

Classified  
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: io LED

Report Number: P895878

Luminaire Tested: **GRZ-05L-930-ASYMx40-X-UNV-STD-1F**

Issue Date: 11/20/2024



**Test Information**

Test Method: LM-79-08  
Report Number: P895878  
Test Lab: EVERFINE  
Issue Date: 11/20/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: io LED  
Catalog Number: GRZ-05L-930-ASYMx40-X-UNV-STD-1F  
Description: io LED 90CRI 3000K GRAZER 500 lumens per ft WITH Asymmetric x 40 deg OPTIC  
Light Source: 3000K CCT, 90 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

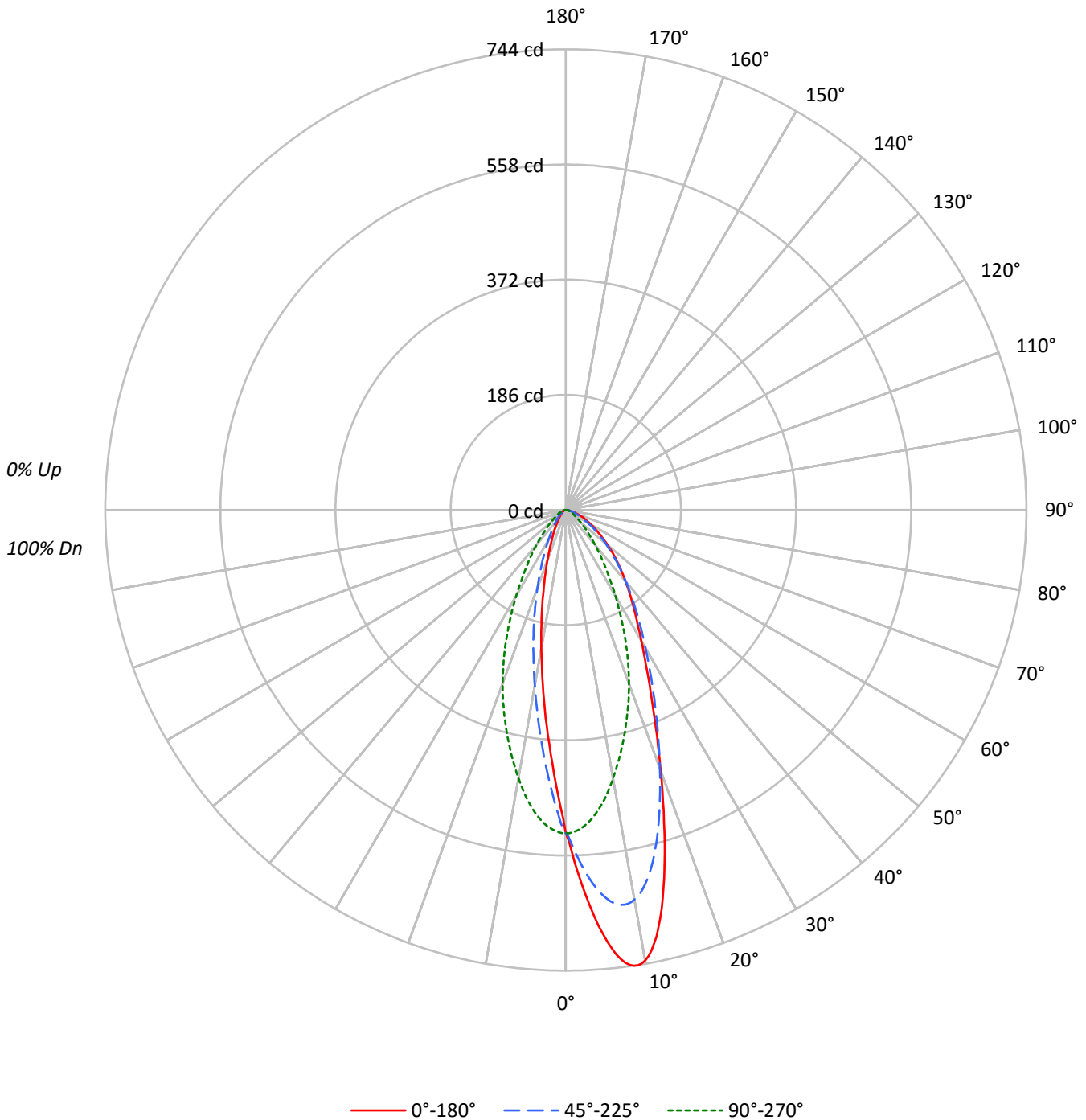
**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 426.9 lumens  
Efficiency: N/A  
Efficacy: 80.6 lumens/watt  
Spacing Criteria (0/90/45): 0.66 / 0.7 / 0.73  
Luminous Opening: Rectangular (W 1' x L: 0.17' x H: 0')  
CIE Type: Direct

Input Watts (W): 5.3  
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: 25 FT

TEST NUMBER: P895878  
CATALOG NUMBER: GRZ-05L-930-ASYMx40-X-UNV-STD-1F

### Luminous Intensity Polar Plot





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**COEFFICIENT OF UTILIZATION - ZONAL CAVITY METHOD:**

RF	20				20				20				20				20				
RC	80				70				50				30				10			0	
RW	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	50	30	10	0
RCR																					
0	119	119	119	119	116	116	116	116	111	111	111	106	106	106	102	102	102	100	100	100	100
1	112	109	106	103	110	107	104	101	103	100	98	99	97	95	95	94	93	91	91	91	91
2	105	100	95	91	103	98	93	90	94	91	88	91	88	86	89	86	84	82	82	82	82
3	99	91	86	81	97	90	85	80	87	83	79	85	81	78	82	79	76	75	75	75	75
4	93	84	78	73	91	83	77	73	81	76	72	79	74	71	77	73	70	68	68	68	68
5	88	78	71	67	86	77	71	66	75	70	66	74	69	65	72	68	64	63	63	63	63
6	83	73	66	61	81	72	66	61	70	65	60	69	64	60	68	63	60	58	58	58	58
7	78	68	61	57	77	67	61	56	66	60	56	65	60	56	64	59	55	54	54	54	54
8	74	64	57	53	73	63	57	53	62	56	52	61	56	52	60	55	52	50	50	50	50
9	71	60	54	49	70	60	53	49	59	53	49	58	52	49	57	52	49	47	47	47	47
10	67	57	50	46	66	56	50	46	55	50	46	55	50	46	54	49	46	44	44	44	44

**AVERAGE LUMINANCE (cd/sqm):**

	0°	90°	180°
0°	33674	33674	33674
5°	44549	32318	22790
10°	48447	28849	14903
15°	41038	24707	9539
20°	30784	20484	5958
25°	23112	16080	3840
30°	18200	12004	2610
35°	14985	8663	1876
40°	12627	6229	1425
45°	10684	4447	1196
50°	8900	3245	974
55°	7306	2465	856
60°	6070	1976	788
65°	5088	1696	764
70°	4210	1548	774
75°	3318	1497	798
80°	2752	1562	892
85°	2741	1704	1111



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**ZONAL LUMENS:**

Zone	Lumens	% Fixture
0°-10°	47.2	11.1
10°-20°	104.3	24.4
20°-30°	97.4	22.8
30°-40°	72.2	16.9
40°-50°	49.0	11.5
50°-60°	29.9	7.0
60°-70°	16.3	3.8
70°-80°	8.0	1.9
80°-90°	2.7	0.6
90°-100°	0.0	0.0
100°-110°	0.0	0.0
110°-120°	0.0	0.0
120°-130°	0.0	0.0
130°-140°	0.0	0.0
140°-150°	0.0	0.0
150°-160°	0.0	0.0
160°-170°	0.0	0.0
170°-180°	0.0	0.0
0°-30°	248.8	58.3
0°-40°	321.0	75.2
0°-60°	400.0	93.7
0°-90°	426.9	100.0
90°-120°	0.0	0.0
90°-150°	0.0	0.0
90°-180°	0.0	0.0
0°-180°	426.9	100.0

**CANDELA DISTRIBUTION:**

	0°	45°	90°	135°	180°	Flux
0°	522	522	522	522	522	
5°	687	618	499	401	352	68
15°	614	562	370	201	143	168
25°	324	338	226	88	54	151
35°	190	197	110	38	24	120
45°	117	114	49	18	13	90
55°	65	60	22	10	8	59
65°	33	27	11	7	5	33
75°	13	11	6	4	3	15
85°	4	3	2	2	2	4
90°	0	0	0	0	0	



TEST NUMBER: P895878

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**CANDELA DISTRIBUTION (FULL):**

	0°	30°	60°	90°	120°	150°	180°
0°	521.5	521.5	521.5	521.5	521.5	521.5	521.5
0.5°	534.4	528.0	528.3	522.2	516.1	515.8	497.8
1°	552.7	543.2	536.7	521.2	505.9	500.0	479.9
1.5°	570.9	558.5	544.1	519.9	496.0	484.2	461.8
2°	589.0	573.6	551.5	517.9	485.7	468.3	444.6
2.5°	606.9	588.1	558.5	515.8	475.3	453.0	428.0
3°	624.1	602.5	564.9	513.2	464.8	437.4	411.6
3.5°	641.3	616.1	570.7	510.2	454.3	422.1	395.5
4°	657.5	629.0	576.1	506.9	443.6	407.5	380.4
4.5°	673.1	641.2	580.8	502.8	432.8	393.1	365.9
5°	687.3	652.4	584.5	498.6	422.1	379.3	351.6
5.5°	700.4	662.8	587.8	494.1	411.3	366.0	337.7
6°	712.2	671.9	590.1	489.2	400.6	352.6	323.9
6.5°	722.4	679.8	591.9	483.8	390.0	339.7	310.2
7°	730.8	686.3	592.9	478.1	379.7	327.3	297.1
7.5°	737.5	691.2	593.3	472.6	369.4	315.1	284.1
8°	741.9	694.8	592.8	466.4	359.1	302.9	271.8
8.5°	744.3	697.1	591.4	460.1	349.1	291.1	260.1
9°	744.5	697.7	589.5	453.5	339.4	279.3	248.6
9.5°	742.7	696.9	586.9	446.7	329.6	268.0	237.8
10°	738.9	694.2	583.5	440.0	319.8	256.9	227.3
10.5°	732.8	690.5	579.6	433.0	310.5	246.5	217.2
11°	725.0	685.4	575.0	425.9	301.4	236.4	207.9
11.5°	715.0	678.6	570.0	419.0	292.5	226.8	198.2
12°	704.1	670.5	564.5	412.0	283.7	217.3	189.3
12.5°	691.3	661.4	558.4	404.9	275.2	208.1	180.9
13°	677.5	651.0	552.1	398.0	266.4	199.4	172.9
13.5°	662.6	639.9	545.1	390.9	258.2	191.0	165.3
14°	646.9	627.8	538.1	383.7	250.1	182.9	157.8
14.5°	630.5	615.0	530.3	376.7	242.0	175.1	150.2
15°	613.9	601.3	522.2	369.6	234.0	167.8	142.7
15.5°	596.9	587.3	514.2	362.4	226.5	160.6	135.1
16°	579.8	573.0	505.7	355.1	218.8	153.4	128.6
16.5°	562.4	558.1	497.1	348.2	211.1	146.2	122.5
17°	545.0	543.5	488.1	341.1	203.9	139.0	116.8
17.5°	528.0	528.7	479.3	334.1	196.8	132.6	111.0
18°	511.5	513.8	470.1	327.0	189.7	126.7	105.7
18.5°	495.1	499.3	460.7	319.9	182.9	121.0	100.5
19°	478.9	484.8	451.3	312.7	176.3	115.4	95.7
19.5°	463.3	470.1	441.9	305.4	169.8	110.1	91.0
20°	448.0	456.2	432.5	298.1	163.5	105.0	86.7
20.5°	433.7	442.4	423.1	290.9	157.4	100.3	82.5
21°	419.6	429.1	413.4	283.5	151.3	95.7	78.6
21.5°	405.8	416.2	404.2	276.3	145.5	91.2	74.9
22°	392.9	403.6	394.7	269.1	139.8	87.0	71.4



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**CANDELA DISTRIBUTION (continued):**

	0°	30°	60°	90°	120°	150°	180°
22.5°	379.9	391.3	385.2	261.7	134.2	83.1	68.0
23°	367.7	379.5	375.9	254.5	128.9	79.3	64.9
23.5°	356.3	368.4	366.4	247.3	123.7	75.7	61.9
24°	345.1	357.5	357.6	240.0	118.7	72.2	59.1
24.5°	334.7	346.9	348.6	232.9	113.8	69.0	56.4
25°	324.4	336.8	339.9	225.7	109.3	66.0	53.9
25.5°	314.9	327.1	331.1	218.6	104.7	63.0	51.5
26°	305.5	318.0	322.7	211.6	100.4	60.2	49.2
26.5°	296.6	308.9	314.3	204.8	96.2	57.5	47.1
27°	288.2	300.1	306.2	198.1	92.1	55.1	45.1
27.5°	279.9	292.1	298.0	191.4	88.3	52.7	43.2
28°	272.2	284.1	290.2	185.0	84.5	50.5	41.3
28.5°	264.6	276.5	282.4	178.6	81.0	48.3	39.6
29°	257.6	269.2	274.9	172.6	77.5	46.3	38.0
29.5°	250.8	261.9	267.5	166.8	74.3	44.4	36.4
30°	244.1	255.1	260.3	161.0	71.3	42.5	35.0
30.5°	237.9	248.5	253.4	155.3	68.3	40.8	33.6
31°	231.7	242.2	246.5	149.5	65.3	39.2	32.2
31.5°	225.9	235.9	239.7	143.7	62.3	37.6	31.0
32°	220.3	229.9	233.3	137.9	59.8	36.1	29.8
32.5°	214.8	224.2	226.8	132.8	57.3	34.7	28.7
33°	209.5	218.7	220.6	128.0	54.9	33.4	27.6
33.5°	204.4	213.2	214.3	123.3	52.6	32.1	26.5
34°	199.5	208.0	208.4	118.6	50.4	30.9	25.6
34.5°	194.7	203.0	202.4	114.2	48.4	29.7	24.6
35°	190.1	198.0	196.8	109.9	46.4	28.6	23.8
35.5°	185.6	193.2	191.1	105.8	44.6	27.6	22.9
36°	181.2	188.5	185.7	101.8	42.8	26.6	22.1
36.5°	176.9	184.0	180.4	97.8	41.1	25.7	21.3
37°	172.7	179.7	175.2	94.1	39.5	24.8	20.6
37.5°	168.8	175.4	170.1	90.5	37.9	23.9	19.9
38°	165.0	171.2	165.2	87.0	36.4	23.1	19.2
38.5°	161.0	167.0	160.4	83.5	35.0	22.3	18.6
39°	157.2	163.1	155.7	80.1	33.7	21.6	18.0
39.5°	153.5	159.2	151.0	76.9	32.4	20.9	17.4
40°	149.8	155.2	146.6	73.9	31.1	20.2	16.9
40.5°	146.3	151.2	142.3	70.9	30.0	19.5	16.4
41°	142.8	147.2	138.1	68.0	28.9	18.9	15.9
41.5°	139.5	143.3	134.1	65.3	27.9	18.3	15.4
42°	136.0	139.6	130.1	62.6	26.9	17.8	14.9
42.5°	132.8	136.0	126.2	60.1	25.9	17.2	14.5
43°	129.5	132.6	122.4	57.6	25.0	16.7	14.1
43.5°	126.3	129.2	118.8	55.3	24.1	16.2	13.7
44°	123.1	126.0	115.3	53.0	23.3	15.8	13.4
44.5°	120.0	123.6	111.8	50.8	22.6	15.5	13.2



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**CANDELA DISTRIBUTION (continued):**

	0°	30°	60°	90°	120°	150°	180°
45°	117.0	119.4	108.5	48.7	21.8	14.9	13.1
45.5°	113.9	116.2	105.0	46.7	21.0	14.4	12.7
46°	111.0	113.0	101.8	44.8	20.3	14.1	12.6
46.5°	108.0	110.0	98.6	43.0	19.6	13.7	12.3
47°	105.2	106.9	95.5	41.3	19.0	13.3	11.8
47.5°	102.2	104.0	92.5	39.6	18.4	13.0	11.4
48°	99.4	100.9	89.6	38.0	17.8	12.6	11.2
48.5°	96.7	98.1	86.7	36.5	17.2	12.3	10.9
49°	93.9	95.2	83.9	35.0	16.7	12.0	10.3
49.5°	91.3	92.4	81.2	33.6	16.2	11.7	9.9
50°	88.6	89.7	78.5	32.3	15.7	11.4	9.7
50.5°	86.0	87.0	75.9	31.0	15.3	11.1	9.4
51°	83.5	84.3	73.3	29.8	14.8	10.8	9.2
51.5°	81.0	81.7	70.8	28.6	14.4	10.6	9.0
52°	78.6	79.2	68.2	27.5	14.0	10.3	8.7
52.5°	76.2	76.6	65.7	26.5	13.6	10.1	8.5
53°	73.8	74.2	63.4	25.5	13.2	9.9	8.4
53.5°	71.6	71.7	61.1	24.5	12.9	9.6	8.1
54°	69.4	69.3	58.9	23.6	12.5	9.4	7.9
54.5°	67.1	66.9	56.8	22.7	12.2	9.2	7.8
55°	64.9	64.7	54.7	21.9	11.8	9.0	7.6
55.5°	62.8	62.4	52.6	21.1	11.5	8.8	7.4
56°	60.8	60.3	50.6	20.3	11.2	8.6	7.3
56.5°	59.0	58.2	48.7	19.6	10.9	8.4	7.1
57°	57.1	56.1	46.8	18.9	10.7	8.2	7.0
57.5°	55.3	54.1	44.9	18.2	10.4	8.0	6.8
58°	53.6	52.1	43.1	17.6	10.2	7.9	6.7
58.5°	51.8	50.2	41.4	17.0	9.9	7.7	6.5
59°	50.2	48.3	39.7	16.4	9.7	7.5	6.4
59.5°	48.6	46.5	38.1	15.9	9.4	7.4	6.3
60°	47.0	44.7	36.5	15.3	9.2	7.2	6.1
60.5°	45.5	43.1	35.0	14.8	9.0	7.1	6.0
61°	43.9	41.4	33.5	14.3	8.8	6.9	5.9
61.5°	42.4	39.8	32.1	13.9	8.6	6.8	5.8
62°	40.9	38.3	30.7	13.4	8.4	6.6	5.7
62.5°	39.5	36.8	29.4	13.0	8.2	6.5	5.5
63°	38.1	35.3	28.2	12.6	8.0	6.3	5.4
63.5°	36.8	34.0	26.9	12.2	7.8	6.2	5.3
64°	35.6	32.6	25.8	11.8	7.6	6.1	5.2
64.5°	34.4	31.3	24.6	11.5	7.5	6.0	5.1
65°	33.3	30.1	23.6	11.1	7.3	5.8	5.0
65.5°	32.3	28.9	22.5	10.8	7.1	5.7	4.9
66°	31.2	27.7	21.5	10.5	7.0	5.6	4.8
66.5°	30.1	26.7	20.6	10.1	6.8	5.5	4.7
67°	29.0	25.6	19.7	9.8	6.7	5.3	4.6





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**CANDELA DISTRIBUTION (continued):**

	0°	30°	60°	90°	120°	150°	180°
67.5°	27.8	24.6	18.8	9.5	6.5	5.2	4.5
68°	26.7	23.6	18.0	9.2	6.4	5.1	4.4
68.5°	25.5	22.6	17.1	8.9	6.2	5.0	4.3
69°	24.4	21.7	16.4	8.7	6.1	4.9	4.2
69.5°	23.3	20.8	15.6	8.4	5.9	4.8	4.1
70°	22.3	19.9	14.9	8.2	5.8	4.7	4.1
70.5°	21.2	19.1	14.3	7.9	5.7	4.6	4.0
71°	20.2	18.3	13.6	7.7	5.5	4.5	3.9
71.5°	19.2	17.5	13.0	7.5	5.4	4.4	3.8
72°	18.3	16.7	12.4	7.2	5.3	4.3	3.7
72.5°	17.4	16.0	11.8	7.0	5.2	4.2	3.6
73°	16.5	15.3	11.2	6.8	5.0	4.1	3.5
73.5°	15.6	14.6	10.7	6.6	4.9	4.0	3.5
74°	14.8	14.0	10.2	6.4	4.8	3.9	3.4
74.5°	14.0	13.3	9.7	6.2	4.7	3.8	3.3
75°	13.3	12.7	9.3	6.0	4.5	3.7	3.2
75.5°	12.6	12.1	8.8	5.8	4.4	3.6	3.2
76°	11.9	11.5	8.4	5.6	4.3	3.5	3.1
76.5°	11.2	11.0	8.0	5.4	4.2	3.4	3.0
77°	10.6	10.5	7.6	5.2	4.1	3.3	2.9
77.5°	10.0	9.9	7.3	5.0	3.9	3.2	2.8
78°	9.4	9.4	6.9	4.9	3.8	3.1	2.7
78.5°	8.9	9.0	6.5	4.7	3.7	3.0	2.7
79°	8.4	8.5	6.2	4.5	3.6	2.9	2.6
79.5°	7.9	8.1	5.9	4.3	3.4	2.8	2.5
80°	7.4	7.6	5.6	4.2	3.3	2.7	2.4
80.5°	7.0	7.2	5.3	4.0	3.2	2.6	2.3
81°	6.6	6.8	5.0	3.8	3.1	2.5	2.3
81.5°	6.2	6.4	4.7	3.6	2.9	2.4	2.2
82°	5.8	6.0	4.4	3.4	2.8	2.3	2.1
82.5°	5.4	5.6	4.2	3.3	2.7	2.2	2.0
83°	5.1	5.3	3.9	3.1	2.5	2.1	1.9
83.5°	4.7	4.9	3.6	2.9	2.4	2.0	1.8
84°	4.4	4.5	3.3	2.7	2.2	1.9	1.7
84.5°	4.1	4.2	3.1	2.5	2.1	1.8	1.6
85°	3.7	3.8	2.8	2.3	1.9	1.7	1.5
85.5°	3.4	3.5	2.5	2.1	1.8	1.5	1.4
86°	3.1	3.1	2.3	1.9	1.6	1.4	1.2
86.5°	2.7	2.7	2.0	1.6	1.4	1.2	1.1
87°	2.4	2.3	1.7	1.4	1.2	1.1	1.0
87.5°	2.0	1.9	1.4	1.1	1.0	0.9	0.8
88°	1.7	1.5	1.0	0.9	0.8	0.8	0.6
88.5°	1.3	1.1	0.7	0.6	0.6	0.6	0.5
89°	0.9	0.7	0.4	0.4	0.3	0.4	0.3
89.5°	0.5	0.4	0.2	0.1	0.2	0.2	0.1



TEST NUMBER: P895878  
CATALOG NUMBER: GRZ-05L-930-ASYMx40-X-UNV-STD-1F

**CANDELA DISTRIBUTION (continued):**

	0°	30°	60°	90°	120°	150°	180°
90°	0.3	0.2	0.1	0.1	0.1	0.1	0.1

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

Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

iO LED

Report Number: SP1-2101-124-2

Luminaire Tested: GRZ-05L-930-10X10-X-UNV-STD-2F

Test Date: 02/10/2021

**Test Information**

Test Method: LM-79-08  
 Report Number: SP1-2101-124-2  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry: 4π  
 Issue Date: 02/10/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: iO LED  
 Catalog Number: **GRZ-05L-930-10X10-X-UNV-STD-2F**  
 Description: IO LED Wall Grazer GRZ

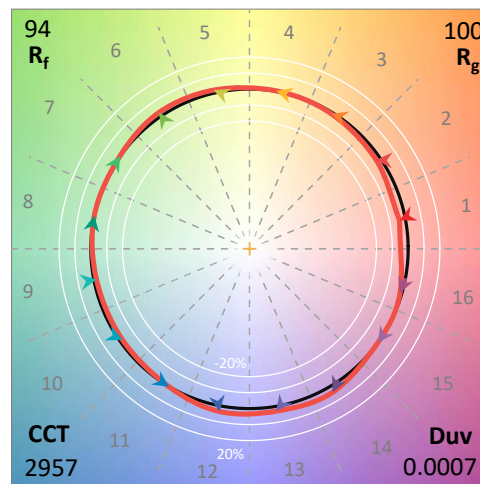
**Spectral Parameters**

CCT (K): 2957  
 CIE u': 0.2518  
 CIE v': 0.5232  
 Duv: 0.0007  
 CIE x: 0.4409  
 CIE y: 0.4072  
 CIE z: 0.1519  
 Peak Wavelength (nm): 624  
 Dominant Wavelength (nm): 582  
 Purity: 54.9  
  
 Rf: 93.7  
 Rg: 100.3

CRI (Ra):	94.1		
R1:	94.6	R9:	66.4
R2:	96.3	R10:	90.2
R3:	96.6	R11:	96.1
R4:	95.3	R12:	86.8
R5:	94.2	R13:	95.0
R6:	95.7	R14:	97.3
R7:	94.2		
R8:	85.7		

**Test Conditions**

Stabilization Time: 48M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.4/38%  
 Sphere Temperature (°C): 24.4

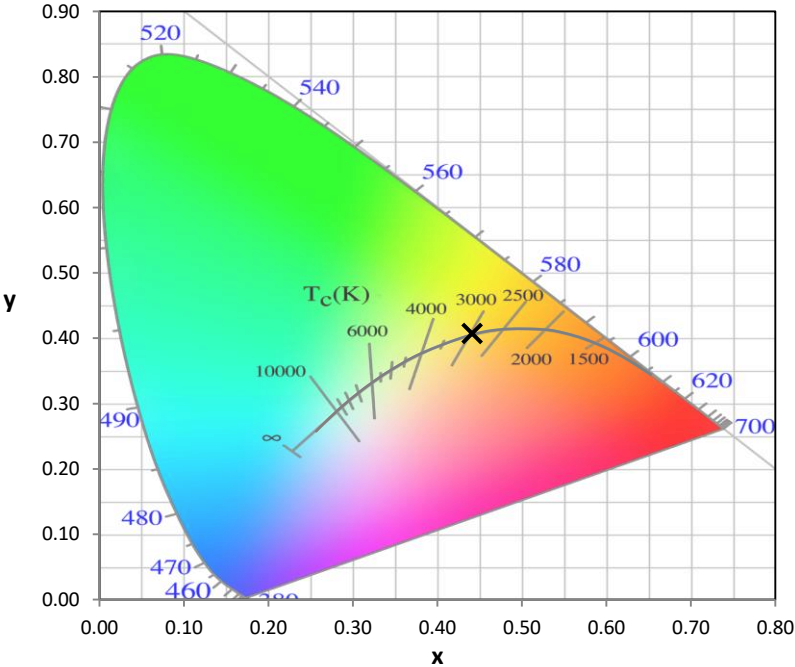


REPORT NUMBER: SP1-2101-124-2

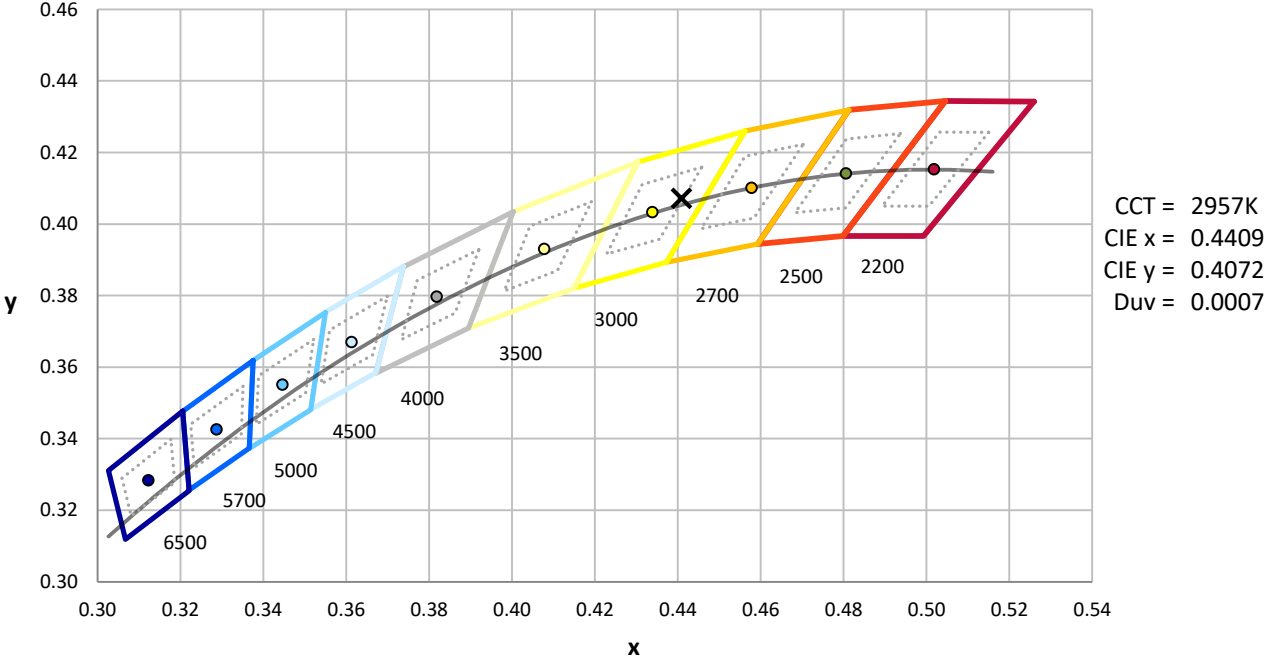
Measurement and Test Equipment			
Instrument	Identification Number	Calibration Date	Calibration Due Date
Photometer	IN0058	1/31/2021	7/31/2021
Power Meter	IN0071	12/1/2020	12/1/2021
AC Power Source	IN0063	12/1/2020	12/1/2021
DC Power Source	IN0208	12/1/2020	12/1/2021
Sphere Thermometer	IN0085	12/1/2020	12/1/2021
Room Thermometer	IN0046	12/1/2020	12/1/2021

REPORT NUMBER: SP1-2101-124-2

CIE 1931 Chromaticity Diagram



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

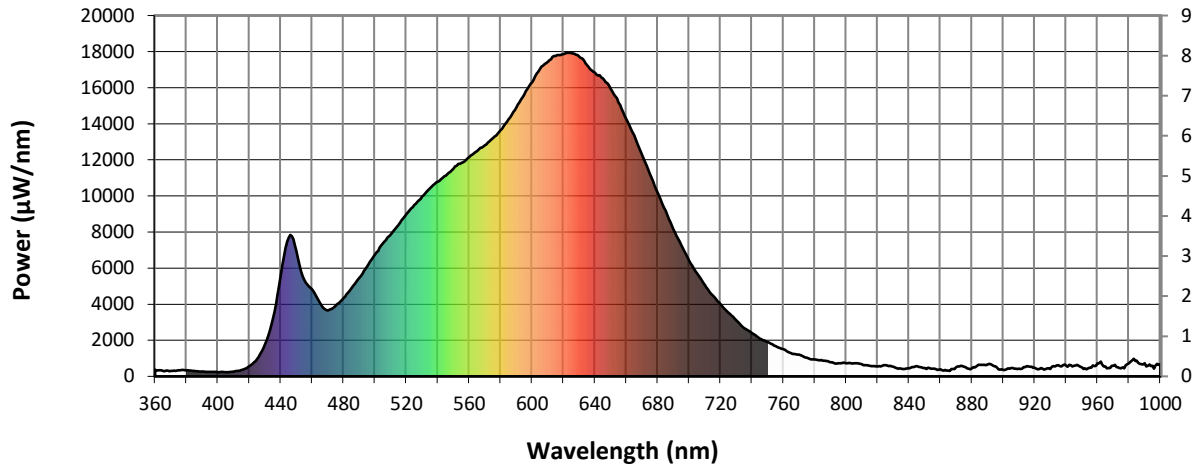


CCT = 2957K  
 CIE x = 0.4409  
 CIE y = 0.4072  
 Duv = 0.0007

Point lies inside the ANSI 3000K 4-step quadrangle

REPORT NUMBER: SP1-2101-124-2

**Photopic Flux vs. Wavelength**

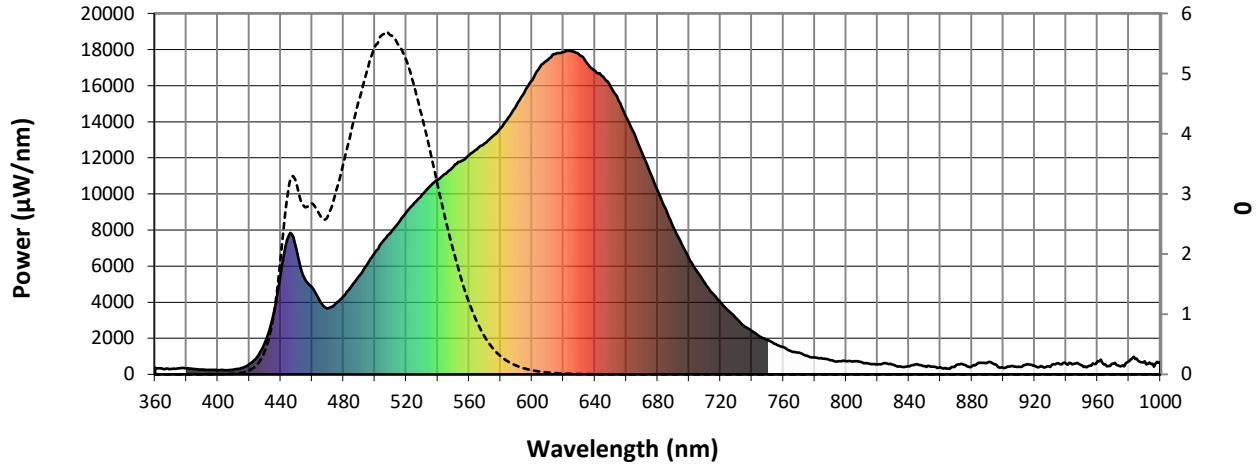


#####

λ (nm)	Power (µW/nm)	Lumens (φ/nm)	λ (nm)	Power (µW/nm)	Lumens (φ/nm)	λ (nm)	Power (µW/nm)	Lumens (φ/nm)	λ (nm)	Power (µW/nm)	Lumens (φ/nm)	λ (nm)	Power (µW/nm)	Lumens (φ/nm)
360	368	0.0	490	5466	0.8	620	17862	4.6	750	1898	0.0	880	436	0.0
365	310	0.0	495	6091	1.1	625	17922	4.0	755	1681	0.0	885	632	0.0
370	293	0.0	500	6757	1.5	630	17723	3.2	760	1509	0.0	890	653	0.0
375	346	0.0	505	7358	2.1	635	17256	2.6	765	1279	0.0	895	546	0.0
380	338	0.0	510	7854	2.7	640	16836	2.0	770	1201	0.0	900	354	0.0
385	299	0.0	515	8389	3.5	645	16513	1.6	775	1028	0.0	905	454	0.0
390	270	0.0	520	8991	4.4	650	15949	1.2	780	937	0.0	910	426	0.0
395	252	0.0	525	9495	5.1	655	15172	0.9	785	877	0.0	915	565	0.0
400	234	0.0	530	9972	5.9	660	14269	0.6	790	784	0.0	920	483	0.0
405	236	0.0	535	10431	6.5	665	13357	0.4	795	723	0.0	925	418	0.0
410	267	0.0	540	10792	7.0	670	12286	0.3	800	735	0.0	930	416	0.0
415	349	0.0	545	11118	7.4	675	11211	0.2	805	729	0.0	935	626	0.0
420	560	0.0	550	11517	7.8	680	10179	0.1	810	667	0.0	940	584	0.0
425	974	0.0	555	11837	8.1	685	9184	0.1	815	584	0.0	945	579	0.0
430	1769	0.0	560	12154	8.3	690	8166	0.0	820	546	0.0	950	504	0.0
435	3208	0.0	565	12489	8.3	695	7279	0.0	825	620	0.0	955	485	0.0
440	5576	0.1	570	12803	8.3	700	6419	0.0	830	532	0.0	960	719	0.0
445	7682	0.2	575	13201	8.2	705	5709	0.0	835	420	0.0	965	552	0.0
450	6958	0.2	580	13645	8.1	710	5055	0.0	840	444	0.0	970	586	0.0
455	5347	0.2	585	14250	7.9	715	4482	0.0	845	562	0.0	975	439	0.0
460	4823	0.2	590	14919	7.7	720	3984	0.0	850	454	0.0	980	736	0.0
465	4070	0.2	595	15606	7.4	725	3526	0.0	855	433	0.0	985	863	0.0
470	3650	0.2	600	16305	7.0	730	3109	0.0	860	383	0.0	990	722	0.0
475	3914	0.3	605	17030	6.6	735	2684	0.0	865	322	0.0	995	579	0.0
480	4339	0.4	610	17428	6.0	740	2396	0.0	870	523	0.0	1000	672	0.0
485	4881	0.6	615	17762	5.4	745	2098	0.0	875	541	0.0			

REPORT NUMBER: SP1-2101-124-2

**Scotopic Flux vs. Wavelength**



**Scotopic Lumens: 1239**

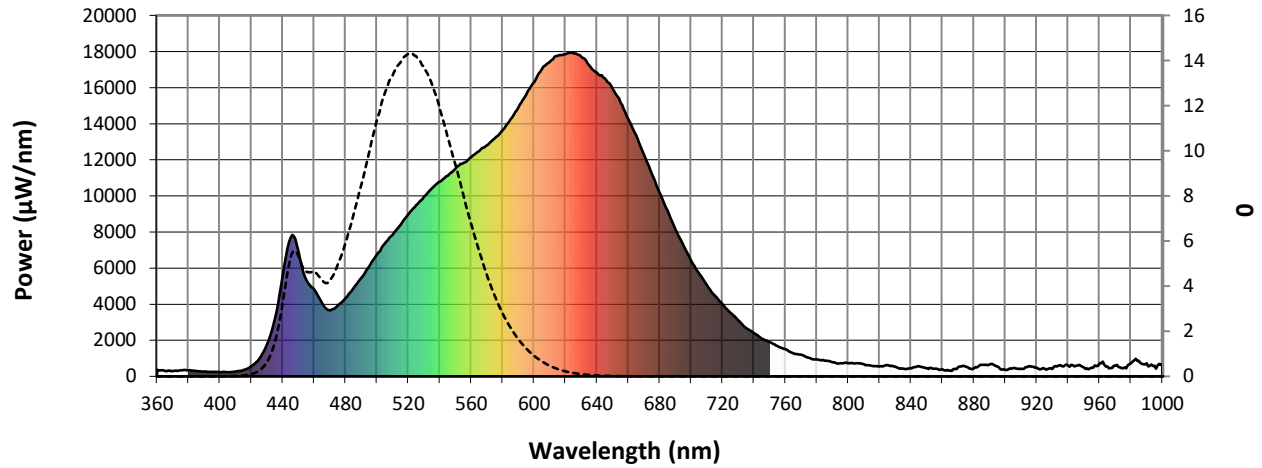
**S/P: 1.4**

$\lambda$ (nm)	Power ( $\mu\text{W}/\text{nm}$ )	Lumens ( $\phi/\text{nm}$ )	$\lambda$ (nm)	Power ( $\mu\text{W}/\text{nm}$ )	Lumens ( $\phi/\text{nm}$ )	$\lambda$ (nm)	Power ( $\mu\text{W}/\text{nm}$ )	Lumens ( $\phi/\text{nm}$ )	$\lambda$ (nm)	Power ( $\mu\text{W}/\text{nm}$ )	Lumens ( $\phi/\text{nm}$ )	$\lambda$ (nm)	Power ( $\mu\text{W}/\text{nm}$ )	Lumens ( $\phi/\text{nm}$ )
360	368	0.0	490	5466	8.4	620	17862	0.2	750	1898	0.0	880	436	0.0
365	310	0.0	495	6091	9.8	625	17922	0.2	755	1681	0.0	885	632	0.0
370	293	0.0	500	6757	11.3	630	17723	0.1	760	1509	0.0	890	653	0.0
375	346	0.0	505	7358	12.5	635	17256	0.1	765	1279	0.0	895	546	0.0
380	338	0.0	510	7854	13.3	640	16836	0.0	770	1201	0.0	900	354	0.0
385	299	0.0	515	8389	13.9	645	16513	0.0	775	1028	0.0	905	454	0.0
390	270	0.0	520	8991	14.3	650	15949	0.0	780	937	0.0	910	426	0.0
395	252	0.0	525	9495	14.2	655	15172	0.0	785	877	0.0	915	565	0.0
400	234	0.0	530	9972	13.7	660	14269	0.0	790	784	0.0	920	483	0.0
405	236	0.0	535	10431	13.0	665	13357	0.0	795	723	0.0	925	418	0.0
410	267	0.0	540	10792	11.9	670	12286	0.0	800	735	0.0	930	416	0.0
415	349	0.0	545	11118	10.7	675	11211	0.0	805	729	0.0	935	626	0.0
420	560	0.1	550	11517	9.4	680	10179	0.0	810	667	0.0	940	584	0.0
425	974	0.2	555	11837	8.1	685	9184	0.0	815	584	0.0	945	579	0.0
430	1769	0.6	560	12154	6.8	690	8166	0.0	820	546	0.0	950	504	0.0
435	3208	1.4	565	12489	5.6	695	7279	0.0	825	620	0.0	955	485	0.0
440	5576	3.1	570	12803	4.5	700	6419	0.0	830	532	0.0	960	719	0.0
445	7682	5.1	575	13201	3.6	705	5709	0.0	835	420	0.0	965	552	0.0
450	6958	5.4	580	13645	2.8	710	5055	0.0	840	444	0.0	970	586	0.0
455	5347	4.7	585	14250	2.2	715	4482	0.0	845	562	0.0	975	439	0.0
460	4823	4.7	590	14919	1.7	720	3984	0.0	850	454	0.0	980	736	0.0
465	4070	4.3	595	15606	1.2	725	3526	0.0	855	433	0.0	985	863	0.0
470	3650	4.2	600	16305	0.9	730	3109	0.0	860	383	0.0	990	722	0.0
475	3914	4.9	605	17030	0.7	735	2684	0.0	865	322	0.0	995	579	0.0
480	4339	5.9	610	17428	0.5	740	2396	0.0	870	523	0.0	1000	672	0.0
485	4881	7.1	615	17762	0.3	745	2098	0.0	875	541	0.0			



REPORT NUMBER: SP1-2101-124-2

**Melanopic Flux vs. Wavelength**



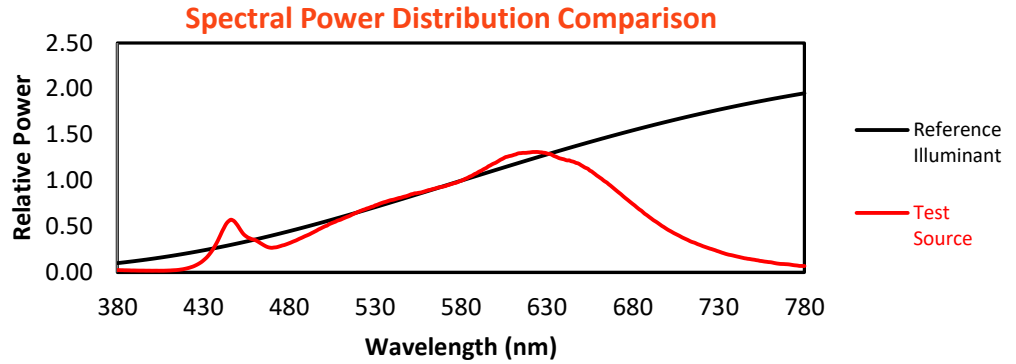
**Melanopic Lumens: 471.9**

**M/P: 0.53**

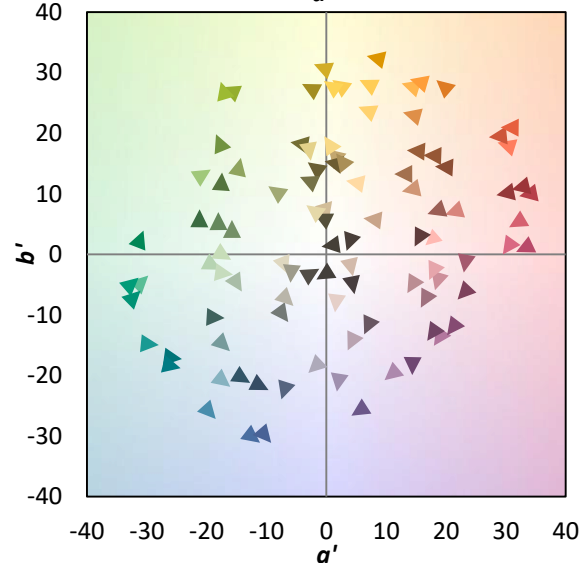
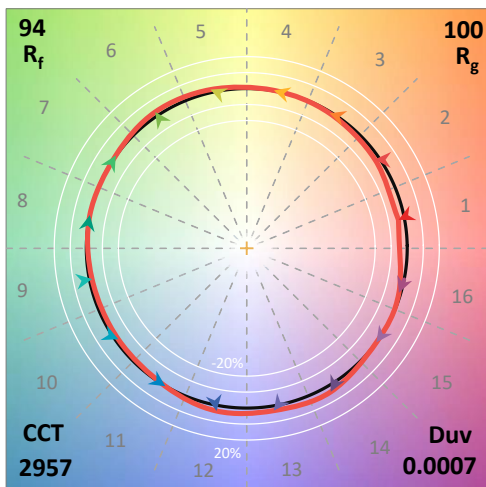
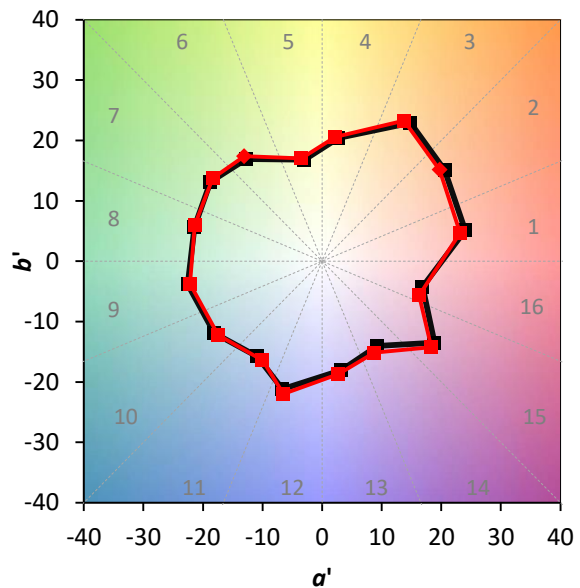
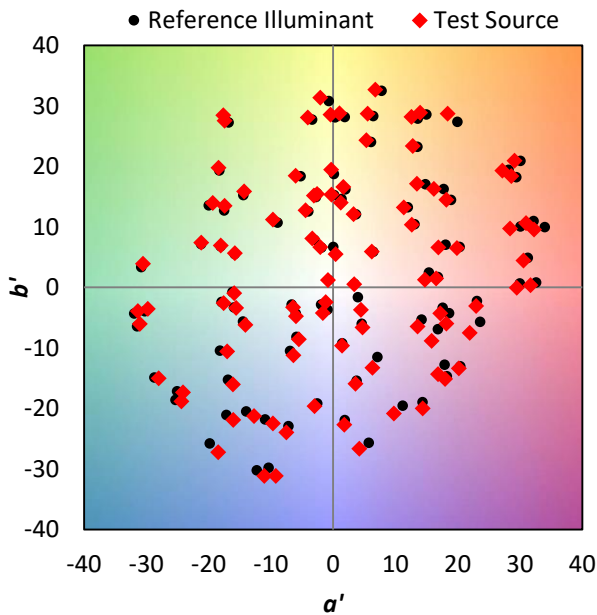
λ (nm)	Power (µW/nm)	Lumens (Φ/nm)	λ (nm)	Power (µW/nm)	Lumens (Φ/nm)	λ (nm)	Power (µW/nm)	Lumens (Φ/nm)	λ (nm)	Power (µW/nm)	Lumens (Φ/nm)	λ (nm)	Power (µW/nm)	Lumens (Φ/nm)
360	368	0.0	490	5466	4.5	620	17862	0.0	750	1898	0.0	880	436	0.0
365	310	0.0	495	6091	5.0	625	17922	0.0	755	1681	0.0	885	632	0.0
370	293	0.0	500	6757	5.4	630	17723	0.0	760	1509	0.0	890	653	0.0
375	346	0.0	505	7358	5.6	635	17256	0.0	765	1279	0.0	895	546	0.0
380	338	0.0	510	7854	5.6	640	16836	0.0	770	1201	0.0	900	354	0.0
385	299	0.0	515	8389	5.5	645	16513	0.0	775	1028	0.0	905	454	0.0
390	270	0.0	520	8991	5.2	650	15949	0.0	780	937	0.0	910	426	0.0
395	252	0.0	525	9495	4.8	655	15172	0.0	785	877	0.0	915	565	0.0
400	234	0.0	530	9972	4.3	660	14269	0.0	790	784	0.0	920	483	0.0
405	236	0.0	535	10431	3.8	665	13357	0.0	795	723	0.0	925	418	0.0
410	267	0.0	540	10792	3.2	670	12286	0.0	800	735	0.0	930	416	0.0
415	349	0.0	545	11118	2.6	675	11211	0.0	805	729	0.0	935	626	0.0
420	560	0.1	550	11517	2.1	680	10179	0.0	810	667	0.0	940	584	0.0
425	974	0.2	555	11837	1.6	685	9184	0.0	815	584	0.0	945	579	0.0
430	1769	0.4	560	12154	1.2	690	8166	0.0	820	546	0.0	950	504	0.0
435	3208	0.9	565	12489	0.9	695	7279	0.0	825	620	0.0	955	485	0.0
440	5576	1.9	570	12803	0.6	700	6419	0.0	830	532	0.0	960	719	0.0
445	7682	3.0	575	13201	0.4	705	5709	0.0	835	420	0.0	965	552	0.0
450	6958	3.2	580	13645	0.3	710	5055	0.0	840	444	0.0	970	586	0.0
455	5347	2.8	585	14250	0.2	715	4482	0.0	845	562	0.0	975	439	0.0
460	4823	2.8	590	14919	0.1	720	3984	0.0	850	454	0.0	980	736	0.0
465	4070	2.7	595	15606	0.1	725	3526	0.0	855	433	0.0	985	863	0.0
470	3650	2.6	600	16305	0.1	730	3109	0.0	860	383	0.0	990	722	0.0
475	3914	3.0	605	17030	0.0	735	2684	0.0	865	322	0.0	995	579	0.0
480	4339	3.5	610	17428	0.0	740	2396	0.0	870	523	0.0	1000	672	0.0
485	4881	4.0	615	17762	0.0	745	2098	0.0	875	541	0.0			

**Summary**

$R_f = 93.7$   
 $R_g = 100.3$   
 CIE  $R_a = 94.1$   
 $R_9 = 66.4$

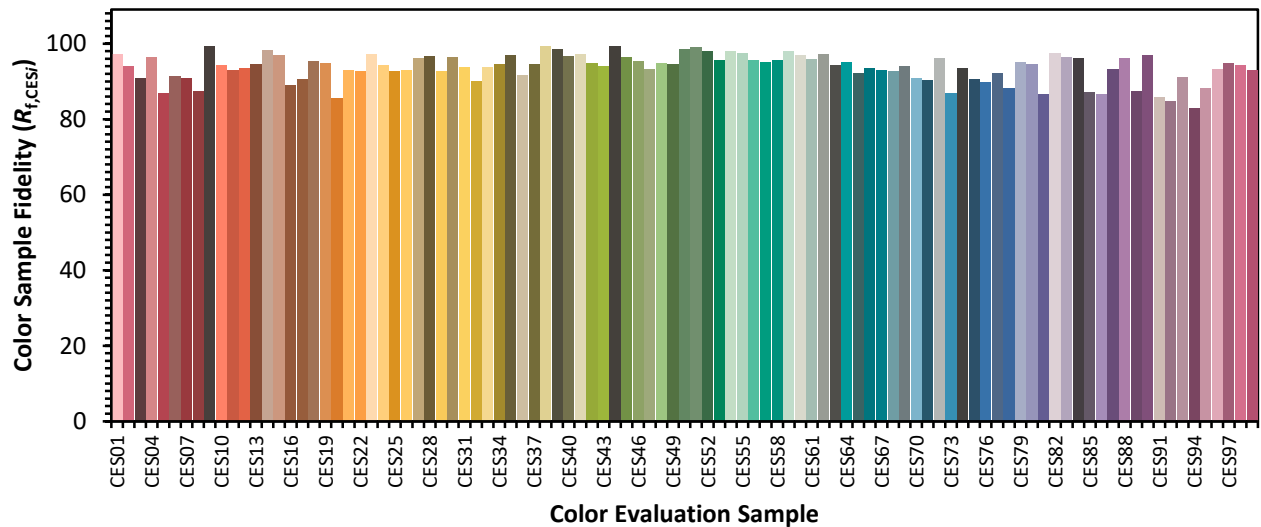


**Color Vector Graphics**

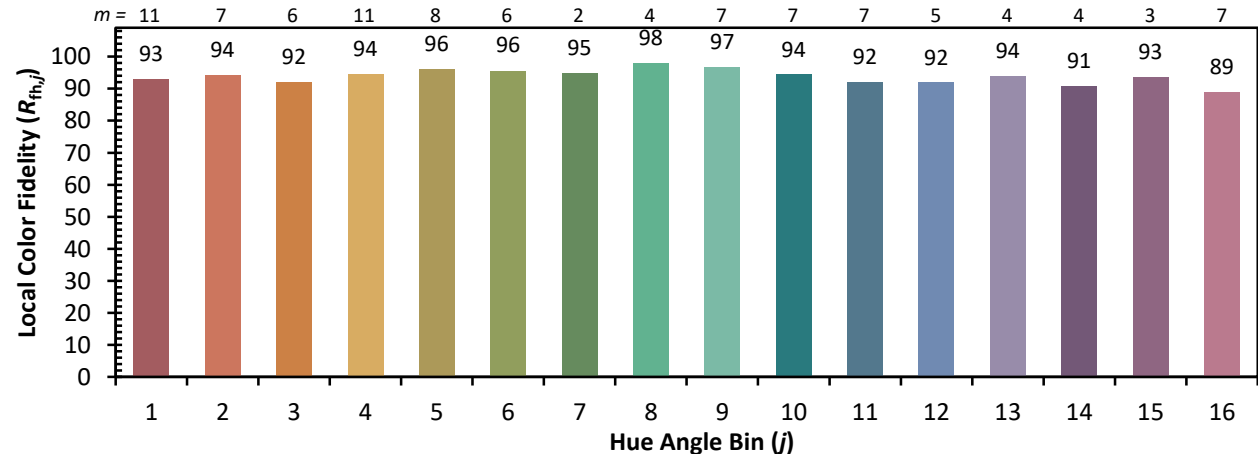
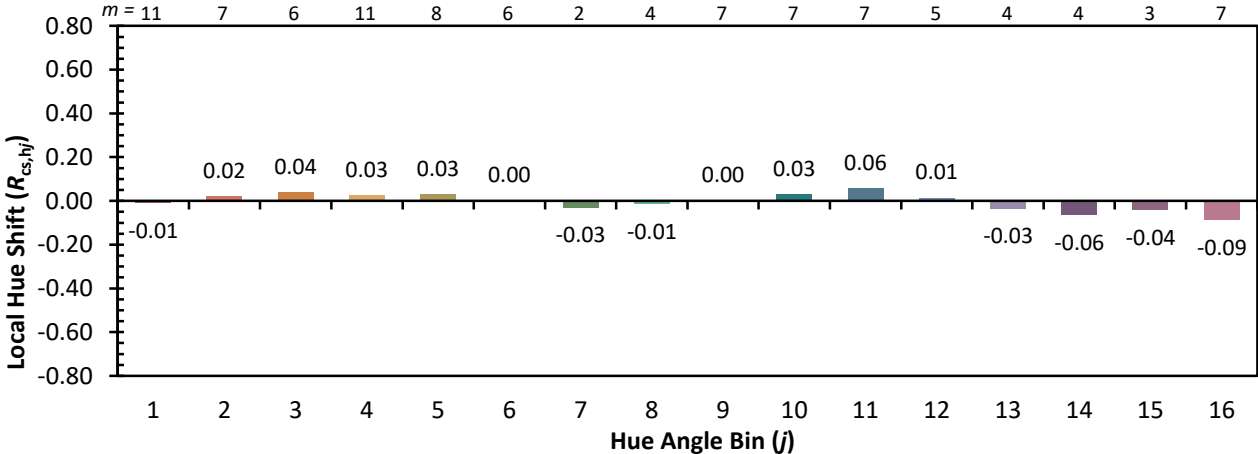
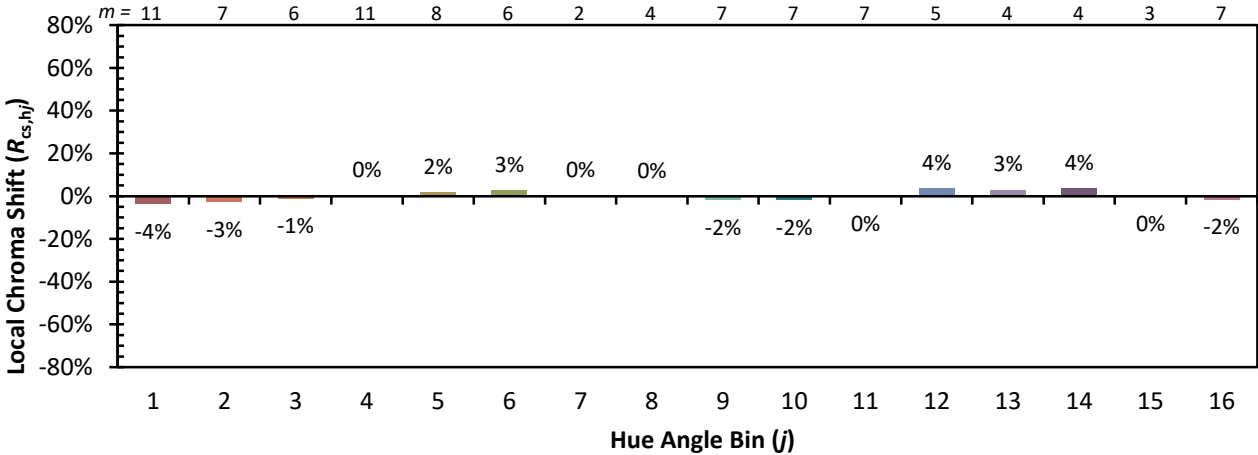


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

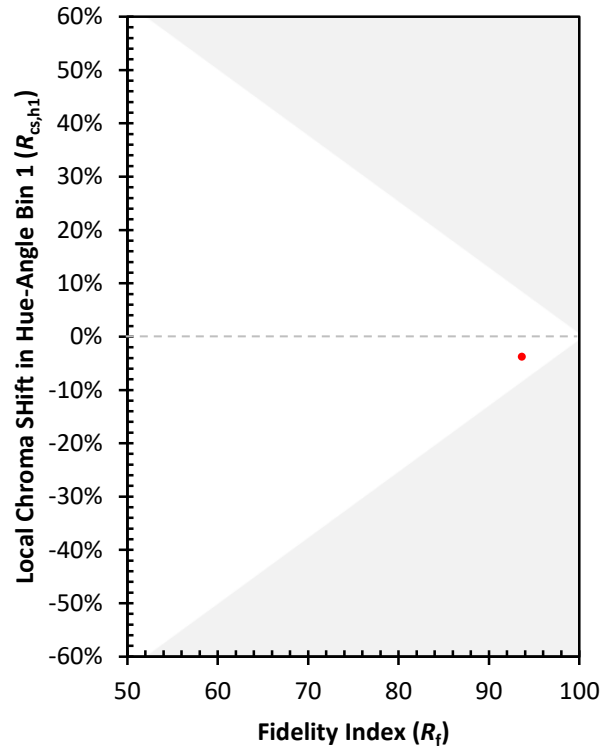
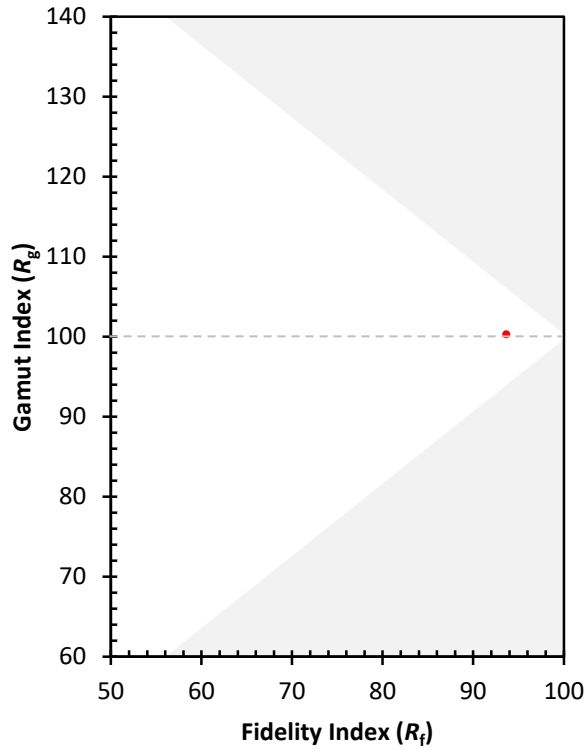
CES01 = 86	CES26 = 93	CES51 = 99	CES76 = 90
CES02 = 63	CES27 = 96	CES52 = 98	CES77 = 92
CES03 = 32	CES28 = 97	CES53 = 96	CES78 = 88
CES04 = 70	CES29 = 93	CES54 = 98	CES79 = 95
CES05 = 51	CES30 = 96	CES55 = 98	CES80 = 95
CES06 = 51	CES31 = 94	CES56 = 96	CES81 = 87
CES07 = 44	CES32 = 90	CES57 = 95	CES82 = 97
CES08 = 42	CES33 = 94	CES58 = 96	CES83 = 96
CES09 = 29	CES34 = 94	CES59 = 98	CES84 = 96
CES10 = 76	CES35 = 97	CES60 = 97	CES85 = 87
CES11 = 59	CES36 = 92	CES61 = 96	CES86 = 87
CES12 = 65	CES37 = 95	CES62 = 97	CES87 = 93
CES13 = 44	CES38 = 99	CES63 = 94	CES88 = 96
CES14 = 74	CES39 = 99	CES64 = 95	CES89 = 87
CES15 = 72	CES40 = 97	CES65 = 92	CES90 = 97
CES16 = 48	CES41 = 97	CES66 = 94	CES91 = 86
CES17 = 50	CES42 = 95	CES67 = 93	CES92 = 85
CES18 = 57	CES43 = 94	CES68 = 93	CES93 = 91
CES19 = 72	CES44 = 99	CES69 = 94	CES94 = 83
CES20 = 67	CES45 = 96	CES70 = 91	CES95 = 88
CES21 = 86	CES46 = 95	CES71 = 90	CES96 = 93
CES22 = 79	CES47 = 93	CES72 = 96	CES97 = 95
CES23 = 92	CES48 = 95	CES73 = 87	CES98 = 94
CES24 = 91	CES49 = 95	CES74 = 94	CES99 = 93
CES25 = 72	CES50 = 99	CES75 = 90	



Color Rendition by Hue-Angle Bin



Measure Comparisons



(END OF REPORT)