

Signify Classified - Internal
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: INVUE

Report Number: P870995

Luminaire Tested: **EMM2-HTN-SA2B-840-U-T5W**

Issue Date: 09/05/2024



Test Information

Test Method: LM-79-08
Report Number: P870995
Test Lab: INNOVATION CENTER(G3)
Issue Date: 09/05/2024
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)
Product Line: INVUE
Catalog Number: EMM2-HTN-SA2B-840-U-T5W
Description: EPIC MODERN TALL HOUSING DISCRETE LED ARRAYS 100W 80CRI 4000K
FITXURE w/ TYPE V SQUARE WIDE DISTRIBUTION OPTIC
Light Source: (20) 4000K CCT, 80 CRI LEDS
Ballast/Driver: ELECTRONIC DRIVER

Summary

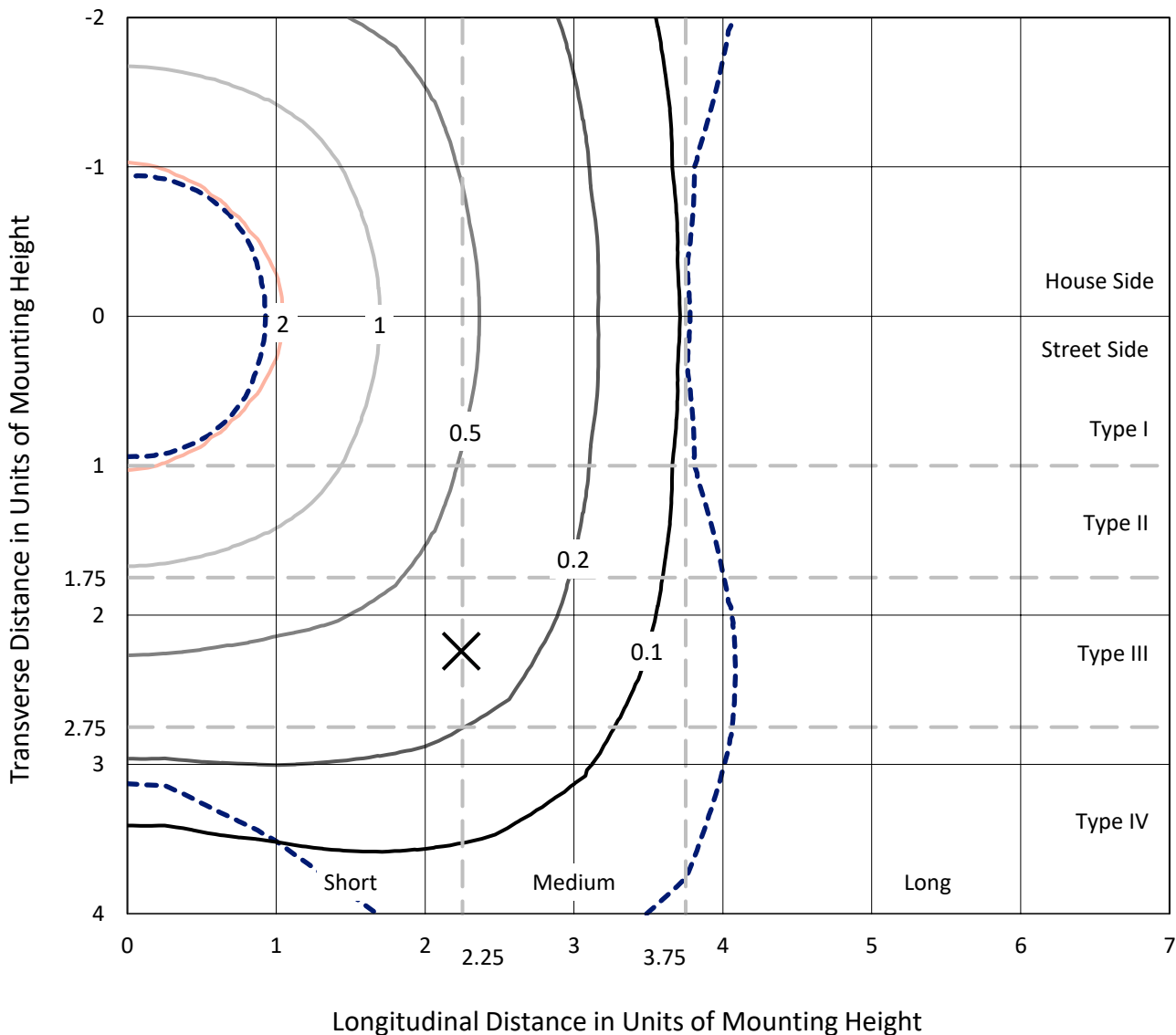
Lumens per Lamp: N/A
Luminaire Lumens: 12591.8 lumens
Efficiency: N/A
Efficacy: 139.9 lumens/watt
Luminous Opening: Rectangular (W 0.67' x L: 0.33' x H: 0')
IES Classification: Type V - Short
BUG Rating: B4 - U0 - G2

Input Watts (W): 90
Input Voltage (V): 120
Input Current (A_{in}): NR
Voltage Rise (V): NR
Power Factor: 0.99
Total Harmonic Distortion (THDi): 6.20%
Frequency (hertz): 60
Stabilization Time: NR
Operation Time: NR
Ambient Temperature (°C): NR
Test Distance: 24 FT

REPORT NUMBER: P870995
 CATALOG NUMBER: EMM2-HTN-SA2B-840-U-T5W

Iso-Footcandle Lines of Horizontal Illumination

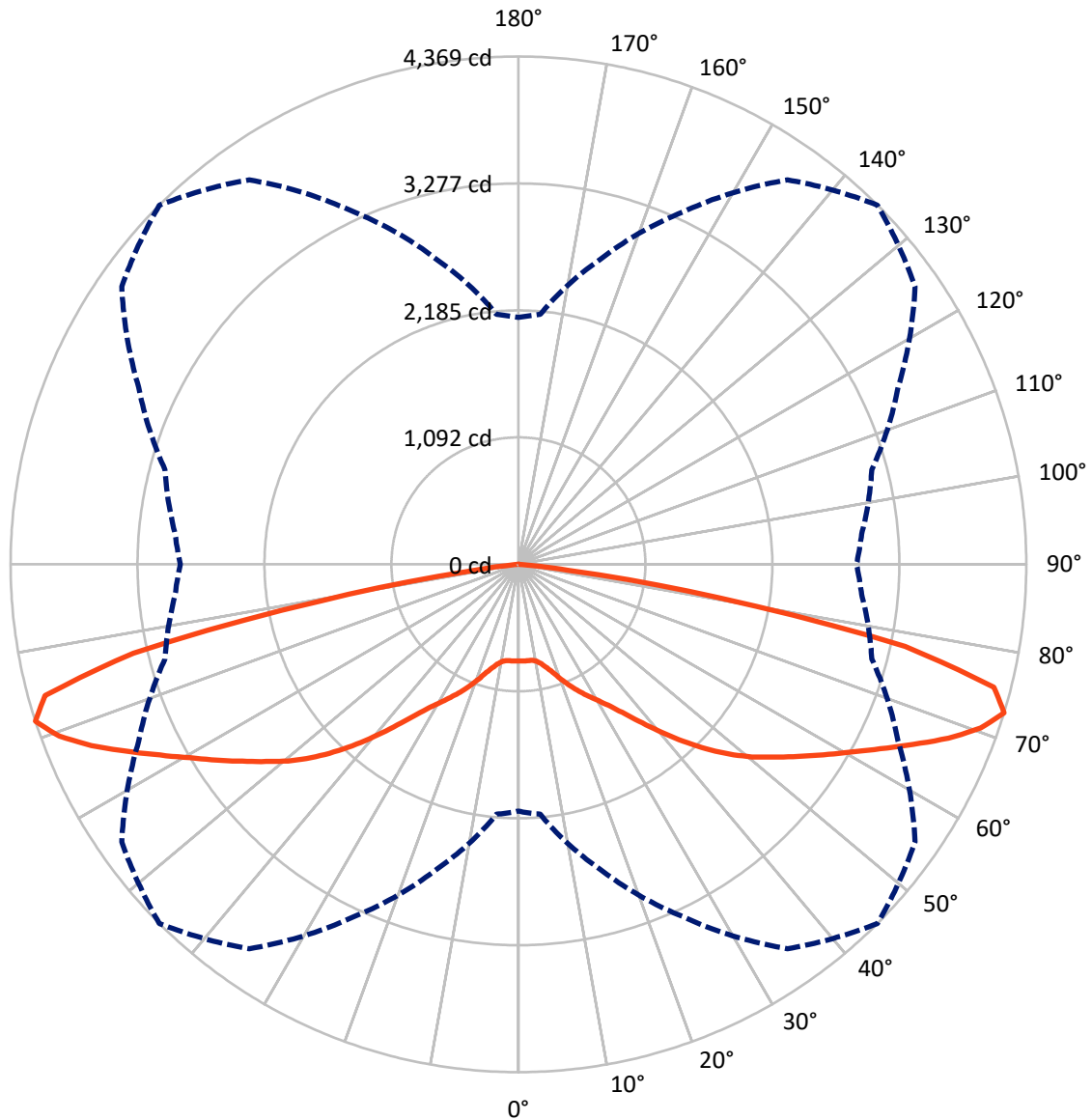
× Max cd
 - - - 1/2 Max cd



Based on 20 foot mounting height. Maximum calculated value = 2.2 fc
 Type V - Short - N/A

REPORT NUMBER: P870995
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Luminous Intensity Polar Plot



— Vertical Plane Through 45-Deg Lateral - - - Horizontal Cone Through 72.5-Deg Vertical

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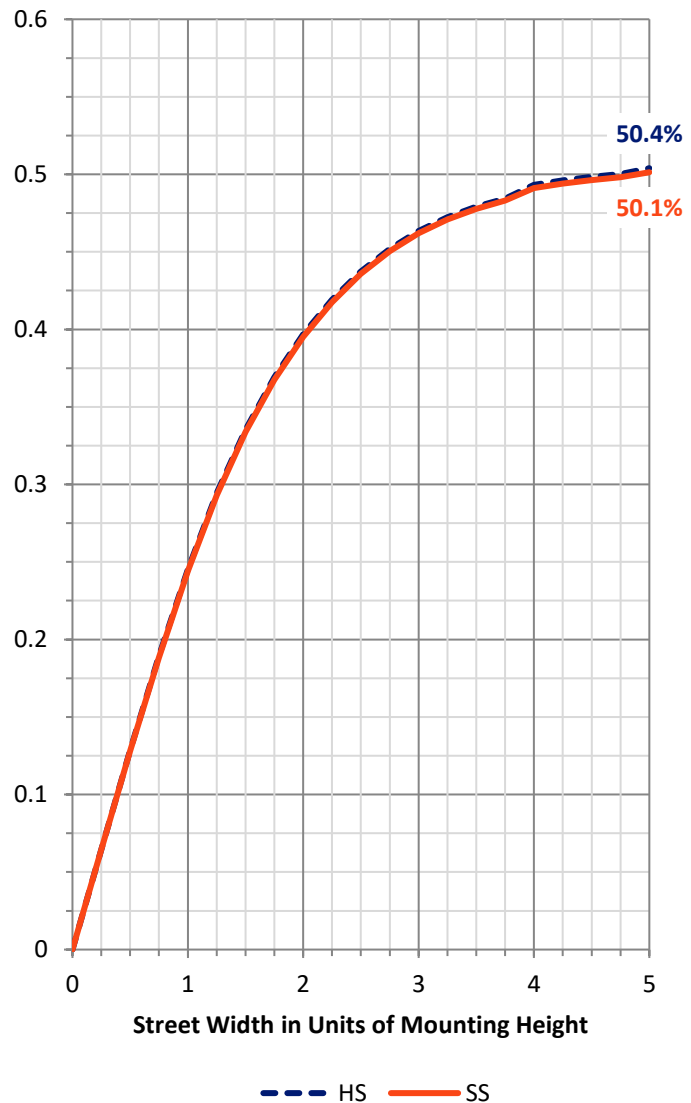
FLUX DISTRIBUTION:

		Downward	Upward	Total
House Side	Lumens	6295.9	0.0	6295.9
	% Fixture	50.0	0.0	50.0
Street Side	Lumens	6295.9	0.0	6295.9
	% Fixture	50.0	0.0	50.0
Total	Lumens	12591.8	0.0	12591.8
	% Fixture	100.0	0.0	100.0

Coefficient of Utilization

ZONAL LUMENS:

Zone	Lumens	% Fixture
0°-10°	79.7	0.6
10°-20°	265.9	2.1
20°-30°	548.6	4.4
30°-40°	1010.0	8.0
40°-50°	1775.9	14.1
50°-60°	2575.6	20.5
60°-70°	3357.7	26.7
70°-80°	2791.0	22.2
80°-90°	187.4	1.5
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°-90°	12591.8	100.0
0°-180°	12591.8	100.0



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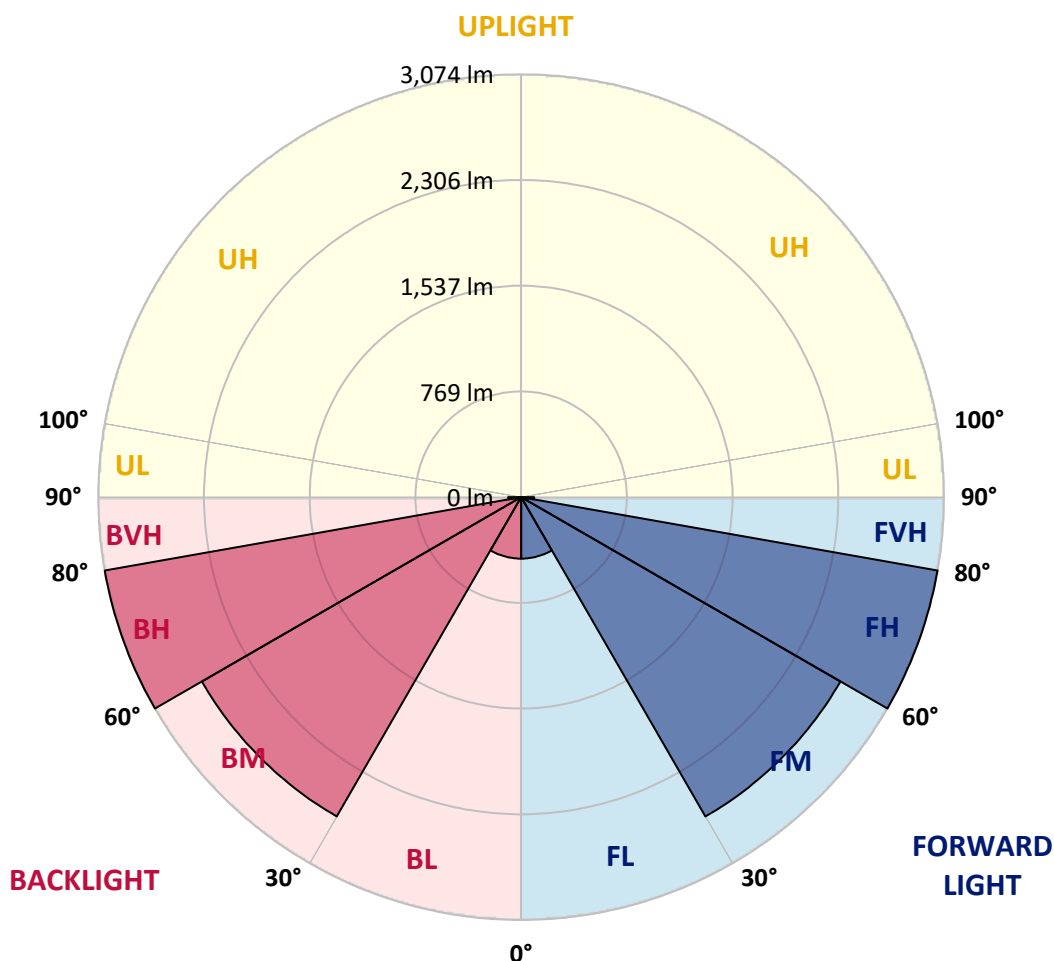
CATALOG NUMBER: EMM2-HTN-SA2B-840-U-T5W

LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

Zone	Lumens	% Fixture	Zone Rating/Lumen Limit		
			B	U	G
FL (0°-30°)	447.1	3.6			
FM (30°-60°)	2680.8	21.3			
FH (60°-80°)	3074.3	24.4			G2/5000
FVH (80°-90°)	93.7	0.7			G1/100
BL (0°-30°)	447.1	3.6	B1/500		
BM (30°-60°)	2680.8	21.3	B3/5000		
BH (60°-80°)	3074.3	24.4	B4/5000		G2/5000
BVH (80°-90°)	93.7	0.7			G1/100
UL (90°-100°)	0.0	0.0		U0/0	
UH (100°-180°)	0.0	0.0		U0/0	

BUG Rating: B4-U0-G2

Type V Short





REPORT NUMBER: P870995

CATALOG NUMBER: EMM2-HTN-SA2B-840-U-T5W

CANDELA DISTRIBUTION (FULL):

	0°	5°	15°	25°	35°	45°	55°	65°	75°	85°	90°
0°	831.3	831.3	831.3	831.3	831.3	831.3	831.3	831.3	831.3	831.3	831.3
2.5°	828.7	830.0	830.0	830.0	831.3	832.6	833.9	835.2	837.8	839.1	839.1
5°	832.6	831.3	830.0	832.6	832.6	832.6	833.9	835.2	835.2	835.2	836.5
7.5°	828.7	830.0	828.7	828.7	832.6	833.9	832.6	831.3	831.3	832.6	832.6
10°	843.0	841.7	840.4	840.4	844.3	845.6	844.3	843.0	843.0	845.6	845.6
12.5°	875.7	878.3	870.4	870.4	875.7	878.3	874.3	873.0	874.3	877.0	877.0
15°	926.5	925.2	920.0	914.8	920.0	923.9	918.7	916.1	917.4	923.9	918.7
17.5°	982.7	984.0	978.7	973.5	977.4	982.7	974.8	968.3	969.6	972.2	969.6
20°	1045.3	1044.0	1042.7	1042.7	1050.5	1057.0	1045.3	1029.6	1025.7	1023.1	1023.1
22.5°	1091.0	1094.9	1096.2	1107.9	1126.2	1132.7	1117.1	1096.2	1080.5	1072.7	1067.5
25°	1162.8	1158.8	1156.2	1169.3	1196.7	1208.4	1188.9	1160.1	1144.5	1143.2	1147.1
27.5°	1228.0	1228.0	1233.2	1246.3	1272.4	1284.1	1267.1	1238.4	1230.6	1230.6	1226.7
30°	1312.8	1308.9	1314.1	1336.3	1355.9	1363.7	1349.4	1329.8	1323.3	1323.3	1316.7
32.5°	1412.0	1413.3	1421.1	1435.5	1455.1	1456.4	1451.2	1442.0	1438.1	1434.2	1440.7
35°	1563.4	1563.4	1560.8	1571.2	1576.4	1579.0	1581.7	1577.7	1577.7	1577.7	1572.5
37.5°	1751.3	1740.9	1739.6	1730.4	1723.9	1730.4	1742.2	1755.2	1765.7	1759.1	1756.5
40°	1937.9	1932.7	1917.0	1902.7	1897.5	1900.1	1914.4	1941.8	1953.6	1953.6	1964.0
42.5°	2138.9	2128.4	2108.9	2091.9	2077.6	2081.5	2094.5	2128.4	2154.5	2166.3	2161.1
45°	2319.0	2309.8	2290.3	2274.6	2264.2	2262.9	2279.8	2302.0	2337.2	2347.7	2355.5
47.5°	2473.0	2466.4	2449.5	2433.8	2437.7	2439.0	2444.3	2463.8	2492.5	2506.9	2505.6
50°	2598.2	2593.0	2577.4	2583.9	2594.3	2604.8	2598.2	2611.3	2629.6	2636.1	2641.3
52.5°	2713.1	2705.3	2694.8	2706.6	2734.0	2754.8	2758.8	2749.6	2754.8	2758.8	2754.8
55°	2826.6	2817.5	2814.9	2835.8	2877.5	2916.7	2912.7	2886.6	2880.1	2872.3	2868.4
57.5°	2919.3	2912.7	2923.2	2958.4	3039.3	3091.5	3074.6	3014.5	2988.4	2970.2	2964.9
60°	2978.0	2976.7	3000.2	3082.4	3205.1	3278.1	3250.7	3147.6	3088.9	3072.0	3064.1
62.5°	3009.3	3010.6	3052.4	3198.5	3394.3	3493.5	3445.2	3287.3	3195.9	3179.0	3181.6
65°	3038.0	3034.1	3088.9	3296.4	3599.2	3733.6	3668.3	3455.6	3322.5	3288.6	3288.6
67.5°	3058.9	3062.8	3145.0	3394.3	3798.8	3990.7	3895.4	3634.4	3458.2	3407.3	3400.8
70°	2795.3	2833.1	3090.2	3459.5	3956.7	4217.7	4092.5	3744.0	3463.5	3318.6	3304.2
72.5°	2123.2	2158.5	2714.4	3343.4	4037.7	4369.1	4165.5	3604.4	3147.6	2963.6	2908.8
75°	1400.3	1425.1	2022.7	2920.6	3813.2	4225.6	3793.6	3104.6	2478.2	2239.4	2253.7
77.5°	623.8	703.4	1289.3	2278.5	3141.1	3400.8	2893.2	2118.0	1513.8	1281.5	1256.7
80°	261.0	285.8	486.8	1214.9	1820.5	1742.2	1231.9	709.9	451.5	351.0	339.3
82.5°	75.7	78.3	96.6	210.1	370.6	435.9	262.3	133.1	126.6	100.5	92.7
85°	5.2	5.2	7.8	13.0	18.3	30.0	33.9	39.1	44.4	37.8	37.8
87.5°	2.6	2.6	2.6	3.9	3.9	5.2	3.9	3.9	3.9	3.9	3.9
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



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

Report Prepared for

Cooper Lighting Solutions

Streetworks

Report Number: SP1-2407-157-8

Test Date: 09/05/2024

Luminaire Tested: MEM2-HTN-SA-40-840-U-5WQ

Data in this report applies to families of products including MEM2-HTN-SA-40-840-U-5WQ

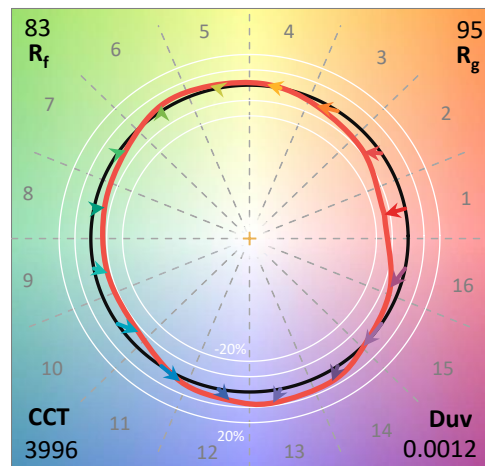
Test Information

Test Method: LM-79-2019
 Report Number: SP1-2407-157-8
 Test Lab: COOPER LIGHTING SOLUTIONS
 Photometer: SP1 - 76IN SPHERE
 Measurement Geometry: 4π
 Issue Date: 09/05/2024
 Manufacturer: COOPER LIGHTING SOLUTIONS
 Product Line: Streetworks
 Catalog Number: **MEM2-HTN-SA-40-840-U-5WQ**
 Description: Epic Modern Light Square 40W 5WQ Optic

Spectral Parameters

CCT (K): 3996
 CIE u': 0.2245
 CIE v': 0.5031
 Duv: 0.0012
 CIE x: 0.3815
 CIE y: 0.3799
 CIE z: 0.2386
 Peak Wavelength (nm): 449
 Dominant Wavelength (nm): 578
 Purity: 28.49233
 Rf: 82.6
 Rg: 95.1

CRI (Ra):	80.6		
R1:	78.1	R9:	-5.8
R2:	87.1	R10:	70.3
R3:	94.5	R11:	78.7
R4:	79.7	R12:	60.5
R5:	78.7	R13:	80.2
R6:	82.7	R14:	97.2
R7:	84.3	R15:	70.6
R8:	59.5		



Test Conditions

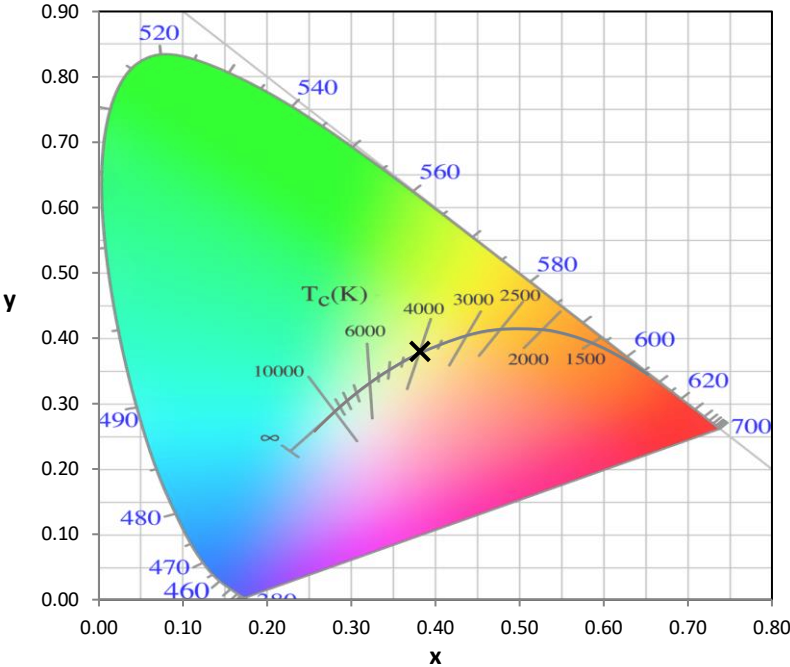
Stabilization Time: 29M
 Operation Time: 1H 29M
 Sphere Temperature (°C): 24.3

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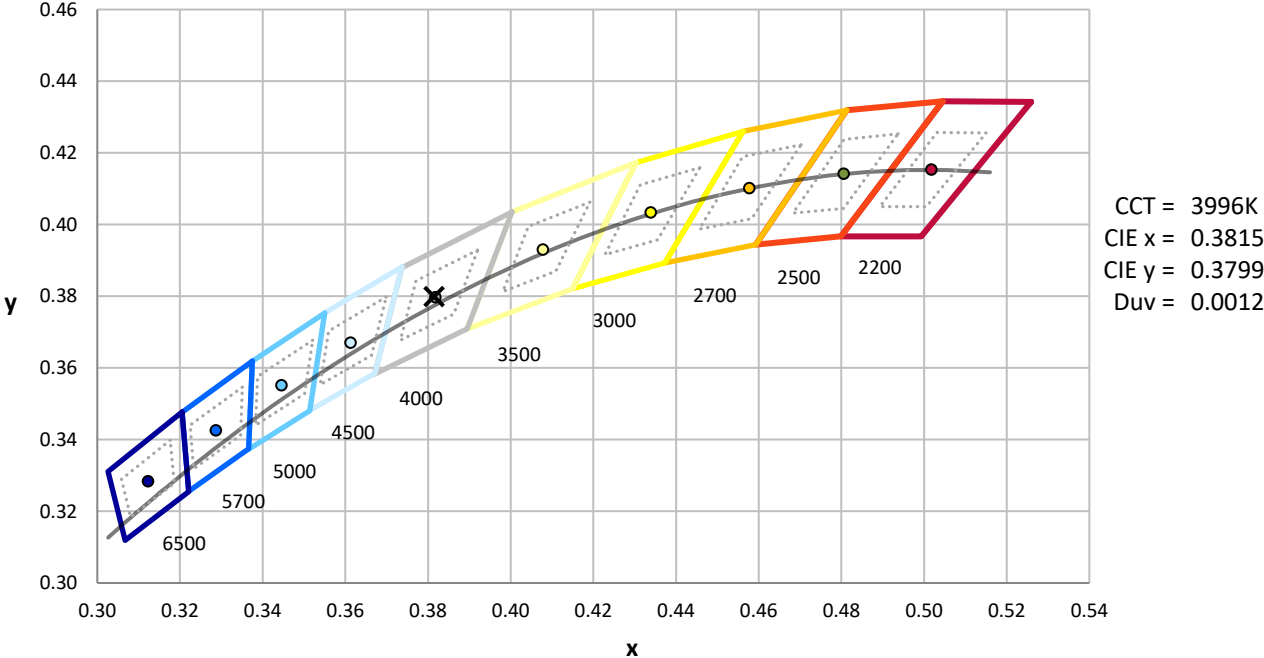
Measurement and Test Equipment			
Instrument	Identification Number	Calibration Date	Calibration Due Date
Photometer	IN0058	6/18/2024	12/18/2024
Power Meter	INXT2011004	2/8/2024	2/8/2025
AC Power Source	IN0063	10/24/2023	10/24/2024
DC Power Source	IN0208	10/24/2023	10/24/2024
Sphere Thermometer	IN0085	10/24/2023	10/24/2024
Room Thermometer	IN0046	10/24/2023	10/24/2024

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CIE 1931 Chromaticity Diagram



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

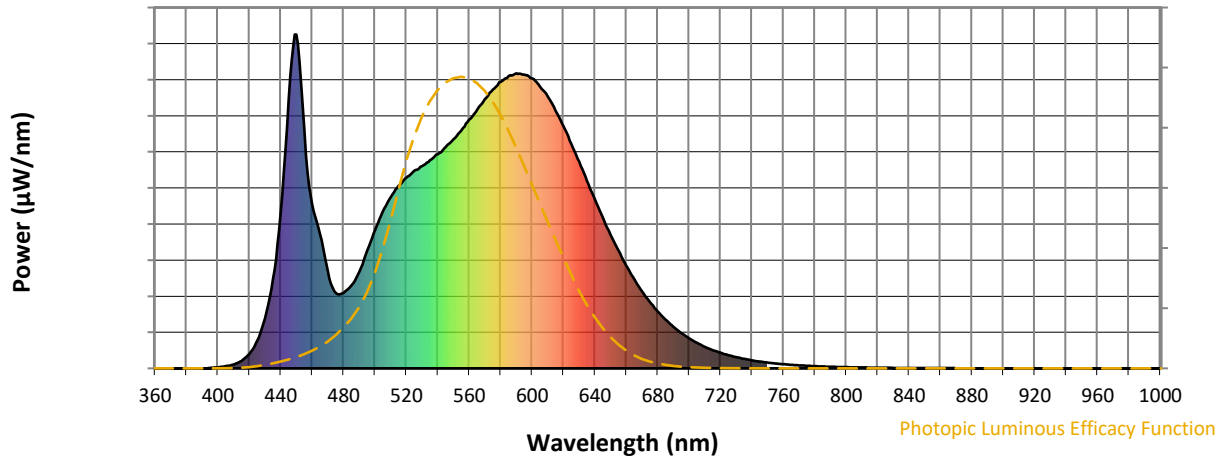


CCT = 3996K
 CIE x = 0.3815
 CIE y = 0.3799
 Duv = 0.0012

Point lies inside the ANSI 4000K 4-step quadrangle

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Photopic Flux vs. Wavelength

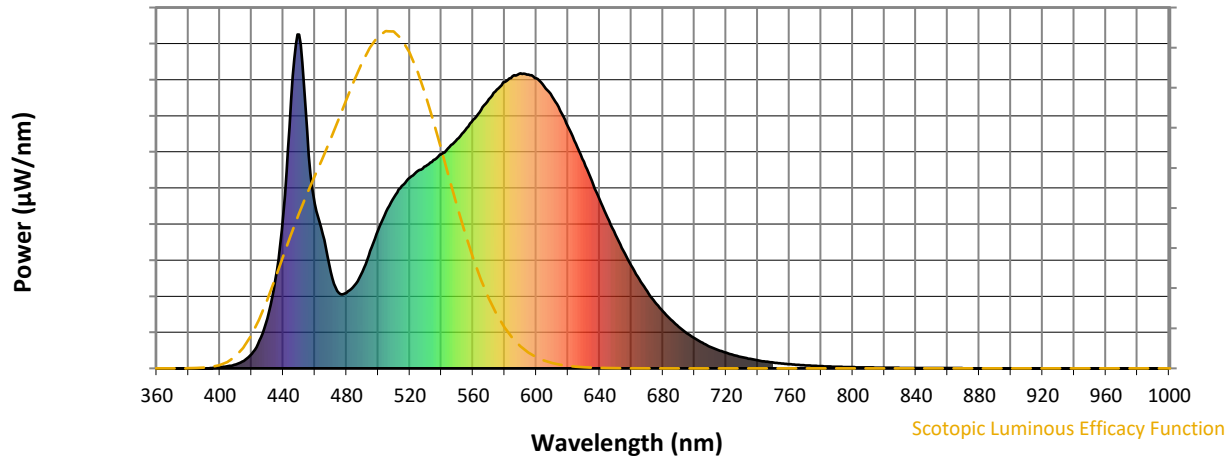


Photopic Lumens: NR

λ (nm)	Power W [^] /nm	Lumens (ϕ /nm)	λ (nm)	Power W [^] /nm	Lumens (ϕ /nm)	λ (nm)	Power W [^] /nm	Lumens (ϕ /nm)	λ (nm)	Power W [^] /nm	Lumens (ϕ /nm)	λ (nm)	Power W [^] /nm	Lumens (ϕ /nm)
360	0	NR	490	289	NR	620	725	NR	750	17	NR	880	0	NR
365	0	NR	495	351	NR	625	673	NR	755	15	NR	885	0	NR
370	0	NR	500	414	NR	630	619	NR	760	13	NR	890	0	NR
375	0	NR	505	470	NR	635	562	NR	765	11	NR	895	0	NR
380	0	NR	510	513	NR	640	506	NR	770	9	NR	900	0	NR
385	0	NR	515	546	NR	645	452	NR	775	8	NR	905	0	NR
390	0	NR	520	571	NR	650	400	NR	780	7	NR	910	0	NR
395	1	NR	525	592	NR	655	352	NR	785	6	NR	915	0	NR
400	3	NR	530	606	NR	660	307	NR	790	5	NR	920	0	NR
405	6	NR	535	624	NR	665	267	NR	795	4	NR	925	0	NR
410	12	NR	540	642	NR	670	231	NR	800	4	NR	930	0	NR
415	22	NR	545	663	NR	675	199	NR	805	3	NR	935	0	NR
420	44	NR	550	686	NR	680	171	NR	810	3	NR	940	0	NR
425	83	NR	555	713	NR	685	146	NR	815	2	NR	945	0	NR
430	150	NR	560	745	NR	690	125	NR	820	2	NR	950	0	NR
435	267	NR	565	774	NR	695	106	NR	825	2	NR	955	0	NR
440	466	NR	570	806	NR	700	90	NR	830	1	NR	960	0	NR
445	804	NR	575	835	NR	705	76	NR	835	1	NR	965	0	NR
450	1000	NR	580	858	NR	710	65	NR	840	1	NR	970	0	NR
455	715	NR	585	875	NR	715	55	NR	845	1	NR	975	0	NR
460	492	NR	590	884	NR	720	47	NR	850	1	NR	980	0	NR
465	402	NR	595	880	NR	725	40	NR	855	1	NR	985	0	NR
470	288	NR	600	868	NR	730	34	NR	860	1	NR	990	0	NR
475	226	NR	605	844	NR	735	28	NR	865	1	NR	995	0	NR
480	227	NR	610	814	NR	740	24	NR	870	0	NR	1000	0	NR
485	248	NR	615	771	NR	745	20	NR	875	0	NR			

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Scotopic Flux vs. Wavelength



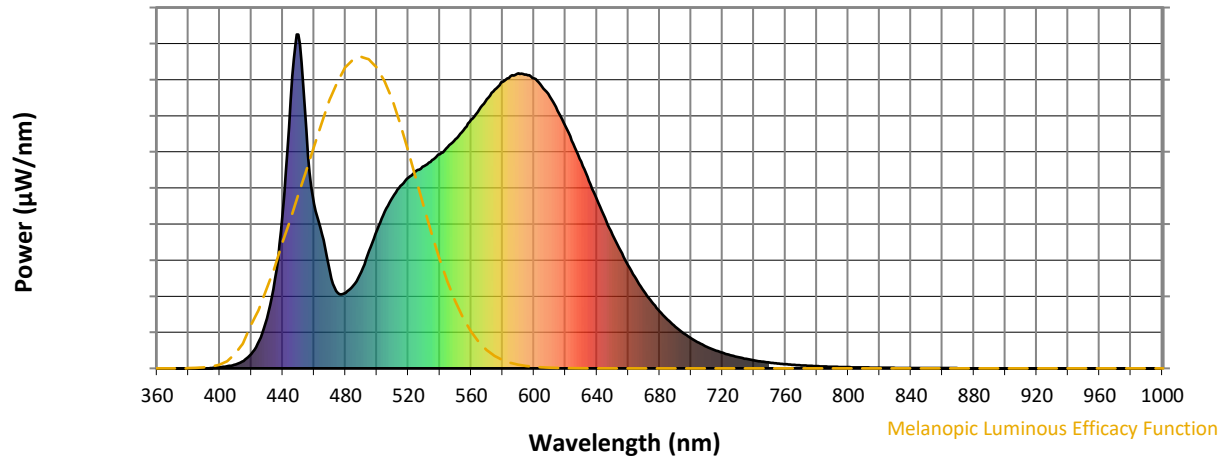
Scotopic Lumens: NR

S/P: 1.66

λ (nm)	Power W [^] /nm	Lumens (φ/nm)	λ (nm)	Power W [^] /nm	Lumens (φ/nm)	λ (nm)	Power W [^] /nm	Lumens (φ/nm)	λ (nm)	Power W [^] /nm	Lumens (φ/nm)	λ (nm)	Power W [^] /nm	Lumens (φ/nm)
360	0	NR	490	289	NR	620	725	NR	750	17	NR	880	0	NR
365	0	NR	495	351	NR	625	673	NR	755	15	NR	885	0	NR
370	0	NR	500	414	NR	630	619	NR	760	13	NR	890	0	NR
375	0	NR	505	470	NR	635	562	NR	765	11	NR	895	0	NR
380	0	NR	510	513	NR	640	506	NR	770	9	NR	900	0	NR
385	0	NR	515	546	NR	645	452	NR	775	8	NR	905	0	NR
390	0	NR	520	571	NR	650	400	NR	780	7	NR	910	0	NR
395	1	NR	525	592	NR	655	352	NR	785	6	NR	915	0	NR
400	3	NR	530	606	NR	660	307	NR	790	5	NR	920	0	NR
405	6	NR	535	624	NR	665	267	NR	795	4	NR	925	0	NR
410	12	NR	540	642	NR	670	231	NR	800	4	NR	930	0	NR
415	22	NR	545	663	NR	675	199	NR	805	3	NR	935	0	NR
420	44	NR	550	686	NR	680	171	NR	810	3	NR	940	0	NR
425	83	NR	555	713	NR	685	146	NR	815	2	NR	945	0	NR
430	150	NR	560	745	NR	690	125	NR	820	2	NR	950	0	NR
435	267	NR	565	774	NR	695	106	NR	825	2	NR	955	0	NR
440	466	NR	570	806	NR	700	90	NR	830	1	NR	960	0	NR
445	804	NR	575	835	NR	705	76	NR	835	1	NR	965	0	NR
450	1000	NR	580	858	NR	710	65	NR	840	1	NR	970	0	NR
455	715	NR	585	875	NR	715	55	NR	845	1	NR	975	0	NR
460	492	NR	590	884	NR	720	47	NR	850	1	NR	980	0	NR
465	402	NR	595	880	NR	725	40	NR	855	1	NR	985	0	NR
470	288	NR	600	868	NR	730	34	NR	860	1	NR	990	0	NR
475	226	NR	605	844	NR	735	28	NR	865	1	NR	995	0	NR
480	227	NR	610	814	NR	740	24	NR	870	0	NR	1000	0	NR
485	248	NR	615	771	NR	745	20	NR	875	0	NR			

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Melanopic Flux vs. Wavelength



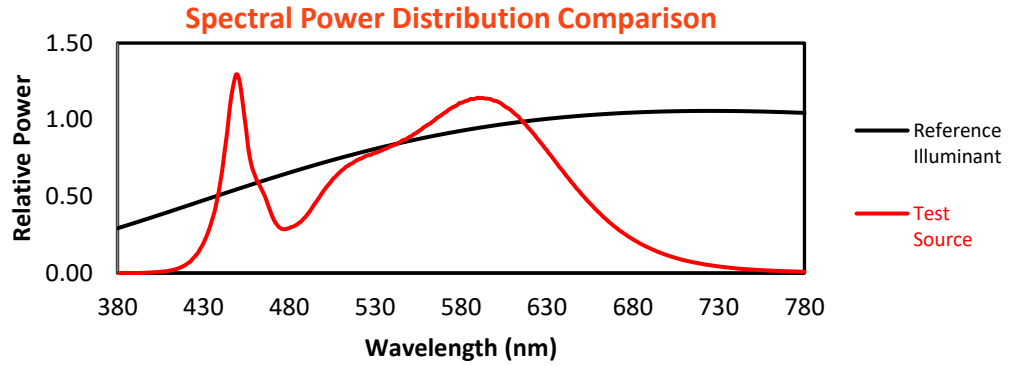
Melanopic Lumens: NR

M/P: 3.37

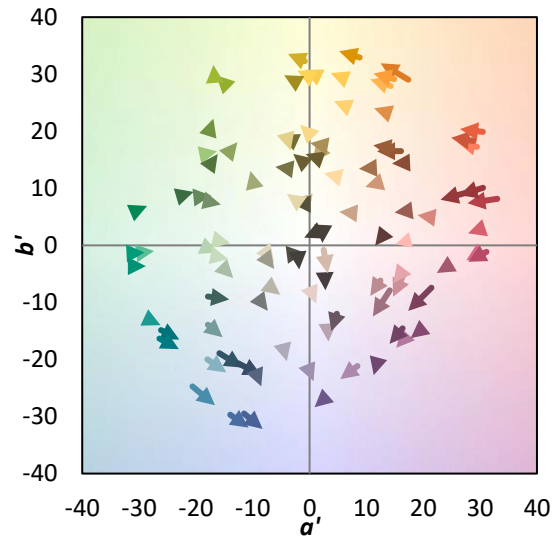
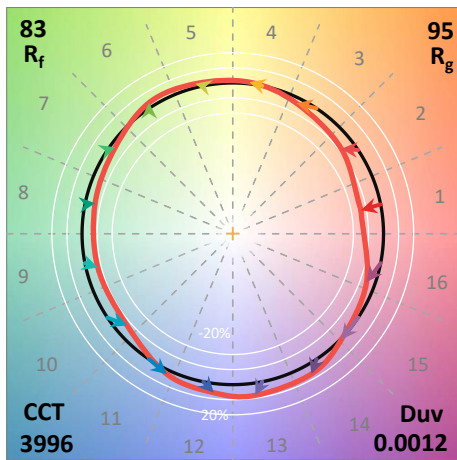
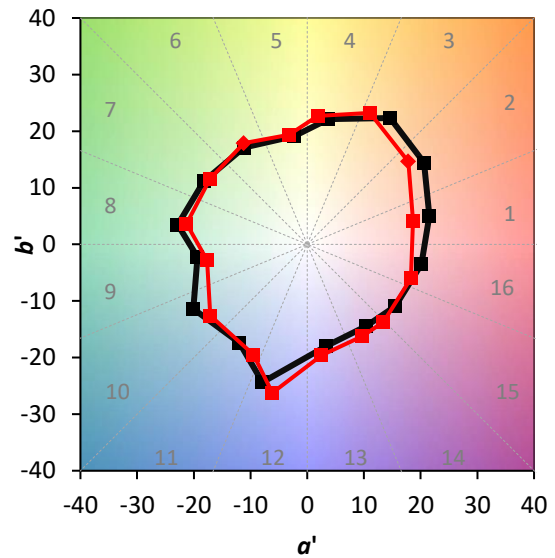
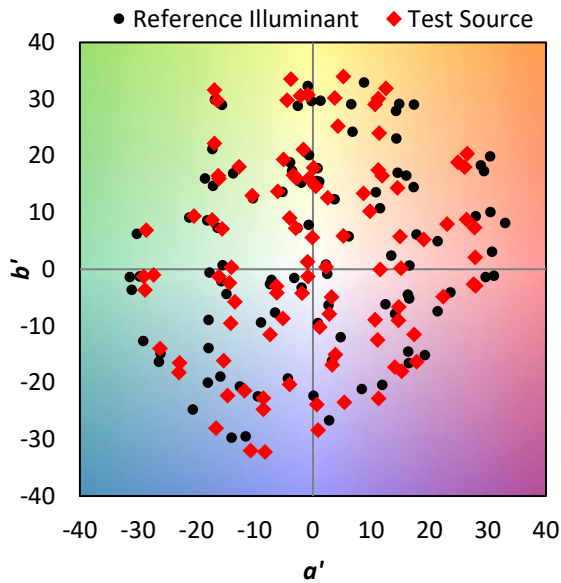
λ (nm)	Power W [^] /nm	Lumens (φ/nm)	λ (nm)	Power W [^] /nm	Lumens (φ/nm)	λ (nm)	Power W [^] /nm	Lumens (φ/nm)	λ (nm)	Power W [^] /nm	Lumens (φ/nm)	λ (nm)	Power W [^] /nm	Lumens (φ/nm)
360	0	NR	490	289	NR	620	725	NR	750	17	NR	880	0	NR
365	0	NR	495	351	NR	625	673	NR	755	15	NR	885	0	NR
370	0	NR	500	414	NR	630	619	NR	760	13	NR	890	0	NR
375	0	NR	505	470	NR	635	562	NR	765	11	NR	895	0	NR
380	0	NR	510	513	NR	640	506	NR	770	9	NR	900	0	NR
385	0	NR	515	546	NR	645	452	NR	775	8	NR	905	0	NR
390	0	NR	520	571	NR	650	400	NR	780	7	NR	910	0	NR
395	1	NR	525	592	NR	655	352	NR	785	6	NR	915	0	NR
400	3	NR	530	606	NR	660	307	NR	790	5	NR	920	0	NR
405	6	NR	535	624	NR	665	267	NR	795	4	NR	925	0	NR
410	12	NR	540	642	NR	670	231	NR	800	4	NR	930	0	NR
415	22	NR	545	663	NR	675	199	NR	805	3	NR	935	0	NR
420	44	NR	550	686	NR	680	171	NR	810	3	NR	940	0	NR
425	83	NR	555	713	NR	685	146	NR	815	2	NR	945	0	NR
430	150	NR	560	745	NR	690	125	NR	820	2	NR	950	0	NR
435	267	NR	565	774	NR	695	106	NR	825	2	NR	955	0	NR
440	466	NR	570	806	NR	700	90	NR	830	1	NR	960	0	NR
445	804	NR	575	835	NR	705	76	NR	835	1	NR	965	0	NR
450	1000	NR	580	858	NR	710	65	NR	840	1	NR	970	0	NR
455	715	NR	585	875	NR	715	55	NR	845	1	NR	975	0	NR
460	492	NR	590	884	NR	720	47	NR	850	1	NR	980	0	NR
465	402	NR	595	880	NR	725	40	NR	855	1	NR	985	0	NR
470	288	NR	600	868	NR	730	34	NR	860	1	NR	990	0	NR
475	226	NR	605	844	NR	735	28	NR	865	1	NR	995	0	NR
480	227	NR	610	814	NR	740	24	NR	870	0	NR	1000	0	NR
485	248	NR	615	771	NR	745	20	NR	875	0	NR			

Summary

$R_f = 82.6$
 $R_g = 95.1$
 CIE $R_a = 80.6$
 $R_9 = -5.8$

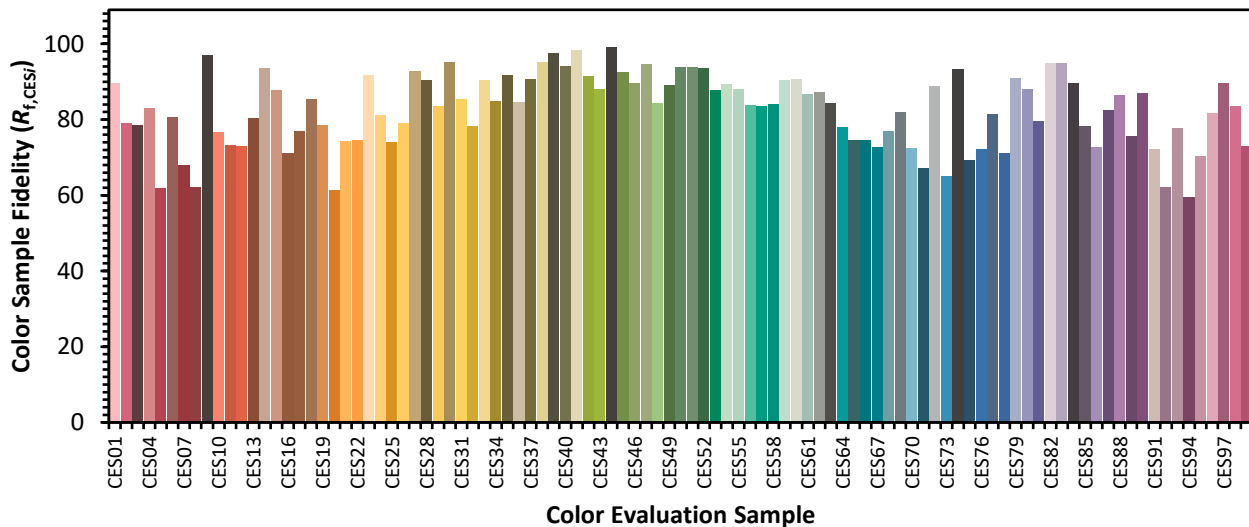


Color Vector Graphics

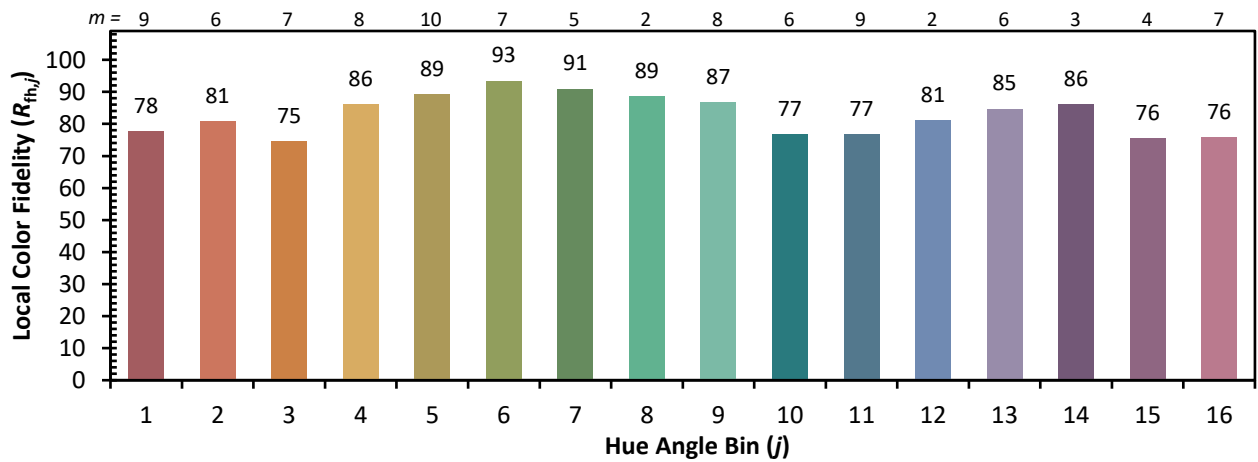
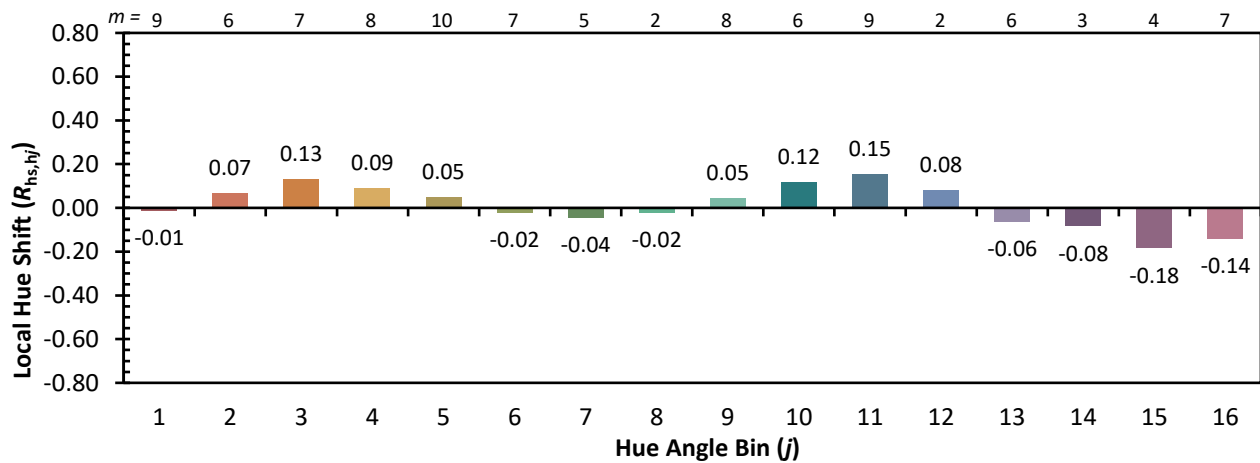
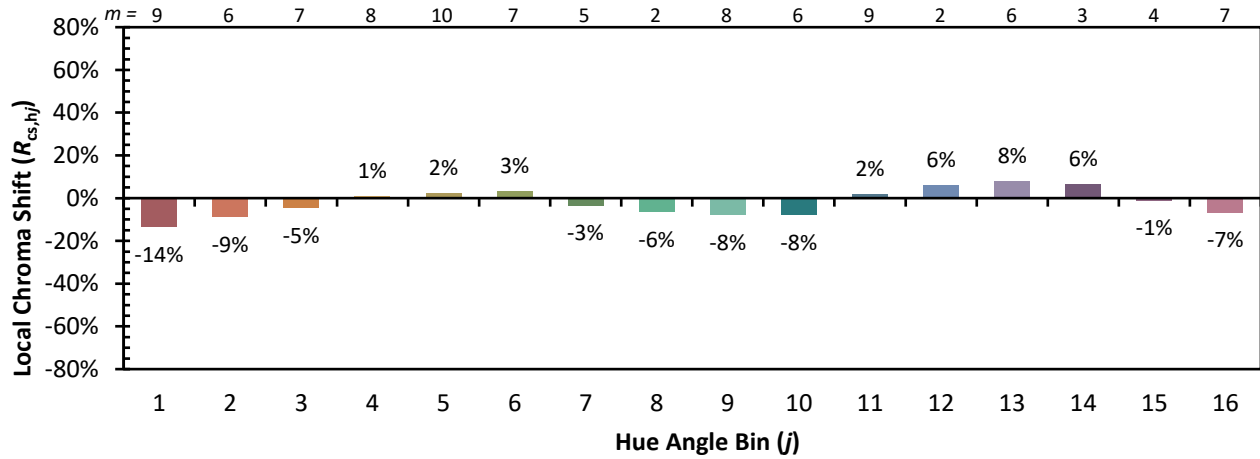


Individual Sample Fidelity Index ($R_{f,i}$)

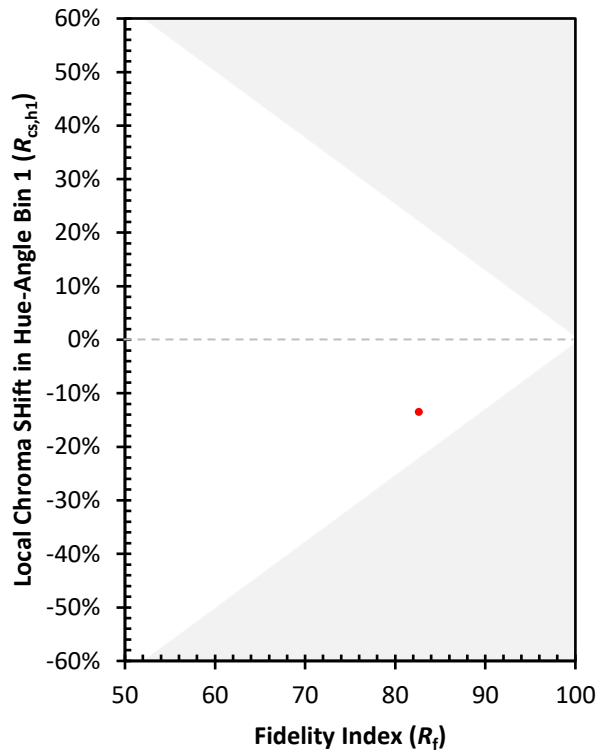
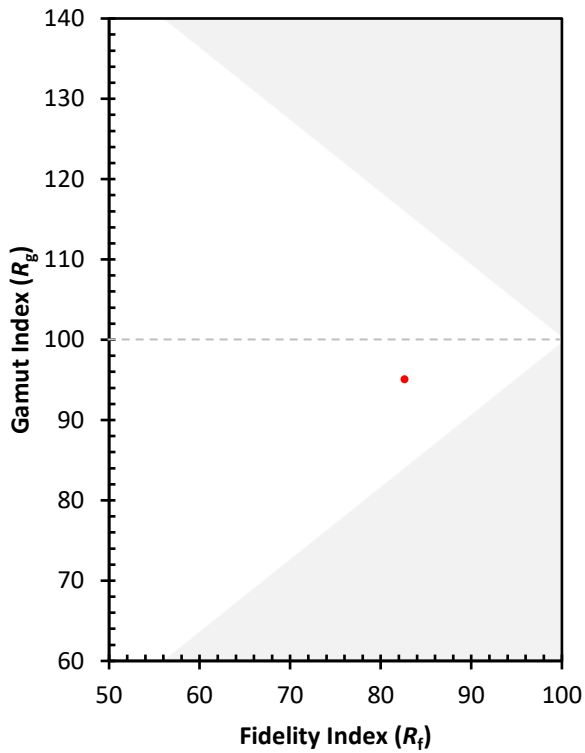
CES01 = 85	CES26 = 79	CES51 = 94	CES76 = 72
CES02 = 61	CES27 = 93	CES52 = 94	CES77 = 82
CES03 = 31	CES28 = 90	CES53 = 88	CES78 = 71
CES04 = 69	CES29 = 83	CES54 = 89	CES79 = 91
CES05 = 48	CES30 = 95	CES55 = 88	CES80 = 88
CES06 = 50	CES31 = 86	CES56 = 84	CES81 = 80
CES07 = 40	CES32 = 78	CES57 = 84	CES82 = 95
CES08 = 39	CES33 = 90	CES58 = 84	CES83 = 95
CES09 = 29	CES34 = 85	CES59 = 90	CES84 = 90
CES10 = 74	CES35 = 92	CES60 = 91	CES85 = 78
CES11 = 57	CES36 = 85	CES61 = 87	CES86 = 73
CES12 = 63	CES37 = 91	CES62 = 87	CES87 = 83
CES13 = 42	CES38 = 95	CES63 = 84	CES88 = 86
CES14 = 74	CES39 = 98	CES64 = 78	CES89 = 76
CES15 = 71	CES40 = 94	CES65 = 75	CES90 = 87
CES16 = 46	CES41 = 98	CES66 = 75	CES91 = 72
CES17 = 49	CES42 = 92	CES67 = 73	CES92 = 62
CES18 = 56	CES43 = 88	CES68 = 77	CES93 = 78
CES19 = 71	CES44 = 99	CES69 = 82	CES94 = 60
CES20 = 65	CES45 = 93	CES70 = 72	CES95 = 70
CES21 = 86	CES46 = 90	CES71 = 67	CES96 = 82
CES22 = 78	CES47 = 95	CES72 = 89	CES97 = 90
CES23 = 91	CES48 = 84	CES73 = 65	CES98 = 84
CES24 = 90	CES49 = 89	CES74 = 93	CES99 = 73
CES25 = 71	CES50 = 94	CES75 = 69	



Color Rendition by Hue-Angle Bin



Measure Comparisons



(END OF REPORT)