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: P895814

Luminaire Tested: **GRZ-15L-940-10x10FR-X-UNV-STD-1F**

Issue Date: 11/20/2024

Report Generated By 670245763 / DESKTOP-DVLU35A

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:	P895814
Test Lab:	INNOVATION CENTER(G3)
Issue Date:	11/20/2024
Manufacturer:	COOPER LIGHTING SOLUTIONS (FORMERLY EATON)
Product Line:	io LED
Catalog Number:	GRZ-15L-940-10x10FR-X-UNV-STD-1F
Description:	iO LED 90CRI 4000K GRAZER 1500 lumens per ft WITH 10 deg x 10 deg, 1/3 Frosted OPTIC
Light Source:	4000K CCT, 90 CRI LEDS
Ballast/Driver:	ELECTRONIC DRIVER

Summary

Lumens per Lamp:	N/A
Luminaire Lumens:	1351.6 lumens
Efficiency:	N/A
Efficacy:	90.7 lumens/watt
Spacing Criteria (0/90/45):	0.19 / 0.25 / 0.25
Luminous Opening:	Rectangular (W 1' x L: 0.17' x H: 0')
CIE Type:	Direct

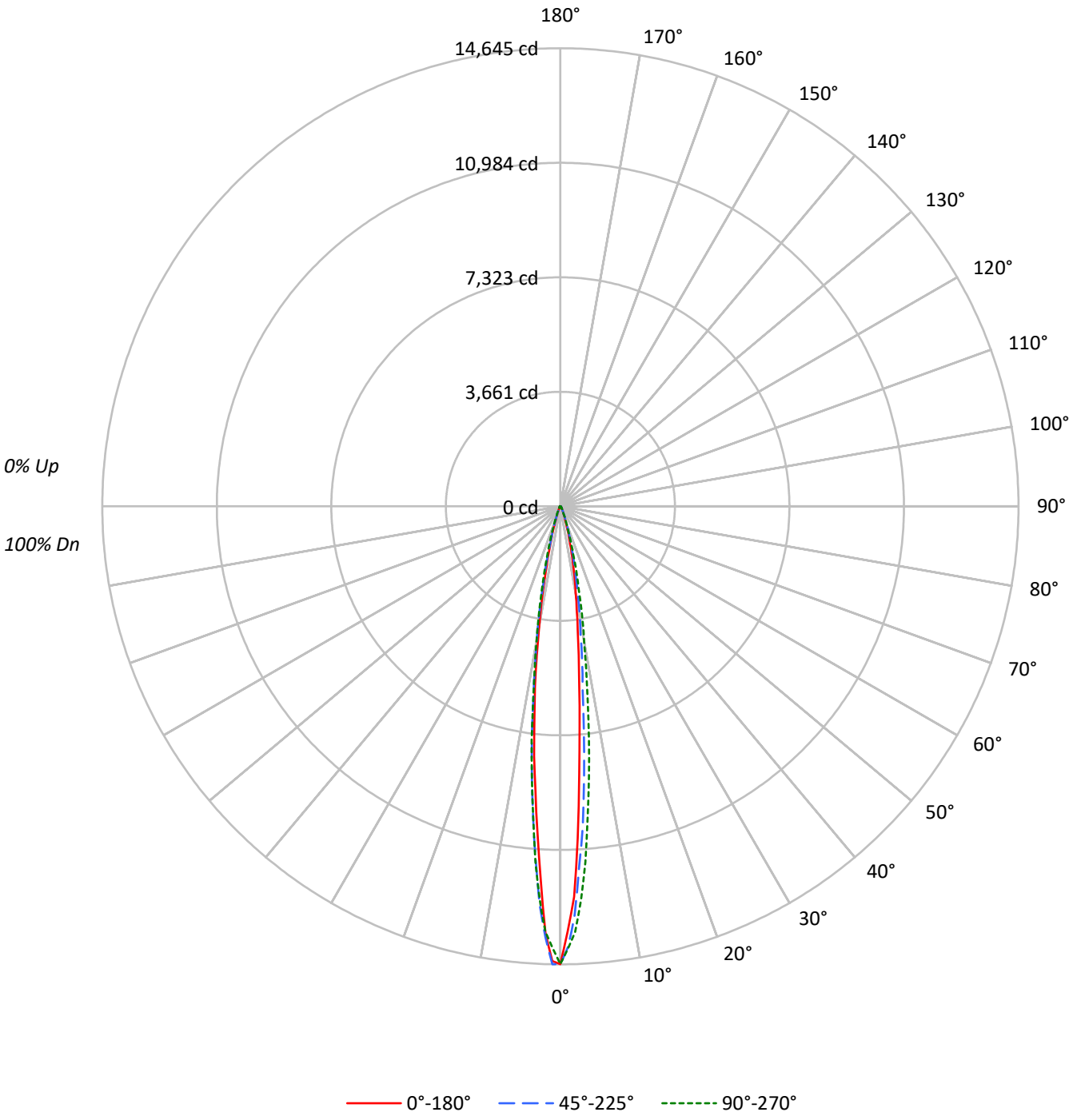
Input Watts (W):	14.9
Input Voltage (V):	120
Input Current (Ain):	NR
Voltage Rise (V):	NR
Power Factor:	NR
Total Harmonic Distortion (THDi):	NR
Frequency (hertz):	60
Stabilization Time:	NR
Operation Time:	NR
Ambient Temperature (°C):	NR
Test Distance:	25 FT

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

Scaled Data Report

TEST NUMBER: P895814
CATALOG NUMBER: GRZ-15L-940-10x10FR-X-UNV-STD-1F

Luminous Intensity Polar Plot



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

Scaled Data Report

TEST NUMBER: P895814
CATALOG NUMBER: GRZ-15L-940-10x10FR-X-UNV-STD-1F

COEFFICIENT OF UTILIZATION - ZONAL CAVITY METHOD:

RF	20				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	0
RCR																		
0	119	119	119	119	116	116	116	116	111	111	111	106	106	106	102	102	102	100
1	115	113	111	109	113	111	109	107	107	105	104	103	102	101	100	99	98	97
2	111	108	105	102	109	106	103	101	103	101	99	100	98	97	97	96	95	93
3	108	103	100	97	106	102	99	96	100	97	95	97	95	93	95	93	92	91
4	105	100	96	93	103	99	95	92	97	94	91	95	92	90	93	91	89	88
5	102	96	93	90	101	96	92	89	94	91	89	93	90	88	91	89	87	86
6	100	94	90	87	98	93	89	87	92	89	86	91	88	86	89	87	85	84
7	97	91	87	85	96	91	87	84	90	86	84	89	86	84	88	85	83	82
8	95	89	85	83	94	89	85	83	88	85	82	87	84	82	86	84	82	81
9	93	87	83	81	92	87	83	81	86	83	81	85	82	80	85	82	80	79
10	91	85	82	79	91	85	82	79	84	81	79	84	81	79	83	81	79	78

AVERAGE LUMINANCE (cd/sqm):

	0°	90°	180°
0°	945255	945255	945255
5°	456333	645968	591490
10°	184354	287274	252937
15°	73079	105674	78286
20°	28544	34934	23006
25°	13159	13850	10587
30°	7769	7560	6211
35°	5258	5258	4162
40°	3979	4215	3279
45°	3424	3680	2794
50°	2933	3345	2371
55°	2657	3130	2184
60°	2337	3048	2157
65°	2124	2964	2124
70°	1831	2889	1831
75°	1397	2420	1721
80°	1041	2082	1562
85°	1037	1037	1037

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

Scaled Data Report

TEST NUMBER: P895814
CATALOG NUMBER: GRZ-15L-940-10x10FR-X-UNV-STD-1F

ZONAL LUMENS:

Zone	Lumens	% Fixture
0°-10°	705.6	52.2
10°-20°	426.4	31.5
20°-30°	95.2	7.0
30°-40°	41.1	3.0
40°-50°	29.6	2.2
50°-60°	23.5	1.7
60°-70°	17.5	1.3
70°-80°	10.1	0.7
80°-90°	2.6	0.2
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°	1227.2	90.8
0°-40°	1268.3	93.8
0°-60°	1321.4	97.8
0°-90°	1351.6	100.0
90°-120°	0.0	0.0
90°-150°	0.0	0.0
90°-180°	0.0	0.0
0°-180°	1351.6	100.0

CANDELA DISTRIBUTION:

	0°	45°	90°	135°	180°	Flux
0°	14639	14639	14639	14639	14639	
5°	7040	8688	9966	10012	9126	549
15°	1093	1409	1581	1302	1171	336
25°	185	210	194	153	149	94
35°	67	67	67	58	53	43
45°	38	40	40	36	31	29
55°	24	29	28	25	19	20
65°	14	21	19	17	14	13
75°	6	11	10	10	7	6
85°	1	3	1	3	1	2
90°	0	0	0	0	0	

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

Scaled Data Report

TEST NUMBER: P895814
CATALOG NUMBER: GRZ-15L-940-10x10FR-X-UNV-STD-1F

CANDELA DISTRIBUTION (FULL):

	0°	5°	15°	25°	35°	45°	55°	65°	75°	85°	90°
0°	14639.1	14639.1	14639.1	14639.1	14639.1	14639.1	14639.1	14639.1	14639.1	14639.1	14639.1
1°	*13583.2*	*14009.7*	*13904.2*	*14004.2*	*14022.2*	*14090.3*	*14134.9*	*14165.4*	*14239.0*	*14212.6*	*14122.2*
2°	12495.6	12731.7	12717.8	12779.0	13127.6	13079.0	13204.1	13468.0	13426.3	13487.4	13615.2
3°	10635.5	11153.6	11034.2	11023.1	11357.9	11502.3	11998.3	12114.9	12405.3	12601.1	12605.3
4°	8592.1	8928.1	9007.3	9647.8	9611.7	10245.1	10541.0	10784.1	11010.6	11719.0	11410.7
5°	7040.3	7289.0	7536.2	7851.6	7929.4	8687.9	8855.9	9206.0	9818.6	10084.0	9966.0
6°	5763.6	6008.2	6006.8	6323.5	6613.8	7155.5	7343.2	7846.0	8344.7	8694.8	8710.1
7°	4794.0	4934.4	5023.3	5227.4	5551.1	5838.7	6277.7	6608.2	6929.2	7294.6	7516.8
8°	3987.0	4121.7	4171.7	4357.8	4549.6	4958.0	5397.0	5653.9	5990.1	6308.3	6244.2
9°	3350.6	3560.5	3531.3	3641.0	3859.1	4135.6	4398.0	4778.7	4995.5	5309.3	5237.1
10°	2811.7	2945.0	3031.2	3168.7	3249.3	3552.2	3711.9	3959.2	4231.4	4274.4	4381.4
12.5°	1844.8	1875.4	1893.4	1961.5	2108.8	2256.0	2415.7	2546.3	2627.0	2643.6	2722.8
15°	1093.2	1146.0	1157.1	1250.3	1330.8	1408.6	1510.0	1529.4	1572.5	1555.8	1580.8
17.5°	672.3	677.8	719.7	721.0	808.5	848.8	919.6	936.3	912.7	900.2	900.2
20°	415.4	418.2	429.3	458.4	475.1	519.5	555.6	559.8	547.3	520.9	508.4
22.5°	269.6	277.9	269.6	280.7	297.3	322.3	339.0	341.8	325.1	315.4	314.0
25°	184.7	186.1	193.0	186.1	194.4	209.7	215.2	219.4	205.5	201.4	194.4
27.5°	136.1	136.1	136.1	136.1	138.9	138.9	141.6	143.0	138.9	136.1	137.5
30°	104.2	102.8	104.2	104.2	101.4	104.2	105.5	105.5	102.8	102.8	101.4
32.5°	80.5	81.9	83.3	81.9	80.5	81.9	83.3	81.9	81.9	83.3	80.5
35°	66.7	66.7	68.0	66.7	66.7	66.7	68.0	68.0	68.0	68.0	66.7
37.5°	54.2	55.5	56.9	56.9	56.9	56.9	58.3	58.3	59.7	56.9	55.5
40°	47.2	47.2	48.6	48.6	50.0	48.6	50.0	51.4	51.4	50.0	50.0
42.5°	41.7	41.7	43.0	43.0	43.0	44.4	45.8	45.8	45.8	45.8	44.4
45°	37.5	36.1	37.5	38.9	40.3	40.3	41.7	43.0	41.7	41.7	40.3
47.5°	33.3	33.3	33.3	34.7	36.1	37.5	37.5	38.9	38.9	37.5	36.1
50°	29.2	29.2	30.6	31.9	33.3	34.7	34.7	36.1	36.1	34.7	33.3
52.5°	25.0	25.0	26.4	29.2	30.6	31.9	31.9	33.3	33.3	31.9	30.6
55°	23.6	22.2	23.6	25.0	27.8	29.2	30.6	30.6	30.6	29.2	27.8
57.5°	19.4	19.4	20.8	22.2	25.0	27.8	27.8	29.2	27.8	26.4	26.4
60°	18.1	18.1	19.4	20.8	23.6	26.4	26.4	26.4	25.0	23.6	23.6
62.5°	15.3	15.3	16.7	18.1	20.8	23.6	25.0	25.0	23.6	22.2	20.8
65°	13.9	13.9	13.9	16.7	19.4	20.8	22.2	22.2	20.8	19.4	19.4
67.5°	11.1	11.1	12.5	13.9	16.7	18.1	19.4	20.8	19.4	18.1	16.7
70°	9.7	9.7	9.7	12.5	15.3	16.7	18.1	18.1	16.7	15.3	15.3
72.5°	6.9	6.9	8.3	9.7	12.5	13.9	15.3	15.3	13.9	12.5	12.5
75°	5.6	5.6	6.9	8.3	9.7	11.1	12.5	12.5	12.5	11.1	9.7
77.5°	4.2	4.2	5.6	6.9	8.3	9.7	9.7	9.7	9.7	8.3	8.3
80°	2.8	2.8	4.2	4.2	5.6	6.9	6.9	6.9	6.9	5.6	5.6
82.5°	2.8	1.4	2.8	2.8	4.2	4.2	5.6	5.6	4.2	4.2	4.2
85°	1.4	1.4	1.4	1.4	2.8	2.8	2.8	2.8	2.8	2.8	1.4
87.5°	0.0	0.0	0.0	0.0	1.4	1.4	1.4	1.4	1.4	1.4	1.4
90°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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

Scaled Data Report

TEST NUMBER: P895814
CATALOG NUMBER: GRZ-15L-940-10x10FR-X-UNV-STD-1F

CANDELA DISTRIBUTION (continued):

	95°	105°	115°	125°	135°	145°	155°	165°	175°	180°
0°	14639.1	14639.1	14639.1	14639.1	14639.1	14639.1	*14639.1*	14639.1	14639.1	14639.1
1°	*14344.6*	*14554.3*	*14415.4*	*14570.9*	*14644.7*	*14644.7*	*14669.7*	*14564.0*	*14494.5*	*14545.9*
2°	13670.9	13854.2	13908.3	13877.8	13784.8	13798.6	*13622.1*	13604.1	13372.2	13640.2
3°	12701.1	12904.0	12820.7	12713.6	12731.7	12533.1	*12249.6*	12116.3	12034.4	11996.9
4°	11537.1	11667.6	11645.4	11570.4	11335.5	11103.6	*10846.6*	10932.8	10409.0	10478.6
5°	10271.5	10417.3	10342.3	10095.1	10011.8	9761.7	*9632.5*	9365.7	9083.8	9125.5
6°	8836.5	8787.9	8930.9	8757.3	8717.1	8276.7	*8207.2*	8251.7	8054.3	8036.3
7°	7376.5	7715.5	7620.9	7497.3	7450.1	7187.6	*7145.8*	6876.4	6893.1	6790.3
8°	6419.4	6452.7	6540.2	6372.2	6219.2	6187.3	*6026.2*	5867.9	5902.6	5830.4
9°	5337.3	5441.4	5370.6	5387.3	5188.5	4983.0	*4906.6*	4948.3	4830.1	4846.7
10°	4324.4	4492.6	4448.2	4410.7	4371.6	4159.2	*4123.1*	4028.6	3966.1	3857.7
12.5°	2722.8	2660.3	2690.8	2570.0	2522.7	2357.4	*2325.5*	2285.2	2150.5	2150.5
15°	1657.3	1525.3	1572.5	1419.7	1301.7	1267.0	*1179.5*	1180.9	1176.7	1171.1
17.5°	872.4	872.4	853.0	732.2	696.1	633.4	*625.1*	633.4	612.6	616.7
20°	512.6	494.5	465.4	408.4	383.4	357.1	*351.5*	347.3	347.3	334.8
22.5°	315.4	300.1	283.5	248.7	229.1	220.8	*212.5*	216.6	216.6	218.0
25°	201.4	188.9	181.9	161.1	152.8	151.4	*147.2*	141.6	143.0	148.6
27.5°	134.7	129.1	123.6	115.3	109.7	106.9	*106.9*	108.3	105.5	102.8
30°	101.4	94.4	91.7	88.9	84.7	84.7	*84.7*	83.3	81.9	83.3
32.5°	80.5	76.4	73.6	70.8	69.4	68.0	*69.4*	68.0	66.7	65.3
35°	66.7	62.5	61.1	59.7	58.3	56.9	*56.9*	56.9	54.2	52.8
37.5°	55.5	54.2	54.2	51.4	50.0	48.6	*48.6*	48.6	45.8	45.8
40°	50.0	48.6	47.2	45.8	44.4	43.0	*41.7*	41.7	38.9	38.9
42.5°	44.4	43.0	43.0	41.7	40.3	37.5	*37.5*	36.1	34.7	34.7
45°	40.3	38.9	38.9	37.5	36.1	34.7	*33.3*	31.9	30.6	30.6
47.5°	37.5	36.1	36.1	34.7	31.9	30.6	*29.2*	27.8	27.8	27.8
50°	33.3	33.3	33.3	31.9	30.6	29.2	*26.4*	25.0	23.6	23.6
52.5°	30.6	30.6	29.2	29.2	27.8	26.4	*23.6*	22.2	22.2	22.2
55°	29.2	27.8	27.8	26.4	25.0	25.0	*22.2*	20.8	19.4	19.4
57.5°	26.4	25.0	25.0	23.6	23.6	22.2	*19.4*	19.4	18.1	18.1
60°	23.6	22.2	22.2	20.8	20.8	19.4	*18.1*	16.7	16.7	16.7
62.5°	20.8	19.4	20.8	19.4	19.4	18.1	*16.7*	15.3	15.3	15.3
65°	19.4	18.1	18.1	18.1	16.7	16.7	*15.3*	13.9	13.9	13.9
67.5°	16.7	15.3	16.7	15.3	15.3	13.9	*13.9*	12.5	12.5	11.1
70°	13.9	13.9	13.9	13.9	13.9	12.5	*11.1*	11.1	9.7	9.7
72.5°	12.5	12.5	12.5	12.5	11.1	11.1	*9.7*	9.7	8.3	8.3
75°	9.7	9.7	9.7	9.7	9.7	9.7	*8.3*	8.3	6.9	6.9
77.5°	8.3	8.3	8.3	8.3	8.3	6.9	*6.9*	5.6	5.6	5.6
80°	5.6	5.6	5.6	5.6	5.6	5.6	*5.6*	4.2	4.2	4.2
82.5°	4.2	4.2	4.2	4.2	4.2	2.8	*2.8*	2.8	2.8	2.8
85°	2.8	2.8	2.8	2.8	2.8	1.4	*1.4*	1.4	1.4	1.4
87.5°	1.4	1.4	1.4	1.4	1.4	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

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

Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

iO LED

Report Number: SP1-2101-124-4

Luminaire Tested: GRZ-05L-940-10X10-X-UNV-STD-2F

Test Date: 02/11/2021

Report Generated By controller / USPTCWHP6086842

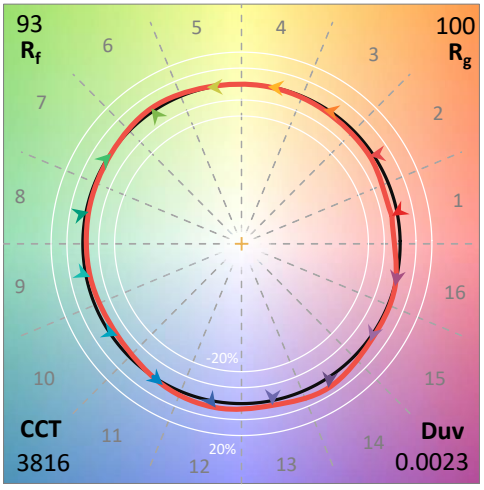
Test Information

Test Method:	LM-79-08
Report Number:	SP1-2101-124-4
Test Lab:	COOPER LIGHTING SOLUTIONS
Photometer:	SP1
Measurement Geometry:	4π
Issue Date:	02/11/2021
Manufacturer:	COOPER LIGHTING SOLUTIONS (FORMERLY EATON)
Product Line:	iO LED
Catalog Number:	**GRZ-05L-940-10X10-X-UNV-STD-2F**
Description:	IO LED Wall Grazer GRZ

Spectral Parameters

CCT (K):	3816	CRI (Ra):	93.3		
CIE u':	0.2273	R1:	93.7	R9:	69.2
CIE v':	0.5079	R2:	94.3	R10:	85.8
Duv:	0.0023	R3:	93.9	R11:	94.6
CIE x:	0.3907	R4:	94.7	R12:	78.9
CIE y:	0.3879	R5:	92.9	R13:	93.7
CIE z:	0.2214	R6:	92.1	R14:	96.1
Peak Wavelength (nm):	614	R7:	95.7		
Dominant Wavelength (nm):	578	R8:	88.8		
Purity:	33.8				

Rf:	93.1
Rg:	100.2



Test Conditions

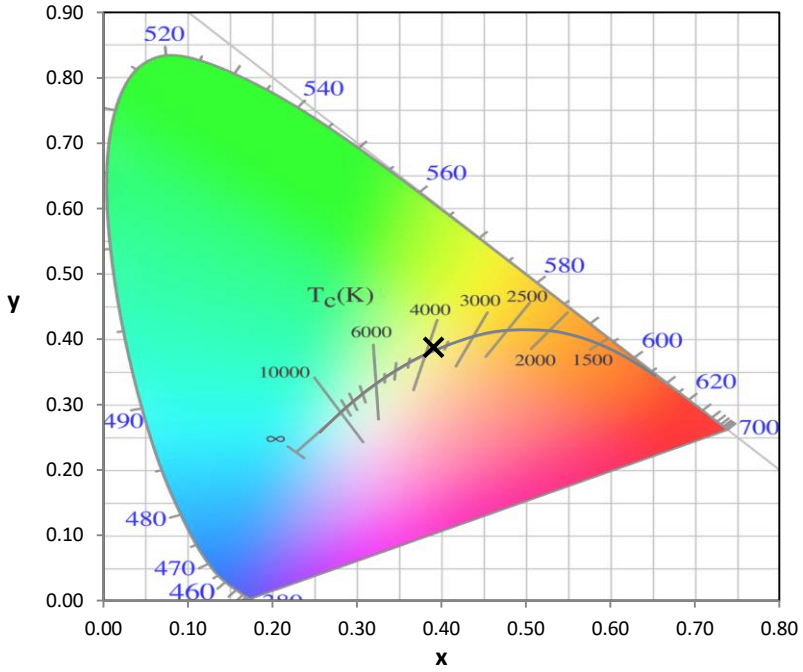
Stabilization Time:	162M
Operation Time:	12H
Room Temperature (°C) / RH%:	25.1/41%
Sphere Temperature (°C):	24.1

REPORT NUMBER: SP1-2101-124-4

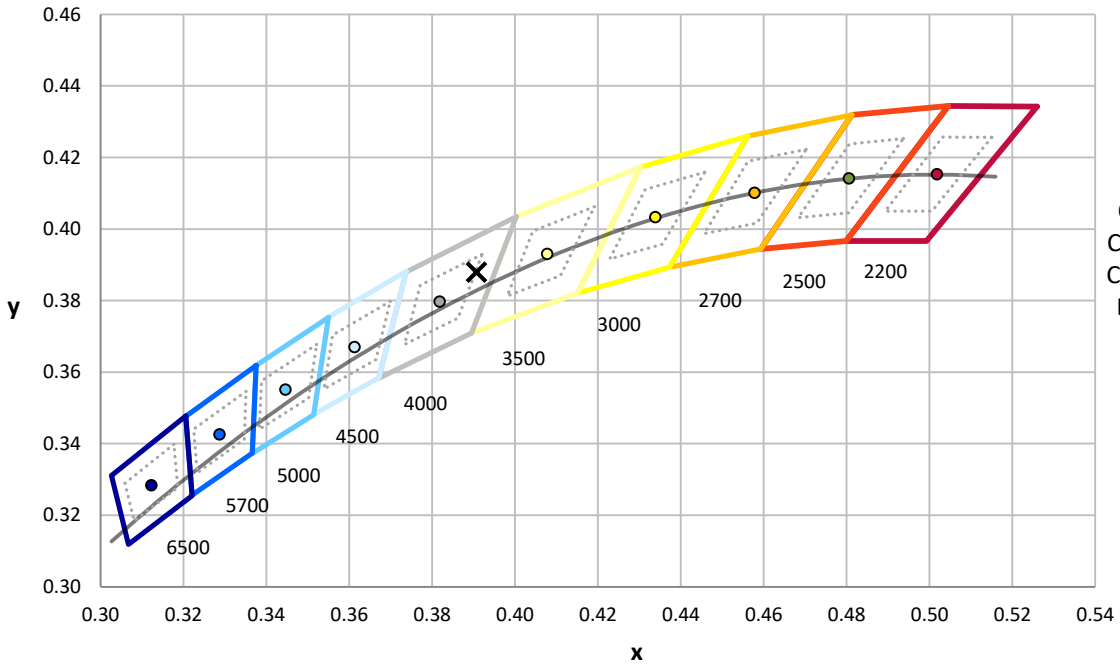
Measurement and Test Equipment			
Instrument	Identification Number	Calibration Date	Calibration Due Date
Photometer	IN0058	1/31/2021	7/31/2021
Power Meter	IN0071	12/1/2020	12/1/2021
AC Power Source	IN0063	12/1/2020	12/1/2021
DC Power Source	IN0208	12/1/2020	12/1/2021
Sphere Thermometer	IN0085	12/1/2020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

REPORT NUMBER: SP1-2101-124-4

CIE 1931 Chromaticity Diagram



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

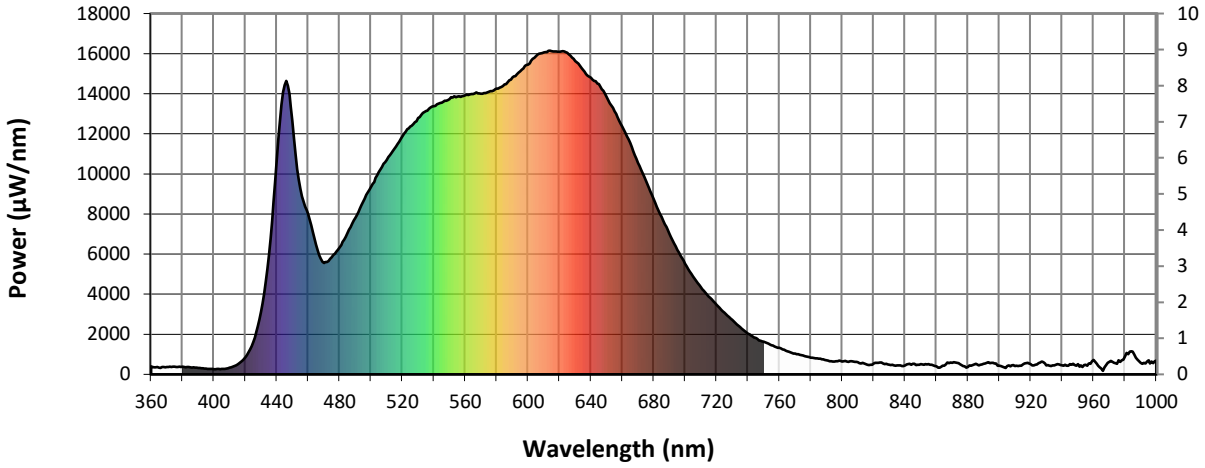


CCT = 3816K
CIE x = 0.3907
CIE y = 0.3879
Duv = 0.0023

Point lies inside the ANSI 4000K 7-step quadrangle

REPORT NUMBER: SP1-2101-124-4

Photopic Flux vs. Wavelength

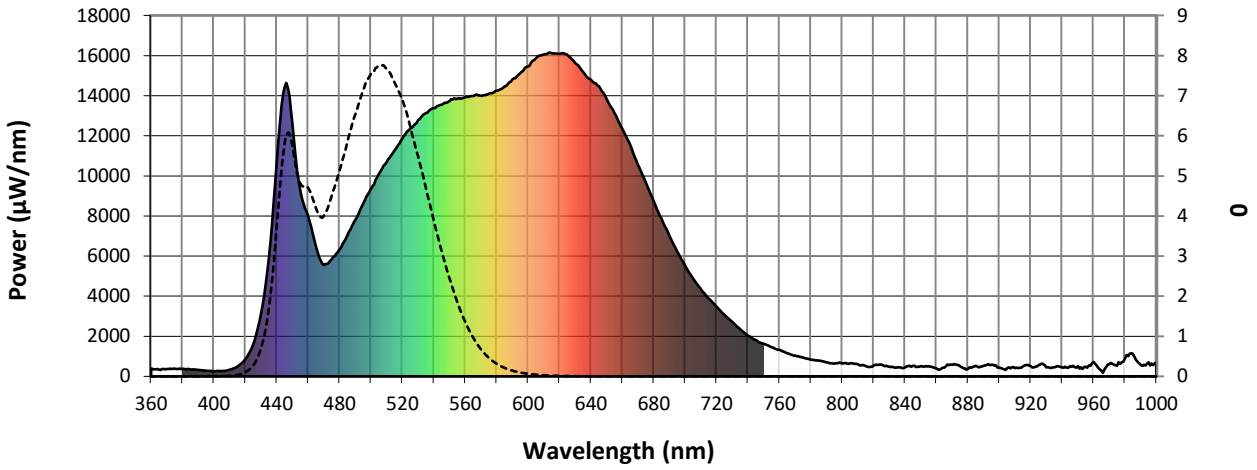


######

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	405	0.0	490	7814	1.1	620	16090	4.2	750	1625	0.0	880	367	0.0
365	335	0.0	495	8606	1.6	625	16048	3.5	755	1453	0.0	885	533	0.0
370	363	0.0	500	9360	2.1	630	15632	2.8	760	1318	0.0	890	535	0.0
375	388	0.0	505	10093	2.8	635	15196	2.3	765	1153	0.0	895	583	0.0
380	378	0.0	510	10690	3.7	640	14791	1.8	770	1033	0.0	900	438	0.0
385	344	0.0	515	11247	4.7	645	14481	1.4	775	948	0.0	905	410	0.0
390	323	0.0	520	11881	5.8	650	13840	1.0	780	831	0.0	910	413	0.0
395	292	0.0	525	12359	6.6	655	13125	0.8	785	778	0.0	915	489	0.0
400	261	0.0	530	12780	7.5	660	12353	0.5	790	708	0.0	920	518	0.0
405	272	0.0	535	13137	8.1	665	11536	0.4	795	643	0.0	925	563	0.0
410	331	0.0	540	13369	8.7	670	10559	0.2	800	645	0.0	930	452	0.0
415	497	0.0	545	13551	9.0	675	9658	0.2	805	648	0.0	935	454	0.0
420	847	0.0	550	13731	9.3	680	8746	0.1	810	610	0.0	940	446	0.0
425	1620	0.0	555	13860	9.5	685	7852	0.1	815	505	0.0	945	516	0.0
430	3114	0.0	560	13921	9.5	690	7031	0.0	820	544	0.0	950	514	0.0
435	5958	0.1	565	13987	9.3	695	6210	0.0	825	591	0.0	955	487	0.0
440	10649	0.2	570	14001	9.1	700	5517	0.0	830	484	0.0	960	723	0.0
445	14435	0.3	575	14097	8.8	705	4890	0.0	835	440	0.0	965	281	0.0
450	12623	0.3	580	14256	8.5	710	4342	0.0	840	452	0.0	970	627	0.0
455	9257	0.3	585	14467	8.0	715	3886	0.0	845	527	0.0	975	532	0.0
460	8011	0.3	590	14814	7.7	720	3470	0.0	850	515	0.0	980	902	0.0
465	6473	0.3	595	15120	7.2	725	3080	0.0	855	517	0.0	985	1126	0.0
470	5561	0.3	600	15449	6.7	730	2713	0.0	860	406	0.0	990	578	0.0
475	5845	0.5	605	15859	6.1	735	2357	0.0	865	434	0.0	995	699	0.0
480	6344	0.6	610	16059	5.5	740	2032	0.0	870	578	0.0	1000	687	0.0
485	7040	0.8	615	16120	4.9	745	1812	0.0	875	517	0.0			

REPORT NUMBER: SP1-2101-124-4

Scotopic Flux vs. Wavelength

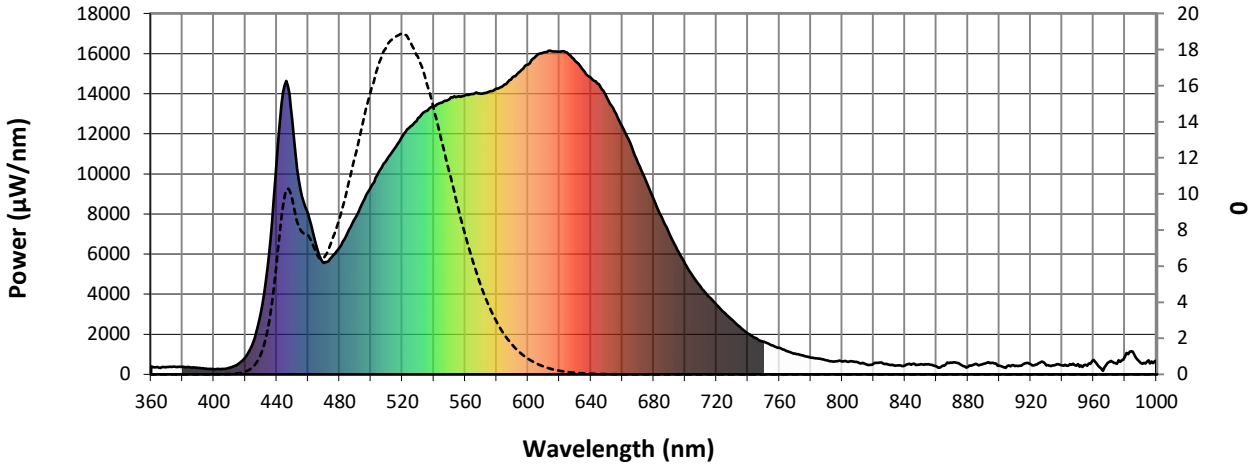


Scotopic Lumens: 1669.3 **S/P: 1.71**

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	405	0.0	490	7814	12.0	620	16090	0.2	750	1625	0.0	880	367	0.0
365	335	0.0	495	8606	13.9	625	16048	0.1	755	1453	0.0	885	533	0.0
370	363	0.0	500	9360	15.7	630	15632	0.1	760	1318	0.0	890	535	0.0
375	388	0.0	505	10093	17.2	635	15196	0.1	765	1153	0.0	895	583	0.0
380	378	0.0	510	10690	18.1	640	14791	0.0	770	1033	0.0	900	438	0.0
385	344	0.0	515	11247	18.6	645	14481	0.0	775	948	0.0	905	410	0.0
390	323	0.0	520	11881	18.9	650	13840	0.0	780	831	0.0	910	413	0.0
395	292	0.0	525	12359	18.5	655	13125	0.0	785	778	0.0	915	489	0.0
400	261	0.0	530	12780	17.6	660	12353	0.0	790	708	0.0	920	518	0.0
405	272	0.0	535	13137	16.4	665	11536	0.0	795	643	0.0	925	563	0.0
410	331	0.0	540	13369	14.8	670	10559	0.0	800	645	0.0	930	452	0.0
415	497	0.1	545	13551	13.0	675	9658	0.0	805	648	0.0	935	454	0.0
420	847	0.1	550	13731	11.2	680	8746	0.0	810	610	0.0	940	446	0.0
425	1620	0.4	555	13860	9.5	685	7852	0.0	815	505	0.0	945	516	0.0
430	3114	1.1	560	13921	7.8	690	7031	0.0	820	544	0.0	950	514	0.0
435	5958	2.7	565	13987	6.3	695	6210	0.0	825	591	0.0	955	487	0.0
440	10649	6.0	570	14001	4.9	700	5517	0.0	830	484	0.0	960	723	0.0
445	14435	9.7	575	14097	3.8	705	4890	0.0	835	440	0.0	965	281	0.0
450	12623	9.8	580	14256	2.9	710	4342	0.0	840	452	0.0	970	627	0.0
455	9257	8.1	585	14467	2.2	715	3886	0.0	845	527	0.0	975	532	0.0
460	8011	7.7	590	14814	1.6	720	3470	0.0	850	515	0.0	980	902	0.0
465	6473	6.8	595	15120	1.2	725	3080	0.0	855	517	0.0	985	1126	0.0
470	5561	6.4	600	15449	0.9	730	2713	0.0	860	406	0.0	990	578	0.0
475	5845	7.3	605	15859	0.6	735	2357	0.0	865	434	0.0	995	699	0.0
480	6344	8.6	610	16059	0.4	740	2032	0.0	870	578	0.0	1000	687	0.0
485	7040	10.2	615	16120	0.3	745	1812	0.0	875	517	0.0			

REPORT NUMBER: SP1-2101-124-4

Melanopic Flux vs. Wavelength



Melanopic Lumens: 670.2 **M/P: 0.69**

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	405	0.0	490	7814	6.5	620	16090	0.0	750	1625	0.0	880	367	0.0
365	335	0.0	495	8606	7.1	625	16048	0.0	755	1453	0.0	885	533	0.0
370	363	0.0	500	9360	7.5	630	15632	0.0	760	1318	0.0	890	535	0.0
375	388	0.0	505	10093	7.7	635	15196	0.0	765	1153	0.0	895	583	0.0
380	378	0.0	510	10690	7.7	640	14791	0.0	770	1033	0.0	900	438	0.0
385	344	0.0	515	11247	7.3	645	14481	0.0	775	948	0.0	905	410	0.0
390	323	0.0	520	11881	6.9	650	13840	0.0	780	831	0.0	910	413	0.0
395	292	0.0	525	12359	6.3	655	13125	0.0	785	778	0.0	915	489	0.0
400	261	0.0	530	12780	5.5	660	12353	0.0	790	708	0.0	920	518	0.0
405	272	0.0	535	13137	4.7	665	11536	0.0	795	643	0.0	925	563	0.0
410	331	0.0	540	13369	3.9	670	10559	0.0	800	645	0.0	930	452	0.0
415	497	0.0	545	13551	3.1	675	9658	0.0	805	648	0.0	935	454	0.0
420	847	0.1	550	13731	2.5	680	8746	0.0	810	610	0.0	940	446	0.0
425	1620	0.3	555	13860	1.9	685	7852	0.0	815	505	0.0	945	516	0.0
430	3114	0.7	560	13921	1.4	690	7031	0.0	820	544	0.0	950	514	0.0
435	5958	1.6	565	13987	1.0	695	6210	0.0	825	591	0.0	955	487	0.0
440	10649	3.6	570	14001	0.7	700	5517	0.0	830	484	0.0	960	723	0.0
445	14435	5.7	575	14097	0.5	705	4890	0.0	835	440	0.0	965	281	0.0
450	12623	5.8	580	14256	0.3	710	4342	0.0	840	452	0.0	970	627	0.0
455	9257	4.9	585	14467	0.2	715	3886	0.0	845	527	0.0	975	532	0.0
460	8011	4.7	590	14814	0.1	720	3470	0.0	850	515	0.0	980	902	0.0
465	6473	4.2	595	15120	0.1	725	3080	0.0	855	517	0.0	985	1126	0.0
470	5561	4.0	600	15449	0.1	730	2713	0.0	860	406	0.0	990	578	0.0
475	5845	4.5	605	15859	0.0	735	2357	0.0	865	434	0.0	995	699	0.0
480	6344	5.1	610	16059	0.0	740	2032	0.0	870	578	0.0	1000	687	0.0
485	7040	5.8	615	16120	0.0	745	1812	0.0	875	517	0.0			

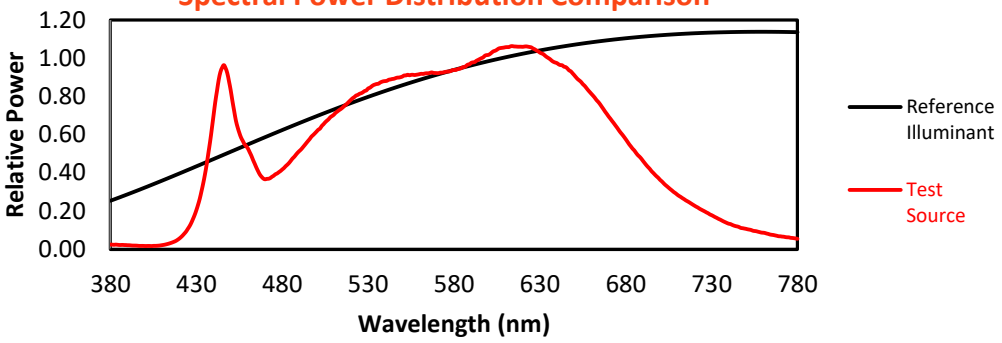
REPORT NUMBER: SP1-2101-124-4

TM-30-18

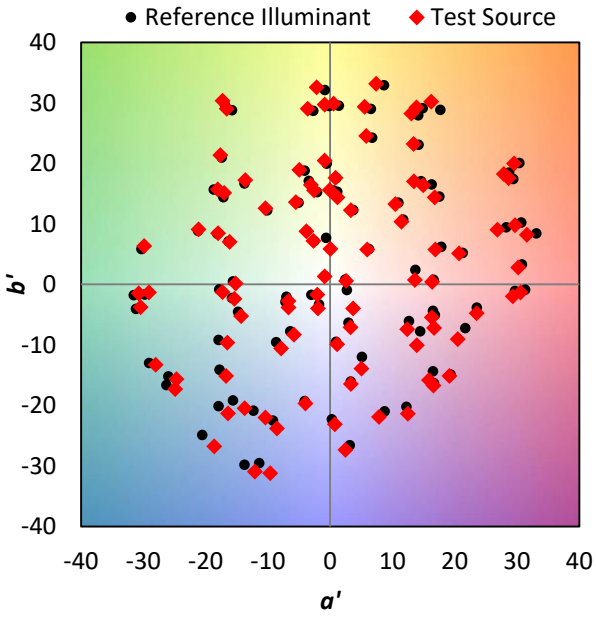
Summary

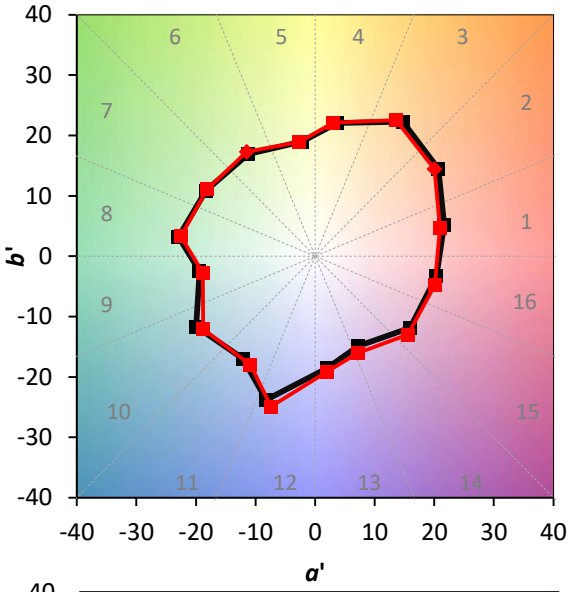
R_f = 93.1
R_g = 100.2
CIE R_a = 93.3
R_9 = 69.2

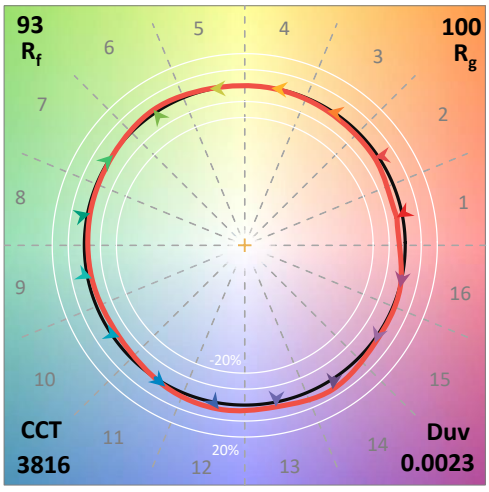
Spectral Power Distribution Comparison

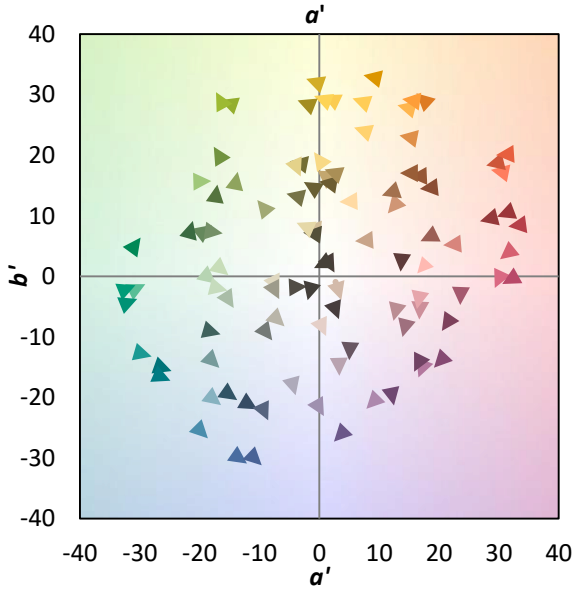


Color Vector Graphics







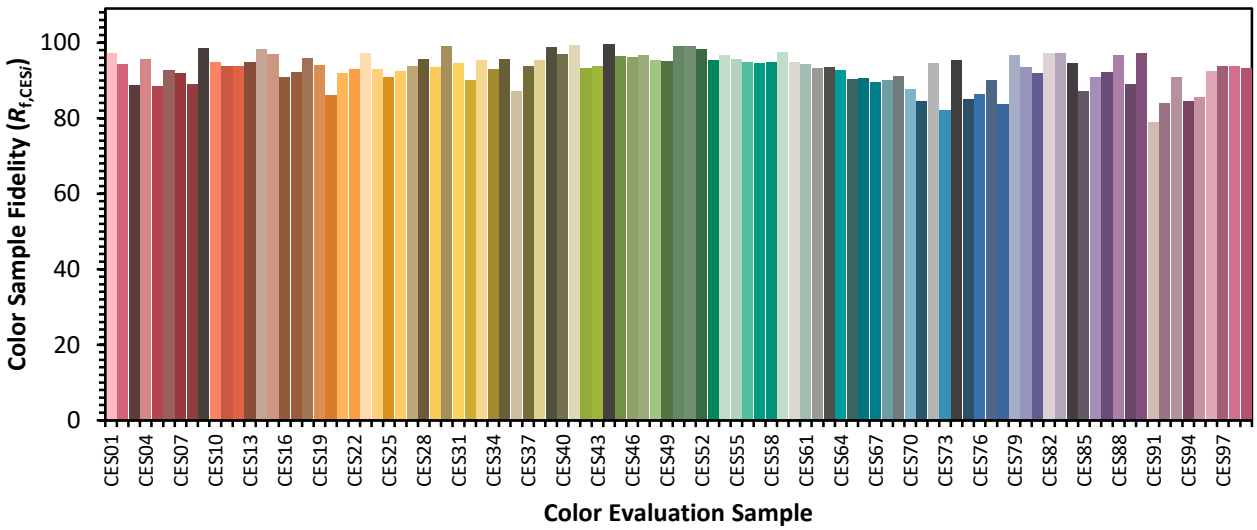


REPORT NUMBER: SP1-2101-124-4

TM-30-18

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

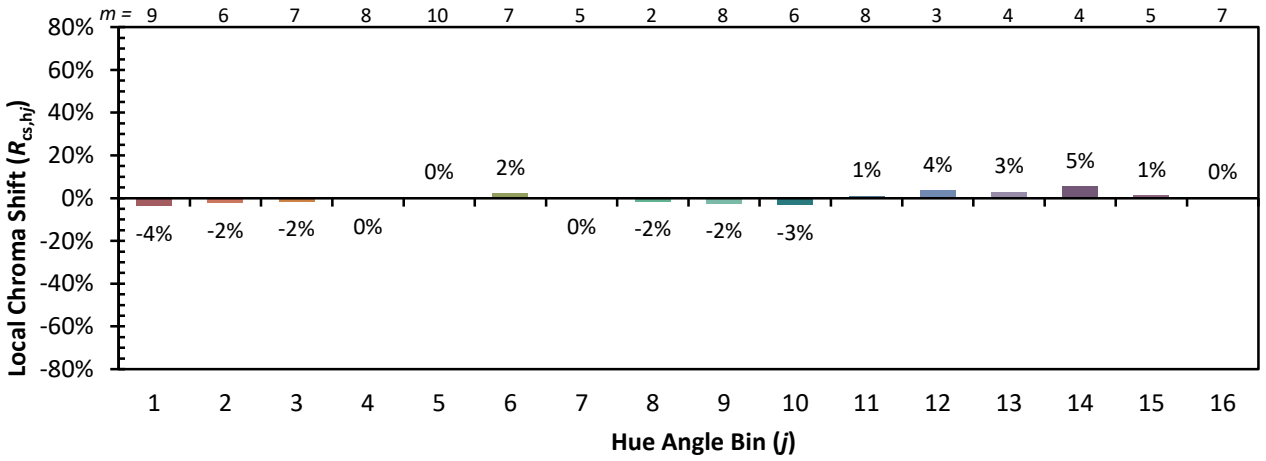
CES01 = 86	CES26 = 93	CES51 = 99	CES76 = 86
CES02 = 62	CES27 = 94	CES52 = 98	CES77 = 90
CES03 = 31	CES28 = 96	CES53 = 95	CES78 = 84
CES04 = 69	CES29 = 94	CES54 = 97	CES79 = 97
CES05 = 49	CES30 = 99	CES55 = 96	CES80 = 94
CES06 = 51	CES31 = 95	CES56 = 95	CES81 = 92
CES07 = 42	CES32 = 90	CES57 = 94	CES82 = 97
CES08 = 41	CES33 = 96	CES58 = 95	CES83 = 97
CES09 = 29	CES34 = 93	CES59 = 97	CES84 = 95
CES10 = 74	CES35 = 96	CES60 = 95	CES85 = 87
CES11 = 57	CES36 = 87	CES61 = 94	CES86 = 91
CES12 = 63	CES37 = 94	CES62 = 93	CES87 = 92
CES13 = 43	CES38 = 95	CES63 = 94	CES88 = 97
CES14 = 74	CES39 = 99	CES64 = 93	CES89 = 89
CES15 = 71	CES40 = 97	CES65 = 90	CES90 = 97
CES16 = 47	CES41 = 99	CES66 = 91	CES91 = 79
CES17 = 49	CES42 = 93	CES67 = 90	CES92 = 84
CES18 = 56	CES43 = 94	CES68 = 90	CES93 = 91
CES19 = 71	CES44 = 100	CES69 = 91	CES94 = 85
CES20 = 66	CES45 = 96	CES70 = 88	CES95 = 86
CES21 = 85	CES46 = 96	CES71 = 85	CES96 = 93
CES22 = 78	CES47 = 97	CES72 = 95	CES97 = 94
CES23 = 91	CES48 = 96	CES73 = 82	CES98 = 94
CES24 = 90	CES49 = 95	CES74 = 95	CES99 = 93
CES25 = 71	CES50 = 99	CES75 = 85	

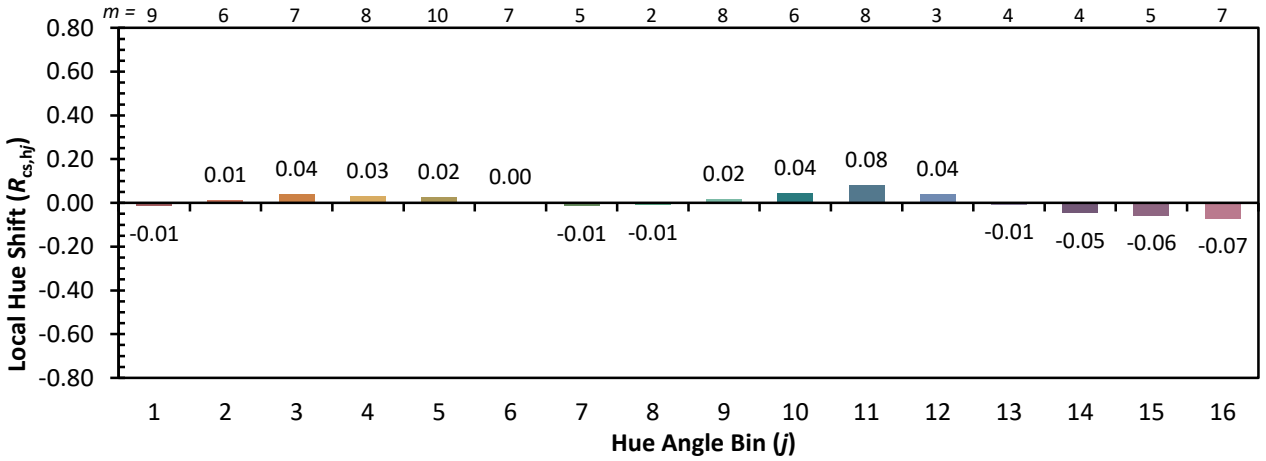


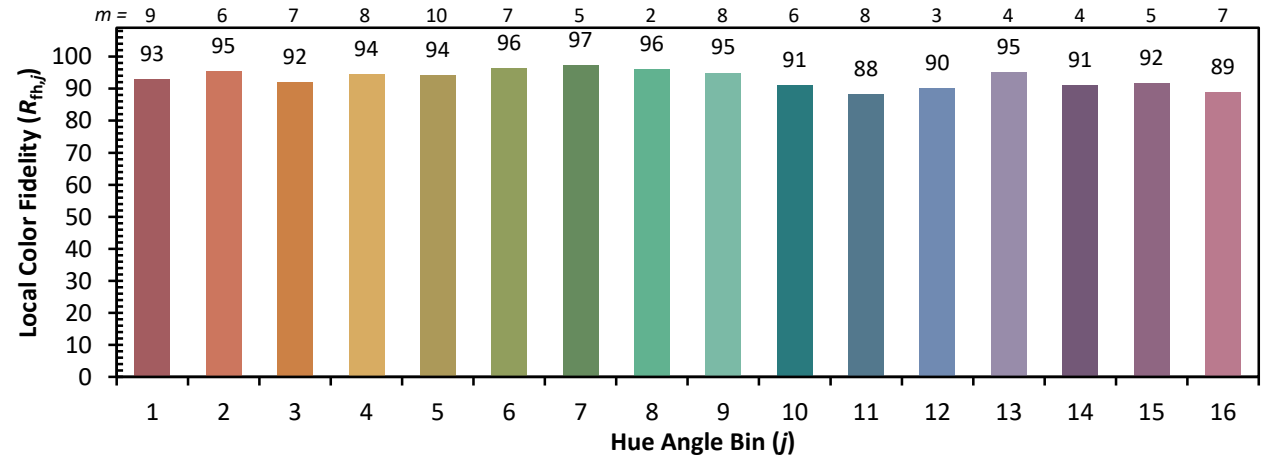
REPORT NUMBER: SP1-2101-124-4

TM-30-18

Color Rendition by Hue-Angle Bin



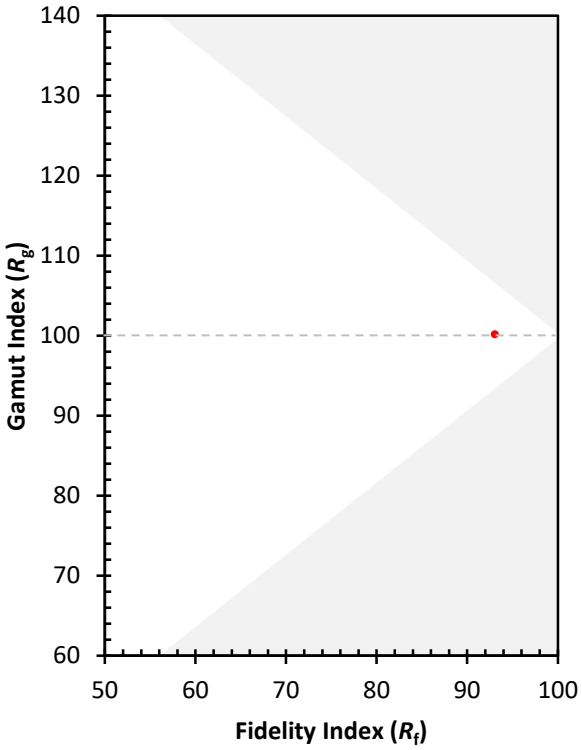


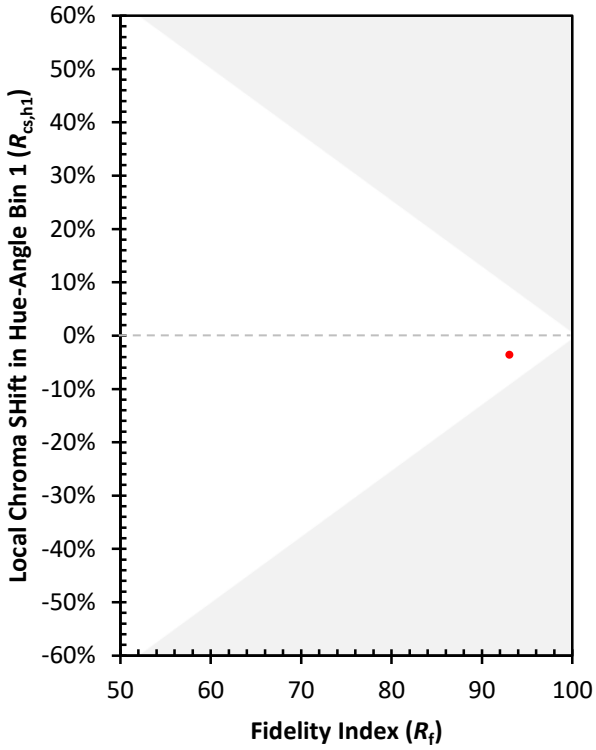


REPORT NUMBER: SP1-2101-124-4

TM-30-18

Measure Comparisons





(END OF REPORT)