

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: P895881

Luminaire Tested: **GRZ-05L-935-ASYMx40-X-UNV-STD-1F**

Issue Date: 11/20/2024



Test Information

Test Method: LM-79-08
Report Number: P895881
Test Lab: EVERFINE
Issue Date: 11/20/2024
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)
Product Line: io LED
Catalog Number: GRZ-05L-935-ASYMx40-X-UNV-STD-1F
Description: iO LED 90CRI 3500K GRAZER 500 lumens per ft WITH Asymmetric x 40 deg OPTIC
Light Source: 3500K CCT, 90 CRI LEDS
Ballast/Driver: ELECTRONIC DRIVER

Summary

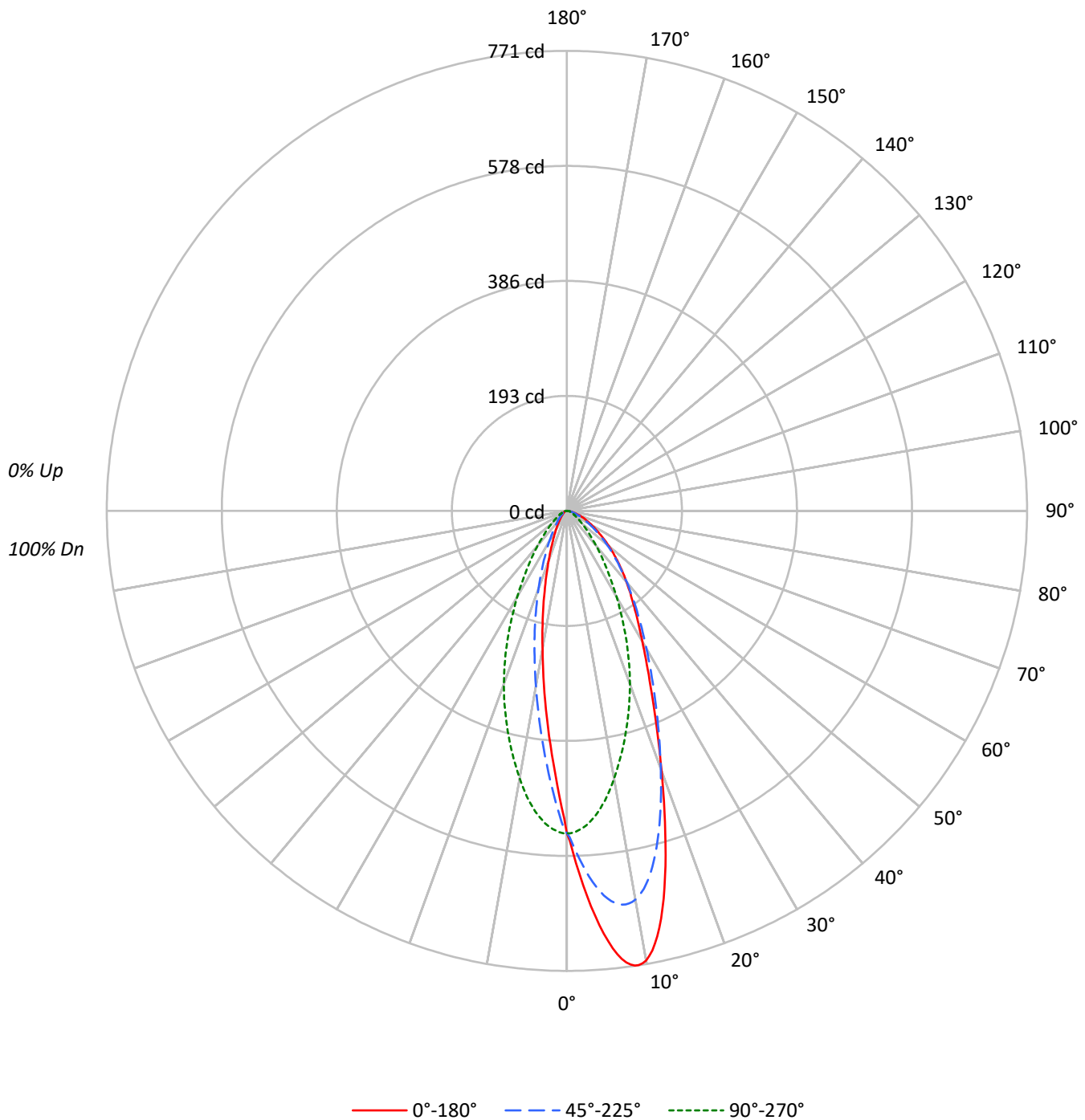
Lumens per Lamp: N/A
Luminaire Lumens: 442.0 lumens
Efficiency: N/A
Efficacy: 83.4 lumens/watt
Spacing Criteria (0/90/45): 0.66 / 0.7 / 0.73
Luminous Opening: Rectangular (W 1' x L: 0.17' x H: 0')
CIE Type: Direct

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

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CATALOG NUMBER: GRZ-05L-935-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
RW	70	50	30	10	70	50	30	10	50	30	10		50	30	10		50
RCR																	
0	119	119	119	119	116	116	116	116	111	111	111		106	106	106		102
1	112	109	106	103	110	107	104	101	103	100	98		99	97	95		95
2	105	100	95	91	103	98	93	90	94	91	88		91	88	86		89
3	99	91	86	81	97	90	85	80	87	83	79		85	81	78		82
4	93	84	78	73	91	83	77	73	81	76	72		79	74	71		77
5	88	78	71	67	86	77	71	66	75	70	66		74	69	65		72
6	83	73	66	61	81	72	66	61	70	65	60		69	64	60		68
7	78	68	61	57	77	67	61	56	66	60	56		65	60	56		64
8	74	64	57	53	73	63	57	53	62	56	52		61	56	52		60
9	71	60	54	49	70	60	53	49	59	53	49		58	52	49		57
10	67	57	50	46	66	56	50	46	55	50	46		55	50	46		54

AVERAGE LUMINANCE (cd/sqm):

	0°	90°	180°
0°	34855	34855	34855
5°	46117	33459	23587
10°	50152	29866	15428
15°	42482	25576	9874
20°	31863	21205	6164
25°	23931	16650	3976
30°	18841	12429	2699
35°	15513	8970	1939
40°	13074	6448	1475
45°	11058	4611	1242
50°	9212	3355	1005
55°	7565	2544	889
60°	6289	2053	814
65°	5271	1757	794
70°	4342	1605	793
75°	3443	1547	823
80°	2863	1599	930
85°	2889	1778	1111

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ZONAL LUMENS:

Zone	Lumens	% Fixture
0°-10°	48.9	11.1
10°-20°	107.9	24.4
20°-30°	100.8	22.8
30°-40°	74.7	16.9
40°-50°	50.7	11.5
50°-60°	31.0	7.0
60°-70°	16.9	3.8
70°-80°	8.3	1.9
80°-90°	2.8	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°	257.6	58.3
0°-40°	332.3	75.2
0°-60°	414.0	93.7
0°-90°	442.0	100.0
90°-120°	0.0	0.0
90°-150°	0.0	0.0
90°-180°	0.0	0.0
0°-180°	442.0	100.0

CANDELA DISTRIBUTION:

	0°	45°	90°	135°	180°	Flux
0°	540	540	540	540	540	
5°	712	640	516	415	364	70
15°	636	582	383	208	148	173
25°	336	350	234	91	56	156
35°	197	204	114	39	25	124
45°	121	118	50	19	14	94
55°	67	62	23	11	8	61
65°	34	28	12	7	5	35
75°	14	11	6	4	3	15
85°	4	3	2	2	2	4
90°	0	0	0	0	0	

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CATALOG NUMBER: GRZ-05L-935-ASYMx40-X-UNV-STD-1F

CANDELA DISTRIBUTION (FULL):

	0°	30°	60°	90°	120°	150°	180°
0°	539.8	539.8	539.8	539.8	539.8	539.8	539.8
0.5°	553.2	546.6	546.9	540.6	534.2	533.9	515.4
1°	572.1	562.3	555.6	539.6	523.7	517.6	496.8
1.5°	591.0	578.2	563.2	538.2	513.4	501.2	478.0
2°	609.8	593.8	570.9	536.1	502.8	484.8	460.2
2.5°	628.2	608.8	578.1	534.0	492.1	468.9	443.0
3°	646.1	623.7	584.8	531.3	481.2	452.8	426.1
3.5°	663.8	637.7	590.8	528.2	470.3	437.0	409.5
4°	680.6	651.2	596.4	524.7	459.2	421.8	393.8
4.5°	696.8	663.8	601.2	520.5	448.0	406.9	378.7
5°	711.5	675.4	605.1	516.2	437.0	392.7	363.9
5.5°	725.1	686.1	608.5	511.5	425.8	378.9	349.6
6°	737.3	695.5	610.8	506.4	414.7	365.0	335.3
6.5°	747.9	703.7	612.7	500.8	403.8	351.7	321.1
7°	756.5	710.4	613.8	495.0	393.0	338.8	307.6
7.5°	763.4	715.5	614.1	489.2	382.4	326.2	294.1
8°	768.0	719.2	613.6	482.8	371.7	313.5	281.4
8.5°	770.5	721.6	612.2	476.3	361.4	301.4	269.3
9°	770.7	722.3	610.2	469.5	351.3	289.1	257.4
9.5°	768.8	721.4	607.5	462.4	341.2	277.4	246.2
10°	764.9	718.6	604.1	455.5	331.1	265.9	235.3
10.5°	758.5	714.8	600.0	448.2	321.5	255.1	224.9
11°	750.5	709.5	595.3	440.9	312.0	244.7	215.2
11.5°	740.1	702.5	590.0	433.8	302.8	234.7	205.2
12°	728.9	694.1	584.4	426.5	293.7	224.9	196.0
12.5°	715.7	684.7	578.1	419.2	284.9	215.5	187.3
13°	701.4	673.9	571.5	412.0	275.8	206.4	179.0
13.5°	685.9	662.4	564.3	404.6	267.3	197.7	171.2
14°	669.6	649.9	557.0	397.3	258.9	189.3	163.3
14.5°	652.6	636.6	549.0	390.0	250.5	181.2	155.5
15°	635.5	622.5	540.6	382.6	242.3	173.8	147.7
15.5°	617.9	608.0	532.3	375.2	234.4	166.3	139.9
16°	600.2	593.1	523.5	367.6	226.5	158.8	133.2
16.5°	582.2	577.8	514.6	360.5	218.6	151.3	126.9
17°	564.1	562.7	505.3	353.1	211.1	143.9	120.9
17.5°	546.6	547.3	496.1	345.8	203.7	137.3	114.9
18°	529.5	531.9	486.7	338.5	196.4	131.2	109.4
18.5°	512.5	516.9	477.0	331.1	189.3	125.3	104.1
19°	495.7	501.8	467.2	323.7	182.5	119.5	99.0
19.5°	479.6	486.7	457.5	316.2	175.7	114.0	94.2
20°	463.7	472.3	447.7	308.6	169.2	108.7	89.7
20.5°	448.9	457.9	438.0	301.1	163.0	103.8	85.4
21°	434.3	444.2	427.9	293.5	156.6	99.0	81.3
21.5°	420.1	430.9	418.4	286.0	150.7	94.4	77.5
22°	406.7	417.8	408.6	278.6	144.7	90.1	73.9

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CANDELA DISTRIBUTION (continued):

	0°	30°	60°	90°	120°	150°	180°
22.5°	393.3	405.1	398.8	271.0	139.0	86.0	70.4
23°	380.6	392.9	389.1	263.4	133.4	82.1	67.2
23.5°	368.9	381.4	379.3	256.0	128.1	78.4	64.1
24°	357.3	370.1	370.2	248.4	122.9	74.8	61.2
24.5°	346.4	359.1	360.8	241.1	117.8	71.4	58.4
25°	335.9	348.7	351.9	233.7	113.1	68.3	55.8
25.5°	326.0	338.7	342.8	226.3	108.4	65.2	53.3
26°	316.2	329.2	334.0	219.0	103.9	62.4	51.0
26.5°	307.1	319.8	325.3	212.1	99.6	59.6	48.8
27°	298.4	310.7	316.9	205.1	95.4	57.1	46.7
27.5°	289.8	302.4	308.5	198.2	91.4	54.6	44.7
28°	281.8	294.1	300.5	191.5	87.5	52.2	42.8
28.5°	273.9	286.2	292.4	184.9	83.8	50.0	41.0
29°	266.7	278.6	284.5	178.7	80.3	48.0	39.3
29.5°	259.6	271.1	276.9	172.7	77.0	45.9	37.7
30°	252.7	264.1	269.5	166.7	73.8	44.0	36.2
30.5°	246.3	257.3	262.3	160.7	70.7	42.3	34.8
31°	239.9	250.8	255.2	154.7	67.6	40.6	33.4
31.5°	233.9	244.2	248.2	148.7	64.5	39.0	32.1
32°	228.0	238.0	241.5	142.8	61.9	37.4	30.8
32.5°	222.3	232.1	234.8	137.5	59.3	35.9	29.7
33°	216.9	226.4	228.4	132.5	56.9	34.5	28.5
33.5°	211.6	220.7	221.8	127.7	54.5	33.2	27.5
34°	206.5	215.3	215.7	122.8	52.2	32.0	26.5
34.5°	201.5	210.1	209.5	118.2	50.1	30.8	25.5
35°	196.8	205.0	203.7	113.8	48.1	29.6	24.6
35.5°	192.1	200.1	197.8	109.5	46.1	28.6	23.7
36°	187.5	195.1	192.3	105.4	44.3	27.5	22.9
36.5°	183.1	190.5	186.8	101.3	42.5	26.6	22.1
37°	178.8	186.0	181.3	97.4	40.9	25.6	21.3
37.5°	174.8	181.5	176.1	93.7	39.2	24.8	20.6
38°	170.8	177.2	171.0	90.1	37.7	23.9	19.9
38.5°	166.7	172.9	166.1	86.4	36.3	23.1	19.3
39°	162.7	168.9	161.1	82.9	34.9	22.3	18.6
39.5°	158.9	164.8	156.3	79.7	33.6	21.6	18.1
40°	155.1	160.7	151.8	76.5	32.2	20.9	17.5
40.5°	151.4	156.5	147.3	73.4	31.1	20.2	17.0
41°	147.9	152.4	143.0	70.4	29.9	19.6	16.4
41.5°	144.4	148.3	138.8	67.6	28.9	19.0	15.9
42°	140.8	144.5	134.6	64.8	27.8	18.4	15.5
42.5°	137.4	140.8	130.6	62.2	26.8	17.8	15.0
43°	134.0	137.3	126.7	59.7	25.9	17.3	14.6
43.5°	130.7	133.7	122.9	57.2	25.0	16.8	14.2
44°	127.5	130.5	119.3	54.9	24.1	16.4	13.8
44.5°	124.2	128.0	115.7	52.6	23.4	16.0	13.7

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CANDELA DISTRIBUTION (continued):

	0°	30°	60°	90°	120°	150°	180°
45°	121.1	123.6	112.3	50.5	22.5	15.4	13.6
45.5°	117.9	120.3	108.7	48.4	21.7	15.0	13.2
46°	114.9	117.0	105.3	46.4	21.0	14.5	13.1
46.5°	111.8	113.8	102.0	44.5	20.3	14.2	12.8
47°	108.9	110.7	98.8	42.7	19.6	13.8	12.2
47.5°	105.8	107.6	95.7	41.0	19.0	13.4	11.8
48°	102.9	104.5	92.7	39.4	18.4	13.1	11.6
48.5°	100.1	101.5	89.8	37.8	17.8	12.7	11.3
49°	97.2	98.6	86.8	36.2	17.3	12.4	10.7
49.5°	94.5	95.7	84.0	34.8	16.8	12.1	10.3
50°	91.7	92.9	81.2	33.4	16.3	11.8	10.0
50.5°	89.1	90.0	78.6	32.1	15.8	11.5	9.8
51°	86.4	87.3	75.9	30.9	15.3	11.2	9.5
51.5°	83.8	84.6	73.3	29.6	14.9	10.9	9.3
52°	81.3	82.0	70.6	28.5	14.5	10.7	9.0
52.5°	78.9	79.3	68.0	27.4	14.1	10.4	8.8
53°	76.4	76.8	65.6	26.4	13.7	10.2	8.7
53.5°	74.1	74.2	63.3	25.4	13.3	10.0	8.4
54°	71.8	71.8	61.0	24.4	13.0	9.7	8.2
54.5°	69.5	69.3	58.8	23.5	12.6	9.5	8.0
55°	67.2	67.0	56.6	22.6	12.3	9.3	7.9
55.5°	65.0	64.6	54.5	21.8	11.9	9.1	7.7
56°	63.0	62.4	52.4	21.0	11.6	8.9	7.5
56.5°	61.1	60.2	50.4	20.3	11.3	8.7	7.4
57°	59.1	58.1	48.4	19.5	11.1	8.5	7.2
57.5°	57.3	56.0	46.5	18.8	10.8	8.3	7.1
58°	55.5	53.9	44.6	18.2	10.5	8.1	6.9
58.5°	53.6	52.0	42.9	17.6	10.2	8.0	6.8
59°	52.0	50.0	41.1	17.0	10.0	7.8	6.6
59.5°	50.3	48.1	39.4	16.4	9.8	7.6	6.5
60°	48.7	46.3	37.8	15.9	9.5	7.5	6.3
60.5°	47.1	44.6	36.2	15.4	9.3	7.3	6.2
61°	45.5	42.9	34.7	14.8	9.1	7.2	6.1
61.5°	43.9	41.2	33.2	14.4	8.9	7.0	6.0
62°	42.4	39.6	31.8	13.9	8.7	6.8	5.8
62.5°	40.9	38.1	30.5	13.5	8.5	6.7	5.7
63°	39.5	36.6	29.1	13.0	8.3	6.6	5.6
63.5°	38.1	35.2	27.9	12.6	8.1	6.4	5.5
64°	36.8	33.8	26.7	12.3	7.9	6.3	5.4
64.5°	35.6	32.4	25.5	11.9	7.7	6.2	5.3
65°	34.5	31.2	24.4	11.5	7.5	6.0	5.2
65.5°	33.4	29.9	23.3	11.2	7.4	5.9	5.1
66°	32.3	28.7	22.3	10.8	7.2	5.8	5.0
66.5°	31.1	27.6	21.3	10.5	7.1	5.6	4.9
67°	30.0	26.5	20.4	10.2	6.9	5.5	4.8

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CANDELA DISTRIBUTION (continued):

	0°	30°	60°	90°	120°	150°	180°
67.5°	28.8	25.4	19.5	9.9	6.7	5.4	4.7
68°	27.6	24.4	18.6	9.6	6.6	5.3	4.6
68.5°	26.4	23.4	17.7	9.3	6.4	5.2	4.5
69°	25.3	22.4	17.0	9.0	6.3	5.1	4.4
69.5°	24.2	21.5	16.2	8.7	6.2	4.9	4.3
70°	23.0	20.6	15.5	8.5	6.0	4.8	4.2
70.5°	22.0	19.8	14.8	8.2	5.9	4.7	4.1
71°	20.9	18.9	14.1	8.0	5.7	4.6	4.0
71.5°	19.9	18.1	13.4	7.7	5.6	4.5	3.9
72°	18.9	17.3	12.8	7.5	5.5	4.4	3.8
72.5°	18.0	16.6	12.2	7.3	5.3	4.3	3.8
73°	17.1	15.9	11.6	7.0	5.2	4.2	3.7
73.5°	16.2	15.1	11.1	6.8	5.1	4.1	3.6
74°	15.3	14.5	10.6	6.6	4.9	4.0	3.5
74.5°	14.5	13.8	10.1	6.4	4.8	3.9	3.4
75°	13.8	13.2	9.6	6.2	4.7	3.8	3.3
75.5°	13.0	12.6	9.1	6.0	4.6	3.7	3.3
76°	12.3	12.0	8.7	5.8	4.4	3.6	3.2
76.5°	11.6	11.4	8.3	5.6	4.3	3.5	3.1
77°	11.0	10.8	7.9	5.4	4.2	3.4	3.0
77.5°	10.3	10.3	7.5	5.2	4.1	3.3	2.9
78°	9.8	9.8	7.1	5.0	3.9	3.2	2.8
78.5°	9.2	9.3	6.8	4.9	3.8	3.1	2.8
79°	8.7	8.8	6.4	4.7	3.7	3.0	2.7
79.5°	8.2	8.3	6.1	4.5	3.6	2.9	2.6
80°	7.7	7.9	5.8	4.3	3.4	2.8	2.5
80.5°	7.2	7.5	5.5	4.1	3.3	2.7	2.4
81°	6.8	7.0	5.2	3.9	3.2	2.6	2.3
81.5°	6.4	6.6	4.9	3.7	3.0	2.5	2.3
82°	6.0	6.2	4.6	3.6	2.9	2.4	2.2
82.5°	5.6	5.8	4.3	3.4	2.8	2.3	2.1
83°	5.3	5.4	4.0	3.2	2.6	2.2	2.0
83.5°	4.9	5.1	3.7	3.0	2.5	2.1	1.9
84°	4.5	4.7	3.5	2.8	2.3	2.0	1.8
84.5°	4.2	4.3	3.2	2.6	2.2	1.8	1.7
85°	3.9	3.9	2.9	2.4	2.0	1.7	1.5
85.5°	3.5	3.6	2.6	2.2	1.8	1.6	1.4
86°	3.2	3.2	2.3	1.9	1.6	1.4	1.3
86.5°	2.8	2.8	2.0	1.7	1.5	1.3	1.2
87°	2.5	2.4	1.7	1.4	1.2	1.1	1.0
87.5°	2.1	2.0	1.4	1.2	1.0	1.0	0.8
88°	1.7	1.6	1.1	0.9	0.8	0.8	0.7
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	0.4	0.4	0.3
89.5°	0.6	0.4	0.2	0.1	0.2	0.2	0.1



TEST NUMBER: P895881
CATALOG NUMBER: GRZ-05L-935-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

Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

iO LED

Report Number: SP1-2101-124-3

Luminaire Tested: GRZ-05L-935-10X10-X-UNV-STD-2F

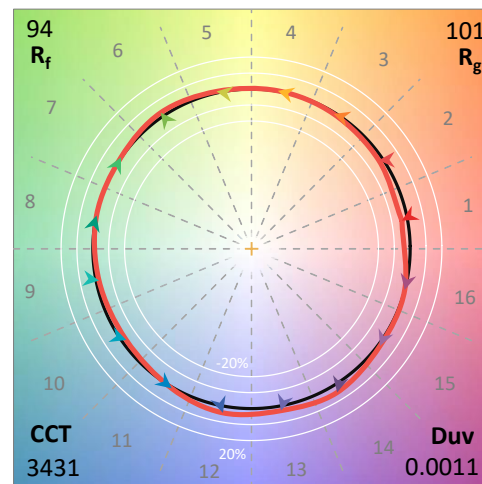
Test Date: 02/10/2021

Test Information

Test Method: LM-79-08
 Report Number: SP1-2101-124-3
 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-935-10X10-X-UNV-STD-2F**
 Description: IO LED Wall Grazer GRZ

Spectral Parameters

CCT (K):	3431	CRI (Ra):	94.0		
CIE u':	0.2369	R1:	94.7	R9:	69.9
CIE v':	0.5141	R2:	95.5	R10:	88.4
Duv:	0.0011	R3:	95.0	R11:	95.7
CIE x:	0.4104	R4:	95.4	R12:	83.2
CIE y:	0.3958	R5:	94.1	R13:	94.8
CIE z:	0.1938	R6:	94.0	R14:	96.6
Peak Wavelength (nm):	624	R7:	95.4		
Dominant Wavelength (nm):	580	R8:	88.3		
Purity:	42.2				
Rf:	93.6				
Rg:	100.6				



Test Conditions

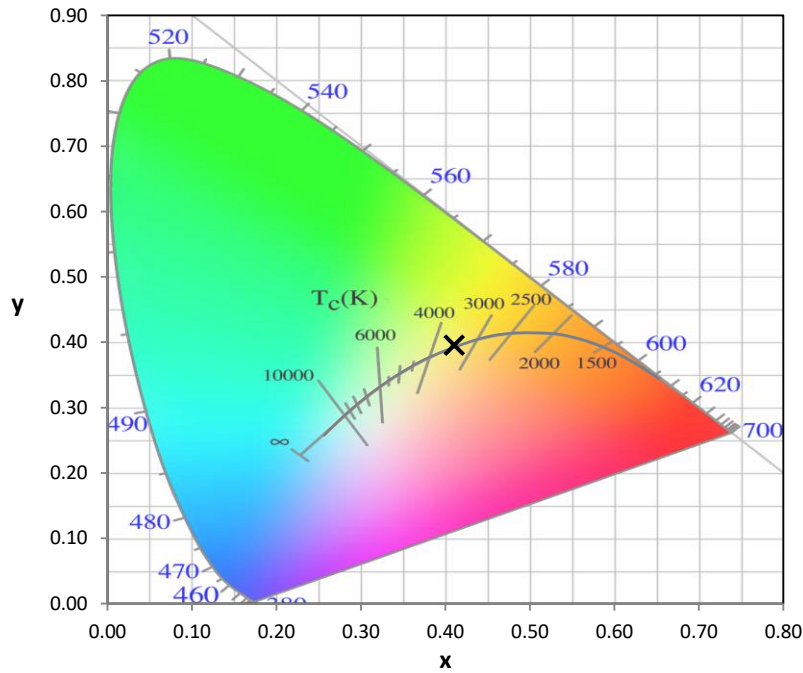
Stabilization Time: 57M
 Operation Time: 12H
 Room Temperature (°C) / RH%: 25.5/38%
 Sphere Temperature (°C): 24.4

REPORT NUMBER: SP1-2101-124-3

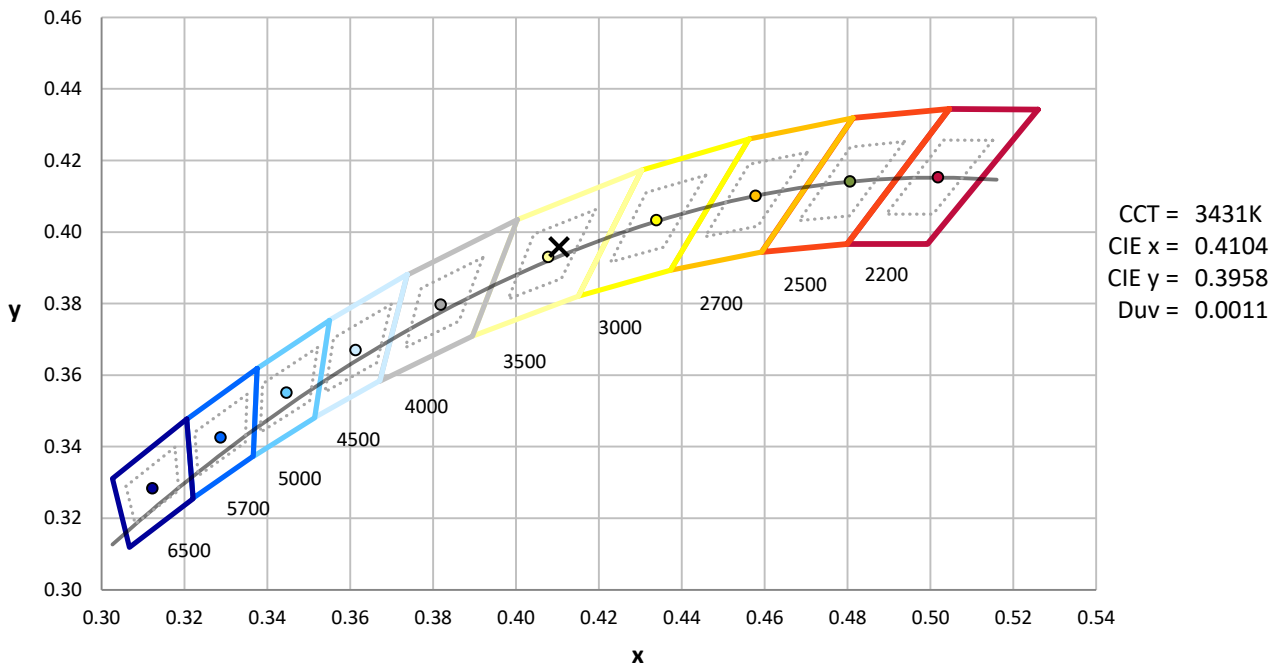
Measurement and Test Equipment			
Instrument	Identification Number	Calibration Date	Calibration Due Date
Photometer	IN0058	1/31/2021	7/31/2021
Power Meter	IN0071	12/1/2020	12/1/2021
AC Power Source	IN0063	12/1/2020	12/1/2021
DC Power Source	IN0208	12/1/2020	12/1/2021
Sphere Thermometer	IN0085	12/1/2020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

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CIE 1931 Chromaticity Diagram



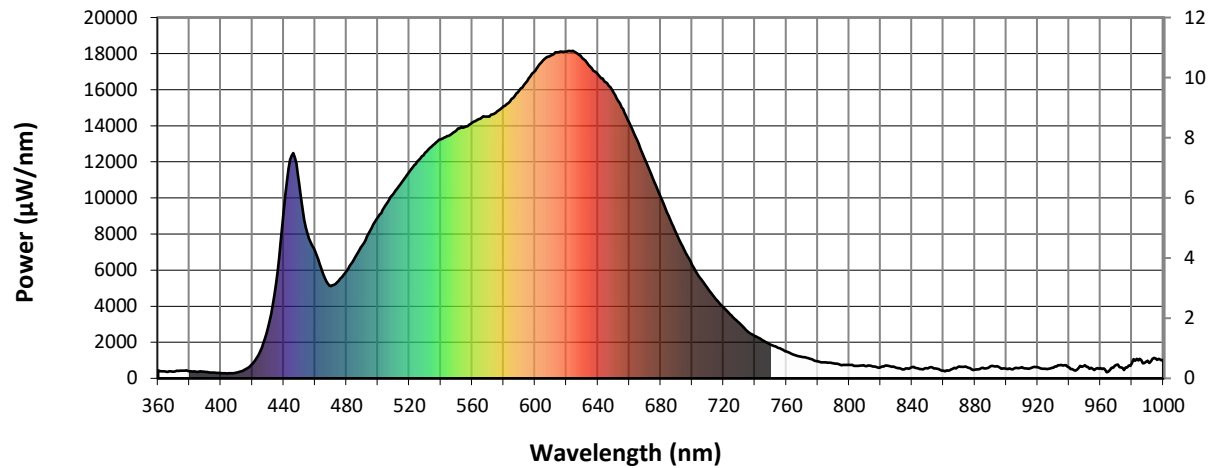
CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles



Point lies inside the ANSI 3500K 4-step quadrangle

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Photopic Flux vs. Wavelength

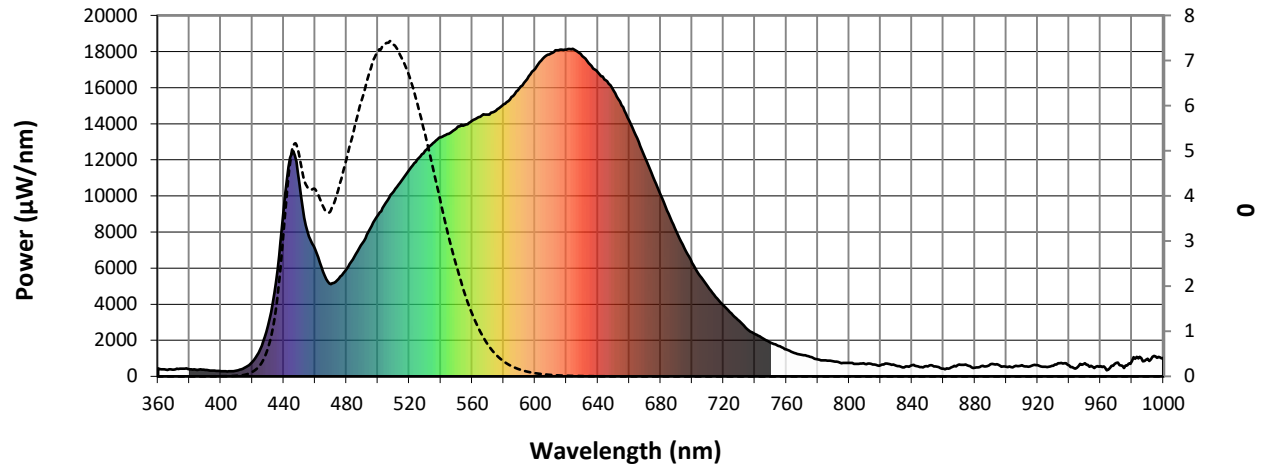


#####

λ (nm)	Power ($\mu\text{W/nm}$)	Lumens (ϕ/nm)	λ (nm)	Power ($\mu\text{W/nm}$)	Lumens (ϕ/nm)	λ (nm)	Power ($\mu\text{W/nm}$)	Lumens (ϕ/nm)	λ (nm)	Power ($\mu\text{W/nm}$)	Lumens (ϕ/nm)	λ (nm)	Power ($\mu\text{W/nm}$)	Lumens (ϕ/nm)
360	436	0.0	490	7373	1.0	620	18112	4.7	750	1864	0.0	880	485	0.0
365	370	0.0	495	8181	1.5	625	18107	4.0	755	1693	0.0	885	593	0.0
370	381	0.0	500	8943	2.0	630	17758	3.2	760	1498	0.0	890	677	0.0
375	432	0.0	505	9613	2.7	635	17291	2.6	765	1302	0.0	895	646	0.0
380	398	0.0	510	10245	3.5	640	16854	2.0	770	1180	0.0	900	526	0.0
385	359	0.0	515	10835	4.5	645	16410	1.6	775	1079	0.0	905	557	0.0
390	355	0.0	520	11465	5.6	650	15843	1.2	780	946	0.0	910	613	0.0
395	320	0.0	525	12004	6.4	655	15029	0.9	785	883	0.0	915	556	0.0
400	290	0.0	530	12512	7.4	660	14175	0.6	790	832	0.0	920	623	0.0
405	278	0.0	535	12925	8.0	665	13195	0.4	795	731	0.0	925	528	0.0
410	327	0.0	540	13254	8.6	670	12132	0.3	800	744	0.0	930	586	0.0
415	471	0.0	545	13437	8.9	675	11067	0.2	805	688	0.0	935	744	0.0
420	803	0.0	550	13744	9.3	680	10056	0.1	810	699	0.0	940	610	0.0
425	1501	0.0	555	13925	9.5	685	9011	0.1	815	651	0.0	945	486	0.0
430	2800	0.0	560	14164	9.6	690	8032	0.0	820	620	0.0	950	719	0.0
435	5221	0.1	565	14379	9.6	695	7112	0.0	825	686	0.0	955	527	0.0
440	9255	0.1	570	14511	9.4	700	6301	0.0	830	578	0.0	960	561	0.0
445	12350	0.3	575	14729	9.2	705	5570	0.0	835	502	0.0	965	364	0.0
450	10708	0.3	580	15069	9.0	710	4970	0.0	840	624	0.0	970	739	0.0
455	8053	0.3	585	15482	8.6	715	4396	0.0	845	523	0.0	975	457	0.0
460	7058	0.3	590	15975	8.3	720	3921	0.0	850	555	0.0	980	848	0.0
465	5809	0.3	595	16476	7.8	725	3489	0.0	855	553	0.0	985	1084	0.0
470	5111	0.3	600	17051	7.3	730	3068	0.0	860	424	0.0	990	980	0.0
475	5409	0.4	605	17607	6.8	735	2631	0.0	865	489	0.0	995	1093	0.0
480	5958	0.6	610	17893	6.1	740	2336	0.0	870	652	0.0	1000	1033	0.0
485	6631	0.8	615	18072	5.5	745	2108	0.0	875	622	0.0			

REPORT NUMBER: SP1-2101-124-3

Scotopic Flux vs. Wavelength



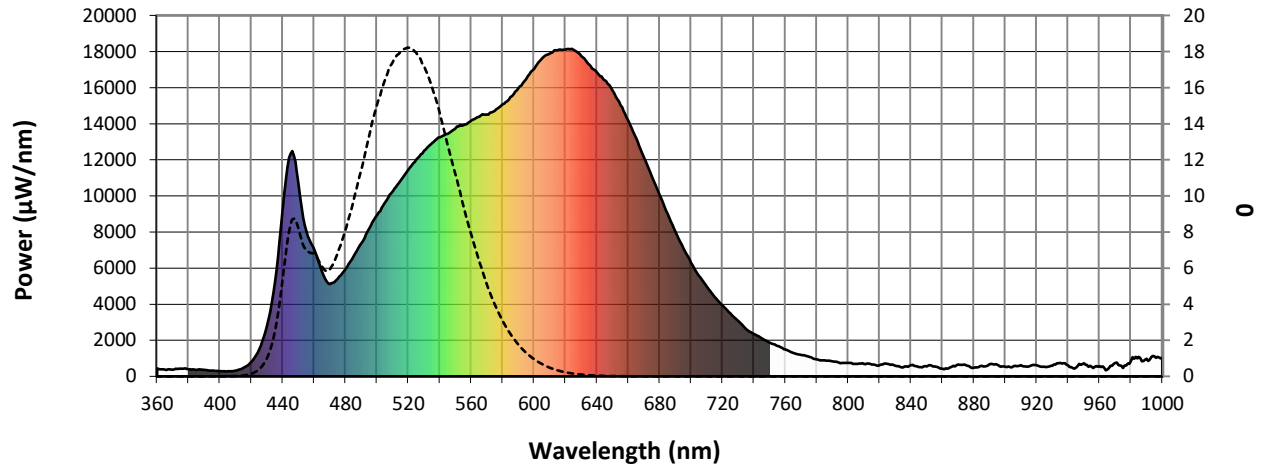
Scotopic Lumens: 1600.8

S/P: 1.59

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	436	0.0	490	7373	11.4	620	18112	0.2	750	1864	0.0	880	485	0.0
365	370	0.0	495	8181	13.2	625	18107	0.2	755	1693	0.0	885	593	0.0
370	381	0.0	500	8943	15.0	630	17758	0.1	760	1498	0.0	890	677	0.0
375	432	0.0	505	9613	16.3	635	17291	0.1	765	1302	0.0	895	646	0.0
380	398	0.0	510	10245	17.4	640	16854	0.0	770	1180	0.0	900	526	0.0
385	359	0.0	515	10835	18.0	645	16410	0.0	775	1079	0.0	905	557	0.0
390	355	0.0	520	11465	18.2	650	15843	0.0	780	946	0.0	910	613	0.0
395	320	0.0	525	12004	18.0	655	15029	0.0	785	883	0.0	915	556	0.0
400	290	0.0	530	12512	17.3	660	14175	0.0	790	832	0.0	920	623	0.0
405	278	0.0	535	12925	16.1	665	13195	0.0	795	731	0.0	925	528	0.0
410	327	0.0	540	13254	14.6	670	12132	0.0	800	744	0.0	930	586	0.0
415	471	0.0	545	13437	12.9	675	11067	0.0	805	688	0.0	935	744	0.0
420	803	0.1	550	13744	11.2	680	10056	0.0	810	699	0.0	940	610	0.0
425	1501	0.4	555	13925	9.5	685	9011	0.0	815	651	0.0	945	486	0.0
430	2800	1.0	560	14164	7.9	690	8032	0.0	820	620	0.0	950	719	0.0
435	5221	2.3	565	14379	6.5	695	7112	0.0	825	686	0.0	955	527	0.0
440	9255	5.2	570	14511	5.1	700	6301	0.0	830	578	0.0	960	561	0.0
445	12350	8.3	575	14729	4.0	705	5570	0.0	835	502	0.0	965	364	0.0
450	10708	8.3	580	15069	3.1	710	4970	0.0	840	624	0.0	970	739	0.0
455	8053	7.0	585	15482	2.4	715	4396	0.0	845	523	0.0	975	457	0.0
460	7058	6.8	590	15975	1.8	720	3921	0.0	850	555	0.0	980	848	0.0
465	5809	6.1	595	16476	1.3	725	3489	0.0	855	553	0.0	985	1084	0.0
470	5111	5.9	600	17051	1.0	730	3068	0.0	860	424	0.0	990	980	0.0
475	5409	6.8	605	17607	0.7	735	2631	0.0	865	489	0.0	995	1093	0.0
480	5958	8.0	610	17893	0.5	740	2336	0.0	870	652	0.0	1000	1033	0.0
485	6631	9.6	615	18072	0.3	745	2108	0.0	875	622	0.0			

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Melanopic Flux vs. Wavelength


Melanopic Lumens: 631
M/P: 0.63

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	436	0.0	490	7373	6.1	620	18112	0.0	750	1864	0.0	880	485	0.0
365	370	0.0	495	8181	6.8	625	18107	0.0	755	1693	0.0	885	593	0.0
370	381	0.0	500	8943	7.2	630	17758	0.0	760	1498	0.0	890	677	0.0
375	432	0.0	505	9613	7.4	635	17291	0.0	765	1302	0.0	895	646	0.0
380	398	0.0	510	10245	7.4	640	16854	0.0	770	1180	0.0	900	526	0.0
385	359	0.0	515	10835	7.1	645	16410	0.0	775	1079	0.0	905	557	0.0
390	355	0.0	520	11465	6.7	650	15843	0.0	780	946	0.0	910	613	0.0
395	320	0.0	525	12004	6.1	655	15029	0.0	785	883	0.0	915	556	0.0
400	290	0.0	530	12512	5.4	660	14175	0.0	790	832	0.0	920	623	0.0
405	278	0.0	535	12925	4.7	665	13195	0.0	795	731	0.0	925	528	0.0
410	327	0.0	540	13254	3.9	670	12132	0.0	800	744	0.0	930	586	0.0
415	471	0.0	545	13437	3.1	675	11067	0.0	805	688	0.0	935	744	0.0
420	803	0.1	550	13744	2.5	680	10056	0.0	810	699	0.0	940	610	0.0
425	1501	0.2	555	13925	1.9	685	9011	0.0	815	651	0.0	945	486	0.0
430	2800	0.6	560	14164	1.4	690	8032	0.0	820	620	0.0	950	719	0.0
435	5221	1.4	565	14379	1.0	695	7112	0.0	825	686	0.0	955	527	0.0
440	9255	3.1	570	14511	0.7	700	6301	0.0	830	578	0.0	960	561	0.0
445	12350	4.9	575	14729	0.5	705	5570	0.0	835	502	0.0	965	364	0.0
450	10708	4.9	580	15069	0.3	710	4970	0.0	840	624	0.0	970	739	0.0
455	8053	4.2	585	15482	0.2	715	4396	0.0	845	523	0.0	975	457	0.0
460	7058	4.2	590	15975	0.2	720	3921	0.0	850	555	0.0	980	848	0.0
465	5809	3.8	595	16476	0.1	725	3489	0.0	855	553	0.0	985	1084	0.0
470	5111	3.7	600	17051	0.1	730	3068	0.0	860	424	0.0	990	980	0.0
475	5409	4.1	605	17607	0.0	735	2631	0.0	865	489	0.0	995	1093	0.0
480	5958	4.8	610	17893	0.0	740	2336	0.0	870	652	0.0	1000	1033	0.0
485	6631	5.5	615	18072	0.0	745	2108	0.0	875	622	0.0			

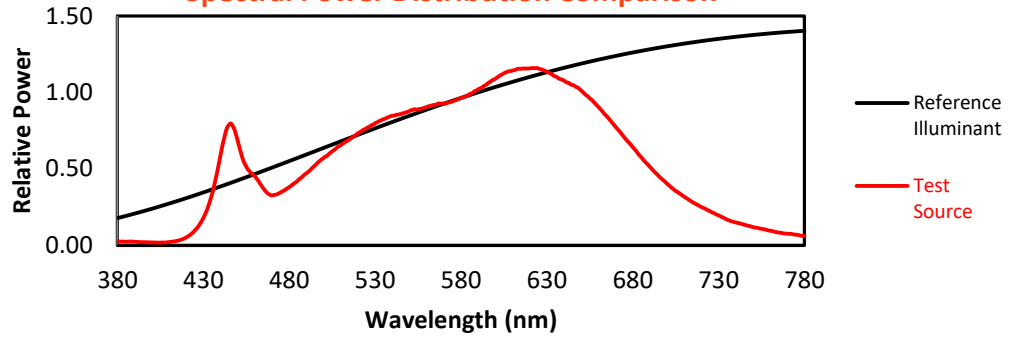
REPORT NUMBER: SP1-2101-124-3

TM-30-18

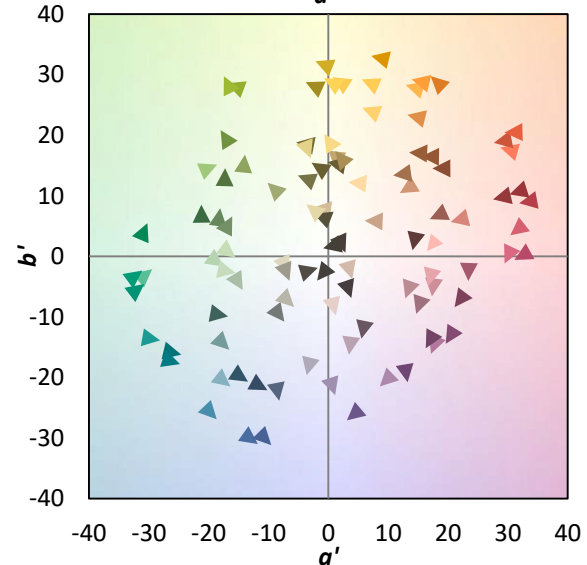
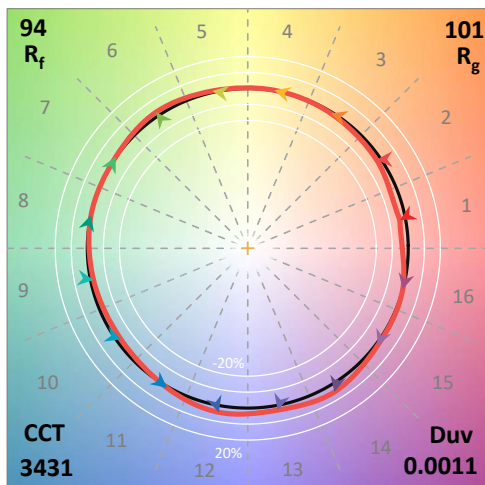
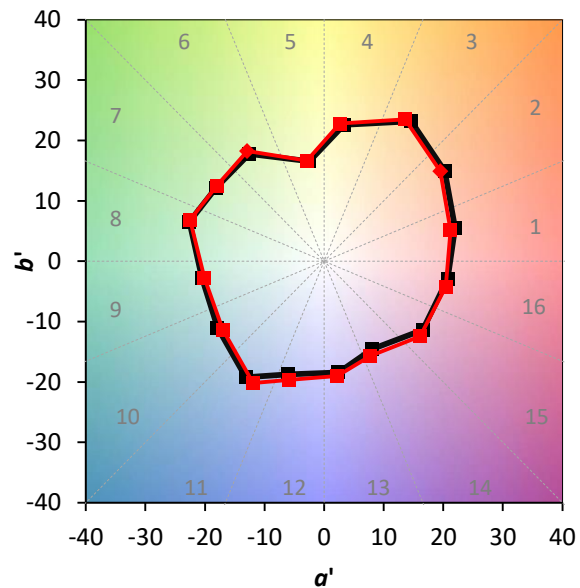
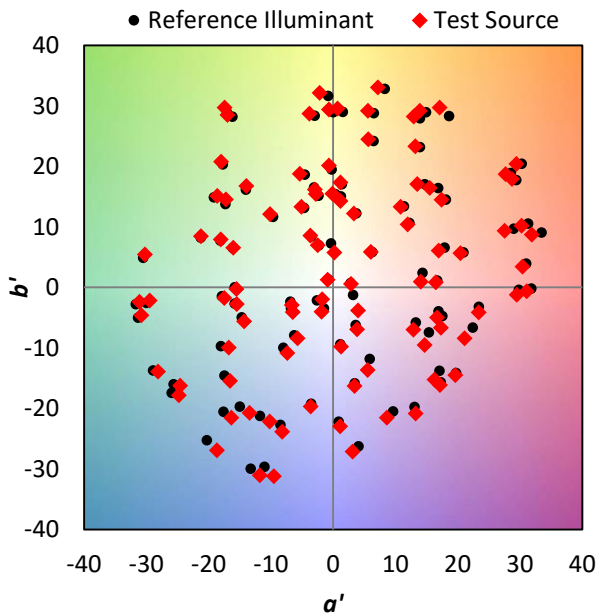
Summary

$R_f = 93.6$
 $R_g = 100.6$
 CIE $R_a = 94.0$
 $R_9 = 69.9$

Spectral Power Distribution Comparison

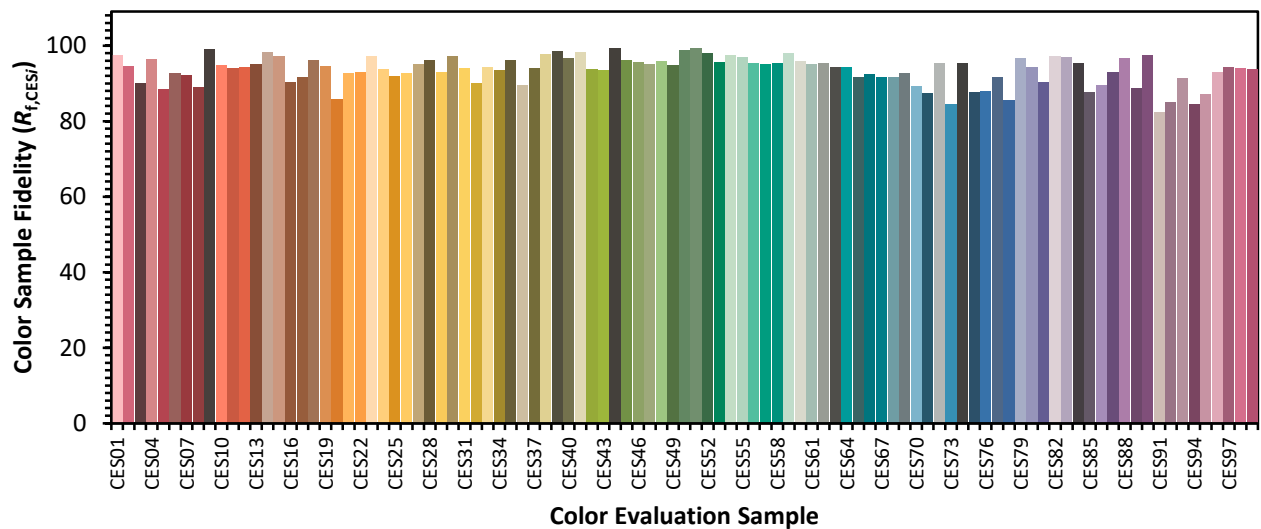


Color Vector Graphics

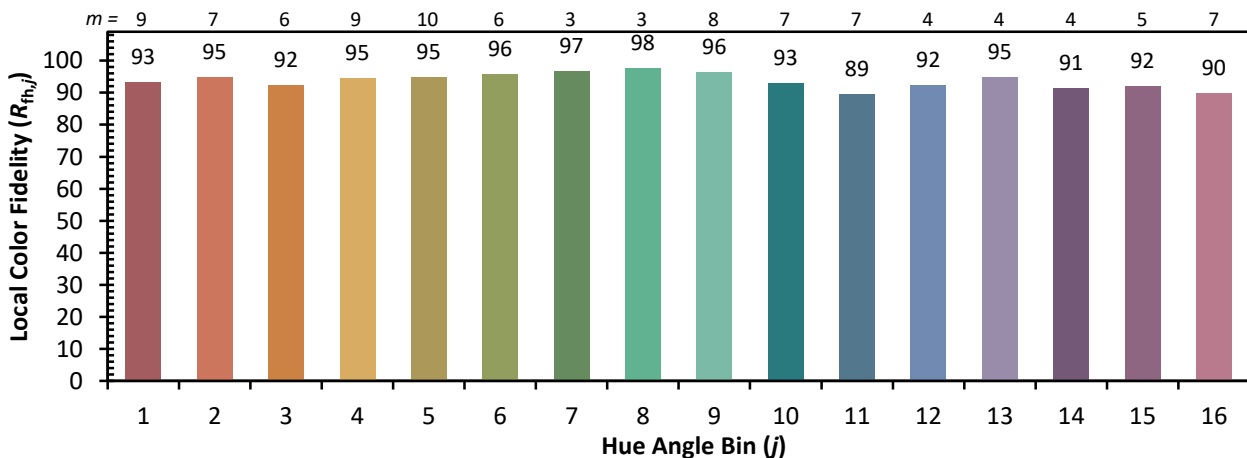
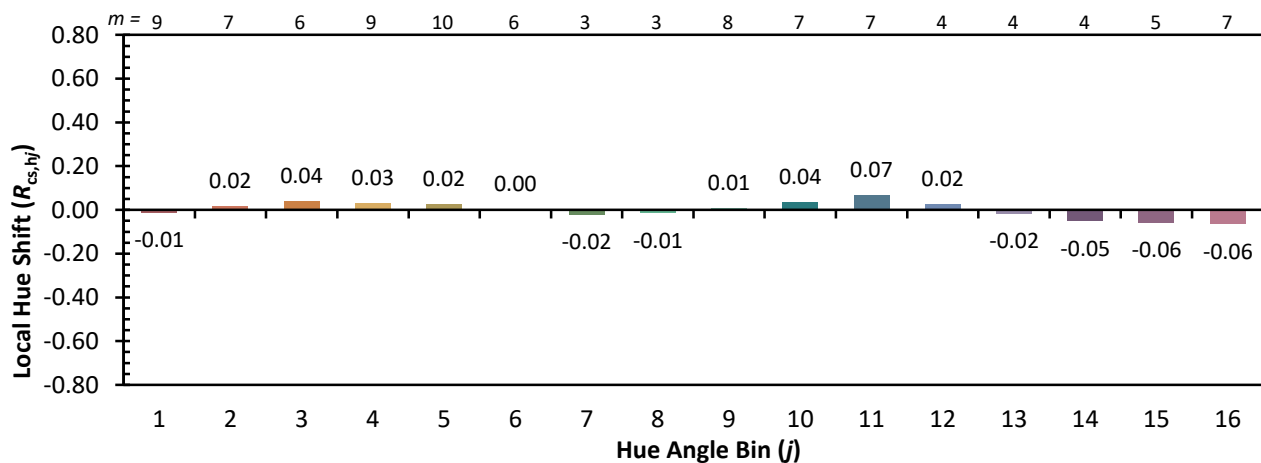
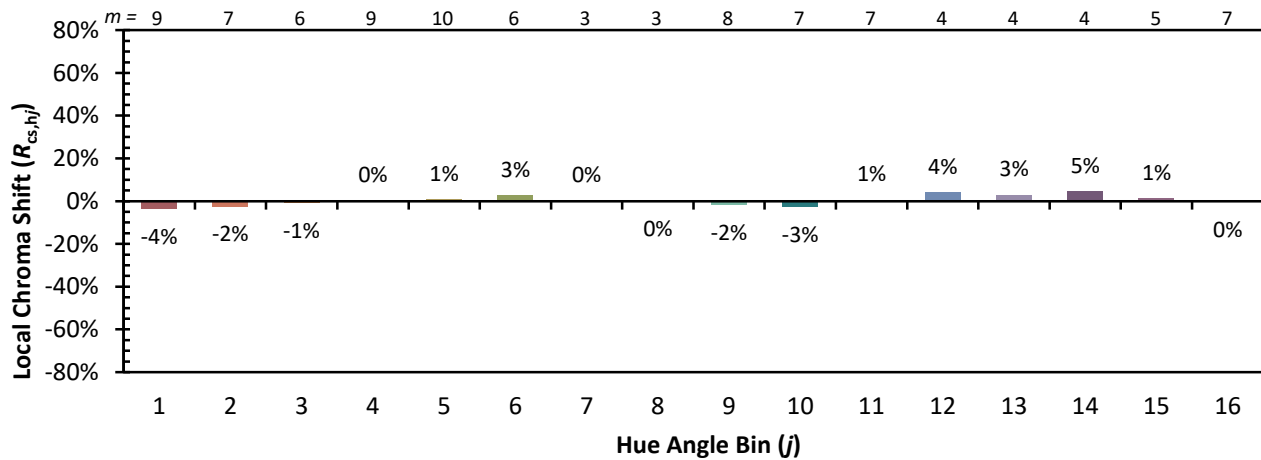


Individual Sample Fidelity Index ($R_{f,i}$)

CES01 = 86	CES26 = 93	CES51 = 99	CES76 = 88
CES02 = 62	CES27 = 95	CES52 = 98	CES77 = 92
CES03 = 31	CES28 = 96	CES53 = 96	CES78 = 86
CES04 = 70	CES29 = 93	CES54 = 98	CES79 = 97
CES05 = 50	CES30 = 97	CES55 = 97	CES80 = 94
CES06 = 51	CES31 = 94	CES56 = 95	CES81 = 90
CES07 = 43	CES32 = 90	CES57 = 95	CES82 = 97
CES08 = 42	CES33 = 94	CES58 = 96	CES83 = 97
CES09 = 29	CES34 = 93	CES59 = 98	CES84 = 95
CES10 = 75	CES35 = 96	CES60 = 96	CES85 = 88
CES11 = 58	CES36 = 90	CES61 = 95	CES86 = 90
CES12 = 64	CES37 = 94	CES62 = 95	CES87 = 93
CES13 = 43	CES38 = 98	CES63 = 94	CES88 = 97
CES14 = 74	CES39 = 99	CES64 = 94	CES89 = 89
CES15 = 71	CES40 = 97	CES65 = 92	CES90 = 97
CES16 = 48	CES41 = 98	CES66 = 92	CES91 = 82
CES17 = 49	CES42 = 94	CES67 = 92	CES92 = 85
CES18 = 56	CES43 = 94	CES68 = 92	CES93 = 91
CES19 = 71	CES44 = 99	CES69 = 93	CES94 = 84
CES20 = 66	CES45 = 96	CES70 = 89	CES95 = 87
CES21 = 86	CES46 = 96	CES71 = 88	CES96 = 93
CES22 = 78	CES47 = 95	CES72 = 95	CES97 = 94
CES23 = 91	CES48 = 96	CES73 = 85	CES98 = 94
CES24 = 90	CES49 = 95	CES74 = 95	CES99 = 94
CES25 = 71	CES50 = 99	CES75 = 88	



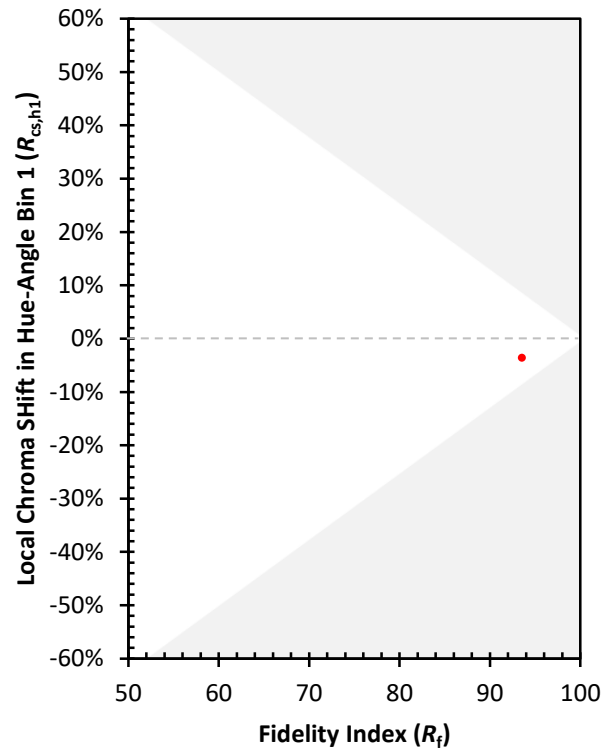
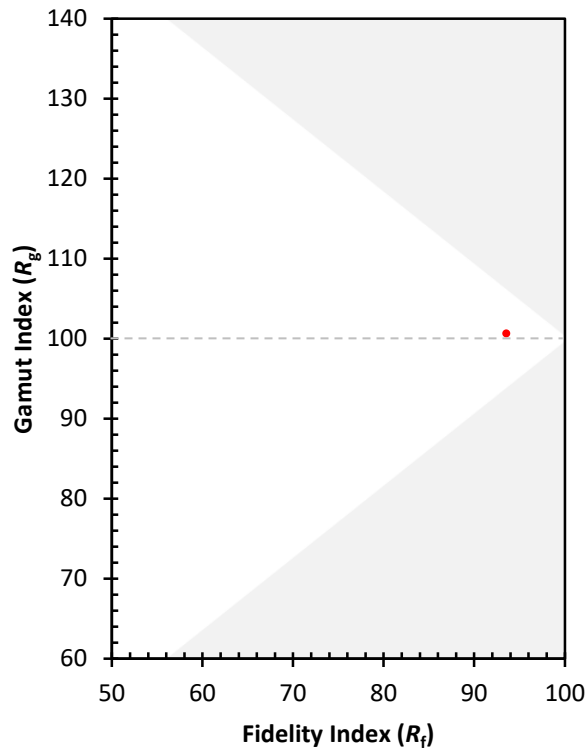
Color Rendition by Hue-Angle Bin



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TM-30-18

Measure Comparisons



(END OF REPORT)