

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: FAIL-SAFE

Report Number: P735596

Luminaire Tested: **4APN6-24-B2750-W2D-CP250-4000K**

Issue Date: 1/5/2024



Test Information

Test Method: LM-79-08
Report Number: P735596
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (P709119)
Test Lab: INNOVATION CENTER(G2)
Issue Date: 1/5/2024
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)
Product Line: FAIL-SAFE
Catalog Number: 4APN6-24-B2750-W2D-CP250-4000K
Description: 4FT 2400 AMBIENT LUMEN OUTPUT APN WITH BIO UP LEDS AT 4000K CCT, AND CP250 LENS

Light Source: -
Ballast/Driver: -

Summary

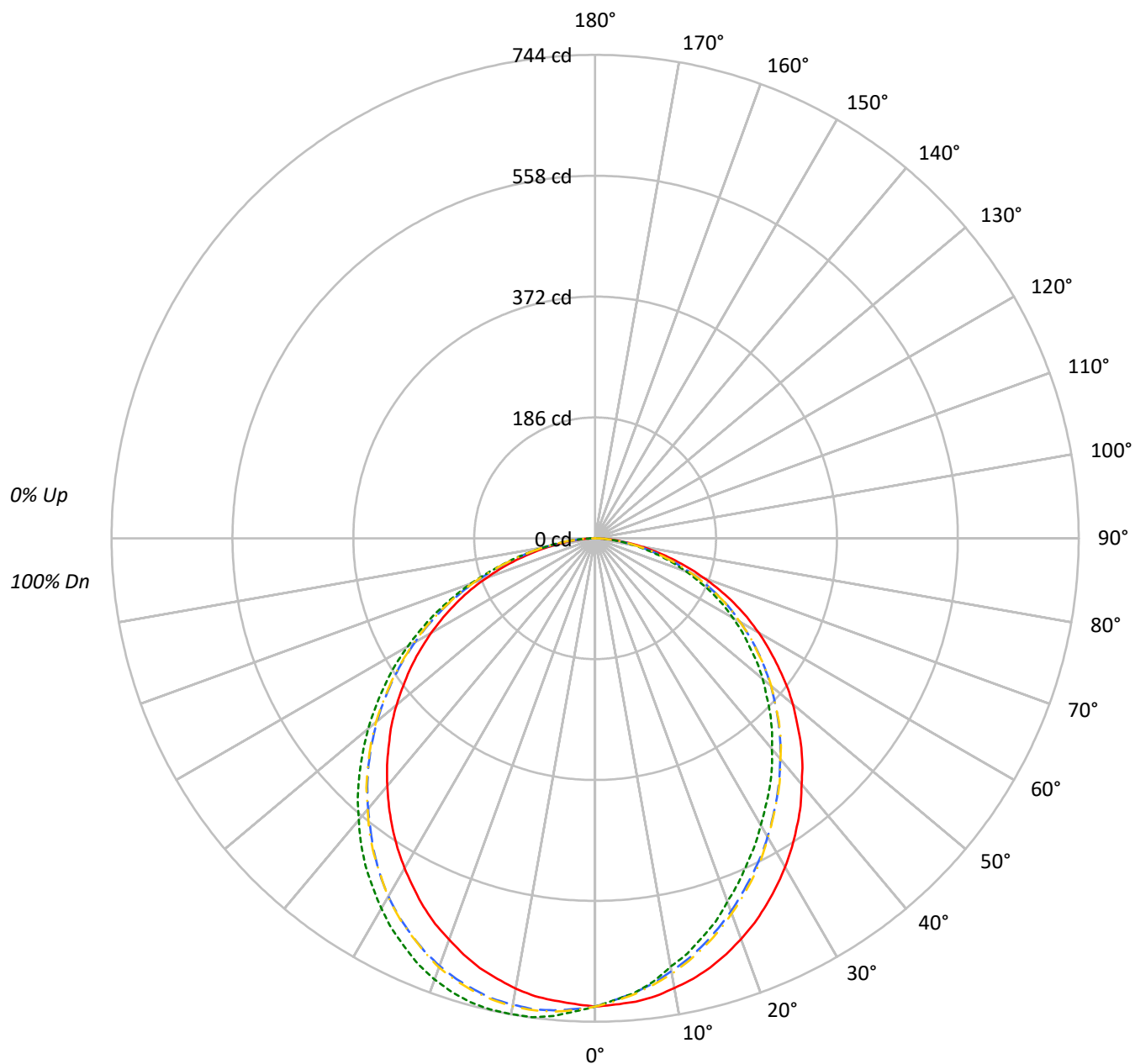
Lumens per Lamp: N/A
Luminaire Lumens: 1933.0 lumens
Efficiency: N/A
Efficacy: 81.2 lumens/watt
Spacing Criteria (0/90/45): 1.21 / 1.21 / 1.33
Luminous Opening: Rectangular (W 0.29' x L: 4' x H: 0')
CIE Type: Direct

Input Watts (W): 23.8
Input Voltage (V): NR
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: P735596

CATALOG NUMBER: 4APN6-24-B2750-W2D-CP250-4000K

Luminous Intensity Polar Plot





TEST NUMBER: P735596

CATALOG NUMBER: 4APN6-24-B2750-W2D-CP250-4000K

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	30	10	50	30	10
RCR																				
0	119	119	119	119	116	116	116	116	111	111	111	106	106	106	102	102	102	100		
1	109	104	100	96	106	102	98	95	98	94	92	94	91	89	90	88	86	84		
2	99	91	84	78	96	89	83	77	85	80	76	82	78	74	79	76	72	70		
3	90	80	72	65	88	78	71	65	75	69	64	73	67	62	70	65	61	59		
4	83	71	62	55	81	70	61	55	67	60	54	65	59	54	63	57	53	51		
5	76	63	54	48	74	62	54	48	60	53	47	58	52	47	56	51	46	44		
6	70	57	48	42	68	56	48	42	54	47	41	53	46	41	51	45	41	38		
7	65	52	43	37	64	51	43	37	49	42	37	48	41	36	47	41	36	34		
8	61	47	39	33	59	47	39	33	45	38	33	44	37	33	43	37	32	30		
9	57	43	35	30	55	43	35	30	42	35	30	41	34	29	40	34	29	27		
10	53	40	32	27	52	40	32	27	39	32	27	38	31	27	37	31	27	25		

AVERAGE LUMINANCE (cd/sqm):

	0°	90°	180°	270°
0°	6649	6649	6649	6649
5°	6630	6502	6615	6834
10°	6584	6271	6592	6966
15°	6533	6075	6542	7063
20°	6445	5844	6452	7093
25°	6341	5627	6366	7063
30°	6227	5429	6245	7009
35°	6097	5271	6125	6934
40°	5951	5096	5991	6814
45°	5840	4969	5852	6691
50°	5700	4833	5723	6541
55°	5521	4657	5561	6362
60°	5355	4513	5371	6139
65°	5143	4325	5143	5875
70°	4794	4003	4775	5476
75°	4360	3632	4303	4912
80°	3772	3119	3640	4203
85°	2943	2329	2763	3451



TEST NUMBER: P735596

CATALOG NUMBER: 4APN6-24-B2750-W2D-CP250-4000K

ZONAL LUMENS:

Zone	Lumens	% Fixture
0°-10°	68.1	3.5
10°-20°	193.3	10.0
20°-30°	287.3	14.9
30°-40°	338.7	17.5
40°-50°	344.8	17.8
50°-60°	307.2	15.9
60°-70°	231.4	12.0
70°-80°	128.7	6.7
80°-90°	33.4	1.7
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°	548.7	28.4
0°-40°	887.4	45.9
0°-60°	1539.4	79.6
0°-90°	1933.0	100.0
90°-120°	0.0	0.0
90°-150°	0.0	0.0
90°-180°	0.0	0.0
0°-180°	1933.0	100.0

CANDELA DISTRIBUTION:

	0°	90°	180°	270°	360°	Flux
0°	721	721	721	721	721	
5°	716	702	714	738	716	68
15°	684	636	685	740	684	193
25°	623	553	625	694	623	287
35°	541	468	544	616	541	339
45°	448	381	448	513	448	345
55°	343	290	346	396	343	307
65°	236	198	236	269	236	233
75°	122	102	121	138	122	130
85°	28	22	26	33	28	33
90°	0	0	0	0	0	



TEST NUMBER: P735596

CATALOG NUMBER: 4APN6-24-B2750-W2D-CP250-4000K

CANDELA DISTRIBUTION (FULL):

	0°	10°	20°	30°	40°	50°	60°	70°	80°	90°	100°
0°	720.7	720.7	720.7	720.7	720.7	720.7	720.7	720.7	720.7	720.7	720.7
2.5°	718.3	718.3	719.1	715.9	711.8	710.1	709.4	708.5	710.1	710.9	710.1
5°	715.9	714.2	712.6	708.5	703.6	700.3	698.7	697.9	699.6	702.0	699.6
7.5°	710.9	707.7	704.4	698.7	693.1	688.1	685.7	684.0	685.7	688.1	686.5
10°	702.8	698.7	693.8	687.3	679.2	673.5	671.0	668.6	669.4	669.4	669.4
12.5°	694.6	689.0	683.3	675.1	666.1	659.6	655.5	652.3	653.8	654.7	654.7
15°	684.0	676.8	668.6	659.6	650.6	643.3	638.4	635.1	636.0	636.0	636.8
17.5°	671.0	662.9	654.7	644.1	633.5	625.3	619.7	615.6	617.2	618.0	618.8
20°	656.4	647.3	638.4	627.0	615.6	606.6	600.9	596.0	595.2	595.2	596.0
22.5°	640.8	631.0	620.5	608.2	596.0	586.2	580.5	575.6	574.8	574.8	575.6
25°	622.9	612.3	601.7	589.5	576.4	566.7	559.3	554.5	553.6	552.8	554.5
27.5°	604.2	593.6	583.0	570.8	556.9	547.1	539.7	534.8	533.2	532.4	534.1
30°	584.5	572.3	561.0	547.9	535.6	525.9	518.5	512.8	511.3	509.6	511.3
32.5°	563.4	551.2	538.9	525.9	513.7	503.9	496.5	490.9	489.2	488.3	490.0
35°	541.3	529.1	517.8	504.7	492.4	482.7	475.3	470.5	468.8	468.0	468.8
37.5°	519.3	507.2	495.7	482.7	470.5	460.7	453.3	448.5	447.6	446.8	447.6
40°	494.1	483.5	472.0	459.8	447.6	437.9	432.1	426.4	424.8	423.1	425.6
42.5°	472.0	461.5	450.1	438.6	426.4	416.6	410.1	405.3	403.6	402.7	403.6
45°	447.6	436.2	424.8	414.2	402.7	393.8	387.3	382.4	381.6	380.8	381.6
47.5°	421.6	411.8	402.0	391.4	379.9	371.0	365.3	360.4	358.8	357.1	358.8
50°	397.1	387.3	377.5	367.7	357.1	349.0	343.2	338.4	337.5	336.7	337.5
52.5°	371.0	361.2	352.3	342.5	333.4	325.3	319.6	315.6	314.7	313.9	314.7
55°	343.2	335.1	326.9	318.8	309.8	302.5	297.6	292.7	291.1	289.5	291.1
57.5°	317.1	309.8	301.7	293.5	285.4	278.9	273.9	269.8	269.1	268.2	269.1
60°	290.2	283.7	276.4	269.1	260.9	254.4	250.3	247.0	245.4	244.6	245.4
62.5°	263.3	256.8	251.1	243.7	236.5	231.5	227.4	224.2	222.6	221.8	222.6
65°	235.6	230.0	224.2	217.7	212.0	207.0	203.0	199.8	198.9	198.1	198.1
67.5°	207.0	202.2	197.3	191.6	185.1	180.2	176.1	173.7	172.9	172.0	172.9
70°	177.7	173.7	168.8	163.9	159.0	154.9	152.5	150.1	149.2	148.4	148.4
72.5°	150.1	146.8	142.7	138.6	134.5	130.5	128.0	126.4	125.6	124.7	124.7
75°	122.3	119.0	116.6	113.4	109.3	106.8	104.3	102.7	101.9	101.9	101.9
77.5°	96.2	93.8	91.3	88.0	85.6	83.2	81.5	80.8	79.9	79.9	79.9
80°	71.0	69.3	67.7	66.0	63.6	61.2	60.4	59.5	58.7	58.7	58.7
82.5°	48.1	47.3	45.6	44.1	42.4	41.5	40.8	40.0	40.0	40.0	40.0
85°	27.8	26.9	26.1	25.2	24.5	24.5	23.7	22.8	22.0	22.0	22.0
87.5°	11.5	11.5	11.5	10.6	9.8	9.8	9.8	9.8	9.8	9.8	9.8
90°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0



TEST NUMBER: P735596

CATALOG NUMBER: 4APN6-24-B2750-W2D-CP250-4000K

CANDELA DISTRIBUTION (continued):

	110°	120°	130°	140°	150°	160°	170°	180°	190°	200°	210°
0°	720.7	720.7	720.7	720.7	720.7	720.7	720.7	720.7	720.7	720.7	720.7
2.5°	708.5	710.1	711.8	714.2	716.7	719.1	718.3	717.5	720.7	724.8	725.7
5°	697.9	699.6	702.0	706.1	710.1	713.4	714.2	714.2	720.7	726.5	728.1
7.5°	684.9	687.3	690.5	694.6	700.3	705.3	707.7	710.9	717.5	724.8	728.1
10°	668.6	672.7	677.5	683.3	689.0	694.6	699.6	703.6	711.8	720.0	724.8
12.5°	653.8	657.9	662.9	669.4	676.8	684.0	689.0	694.6	704.4	714.2	720.0
15°	637.5	641.6	647.3	653.8	662.0	670.2	677.5	684.9	694.6	705.3	711.8
17.5°	619.7	623.8	629.4	637.5	646.6	655.5	663.7	671.8	683.3	694.6	702.0
20°	597.6	603.4	610.7	618.8	629.4	640.1	648.2	657.1	669.4	681.6	689.8
22.5°	576.4	582.1	590.3	600.1	611.5	622.9	632.7	642.5	655.5	667.7	676.8
25°	556.0	562.6	570.8	580.5	591.1	602.5	614.0	625.3	638.4	651.4	660.4
27.5°	535.6	541.3	549.5	559.3	571.5	583.0	594.3	605.8	619.7	633.5	643.3
30°	512.8	519.3	526.7	536.5	549.5	562.6	574.0	586.2	600.1	614.0	623.8
32.5°	491.6	497.4	504.7	514.5	527.5	540.6	552.8	565.8	578.9	592.7	602.5
35°	470.5	476.1	483.5	493.3	506.3	519.3	531.5	543.8	556.9	569.9	579.7
37.5°	449.2	455.0	462.3	472.0	484.3	497.4	508.7	521.0	534.1	547.1	556.0
40°	427.2	432.9	438.6	448.5	460.7	473.7	485.1	497.4	510.4	523.4	532.4
42.5°	405.3	410.9	418.3	428.1	439.4	450.9	462.3	473.7	485.9	498.2	507.2
45°	383.2	388.1	395.5	404.4	415.8	426.4	437.9	448.5	460.7	472.0	481.1
47.5°	360.4	365.3	371.0	379.9	391.4	402.7	414.2	424.8	435.3	446.8	455.0
50°	338.4	343.2	349.7	357.9	368.6	379.1	389.0	398.7	409.3	419.9	427.2
52.5°	315.6	320.4	326.1	334.3	343.2	353.0	362.0	371.8	381.6	391.4	398.7
55°	292.7	296.0	300.8	308.2	318.0	327.8	336.7	345.7	354.7	362.8	370.1
57.5°	269.8	273.9	279.7	286.2	294.3	302.5	310.6	318.8	326.9	335.1	341.6
60°	247.0	250.3	254.4	260.0	268.2	275.6	283.7	291.1	298.4	305.8	311.5
62.5°	223.4	226.7	230.7	236.5	243.0	249.5	256.8	263.3	269.8	276.4	282.1
65°	198.9	202.2	206.3	211.1	216.8	222.6	229.1	235.6	240.5	245.4	251.1
67.5°	173.7	177.0	181.0	185.1	190.0	195.7	201.4	207.0	212.0	216.8	220.9
70°	149.2	151.6	155.7	159.0	163.1	167.2	172.0	177.0	180.2	184.2	189.2
72.5°	125.6	128.0	131.2	134.5	137.0	140.3	145.1	149.2	153.3	158.2	160.6
75°	102.7	104.3	106.8	109.3	111.7	114.2	117.5	120.7	124.0	126.4	129.7
77.5°	79.9	81.5	84.0	85.6	87.3	88.9	91.3	93.8	96.2	97.8	101.1
80°	58.7	60.4	61.9	63.6	65.2	66.9	67.7	68.5	71.7	74.2	75.8
82.5°	40.0	40.8	41.5	43.2	44.1	44.8	45.6	45.6	47.3	48.9	51.3
85°	22.8	23.7	24.5	24.5	24.5	24.5	25.2	26.1	26.9	28.5	30.2
87.5°	8.9	8.9	9.8	9.8	9.8	9.8	9.8	9.8	10.6	12.2	13.0
90°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0



TEST NUMBER: P735596

CATALOG NUMBER: 4APN6-24-B2750-W2D-CP250-4000K

CANDELA DISTRIBUTION (continued):

	220°	230°	240°	250°	260°	270°	280°	290°	300°	310°	320°
0°	720.7	720.7	720.7	720.7	720.7	720.7	720.7	720.7	720.7	720.7	720.7
2.5°	724.8	725.7	727.2	728.1	728.9	728.9	729.8	730.5	728.9	727.2	726.5
5°	728.9	729.8	732.2	734.6	736.3	737.9	737.0	736.3	734.6	732.2	730.5
7.5°	729.8	732.2	734.6	737.9	740.3	743.5	742.0	740.3	737.0	733.8	731.3
10°	727.2	730.5	734.6	738.7	741.1	743.5	742.0	740.3	737.0	733.0	729.8
12.5°	724.0	728.1	733.0	737.0	739.5	742.8	740.3	737.9	733.8	729.8	725.7
15°	716.7	721.6	727.2	732.2	736.3	739.5	737.0	735.4	730.5	724.8	719.1
17.5°	707.7	714.2	720.0	725.7	728.9	732.2	730.5	728.9	723.2	716.7	710.1
20°	697.1	703.6	709.4	715.0	719.1	722.4	720.0	717.5	711.8	706.1	699.6
22.5°	684.0	690.5	697.1	702.8	706.8	710.1	706.8	702.8	697.1	691.4	684.9
25°	667.7	675.1	682.4	688.1	690.5	693.8	690.5	687.3	681.6	675.9	668.6
27.5°	651.4	658.8	666.1	671.8	674.2	677.5	674.2	671.0	665.3	659.6	652.3
30°	632.7	640.1	647.3	653.1	655.5	657.9	654.7	651.4	646.6	640.8	633.5
32.5°	611.5	618.8	624.5	630.3	633.5	636.8	633.5	631.0	625.3	618.0	610.7
35°	588.6	596.0	603.4	609.0	612.3	615.6	611.5	607.5	602.5	596.8	590.3
37.5°	563.4	571.5	579.7	586.2	588.6	591.9	588.6	584.5	579.7	574.0	566.7
40°	539.7	547.1	554.5	561.0	563.4	565.8	562.6	559.3	553.6	547.9	540.6
42.5°	515.3	522.6	529.1	534.8	537.3	540.6	537.3	533.2	529.1	524.3	517.8
45°	489.2	496.5	502.2	508.0	510.4	512.8	509.6	505.5	501.5	497.4	490.9
47.5°	462.3	468.8	474.6	480.2	481.8	484.3	481.1	478.6	474.6	470.5	464.8
50°	434.6	441.1	446.8	451.7	453.3	455.7	452.5	449.2	446.0	442.7	437.9
52.5°	406.0	411.8	417.5	422.3	424.0	425.6	422.3	419.0	415.8	412.5	407.7
55°	376.7	382.4	388.1	392.2	393.8	395.5	392.2	389.7	386.4	384.0	379.1
57.5°	347.3	353.0	357.9	362.0	363.6	365.3	362.0	358.8	356.3	353.8	349.7
60°	317.1	322.8	326.9	330.2	331.9	332.7	329.4	326.9	325.3	323.7	319.6
62.5°	287.8	291.9	296.0	298.4	300.0	300.8	298.4	296.7	295.2	293.5	290.2
65°	256.8	261.7	265.0	267.4	268.2	269.1	266.6	265.0	263.3	261.7	259.3
67.5°	225.9	230.0	232.4	234.8	235.6	235.6	235.6	234.8	233.2	230.7	228.3
70°	194.8	198.1	200.5	202.2	203.0	203.0	201.4	199.8	199.8	198.9	197.3
72.5°	163.1	165.5	167.2	168.8	168.8	168.8	168.8	169.6	168.8	167.2	164.7
75°	132.9	135.3	137.0	137.8	137.8	137.8	137.8	138.6	137.8	137.0	135.3
77.5°	104.3	106.0	106.8	107.6	107.6	107.6	108.4	109.3	108.4	107.6	106.8
80°	77.5	78.2	79.1	79.9	79.1	79.1	79.9	81.5	80.8	79.9	79.1
82.5°	53.0	53.8	54.6	54.6	55.4	56.3	56.3	56.3	56.3	55.4	54.6
85°	31.8	32.6	32.6	32.6	32.6	32.6	33.4	34.3	34.3	33.4	33.4
87.5°	14.7	15.5	14.7	13.9	13.0	13.0	14.7	16.3	16.3	15.5	15.5
90°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0



TEST NUMBER: P735596

CATALOG NUMBER: 4APN6-24-B2750-W2D-CP250-4000K

CANDELA DISTRIBUTION (continued):

	330°	340°	350°	360°
0°	720.7	720.7	720.7	720.7
2.5°	727.2	726.5	722.4	718.3
5°	729.8	727.2	721.6	715.9
7.5°	729.8	726.5	718.3	710.9
10°	725.7	720.7	711.8	702.8
12.5°	720.7	715.0	704.4	694.6
15°	713.4	706.8	695.5	684.0
17.5°	702.8	694.6	683.3	671.0
20°	692.2	683.3	669.4	656.4
22.5°	677.5	669.4	654.7	640.8
25°	661.2	652.3	637.5	622.9
27.5°	644.1	633.5	618.8	604.2
30°	624.5	614.0	599.3	584.5
32.5°	603.4	593.6	578.9	563.4
35°	582.1	571.5	556.9	541.3
37.5°	558.5	548.7	534.1	519.3
40°	533.2	523.4	508.7	494.1
42.5°	509.6	500.6	485.9	472.0
45°	483.5	474.6	460.7	447.6
47.5°	456.6	447.6	434.6	421.6
50°	430.5	421.6	409.3	397.1
52.5°	401.2	393.8	382.4	371.0
55°	372.6	365.3	353.8	343.2
57.5°	344.1	337.5	326.9	317.1
60°	313.9	307.4	299.3	290.2
62.5°	285.4	279.7	271.5	263.3
65°	255.2	250.3	243.0	235.6
67.5°	224.2	220.1	213.6	207.0
70°	193.3	188.3	183.5	177.7
72.5°	162.3	159.8	154.9	150.1
75°	132.9	130.5	126.4	122.3
77.5°	105.2	102.7	99.5	96.2
80°	77.5	75.8	73.4	71.0
82.5°	53.8	52.2	50.6	48.1
85°	32.6	31.0	29.3	27.8
87.5°	14.7	13.9	12.2	11.5
90°	0.0	0.0	0.0	0.0



Report Generated By 670246072 / DESKTOP-50001EG





— 0°-180° - - 45°-225° - - - - 90°-270° - · - 135°-315°













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

Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

METALUX

Report Number: SP1-2210-795-4

Test Date: 10/06/2022

Luminaire Tested: 9WP217084MDER4AM-4000K-315MA

Data in this report applies to families of products including 9WP217084MDER4AM-4000K.

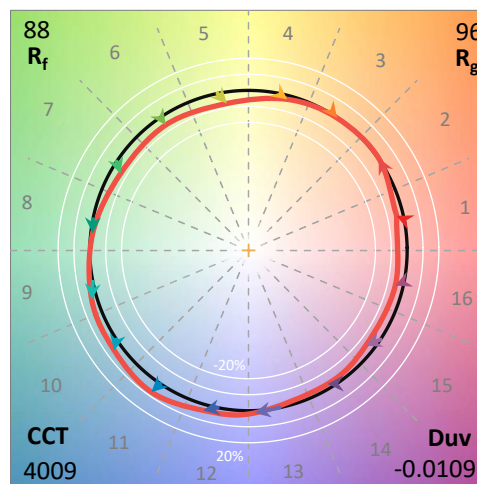
Test Information

Test Method: LM-79-2019
 Report Number: SP1-2210-795-4
 Test Lab: COOPER LIGHTING SOLUTIONS
 Photometer: SP1 - 76IN SPHERE
 Measurement Geometry: 4π
 Issue Date: 10/06/2022
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)
 Product Line: METALUX
 Catalog Number: **9WP217084MDER4AM-4000K-315MA**
 Description: METALUX

TUNABLE BOARD, 4000K-315MA, PROGRAMMED @ 5.0Vdc.

Spectral Parameters

CCT (K):	4009	CRI (Ra):	87.8		
CIE u':	0.2311	R1:	94.2	R9:	79.5
CIE v':	0.4879	R2:	88.6	R10:	77.2
Duv:	-0.0109	R3:	84.5	R11:	92.9
CIE x:	0.3728	R4:	91.1	R12:	72.5
CIE y:	0.3498	R5:	92.1	R13:	92.1
CIE z:	0.2775	R6:	82.3	R14:	92.6
Peak Wavelength (nm):	632	R7:	84.3		
Dominant Wavelength (nm):	588	R8:	84.9		
Purity:	17.1				
Rf:	88				
Rg:	96.2				



Test Conditions

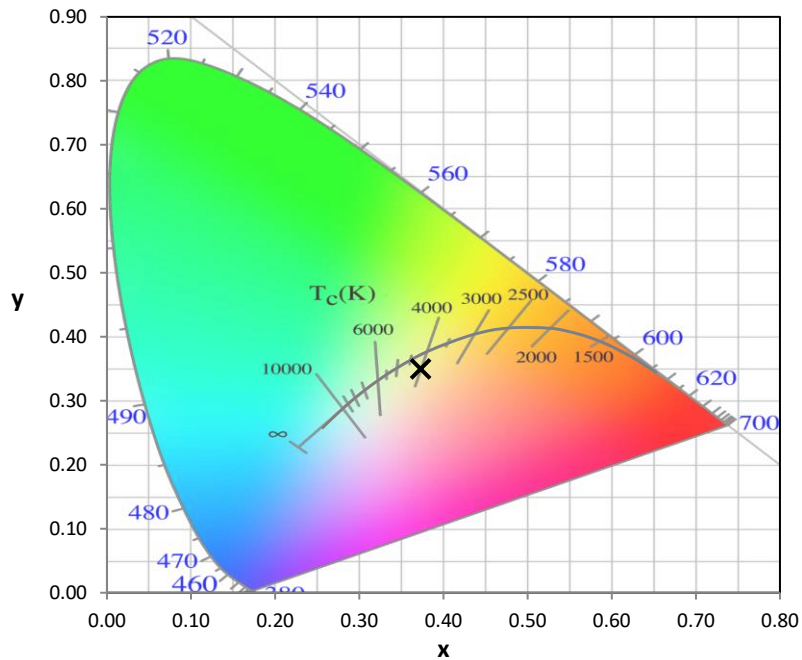
Stabilization Time: 44M
 Operation Time: 12H
 Room Temperature (°C) / RH%: 24.0/38%
 Sphere Temperature (°C): 24.4

REPORT NUMBER: SP1-2210-795-4

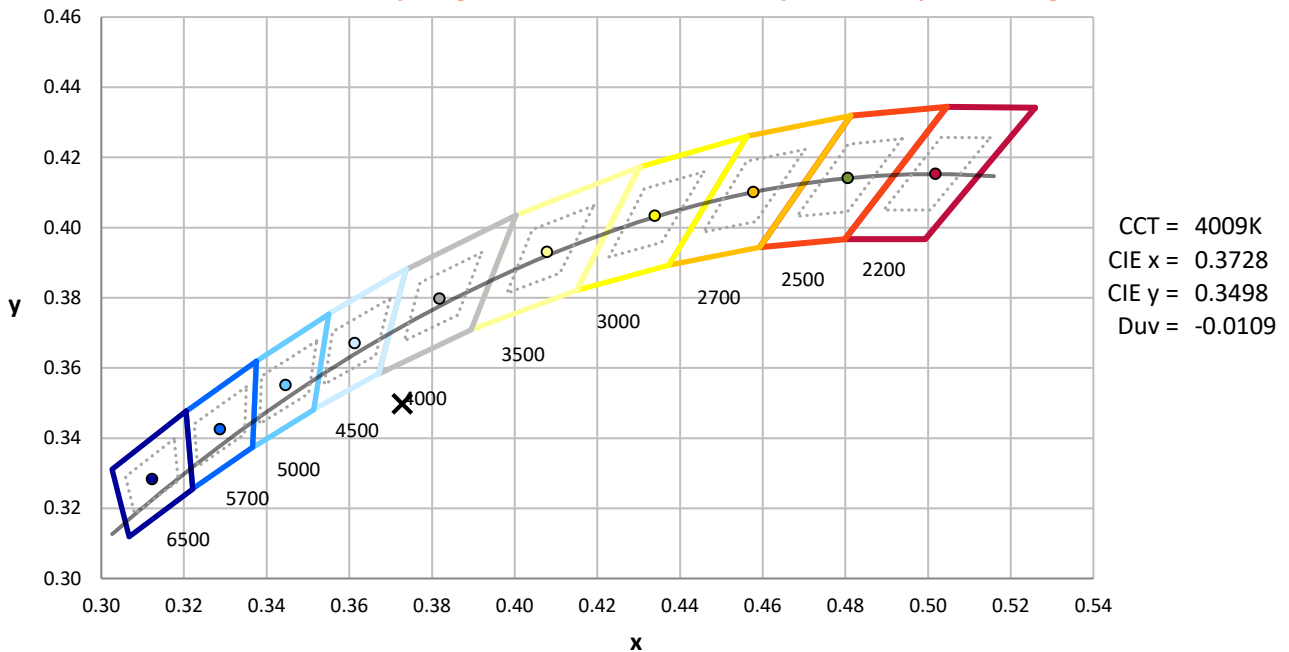
Measurement and Test Equipment			
Instrument	Identification Number	Calibration Date	Calibration Due Date
Photometer	76INCH SPHERE IN0058	8/8/2022	2/8/2023
Power Meter	XITRON 2801 IN0071	11/29/2021	11/29/2022
AC Power Source	CHROMA 61603 IN0063	11/29/2021	11/29/2022
DC Power Source	AGILENT E3634A IN0208	11/29/2021	11/29/2022
Sphere Thermometer	ONSET IN0085	11/29/2021	11/29/2022
Room Thermometer	ONSET IN0046	11/29/2021	11/29/2022

REPORT NUMBER: SP1-2210-795-4

CIE 1931 Chromaticity Diagram



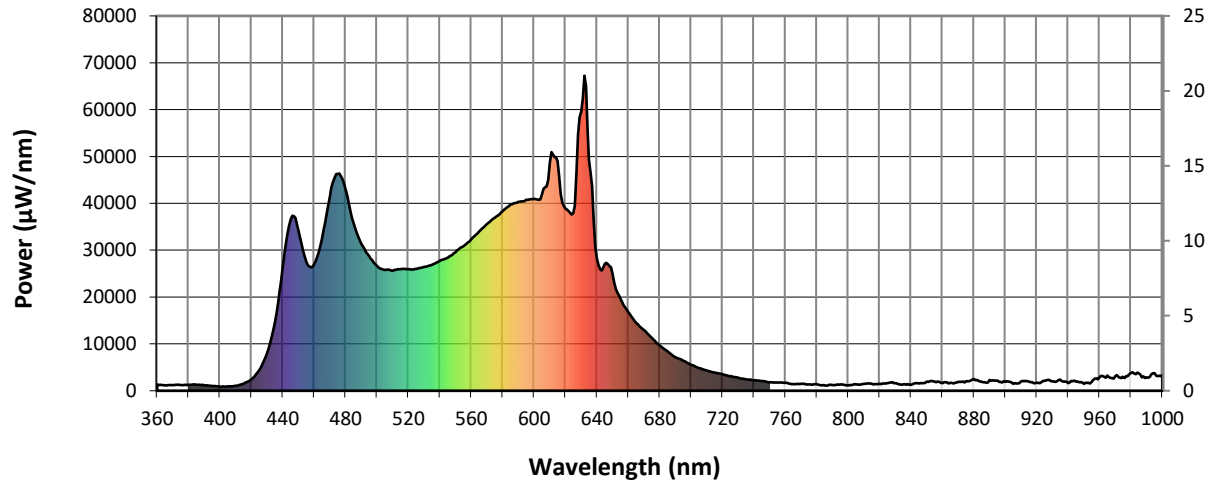
CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles



Point lies outside the range

REPORT NUMBER: SP1-2210-795-4

Photopic Flux vs. Wavelength

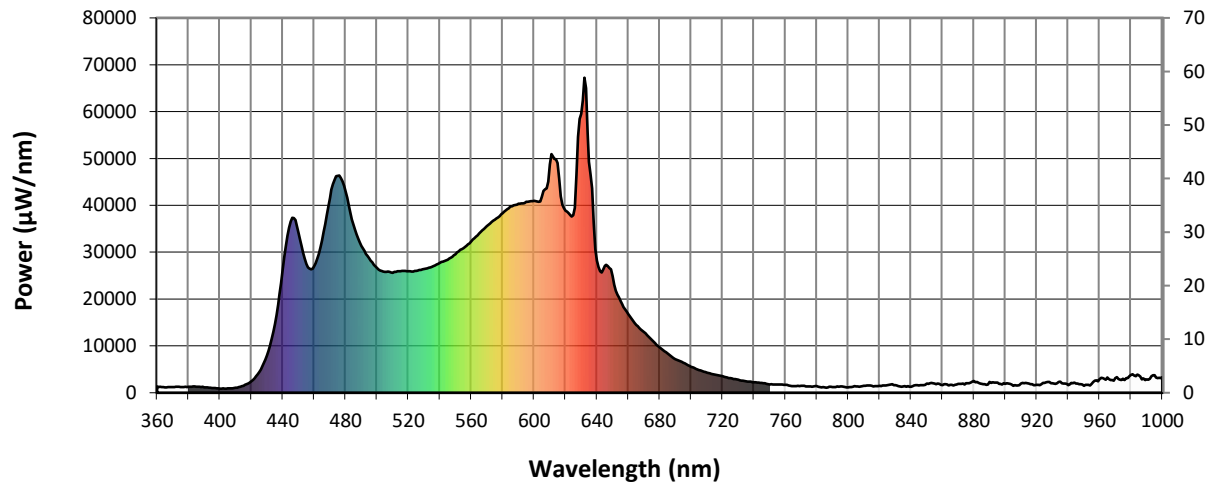


#####

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	1347	NR	490	31353	NR	620	38840	NR	750	1762	NR	880	2493	NR
365	1168	NR	495	28718	NR	625	37861	NR	755	1752	NR	885	1913	NR
370	1204	NR	500	26605	NR	630	59547	NR	760	1690	NR	890	2275	NR
375	1232	NR	505	25784	NR	635	49312	NR	765	1395	NR	895	2173	NR
380	1249	NR	510	25614	NR	640	28168	NR	770	1452	NR	900	1923	NR
385	1285	NR	515	25941	NR	645	27115	NR	775	1370	NR	905	1511	NR
390	1154	NR	520	25900	NR	650	24916	NR	780	1429	NR	910	1971	NR
395	1036	NR	525	26015	NR	655	19572	NR	785	1112	NR	915	1957	NR
400	873	NR	530	26424	NR	660	16766	NR	790	1222	NR	920	1699	NR
405	908	NR	535	26869	NR	665	14487	NR	795	1347	NR	925	2123	NR
410	1056	NR	540	27684	NR	670	12943	NR	800	1132	NR	930	2029	NR
415	1492	NR	545	28407	NR	675	11228	NR	805	1360	NR	935	2371	NR
420	2426	NR	550	29571	NR	680	9665	NR	810	1451	NR	940	1649	NR
425	4409	NR	555	30862	NR	685	8389	NR	815	1507	NR	945	1984	NR
430	7984	NR	560	32297	NR	690	7170	NR	820	1466	NR	950	1495	NR
435	14687	NR	565	33979	NR	695	6398	NR	825	1609	NR	955	1862	NR
440	26286	NR	570	35579	NR	700	5544	NR	830	1642	NR	960	2951	NR
445	36513	NR	575	36922	NR	705	4845	NR	835	1363	NR	965	3240	NR
450	34274	NR	580	38319	NR	710	4309	NR	840	1294	NR	970	3119	NR
455	27519	NR	585	39771	NR	715	3879	NR	845	1584	NR	975	3020	NR
460	26986	NR	590	40329	NR	720	3504	NR	850	1930	NR	980	3800	NR
465	32511	NR	595	40738	NR	725	3094	NR	855	1952	NR	985	3748	NR
470	41588	NR	600	40944	NR	730	2758	NR	860	1631	NR	990	2878	NR
475	46297	NR	605	41826	NR	735	2441	NR	865	1714	NR	995	3708	NR
480	42885	NR	610	48714	NR	740	2221	NR	870	1878	NR	1000	3359	NR
485	35895	NR	615	48984	NR	745	2091	NR	875	2024	NR			

REPORT NUMBER: SP1-2210-795-4

Scotopic Flux vs. Wavelength



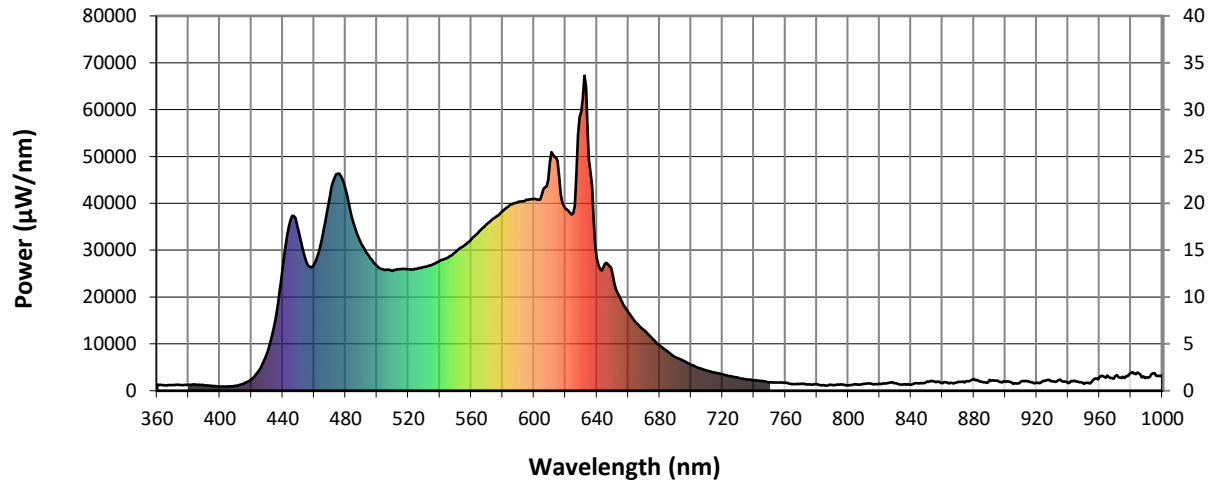
Scotopic Lumens: 4927.4

S/P: 2.02

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	1347	NR	490	31353	NR	620	38840	NR	750	1762	NR	880	2493	NR
365	1168	NR	495	28718	NR	625	37861	NR	755	1752	NR	885	1913	NR
370	1204	NR	500	26605	NR	630	59547	NR	760	1690	NR	890	2275	NR
375	1232	NR	505	25784	NR	635	49312	NR	765	1395	NR	895	2173	NR
380	1249	NR	510	25614	NR	640	28168	NR	770	1452	NR	900	1923	NR
385	1285	NR	515	25941	NR	645	27115	NR	775	1370	NR	905	1511	NR
390	1154	NR	520	25900	NR	650	24916	NR	780	1429	NR	910	1971	NR
395	1036	NR	525	26015	NR	655	19572	NR	785	1112	NR	915	1957	NR
400	873	NR	530	26424	NR	660	16766	NR	790	1222	NR	920	1699	NR
405	908	NR	535	26869	NR	665	14487	NR	795	1347	NR	925	2123	NR
410	1056	NR	540	27684	NR	670	12943	NR	800	1132	NR	930	2029	NR
415	1492	NR	545	28407	NR	675	11228	NR	805	1360	NR	935	2371	NR
420	2426	NR	550	29571	NR	680	9665	NR	810	1451	NR	940	1649	NR
425	4409	NR	555	30862	NR	685	8389	NR	815	1507	NR	945	1984	NR
430	7984	NR	560	32297	NR	690	7170	NR	820	1466	NR	950	1495	NR
435	14687	NR	565	33979	NR	695	6398	NR	825	1609	NR	955	1862	NR
440	26286	NR	570	35579	NR	700	5544	NR	830	1642	NR	960	2951	NR
445	36513	NR	575	36922	NR	705	4845	NR	835	1363	NR	965	3240	NR
450	34274	NR	580	38319	NR	710	4309	NR	840	1294	NR	970	3119	NR
455	27519	NR	585	39771	NR	715	3879	NR	845	1584	NR	975	3020	NR
460	26986	NR	590	40329	NR	720	3504	NR	850	1930	NR	980	3800	NR
465	32511	NR	595	40738	NR	725	3094	NR	855	1952	NR	985	3748	NR
470	41588	NR	600	40944	NR	730	2758	NR	860	1631	NR	990	2878	NR
475	46297	NR	605	41826	NR	735	2441	NR	865	1714	NR	995	3708	NR
480	42885	NR	610	48714	NR	740	2221	NR	870	1878	NR	1000	3359	NR
485	35895	NR	615	48984	NR	745	2091	NR	875	2024	NR			

REPORT NUMBER: SP1-2210-795-4

Melanopic Flux vs. Wavelength



Melanopic Lumens: 2189.1

S/P: 0.9

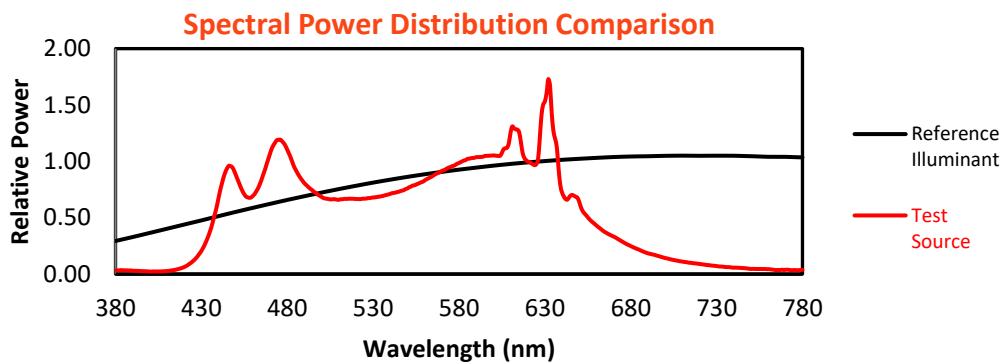
λ (nm)	Power (μW/nm)	Lumens (φ/nm)	λ (nm)	Power (μW/nm)	Lumens (φ/nm)	λ (nm)	Power (μW/nm)	Lumens (φ/nm)	λ (nm)	Power (μW/nm)	Lumens (φ/nm)	λ (nm)	Power (μW/nm)	Lumens (φ/nm)
360	1347	NR	490	31353	NR	620	38840	NR	750	1762	NR	880	2493	NR
365	1168	NR	495	28718	NR	625	37861	NR	755	1752	NR	885	1913	NR
370	1204	NR	500	26605	NR	630	59547	NR	760	1690	NR	890	2275	NR
375	1232	NR	505	25784	NR	635	49312	NR	765	1395	NR	895	2173	NR
380	1249	NR	510	25614	NR	640	28168	NR	770	1452	NR	900	1923	NR
385	1285	NR	515	25941	NR	645	27115	NR	775	1370	NR	905	1511	NR
390	1154	NR	520	25900	NR	650	24916	NR	780	1429	NR	910	1971	NR
395	1036	NR	525	26015	NR	655	19572	NR	785	1112	NR	915	1957	NR
400	873	NR	530	26424	NR	660	16766	NR	790	1222	NR	920	1699	NR
405	908	NR	535	26869	NR	665	14487	NR	795	1347	NR	925	2123	NR
410	1056	NR	540	27684	NR	670	12943	NR	800	1132	NR	930	2029	NR
415	1492	NR	545	28407	NR	675	11228	NR	805	1360	NR	935	2371	NR
420	2426	NR	550	29571	NR	680	9665	NR	810	1451	NR	940	1649	NR
425	4409	NR	555	30862	NR	685	8389	NR	815	1507	NR	945	1984	NR
430	7984	NR	560	32297	NR	690	7170	NR	820	1466	NR	950	1495	NR
435	14687	NR	565	33979	NR	695	6398	NR	825	1609	NR	955	1862	NR
440	26286	NR	570	35579	NR	700	5544	NR	830	1642	NR	960	2951	NR
445	36513	NR	575	36922	NR	705	4845	NR	835	1363	NR	965	3240	NR
450	34274	NR	580	38319	NR	710	4309	NR	840	1294	NR	970	3119	NR
455	27519	NR	585	39771	NR	715	3879	NR	845	1584	NR	975	3020	NR
460	26986	NR	590	40329	NR	720	3504	NR	850	1930	NR	980	3800	NR
465	32511	NR	595	40738	NR	725	3094	NR	855	1952	NR	985	3748	NR
470	41588	NR	600	40944	NR	730	2758	NR	860	1631	NR	990	2878	NR
475	46297	NR	605	41826	NR	735	2441	NR	865	1714	NR	995	3708	NR
480	42885	NR	610	48714	NR	740	2221	NR	870	1878	NR	1000	3359	NR
485	35895	NR	615	48984	NR	745	2091	NR	875	2024	NR			

REPORT NUMBER: SP1-2210-795-4

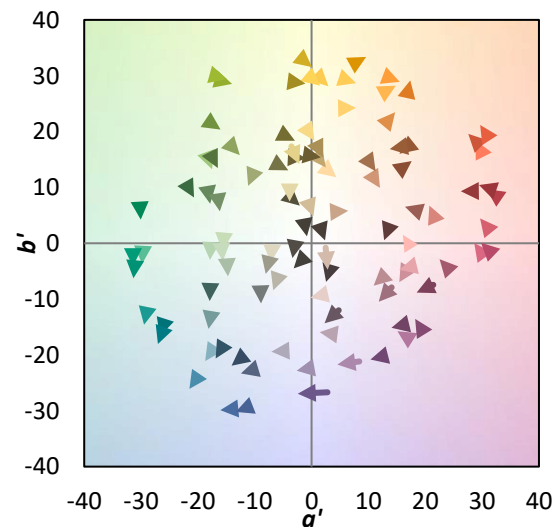
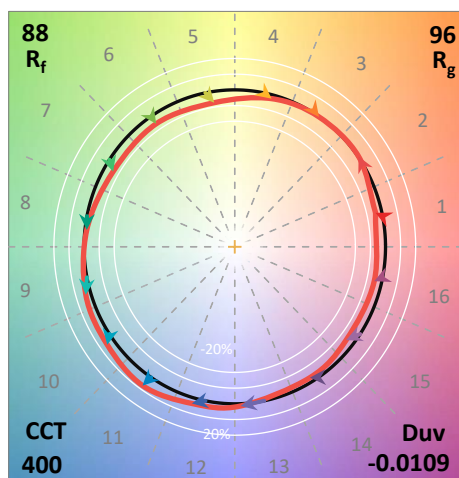
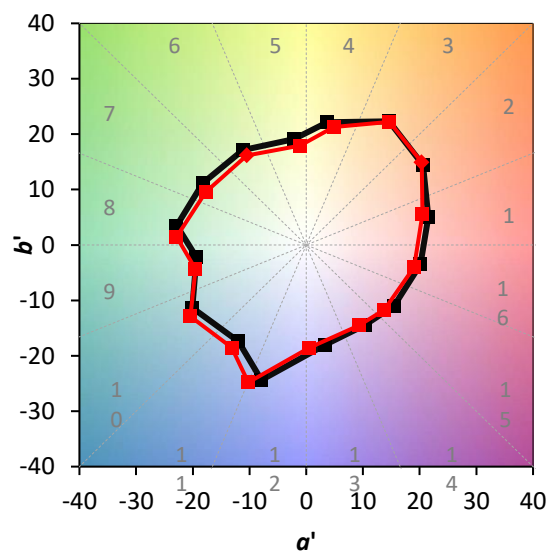
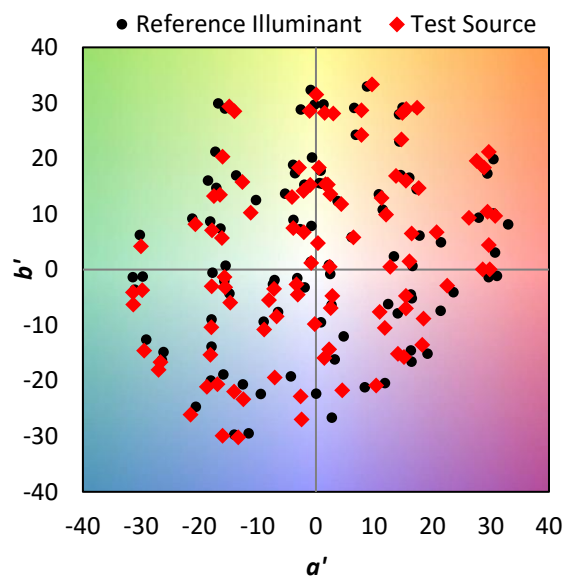
TM-30-18

Summary

$R_f = 88$
 $R_g = 96.2$
 CIE $R_a = 87.8$
 $R_g = 79.5$



Color Vector Graphics

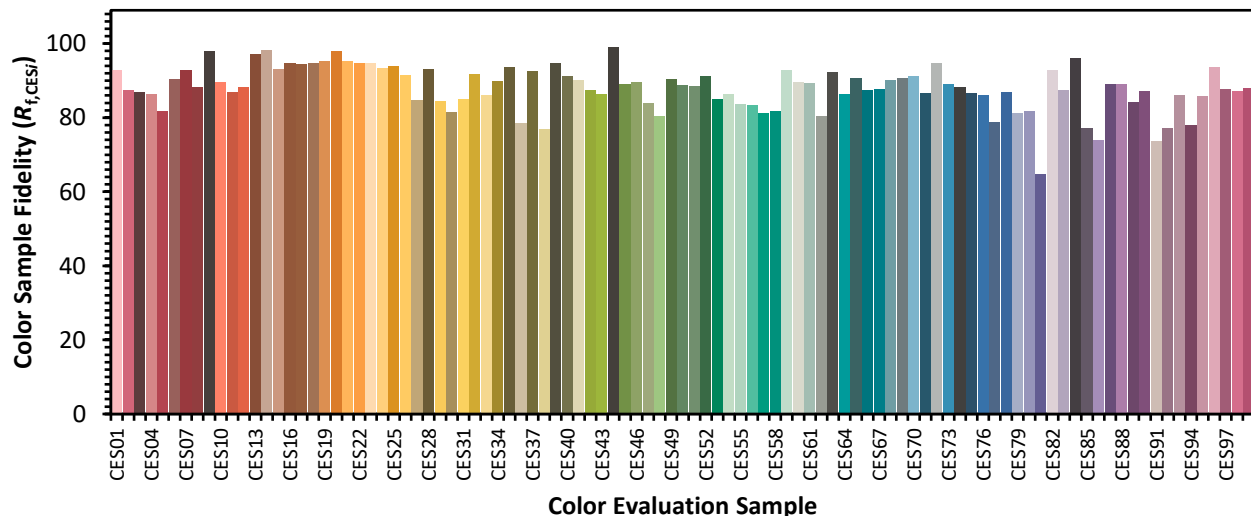


REPORT NUMBER: SP1-2210-795-4

TM-30-18

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

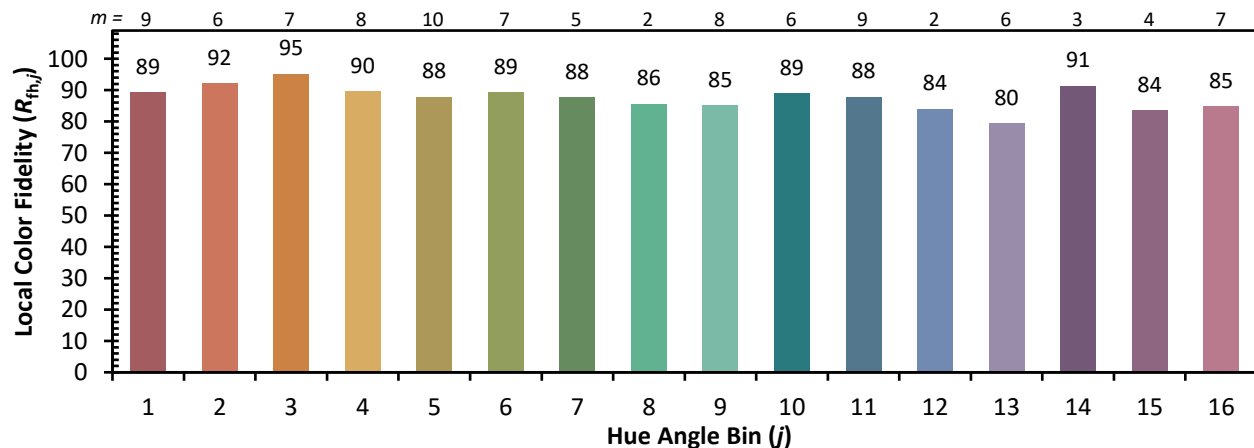
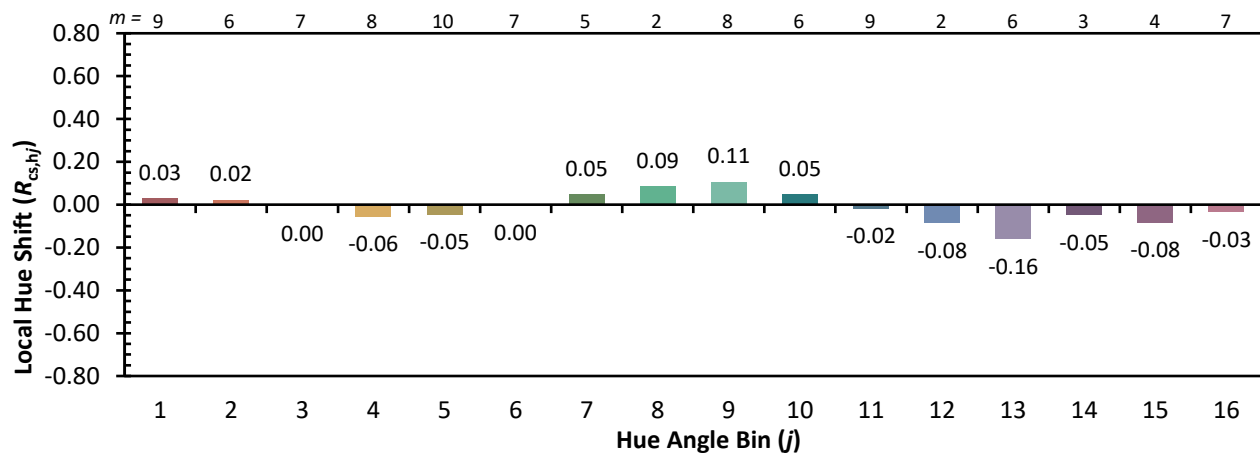
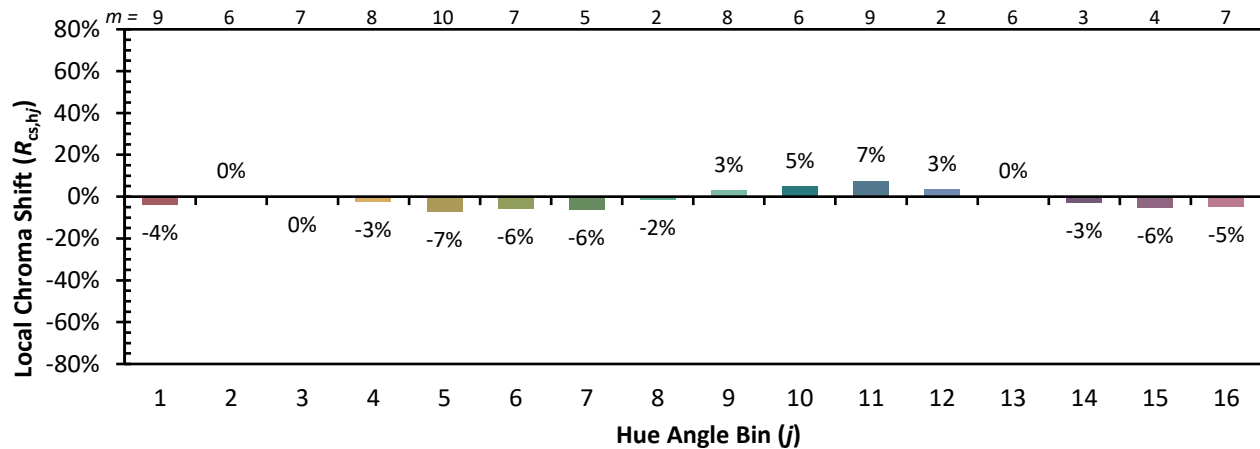
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CES02 = 62	CES27 = 85	CES52 = 91	CES77 = 79
CES03 = 31	CES28 = 93	CES53 = 85	CES78 = 87
CES04 = 70	CES29 = 84	CES54 = 86	CES79 = 81
CES05 = 49	CES30 = 81	CES55 = 84	CES80 = 82
CES06 = 51	CES31 = 85	CES56 = 83	CES81 = 65
CES07 = 42	CES32 = 92	CES57 = 81	CES82 = 93
CES08 = 41	CES33 = 86	CES58 = 82	CES83 = 87
CES09 = 29	CES34 = 90	CES59 = 93	CES84 = 96
CES10 = 75	CES35 = 94	CES60 = 90	CES85 = 77
CES11 = 58	CES36 = 78	CES61 = 89	CES86 = 74
CES12 = 64	CES37 = 92	CES62 = 80	CES87 = 89
CES13 = 43	CES38 = 77	CES63 = 92	CES88 = 89
CES14 = 74	CES39 = 95	CES64 = 86	CES89 = 84
CES15 = 71	CES40 = 91	CES65 = 91	CES90 = 87
CES16 = 47	CES41 = 90	CES66 = 87	CES91 = 74
CES17 = 49	CES42 = 87	CES67 = 88	CES92 = 77
CES18 = 56	CES43 = 86	CES68 = 90	CES93 = 86
CES19 = 71	CES44 = 99	CES69 = 91	CES94 = 78
CES20 = 66	CES45 = 89	CES70 = 91	CES95 = 86
CES21 = 85	CES46 = 90	CES71 = 86	CES96 = 94
CES22 = 78	CES47 = 84	CES72 = 95	CES97 = 88
CES23 = 91	CES48 = 80	CES73 = 89	CES98 = 87
CES24 = 90	CES49 = 90	CES74 = 88	CES99 = 88
CES25 = 71	CES50 = 89	CES75 = 86	



REPORT NUMBER: SP1-2210-795-4

TM-30-18

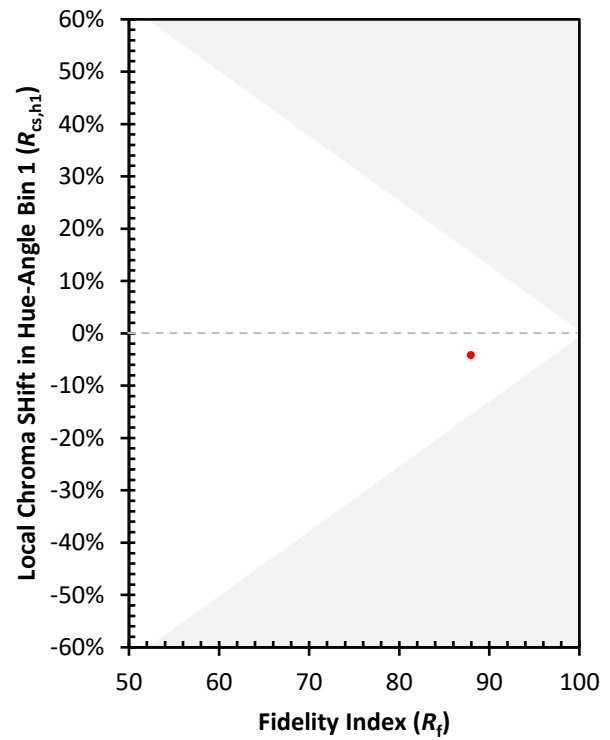
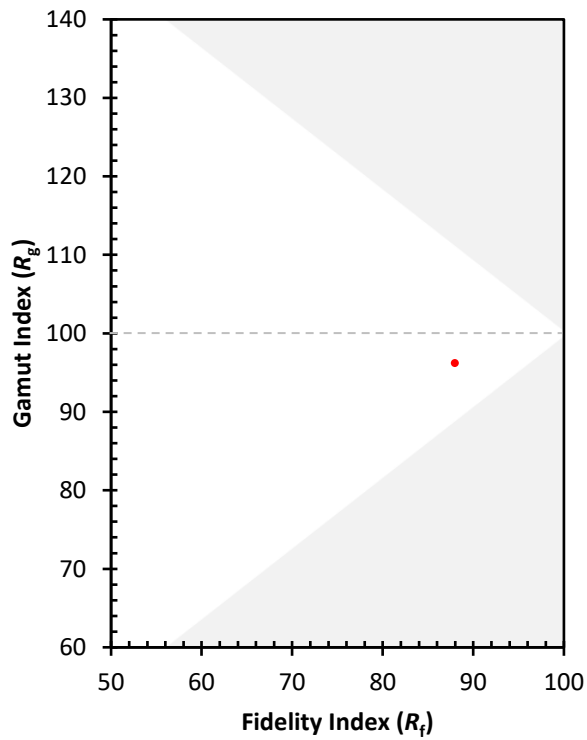
Color Rendition by Hue-Angle Bin



REPORT NUMBER: SP1-2210-795-4

TM-30-18

Measure Comparisons



(END OF REPORT)