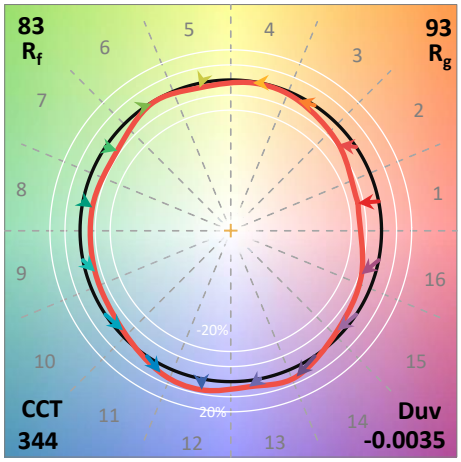
## Spectral Power Distribution Comparison

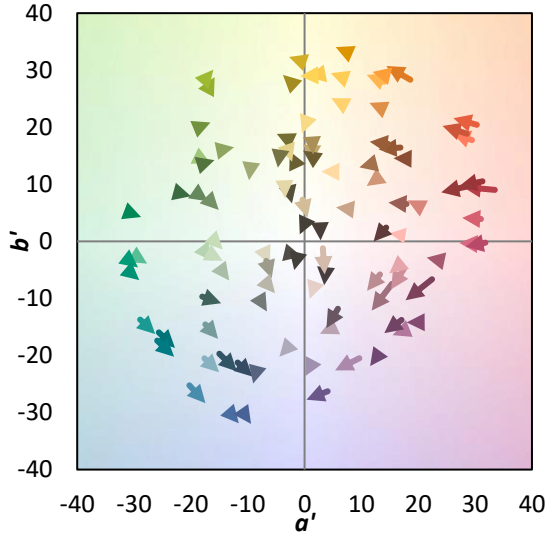



## Color Vector Graphics



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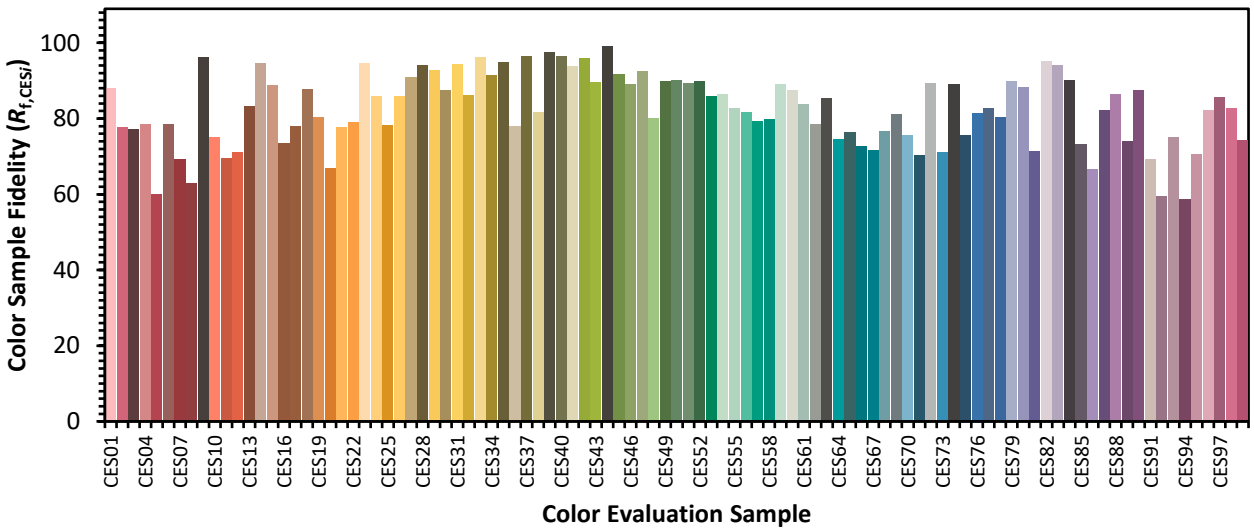
**Individual Sample Fidelity Index ($R_{f,i}$)**

| | | | |
|---|---|---|---|
| CES01 = 86 | CES26 = 86 | CES51 = 89 | CES76 = 81 |
| CES02 = 62 | CES27 = 91 | CES52 = 90 | CES77 = 83 |
| CES03 = 31 | CES28 = 94 | CES53 = 86 | CES78 = 80 |
| CES04 = 70 | CES29 = 93 | CES54 = 86 | CES79 = 90 |
| CES05 = 49 | CES30 = 87 | CES55 = 83 | CES80 = 88 |
| CES06 = 51 | CES31 = 94 | CES56 = 82 | CES81 = 71 |
| CES07 = 41 | CES32 = 86 | CES57 = 79 | CES82 = 95 |
| CES08 = 40 | CES33 = 96 | CES58 = 80 | CES83 = 94 |
| CES09 = 29 | CES34 = 91 | CES59 = 89 | CES84 = 90 |
| CES10 = 75 | CES35 = 95 | CES60 = 88 | CES85 = 73 |
| CES11 = 58 | CES36 = 78 | CES61 = 84 | CES86 = 67 |
| CES12 = 64 | CES37 = 96 | CES62 = 79 | CES87 = 82 |
| CES13 = 43 | CES38 = 82 | CES63 = 86 | CES88 = 86 |
| CES14 = 74 | CES39 = 97 | CES64 = 74 | CES89 = 74 |
| CES15 = 71 | CES40 = 96 | CES65 = 76 | CES90 = 88 |
| CES16 = 47 | CES41 = 94 | CES66 = 73 | CES91 = 69 |
| CES17 = 50 | CES42 = 96 | CES67 = 72 | CES92 = 59 |
| CES18 = 56 | CES43 = 90 | CES68 = 77 | CES93 = 75 |
| CES19 = 72 | CES44 = 99 | CES69 = 81 | CES94 = 59 |
| CES20 = 66 | CES45 = 92 | CES70 = 76 | CES95 = 71 |
| CES21 = 86 | CES46 = 89 | CES71 = 70 | CES96 = 82 |
| CES22 = 79 | CES47 = 92 | CES72 = 89 | CES97 = 86 |
| CES23 = 92 | CES48 = 80 | CES73 = 71 | CES98 = 83 |
| CES24 = 91 | CES49 = 90 | CES74 = 89 | CES99 = 74 |
| CES25 = 72 | CES50 = 90 | CES75 = 76 | |



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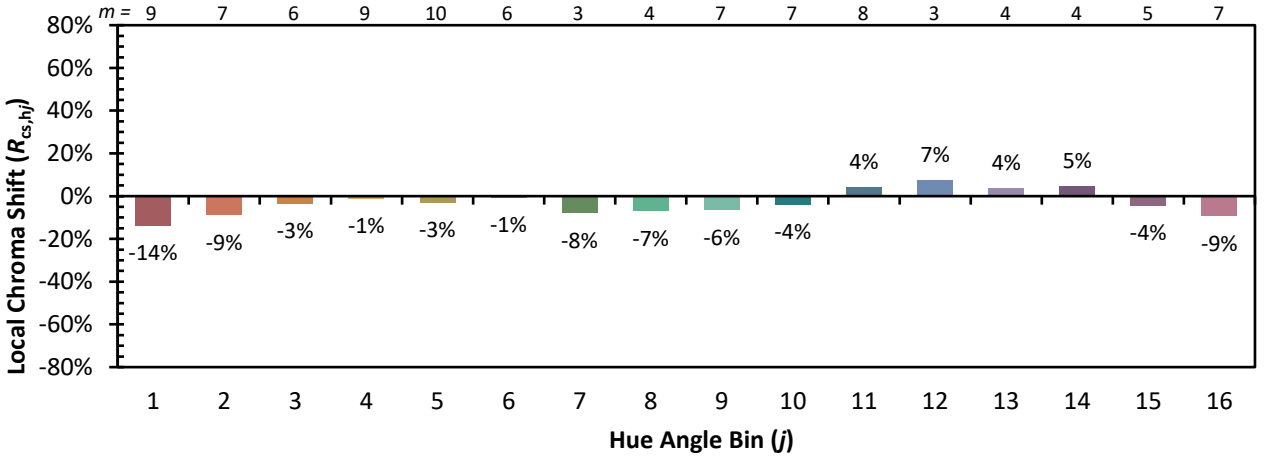
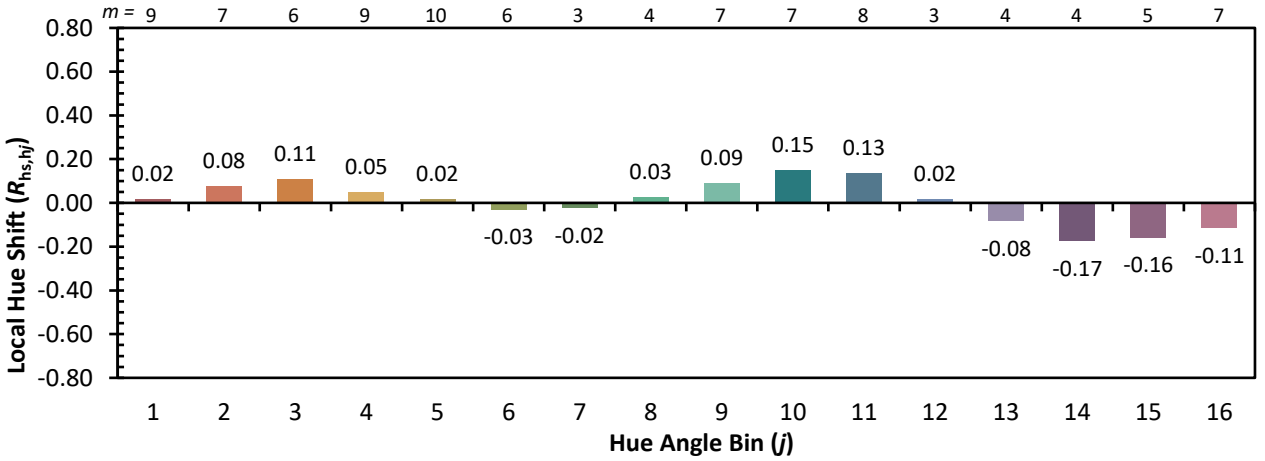
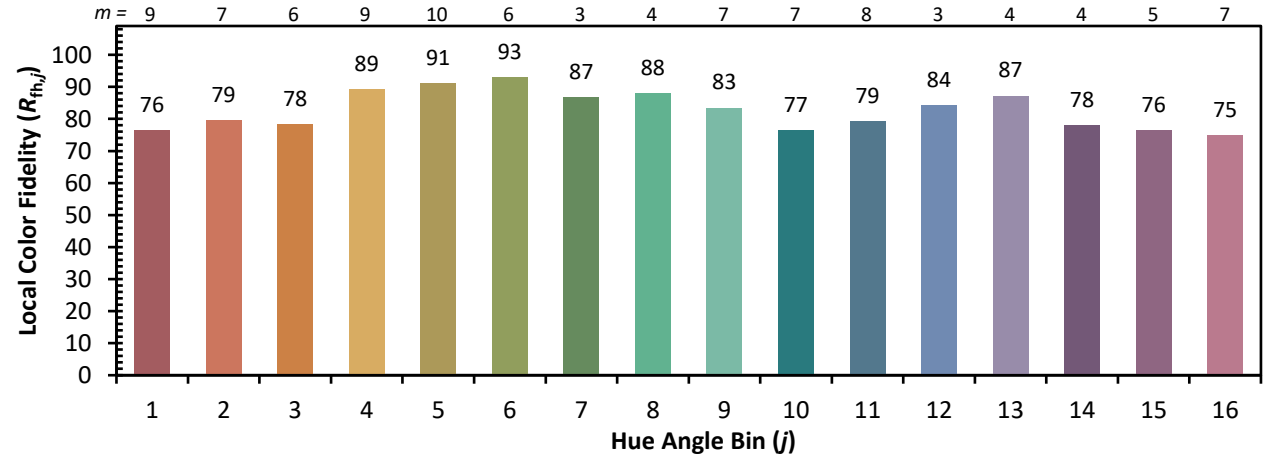
## Color Rendition by Hue-Angle Bin



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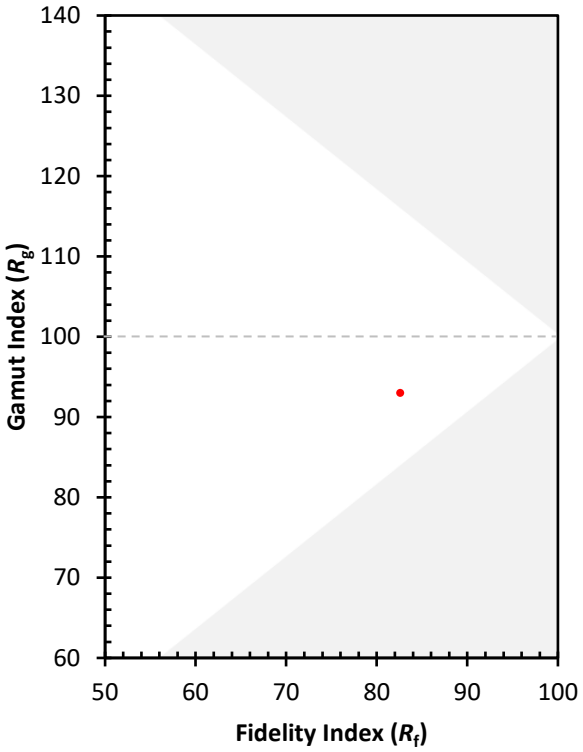
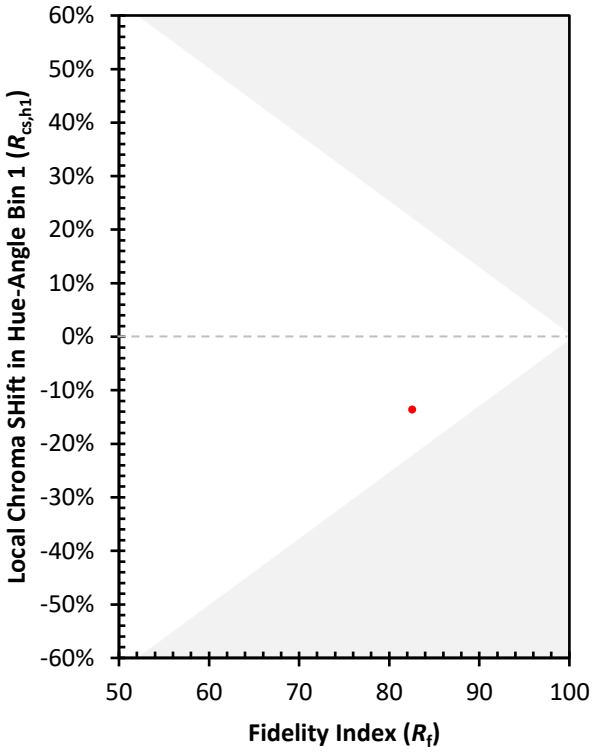
## Measure Comparisons




(END OF REPORT)