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: P895886

Luminaire Tested: **GRZ-15L-940-ASYMx40-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:	P895886
Test Lab:	EVERFINE
Issue Date:	11/20/2024
Manufacturer:	COOPER LIGHTING SOLUTIONS (FORMERLY EATON)
Product Line:	io LED
Catalog Number:	GRZ-15L-940-ASYMx40-X-UNV-STD-1F
Description:	iO LED 90CRI 4000K GRAZER 1500 lumens per ft WITH Asymmetric x 40 deg OPTIC
Light Source:	4000K CCT, 90 CRI LEDS
Ballast/Driver:	ELECTRONIC DRIVER

Summary

Lumens per Lamp:	N/A
Luminaire Lumens:	1186.9 lumens
Efficiency:	N/A
Efficacy:	79.7 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):	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

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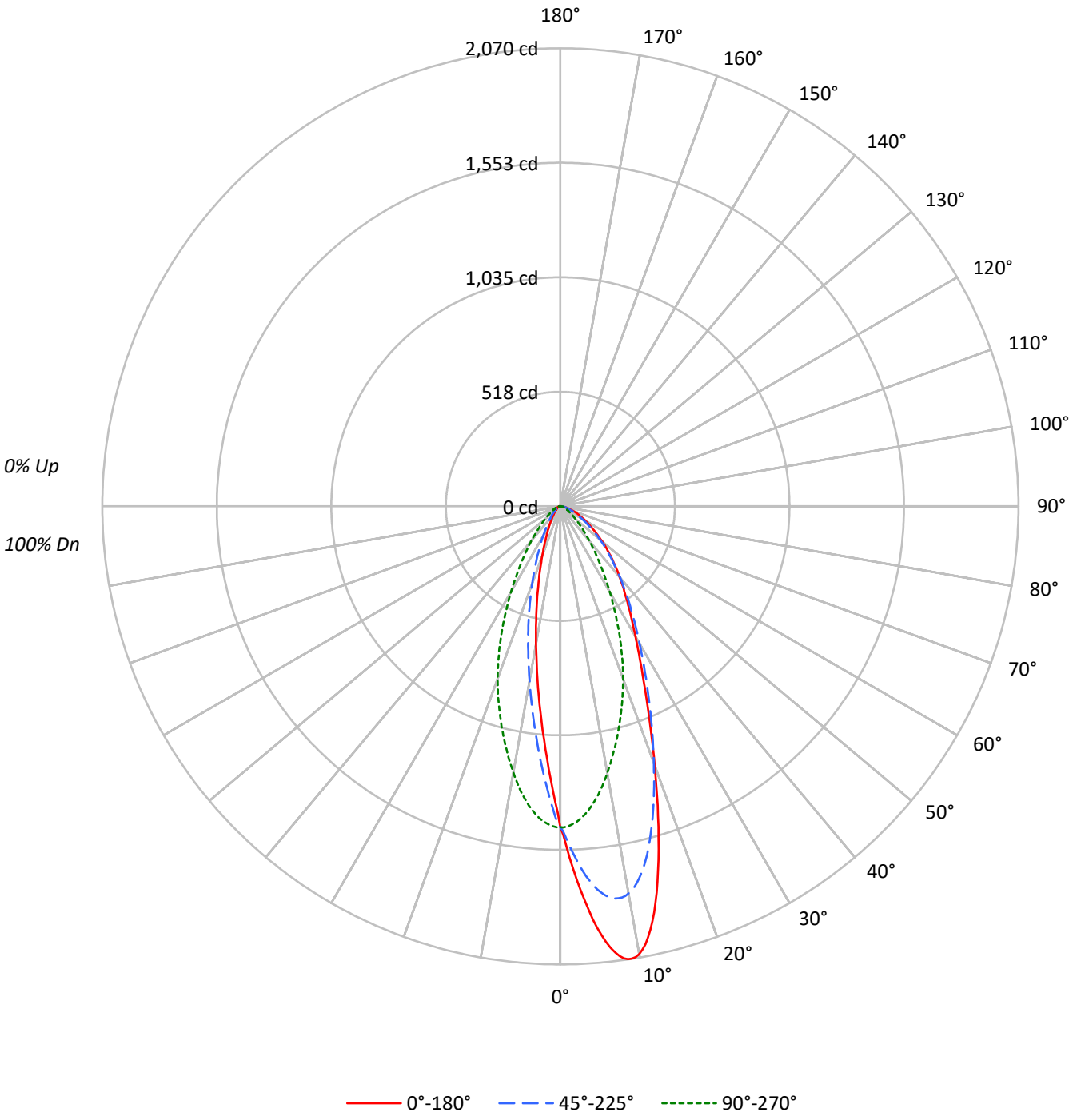
Luminous Intensity Polar Plot



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

AVERAGE LUMINANCE (cd/sqm):

	0°	90°	180°
0°	93614	93614	93614
5°	123853	89843	63346
10°	134674	80201	41438
15°	114090	68693	26512
20°	85577	56951	16560
25°	64264	44707	10680
30°	50589	33380	7255
35°	41660	24089	5210
40°	35107	17313	3962
45°	29696	12373	3333
50°	24742	9021	2702
55°	20309	6845	2375
60°	16879	5501	2195
65°	14163	4721	2124
70°	11686	4286	2133
75°	9231	4141	2245
80°	7660	4313	2491
85°	7705	4742	3038

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ZONAL LUMENS:

Zone	Lumens	% Fixture
0°-10°	131.2	11.1
10°-20°	289.9	24.4
20°-30°	270.7	22.8
30°-40°	200.6	16.9
40°-50°	136.3	11.5
50°-60°	83.2	7.0
60°-70°	45.4	3.8
70°-80°	22.2	1.9
80°-90°	7.4	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°	691.8	58.3
0°-40°	892.4	75.2
0°-60°	1111.9	93.7
0°-90°	1186.9	100.0
90°-120°	0.0	0.0
90°-150°	0.0	0.0
90°-180°	0.0	0.0
0°-180°	1186.9	100.0

CANDELA DISTRIBUTION:

	0°	45°	90°	135°	180°	Flux
0°	1450	1450	1450	1450	1450	
5°	1911	1719	1386	1114	977	188
15°	1707	1562	1028	559	397	466
25°	902	941	628	244	150	419
35°	528	549	306	104	66	333
45°	325	317	136	51	36	251
55°	180	166	61	29	21	163
65°	93	75	31	18	14	93
75°	37	31	17	11	9	40
85°	10	9	6	5	4	11
90°	1	0	0	0	0	

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CANDELA DISTRIBUTION (FULL):

	0°	30°	60°	90°	120°	150°	180°
0°	1449.8	1449.8	1449.8	1449.8	1449.8	1449.8	1449.8
0.5°	1485.8	1467.9	1468.6	1451.7	1434.7	1433.8	1384.0
1°	1536.4	1510.0	1492.0	1449.0	1406.4	1390.1	1334.1
1.5°	1587.0	1552.7	1512.6	1445.3	1378.8	1346.1	1283.8
2°	1637.5	1594.6	1533.2	1439.8	1350.4	1301.8	1235.9
2.5°	1687.1	1634.9	1552.6	1434.1	1321.4	1259.2	1189.8
3°	1735.0	1675.0	1570.6	1426.7	1292.3	1216.0	1144.2
3.5°	1782.7	1712.7	1586.5	1418.5	1263.0	1173.5	1099.6
4°	1827.8	1748.8	1601.6	1409.1	1233.1	1132.9	1057.6
4.5°	1871.3	1782.6	1614.6	1397.9	1203.2	1092.8	1017.1
5°	1910.8	1813.7	1625.0	1386.1	1173.6	1054.6	977.3
5.5°	1947.2	1842.5	1634.0	1373.5	1143.5	1017.6	938.7
6°	1979.9	1867.9	1640.4	1359.9	1113.6	980.2	900.5
6.5°	2008.4	1889.8	1645.5	1345.0	1084.3	944.5	862.3
7°	2031.7	1907.8	1648.4	1329.2	1055.5	910.0	826.0
7.5°	2050.2	1921.5	1649.3	1313.7	1026.8	876.0	789.8
8°	2062.6	1931.5	1647.9	1296.6	998.2	842.0	755.7
8.5°	2069.2	1938.0	1644.0	1279.2	970.5	809.4	723.1
9°	2069.7	1939.7	1638.7	1260.8	943.5	776.4	691.1
9.5°	2064.7	1937.3	1631.5	1241.9	916.3	745.0	661.2
10°	2054.0	1929.9	1622.2	1223.2	889.1	714.2	632.0
10.5°	2037.1	1919.7	1611.2	1203.7	863.3	685.2	603.9
11°	2015.6	1905.5	1598.6	1184.0	837.8	657.1	577.9
11.5°	1987.7	1886.7	1584.5	1165.0	813.2	630.4	551.1
12°	1957.5	1864.0	1569.5	1145.5	788.8	604.0	526.3
12.5°	1922.0	1838.7	1552.4	1125.7	765.0	578.7	503.0
13°	1883.6	1809.8	1534.8	1106.4	740.6	554.3	480.7
13.5°	1842.1	1779.0	1515.3	1086.7	717.9	531.0	459.7
14°	1798.3	1745.4	1496.0	1066.8	695.2	508.4	438.6
14.5°	1752.7	1709.7	1474.3	1047.3	672.9	486.7	417.6
15°	1706.7	1671.7	1451.9	1027.6	650.6	466.6	396.6
15.5°	1659.3	1632.8	1429.6	1007.5	629.5	446.5	375.7
16°	1611.8	1592.8	1406.0	987.2	608.2	426.4	357.6
16.5°	1563.4	1551.6	1382.1	968.0	586.9	406.3	340.7
17°	1515.0	1511.0	1357.0	948.4	566.9	386.4	324.7
17.5°	1468.0	1469.8	1332.3	928.8	547.0	368.8	308.6
18°	1422.1	1428.4	1306.9	909.2	527.5	352.3	293.9
18.5°	1376.3	1388.1	1280.9	889.2	508.5	336.5	279.4
19°	1331.2	1347.7	1254.8	869.2	490.2	320.8	265.9
19.5°	1288.1	1307.0	1228.6	849.2	472.0	306.0	253.0
20°	1245.4	1268.3	1202.3	828.8	454.4	292.0	241.0
20.5°	1205.7	1229.8	1176.2	808.6	437.6	278.8	229.3
21°	1166.4	1193.0	1149.2	788.1	420.6	266.0	218.5
21.5°	1128.1	1157.2	1123.7	768.2	404.6	253.6	208.2
22°	1092.3	1121.9	1097.3	748.2	388.5	242.0	198.4

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CANDELA DISTRIBUTION (continued):

	0°	30°	60°	90°	120°	150°	180°
22.5°	*1056.2*	1087.9	1071.0	727.6	373.2	230.9	189.2
23°	*1022.2*	1055.1	1045.0	707.4	358.3	220.5	180.4
23.5°	*990.6*	1024.2	1018.7	687.5	344.0	210.4	172.1
24°	*959.4*	993.9	994.1	667.2	330.0	200.8	164.3
24.5°	*930.3*	964.3	969.0	647.5	316.4	191.8	156.9
25°	*902.0*	936.4	944.9	627.5	303.7	183.4	149.9
25.5°	*875.5*	909.5	920.5	607.7	291.0	175.2	143.2
26°	*849.2*	884.1	897.0	588.2	279.1	167.5	136.9
26.5°	*824.6*	858.7	873.6	569.5	267.5	160.0	130.9
27°	*801.2*	834.3	851.1	550.7	256.1	153.2	125.4
27.5°	*778.3*	812.1	828.5	532.2	245.3	146.6	120.0
28°	*756.8*	789.9	806.9	514.3	235.0	140.3	114.9
28.5°	*735.5*	768.6	785.2	496.6	225.1	134.2	110.1
29°	*716.3*	748.3	764.1	479.9	215.5	128.8	105.6
29.5°	*697.2*	728.1	743.7	463.8	206.7	123.4	101.3
30°	*678.5*	709.3	723.7	447.7	198.3	118.3	97.3
30.5°	*661.3*	691.0	704.4	431.6	189.9	113.6	93.4
31°	*644.3*	673.4	685.2	415.5	181.6	109.0	89.6
31.5°	*628.1*	655.9	666.5	399.4	173.2	104.6	86.2
32°	*612.4*	639.2	648.4	383.4	166.2	100.4	82.8
32.5°	*597.1*	623.4	630.5	369.3	159.2	96.5	79.7
33°	*582.4*	608.0	613.3	355.8	152.7	92.8	76.6
33.5°	*568.2*	592.7	595.8	342.8	146.4	89.2	73.8
34°	*554.6*	578.2	579.4	329.8	140.2	85.9	71.1
34.5°	*541.1*	564.3	562.7	317.5	134.6	82.7	68.5
35°	*528.5*	550.5	547.1	305.6	129.1	79.6	66.1
35.5°	*515.9*	537.2	531.2	294.1	123.9	76.7	63.7
36°	*503.7*	524.0	516.3	282.9	119.0	73.9	61.4
36.5°	*491.8*	511.5	501.6	272.0	114.2	71.3	59.3
37°	*480.2*	499.6	487.0	261.5	109.7	68.8	57.3
37.5°	*469.3*	487.5	472.9	251.5	105.4	66.5	55.3
38°	*458.6*	476.0	459.2	241.9	101.3	64.2	53.5
38.5°	*447.6*	464.3	446.0	232.1	97.4	62.0	51.7
39°	*437.0*	453.5	432.8	222.7	93.7	60.0	50.1
39.5°	*426.7*	442.5	419.7	213.9	90.1	58.0	48.5
40°	*416.5*	431.4	407.6	205.4	86.5	56.1	47.0
40.5°	*406.7*	420.4	395.6	197.1	83.4	54.3	45.5
41°	*397.1*	409.3	384.0	189.1	80.4	52.6	44.1
41.5°	*387.8*	398.3	372.7	181.6	77.5	51.0	42.8
42°	*378.0*	388.1	361.6	174.0	74.7	49.4	41.6
42.5°	*369.1*	378.2	350.8	167.0	72.0	47.9	40.4
43°	*359.9*	368.7	340.2	160.2	69.4	46.4	39.2
43.5°	*351.1*	359.2	330.1	153.6	67.0	45.1	38.2
44°	*342.3*	350.4	320.5	147.4	64.7	44.1	37.2
44.5°	*333.6*	343.6	310.8	141.3	62.9	43.0	36.7

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CANDELA DISTRIBUTION (continued):

	0°	30°	60°	90°	120°	150°	180°
45°	*325.2*	331.9	301.5	135.5	60.5	41.4	36.5
45.5°	*316.7*	323.0	292.0	129.9	58.4	40.2	35.4
46°	*308.5*	314.2	282.9	124.7	56.3	39.1	35.1
46.5°	*300.3*	305.7	274.0	119.6	54.5	38.0	34.3
47°	*292.3*	297.2	265.5	114.7	52.7	37.0	32.8
47.5°	*284.3*	289.1	257.1	110.1	51.1	36.0	31.8
48°	*276.3*	280.6	249.0	105.7	49.5	35.1	31.1
48.5°	*268.8*	272.7	241.2	101.5	47.9	34.2	30.4
49°	*261.1*	264.7	233.1	97.3	46.5	33.3	28.6
49.5°	*253.8*	257.0	225.6	93.5	45.0	32.4	27.6
50°	*246.3*	249.4	218.1	89.8	43.7	31.6	26.9
50.5°	*239.2*	241.8	211.0	86.2	42.4	30.9	26.2
51°	*232.0*	234.4	203.9	82.9	41.2	30.1	25.5
51.5°	*225.2*	227.1	196.8	79.5	40.0	29.4	24.9
52°	*218.4*	220.1	189.7	76.5	38.9	28.7	24.3
52.5°	*211.9*	212.9	182.5	73.5	37.8	28.0	23.7
53°	*205.2*	206.2	176.2	70.8	36.7	27.4	23.2
53.5°	*199.0*	199.3	170.0	68.1	35.7	26.7	22.6
54°	*192.8*	192.7	163.9	65.6	34.8	26.1	22.1
54.5°	*186.6*	186.1	157.8	63.1	33.8	25.6	21.6
55°	*180.4*	179.8	151.9	60.8	32.9	25.0	21.1
55.5°	*174.7*	173.6	146.2	58.5	32.1	24.4	20.7
56°	*169.1*	167.5	140.6	56.4	31.2	23.9	20.2
56.5°	*164.0*	161.7	135.3	54.4	30.4	23.4	19.8
57°	*158.8*	155.9	130.1	52.5	29.7	22.8	19.4
57.5°	*153.8*	150.3	124.9	50.6	28.9	22.3	19.0
58°	*148.9*	144.9	119.9	48.9	28.2	21.9	18.5
58.5°	*144.1*	139.5	115.1	47.2	27.5	21.4	18.2
59°	*139.6*	134.3	110.4	45.6	26.9	20.9	17.8
59.5°	*135.1*	129.2	105.8	44.1	26.2	20.5	17.4
60°	*130.7*	124.4	101.4	42.6	25.6	20.1	17.0
60.5°	*126.4*	119.7	97.2	41.2	25.0	19.6	16.7
61°	*122.1*	115.1	93.2	39.9	24.4	19.2	16.4
61.5°	*117.9*	110.6	89.2	38.6	23.8	18.8	16.0
62°	*113.8*	106.3	85.4	37.4	23.3	18.4	15.7
62.5°	*109.9*	102.2	81.8	36.2	22.7	18.0	15.4
63°	*106.0*	98.3	78.3	35.0	22.2	17.6	15.1
63.5°	*102.4*	94.4	74.9	34.0	21.7	17.3	14.8
64°	*98.9*	90.7	71.7	32.9	21.2	16.9	14.5
64.5°	*95.7*	87.1	68.4	31.9	20.7	16.5	14.2
65°	*92.7*	83.7	65.5	30.9	20.3	16.2	13.9
65.5°	*89.8*	80.4	62.6	30.0	19.8	15.8	13.6
66°	*86.7*	77.1	59.9	29.1	19.4	15.5	13.4
66.5°	*83.7*	74.1	57.2	28.2	18.9	15.2	13.1
67°	*80.5*	71.1	54.7	27.3	18.5	14.8	12.8

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CANDELA DISTRIBUTION (continued):

	0°	30°	60°	90°	120°	150°	180°
67.5°	77.3	68.3	52.3	26.5	18.1	14.5	12.6
68°	74.1	65.5	49.9	25.7	17.7	14.2	12.3
68.5°	71.0	62.8	47.7	24.9	17.3	13.9	12.0
69°	67.9	60.3	45.5	24.1	16.9	13.6	11.8
69.5°	64.9	57.8	43.5	23.4	16.5	13.3	11.5
70°	61.9	55.4	41.5	22.7	16.2	13.0	11.3
70.5°	59.0	53.1	39.6	22.0	15.8	12.7	11.0
71°	56.2	50.9	37.8	21.4	15.4	12.4	10.8
71.5°	53.5	48.7	36.1	20.7	15.0	12.1	10.6
72°	50.8	46.6	34.4	20.1	14.7	11.8	10.3
72.5°	48.3	44.5	32.8	19.5	14.3	11.5	10.1
73°	45.8	42.6	31.3	18.9	14.0	11.3	9.9
73.5°	43.5	40.7	29.8	18.3	13.6	11.0	9.6
74°	41.2	38.9	28.4	17.7	13.3	10.7	9.4
74.5°	39.0	37.1	27.1	17.2	13.0	10.4	9.2
75°	37.0	35.3	25.8	16.6	12.6	10.2	9.0
75.5°	34.9	33.7	24.6	16.1	12.3	9.9	8.8
76°	33.0	32.1	23.4	15.6	11.9	9.6	8.5
76.5°	31.2	30.6	22.3	15.0	11.6	9.4	8.3
77°	29.4	29.1	21.2	14.5	11.3	9.1	8.1
77.5°	27.8	27.6	20.2	14.0	10.9	8.9	7.9
78°	26.2	26.2	19.2	13.5	10.6	8.6	7.6
78.5°	24.7	24.9	18.2	13.0	10.2	8.4	7.4
79°	23.3	23.6	17.3	12.5	9.9	8.1	7.2
79.5°	21.9	22.4	16.4	12.0	9.6	7.8	7.0
80°	20.6	21.2	15.6	11.6	9.2	7.6	6.7
80.5°	19.4	20.0	14.7	11.1	8.9	7.3	6.5
81°	18.3	18.9	13.9	10.6	8.5	7.0	6.3
81.5°	17.2	17.8	13.1	10.1	8.2	6.7	6.0
82°	16.1	16.7	12.3	9.6	7.8	6.5	5.8
82.5°	15.1	15.7	11.6	9.1	7.4	6.2	5.6
83°	14.1	14.6	10.8	8.6	7.0	5.9	5.3
83.5°	13.2	13.6	10.1	8.0	6.6	5.6	5.0
84°	12.2	12.6	9.3	7.5	6.2	5.3	4.8
84.5°	11.3	11.6	8.6	6.9	5.8	4.9	4.5
85°	10.4	10.6	7.8	6.4	5.3	4.6	4.1
85.5°	9.5	9.6	7.1	5.8	4.9	4.2	3.8
86°	8.5	8.6	6.3	5.2	4.4	3.9	3.5
86.5°	7.6	7.6	5.5	4.5	3.9	3.4	3.1
87°	6.6	6.5	4.6	3.8	3.3	3.0	2.7
87.5°	5.7	5.4	3.8	3.1	2.8	2.6	2.3
88°	4.6	4.2	2.9	2.4	2.2	2.1	1.8
88.5°	3.6	3.0	2.0	1.6	1.5	1.6	1.3
89°	2.5	1.9	1.2	1.1	1.0	1.0	0.8
89.5°	1.5	1.0	0.6	0.4	0.5	0.5	0.4

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

Scaled Data Report

TEST NUMBER: P895886
CATALOG NUMBER: GRZ-15L-940-ASYMx40-X-UNV-STD-1F

CANDELA DISTRIBUTION (continued):

	0°	30°	60°	90°	120°	150°	180°
90°	*0.8*	0.5	0.4	0.3	0.3	0.3	0.3

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

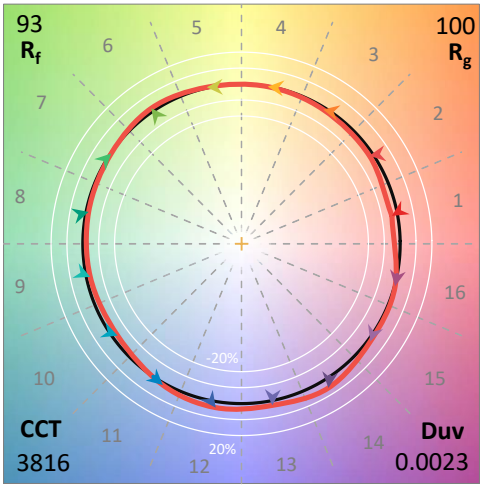
Test Information

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

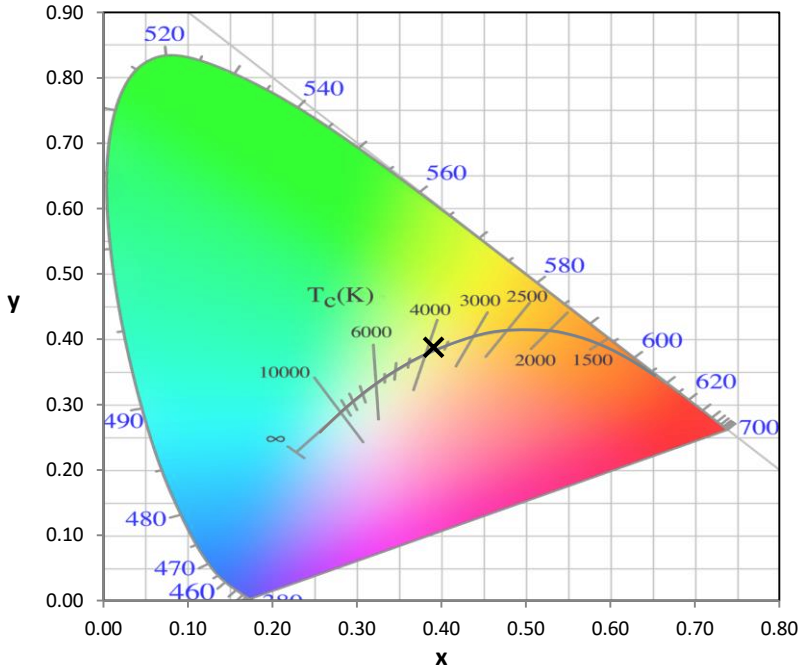
Stabilization Time:	162M
Operation Time:	12H
Room Temperature (°C) / RH%:	25.1/41%
Sphere Temperature (°C):	24.1

REPORT NUMBER: SP1-2101-124-4

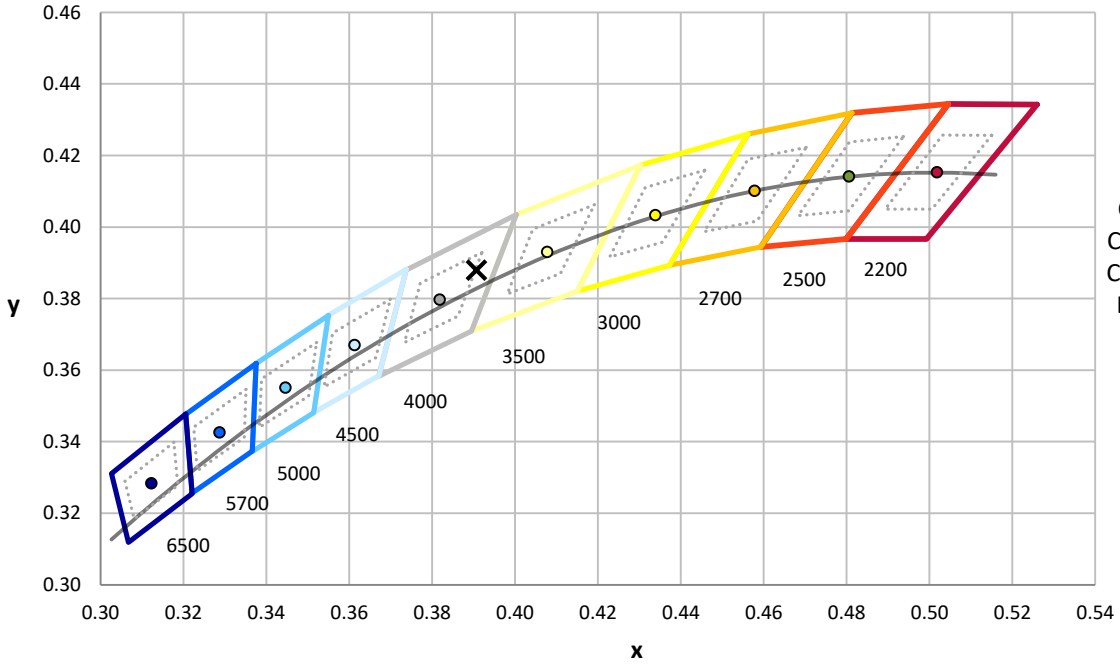
Measurement and Test Equipment			
Instrument	Identification Number	Calibration Date	Calibration Due Date
Photometer	IN0058	1/31/2021	7/31/2021
Power Meter	IN0071	12/1/2020	12/1/2021
AC Power Source	IN0063	12/1/2020	12/1/2021
DC Power Source	IN0208	12/1/2020	12/1/2021
Sphere Thermometer	IN0085	12/1/2020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

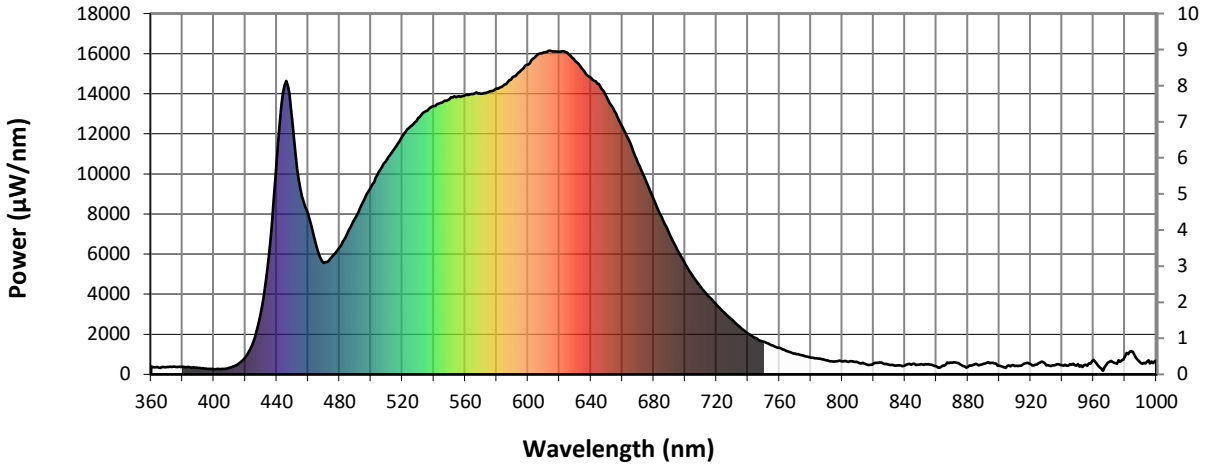


CCT = 3816K
CIE x = 0.3907
CIE y = 0.3879
Duv = 0.0023

Point lies inside the ANSI 4000K 7-step quadrangle

REPORT NUMBER: SP1-2101-124-4

Photopic Flux vs. Wavelength



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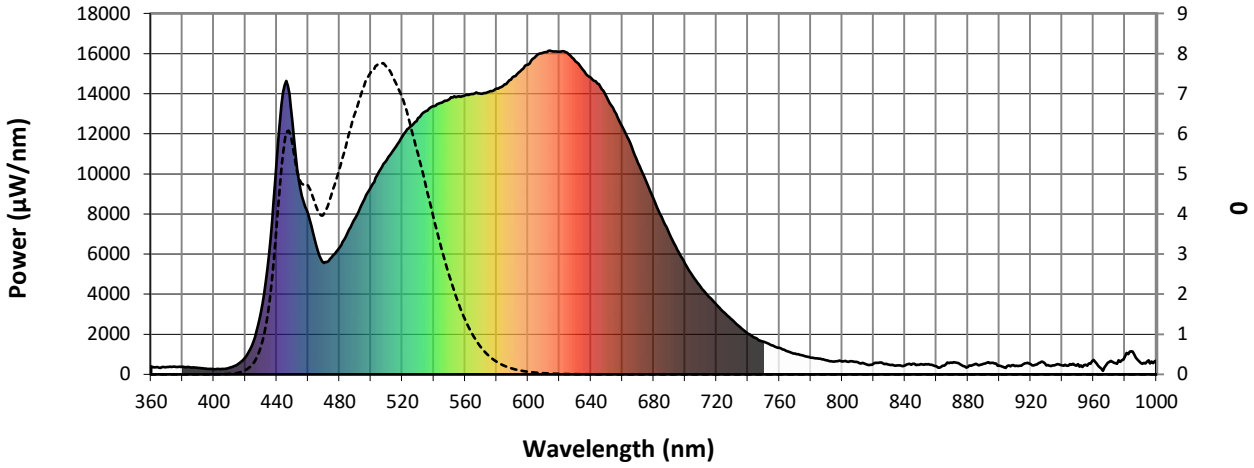
λ (nm)	Power (µW/nm)	Lumens (ϕ/nm)	λ (nm)	Power (µW/nm)	Lumens (ϕ/nm)	λ (nm)	Power (µW/nm)	Lumens (ϕ/nm)	λ (nm)	Power (µW/nm)	Lumens (ϕ/nm)	λ (nm)	Power (µW/nm)	Lumens (ϕ/nm)
360	405	0.0	490	7814	1.1	620	16090	4.2	750	1625	0.0	880	367	0.0
365	335	0.0	495	8606	1.6	625	16048	3.5	755	1453	0.0	885	533	0.0
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

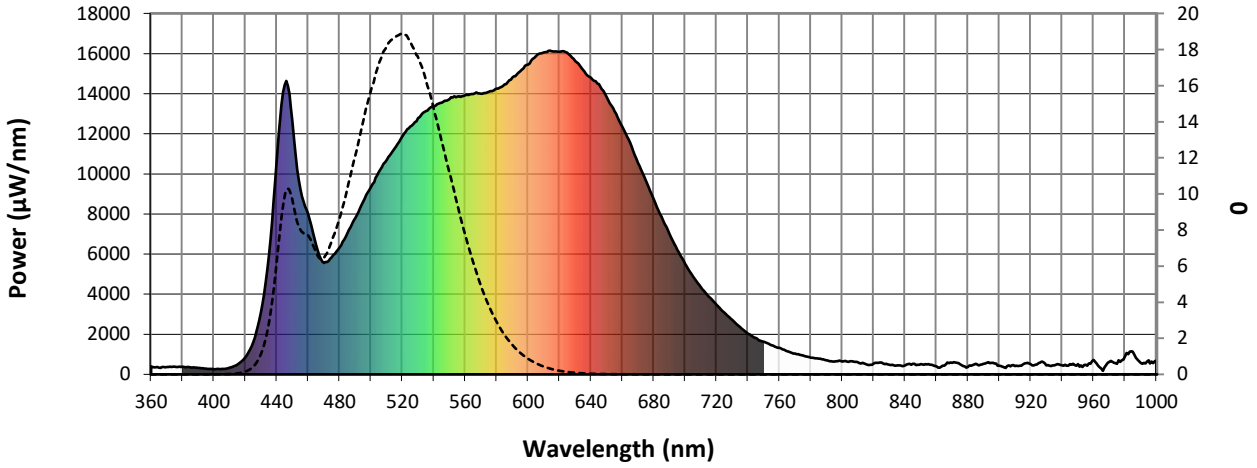


Scotopic Lumens: 1669.3 **S/P: 1.71**

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			

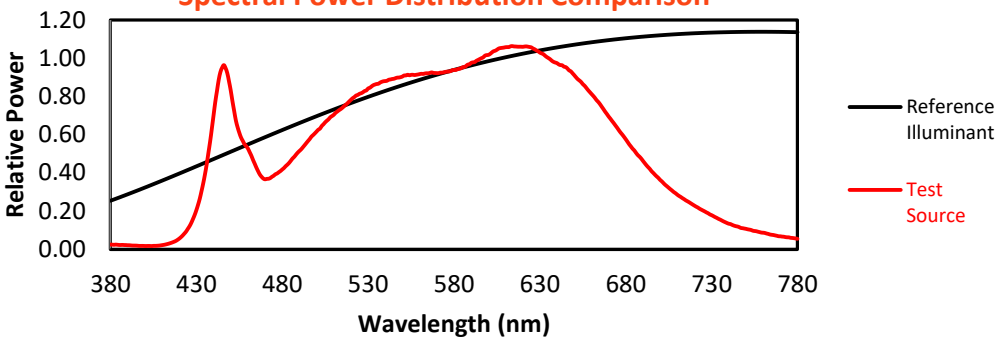
REPORT NUMBER: SP1-2101-124-4

TM-30-18

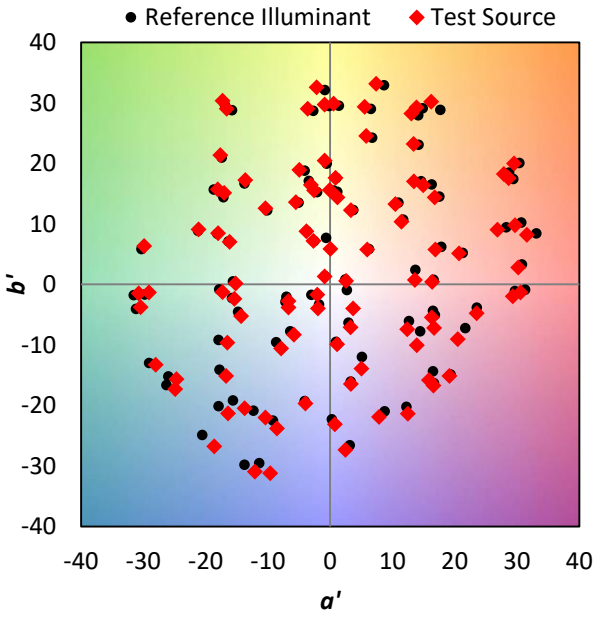
Summary

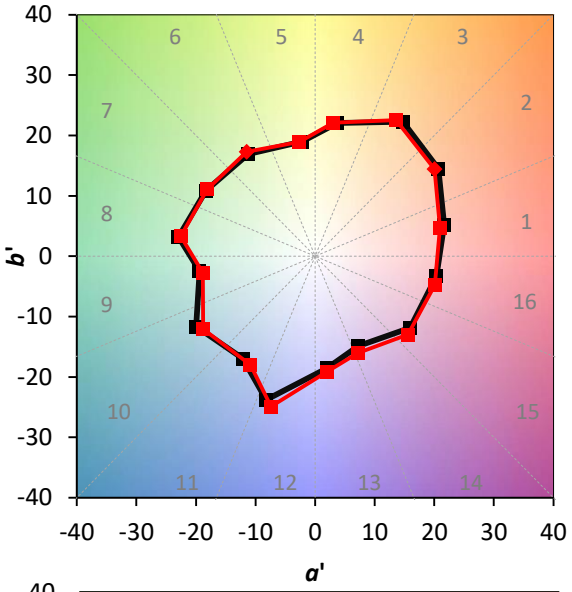
R_f = 93.1
R_g = 100.2
CIE R_a = 93.3
R_9 = 69.2

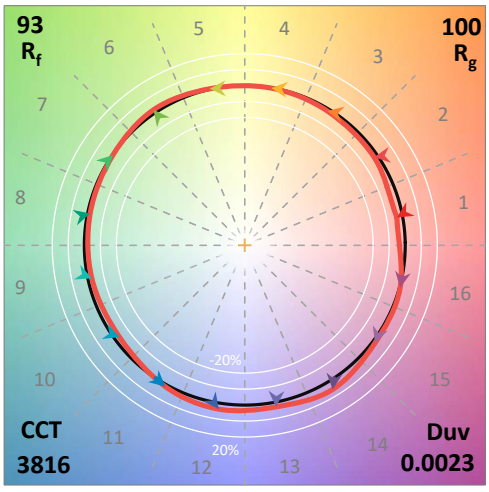
Spectral Power Distribution Comparison

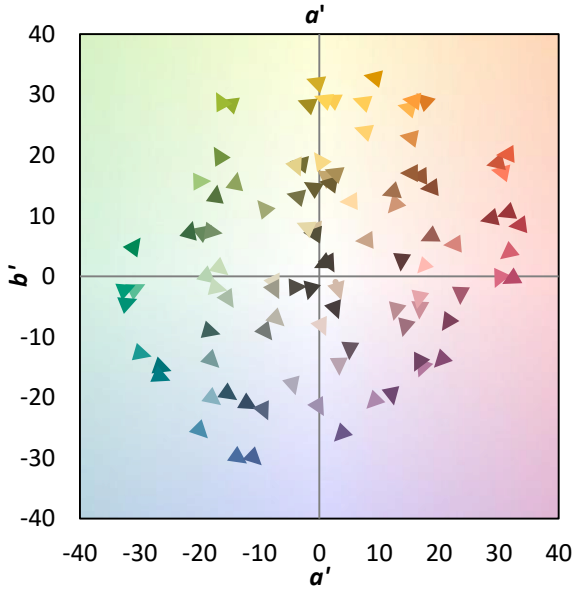


Color Vector Graphics







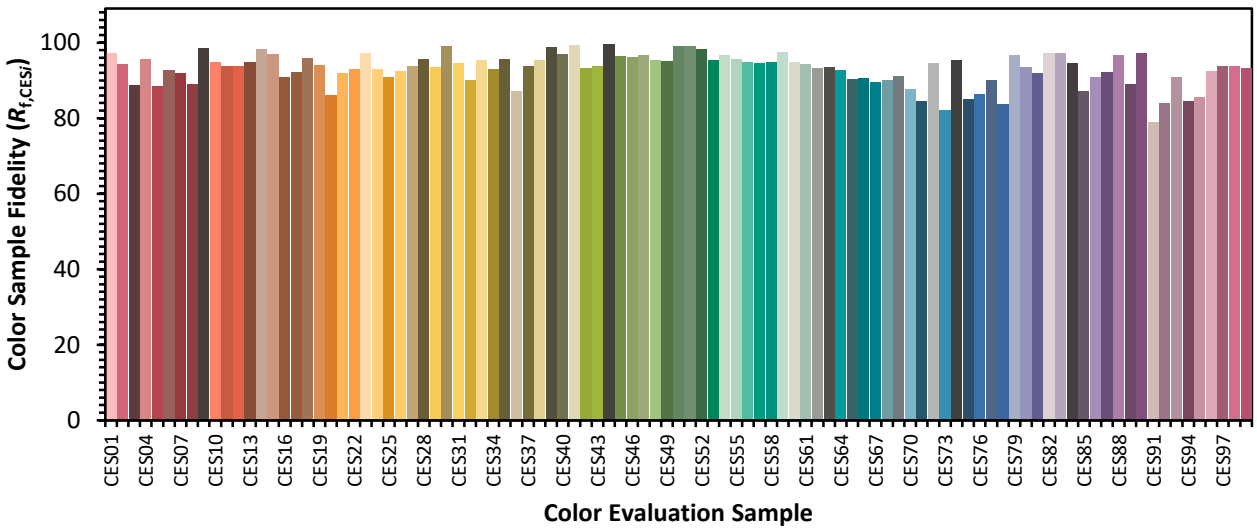


REPORT NUMBER: SP1-2101-124-4

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	



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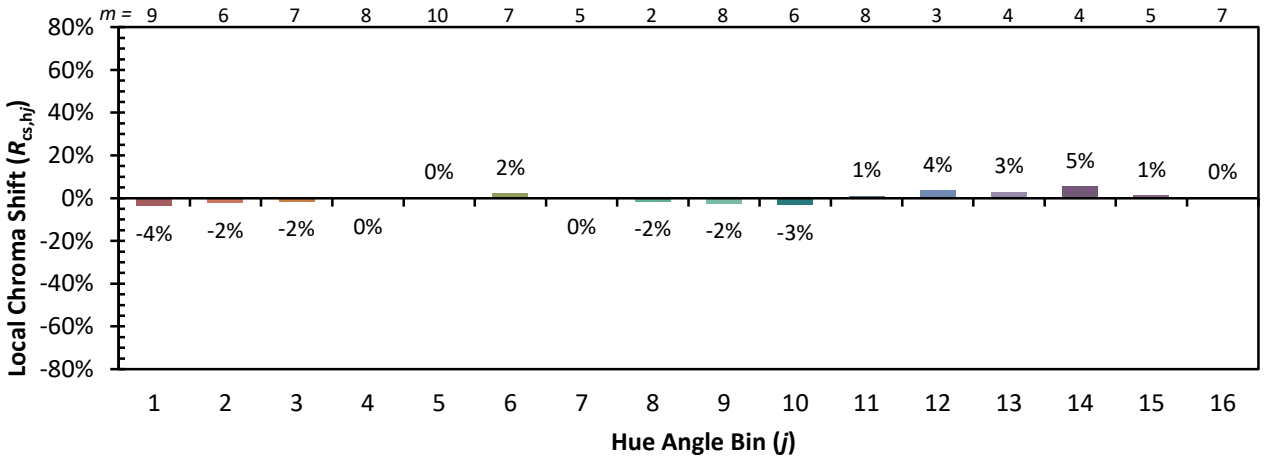
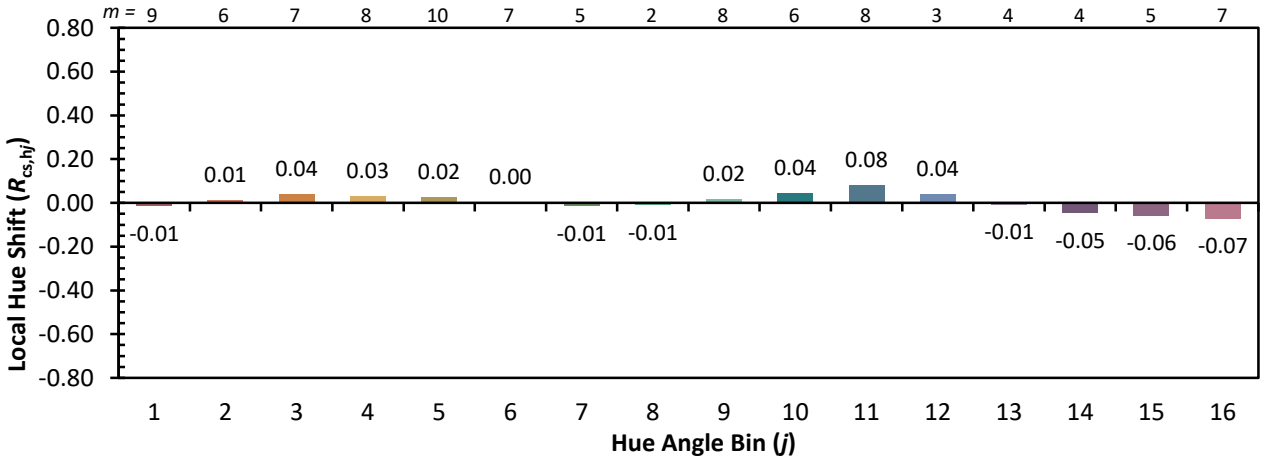
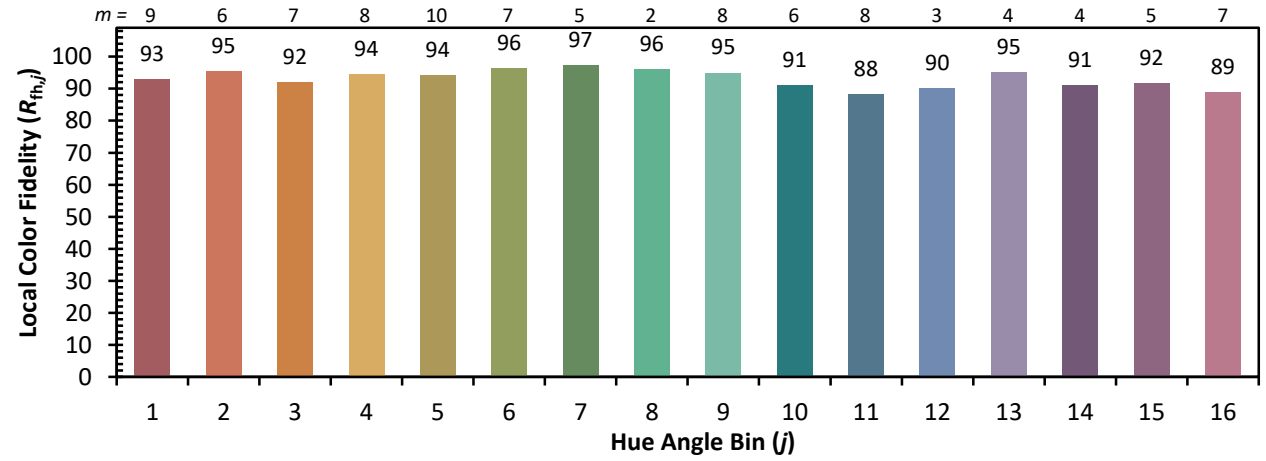
Color Rendition by Hue-Angle Bin







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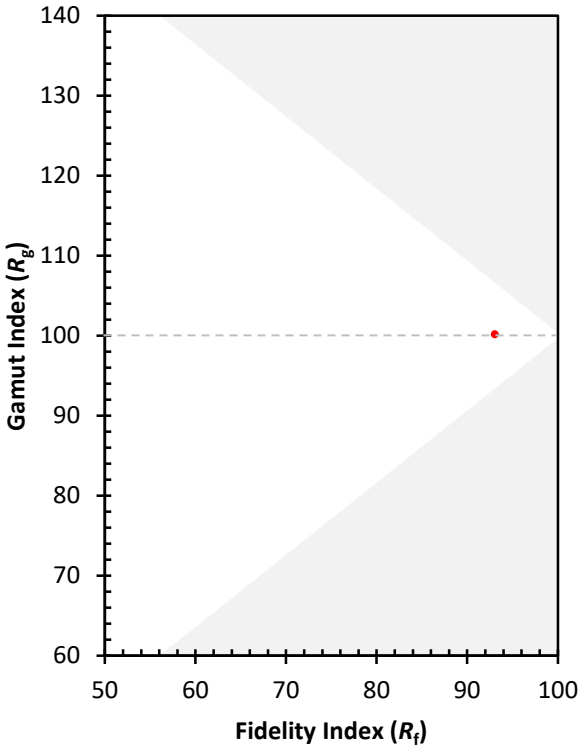
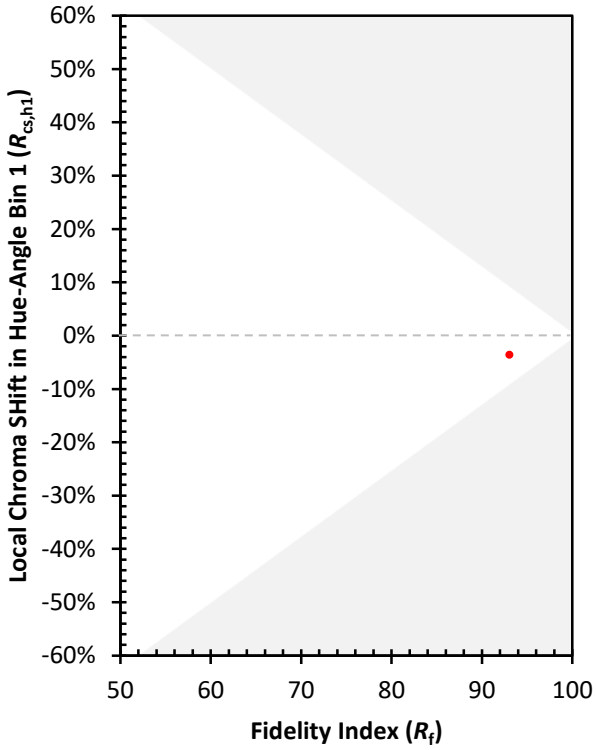
Measure Comparisons





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