

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: P879751

Luminaire Tested: **EMM2-HSN-VA9-740-U-CQ**

Issue Date: 10/01/2024



Test Information

Test Method: LM-79-08
Report Number: P879751
Test Lab: INNOVATION CENTER(G3)
Issue Date: 10/01/2024
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)
Product Line: INVUE
Catalog Number: EMM2-HSN-VA9-740-U-CQ
Description: EPIC MODERN SHORT HOUSING 9W 70CRI 4000K WAVESTREAM FIXTURE w/
TYPE V CONCENTRATED DISTRIBUTION OPTIC
Light Source: (1) 4000K CCT, 70 CRI LEDS
Ballast/Driver: ELECTRONIC DRIVER

Summary

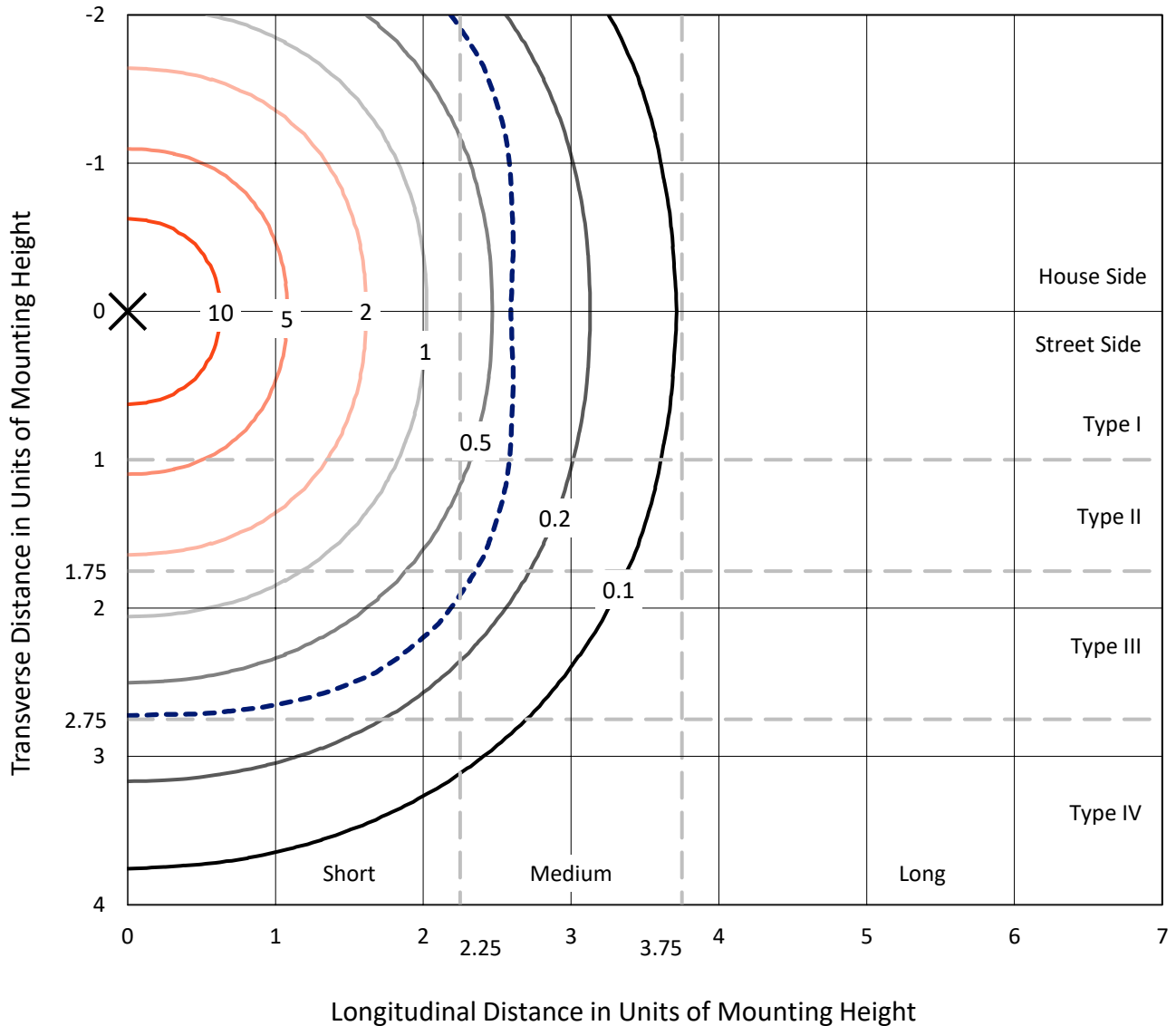
Lumens per Lamp: N/A
Luminaire Lumens: 15983.6 lumens
Efficiency: N/A
Efficacy: 94.0 lumens/watt
Luminous Opening: Circular (Dia: 1.12' x H: 0')
IES Classification: Type V - Short
BUG Rating: B3 - U0 - G2

Input Watts (W): 170
Input Voltage (V): 120
Input Current (Ain): NR
Voltage Rise (V): NR
Power Factor: 0.995
Total Harmonic Distortion (THDi): 5.9%
Frequency (hertz): 60
Stabilization Time: NR
Operation Time: NR
Ambient Temperature (°C): NR
Test Distance: 24 FT

REPORT NUMBER: P879751
 CATALOG NUMBER: EMM2-HSN-VA9-740-U-CQ

Iso-Footcandle Lines of Horizontal Illumination

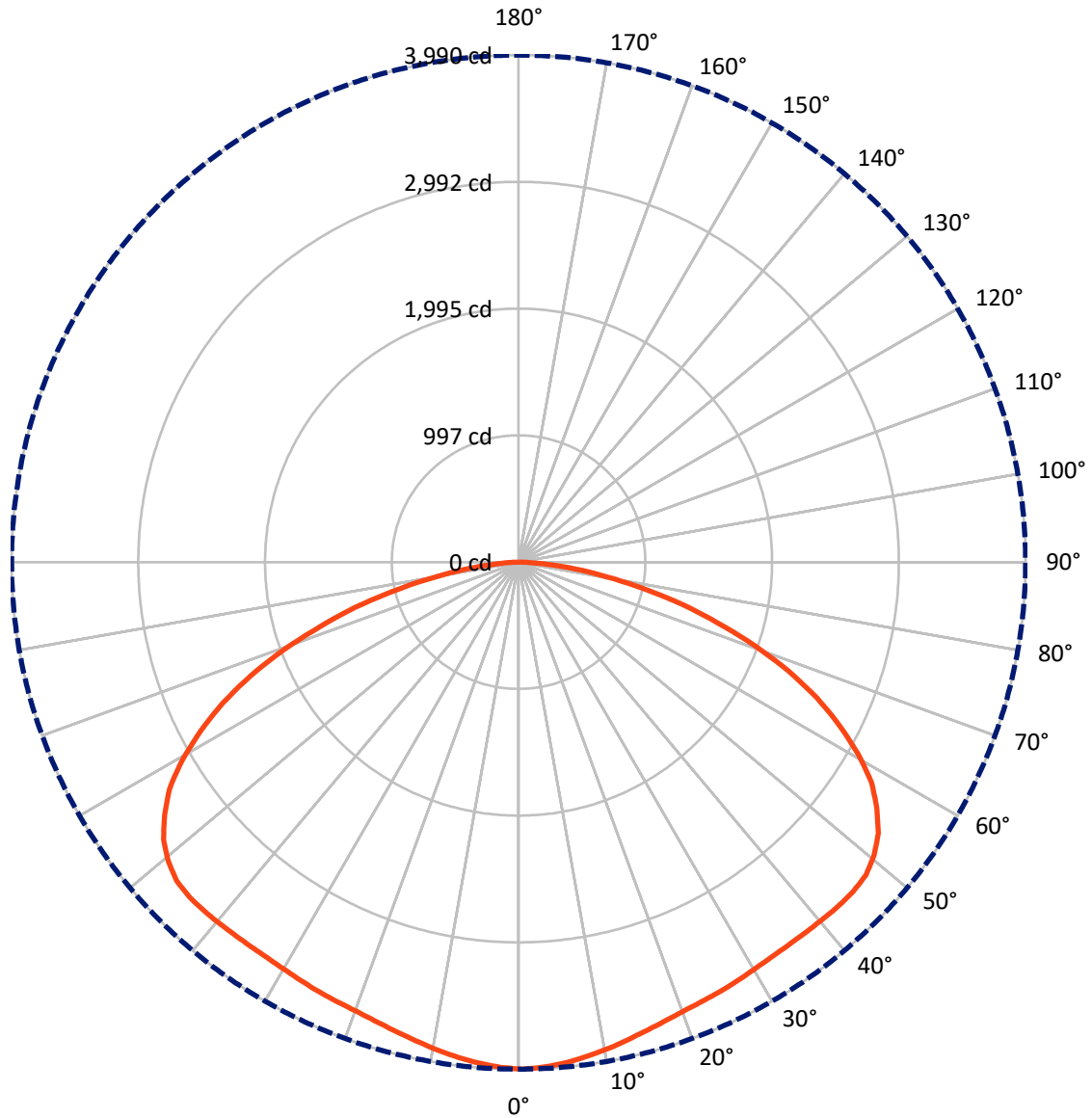
✕ Max cd
 - - - 1/2 Max cd



Based on 15 foot mounting height. Maximum calculated value = 17.7 fc
 Type V - Short - N/A

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Luminous Intensity Polar Plot



— Vertical Plane Through 0-Deg Lateral - - - Horizontal Cone Through 0-Deg Vertical

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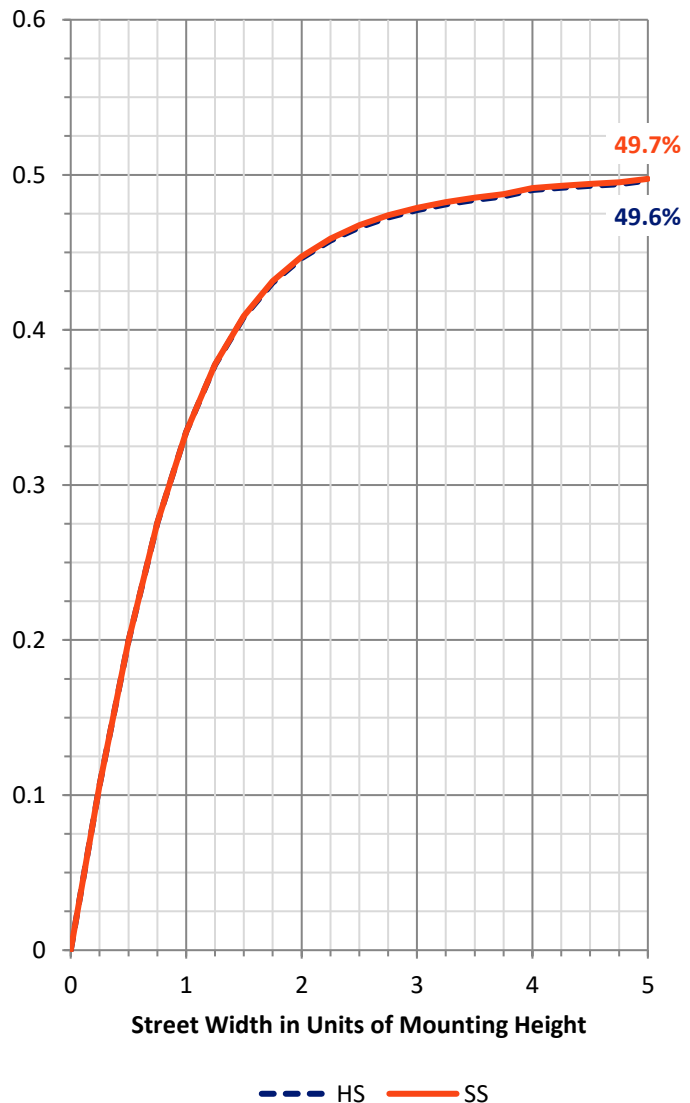
FLUX DISTRIBUTION:

		Downward	Upward	Total
House Side	Lumens	7991.8	0.0	7991.8
	% Fixture	50.0	0.0	50.0
Street Side	Lumens	7991.8	0.0	7991.8
	% Fixture	50.0	0.0	50.0
Total	Lumens	15983.6	0.0	15983.6
	% Fixture	100.0	0.0	100.0

Coefficient of Utilization

ZONAL LUMENS:

Zone	Lumens	% Fixture
0°-10°	376.0	2.4
10°-20°	1084.8	6.8
20°-30°	1736.9	10.9
30°-40°	2352.8	14.7
40°-50°	2905.5	18.2
50°-60°	3121.7	19.5
60°-70°	2625.1	16.4
70°-80°	1465.9	9.2
80°-90°	315.0	2.0
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°	15983.6	100.0
0°-180°	15983.6	100.0



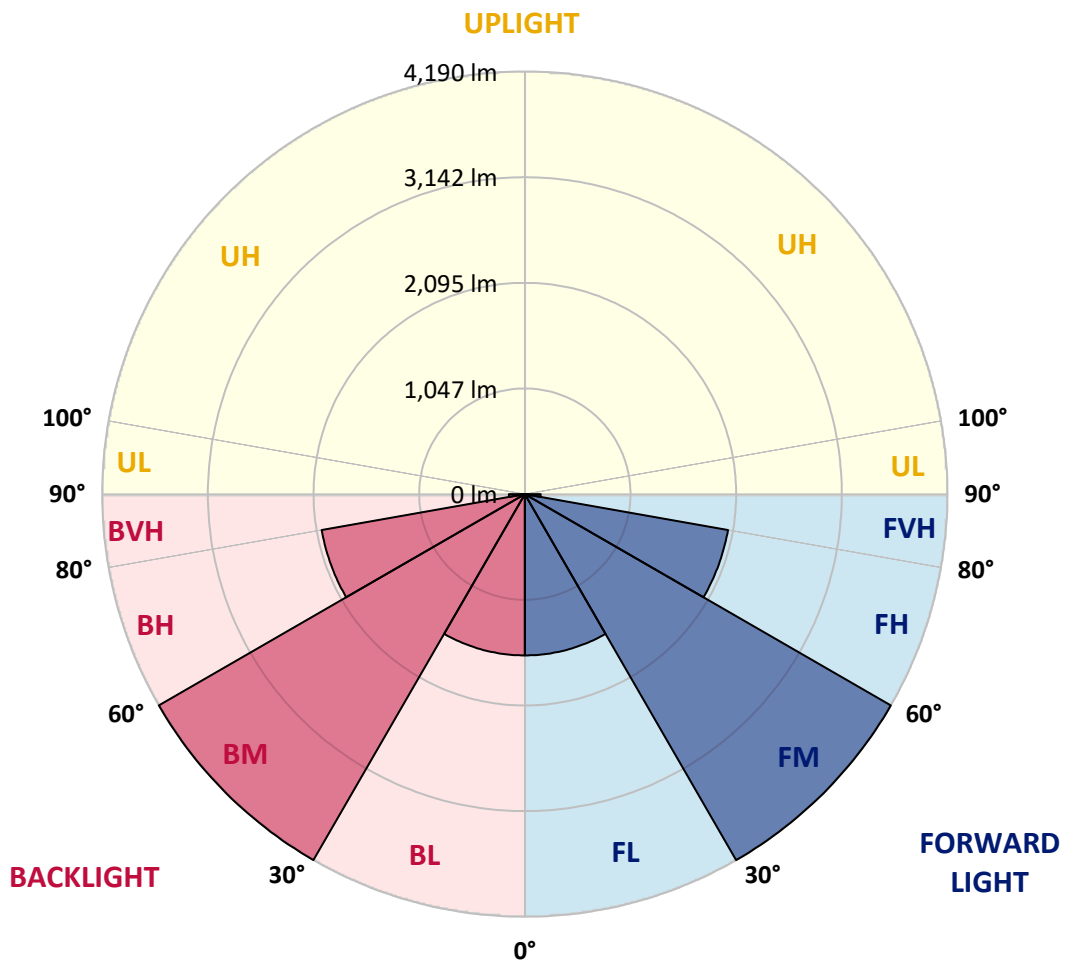
REPORT NUMBER: P879751
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LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

Zone	Lumens	% Fixture	Zone Rating/Lumen Limit		
			B	U	G
FL (0°-30°)	1598.8	10.0			
FM (30°-60°)	4190.0	26.2			
FH (60°-80°)	2045.5	12.8			G2/5000
FVH (80°-90°)	157.5	1.0			G2/225
BL (0°-30°)	1598.8	10.0	B3/2500		
BM (30°-60°)	4190.0	26.2	B3/5000		
BH (60°-80°)	2045.5	12.8	B3/2500		G2/5000
BVH (80°-90°)	157.5	1.0			G2/225
UL (90°-100°)	0.0	0.0		U0/0	
UH (100°-180°)	0.0	0.0		U0/0	

BUG Rating: B3-U0-G2

Type V Short





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CATALOG NUMBER: EMM2-HSN-VA9-740-U-CQ

CANDELA DISTRIBUTION (FULL):

	0°	5°	15°	25°	35°	45°	55°	65°	75°	85°	90°
0°	3989.7	3989.7	3989.7	3989.7	3989.7	3989.7	3989.7	3989.7	3989.7	3989.7	3989.7
2.5°	3977.8	3981.8	3980.8	3980.8	3980.8	3982.8	3982.8	3982.8	3983.7	3983.7	3984.7
5°	3955.0	3958.0	3958.0	3958.0	3960.0	3960.9	3960.9	3961.9	3963.9	3962.9	3961.9
7.5°	3924.3	3927.3	3927.3	3927.3	3929.2	3931.2	3931.2	3930.2	3933.2	3933.2	3932.2
10°	3891.6	3892.6	3893.6	3895.5	3898.5	3899.5	3898.5	3898.5	3897.5	3898.5	3898.5
12.5°	3852.9	3857.9	3858.9	3860.9	3865.8	3866.8	3866.8	3865.8	3864.8	3864.8	3863.8
15°	3818.2	3820.2	3823.2	3827.2	3833.1	3835.1	3836.1	3833.1	3830.1	3829.1	3830.1
17.5°	3786.5	3789.5	3793.5	3797.4	3805.4	3809.3	3809.3	3805.4	3801.4	3799.4	3799.4
20°	3760.8	3763.7	3768.7	3774.6	3785.5	3790.5	3788.5	3784.6	3777.6	3774.6	3775.6
22.5°	3743.9	3747.9	3751.9	3760.8	3772.7	3778.6	3776.6	3769.7	3761.8	3756.8	3756.8
25°	3730.1	3733.0	3739.0	3750.9	3763.7	3770.7	3767.7	3758.8	3747.9	3741.9	3741.0
27.5°	3714.2	3718.2	3726.1	3741.9	3757.8	3763.7	3761.8	3748.9	3736.0	3728.1	3726.1
30°	3699.3	3703.3	3714.2	3732.0	3751.9	3760.8	3755.8	3741.9	3726.1	3716.2	3715.2
32.5°	3689.4	3694.4	3707.3	3730.1	3753.8	3766.7	3761.8	3744.9	3724.1	3711.2	3710.2
35°	3685.5	3690.4	3709.2	3737.0	3766.7	3784.6	3777.6	3756.8	3731.0	3715.2	3713.2
37.5°	3686.4	3692.4	3716.2	3752.8	3790.5	3809.3	3800.4	3773.7	3741.0	3719.2	3716.2
40°	3690.4	3697.3	3728.1	3773.7	3818.2	3836.1	3822.2	3782.6	3738.0	3707.3	3701.3
42.5°	3695.4	3706.3	3743.9	3797.4	3844.0	3858.9	3834.1	3775.6	3713.2	3673.6	3668.6
45°	3694.4	3703.3	3746.9	3810.3	3859.9	3867.8	3827.2	3753.8	3680.5	3629.0	3625.0
47.5°	3677.5	3686.4	3736.0	3806.4	3854.9	3856.9	3808.3	3724.1	3637.9	3578.4	3572.5
50°	3625.0	3636.9	3692.4	3769.7	3824.2	3825.2	3771.7	3678.5	3578.4	3509.1	3499.2
52.5°	3544.7	3553.7	3618.1	3701.3	3762.8	3770.7	3712.2	3604.2	3490.2	3415.9	3409.0
55°	3419.9	3437.7	3506.1	3593.3	3660.7	3669.6	3611.1	3494.2	3377.3	3292.0	3284.1
57.5°	3275.2	3278.2	3350.5	3445.6	3516.0	3525.9	3462.5	3343.6	3221.7	3142.4	3122.6
60°	3071.0	3082.9	3151.3	3244.5	3318.8	3331.7	3271.2	3156.3	3029.4	2939.2	2938.3
62.5°	2835.2	2849.1	2918.4	3017.5	3092.9	3105.7	3041.3	2929.3	2802.5	2725.2	2697.4
65°	2579.5	2583.5	2652.9	2751.0	2819.3	2826.3	2775.7	2669.7	2538.9	2459.6	2441.8
67.5°	2292.1	2296.1	2349.6	2441.8	2515.1	2525.0	2473.5	2376.4	2258.4	2175.2	2166.3
70°	1974.0	1975.0	2027.5	2102.9	2176.2	2197.0	2150.4	2057.3	1944.3	1877.9	1860.1
72.5°	1639.1	1648.0	1694.6	1772.9	1835.3	1840.3	1802.6	1722.3	1630.2	1575.7	1565.7
75°	1332.9	1326.9	1366.6	1414.1	1462.7	1478.5	1447.8	1393.3	1308.1	1260.5	1270.4
77.5°	1000.9	1002.9	1033.6	1077.2	1107.9	1135.7	1101.0	1075.2	1006.8	952.3	954.3
80°	707.6	705.6	734.3	755.1	789.8	793.8	774.9	740.3	696.7	673.9	671.9
82.5°	447.9	439.0	460.8	487.6	502.4	495.5	499.5	476.7	442.0	430.1	419.2
85°	228.9	226.9	238.8	248.7	259.6	259.6	253.7	235.9	228.9	215.0	211.1
87.5°	78.3	81.3	85.2	82.3	87.2	85.2	83.2	70.4	62.4	58.5	54.5
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: SP1-2407-176-9

Test Date: 09/25/2024

Luminaire Tested: MEM2-HTN-VA-130-740-U-RW

Data in this report applies to families of products including MEM2-HTN-VA-130-740-U-RW

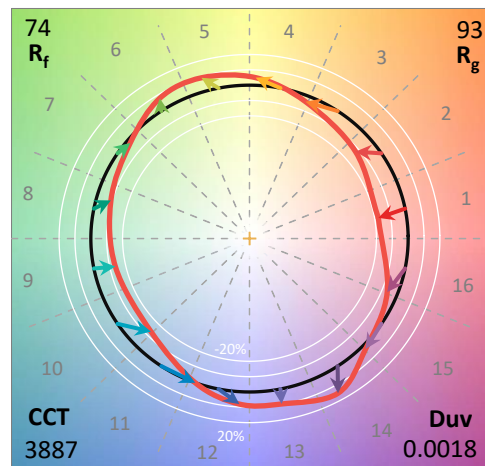
Test Information

Test Method: LM-79-2019
 Report Number: SP1-2407-176-9
 Test Lab: COOPER LIGHTING SOLUTIONS
 Photometer: SP1 - 76IN SPHERE
 Measurement Geometry: 4π
 Issue Date: 09/27/2024
 Manufacturer: COOPER LIGHTING SOLUTIONS
 Product Line: Streetworks
 Catalog Number: **MEM2-HTN-VA-130-740-U-RW**
 Description: EPIC MODERN VISUAL COMFORT 130W WAVESTREAM RECTANGULAR WIDE

Spectral Parameters

CCT (K): 3887
 CIE u': 0.2262
 CIE v': 0.5060
 Duv: 0.0018
 CIE x: 0.3870
 CIE y: 0.3847
 CIE z: 0.2283
 Peak Wavelength (nm): 583
 Dominant Wavelength (nm): 578
 Purity: 31.59626
 Rf: 74.5
 Rg: 93.5

CRI (Ra):	71.4		
R1:	67.6	R9:	-36.8
R2:	78.8	R10:	50.4
R3:	88.2	R11:	65.0
R4:	69.8	R12:	44.4
R5:	67.7	R13:	69.4
R6:	70.3	R14:	93.3
R7:	80.1	R15:	59.9
R8:	49.0		



Test Conditions

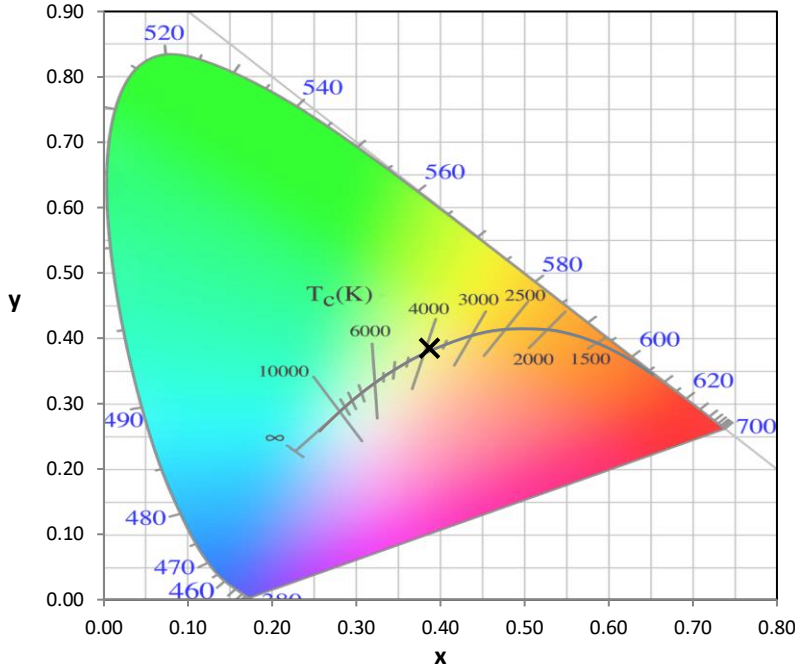
Stabilization Time: 50M
 Operation Time: 1H 50M
 Sphere Temperature (°C): 25.2

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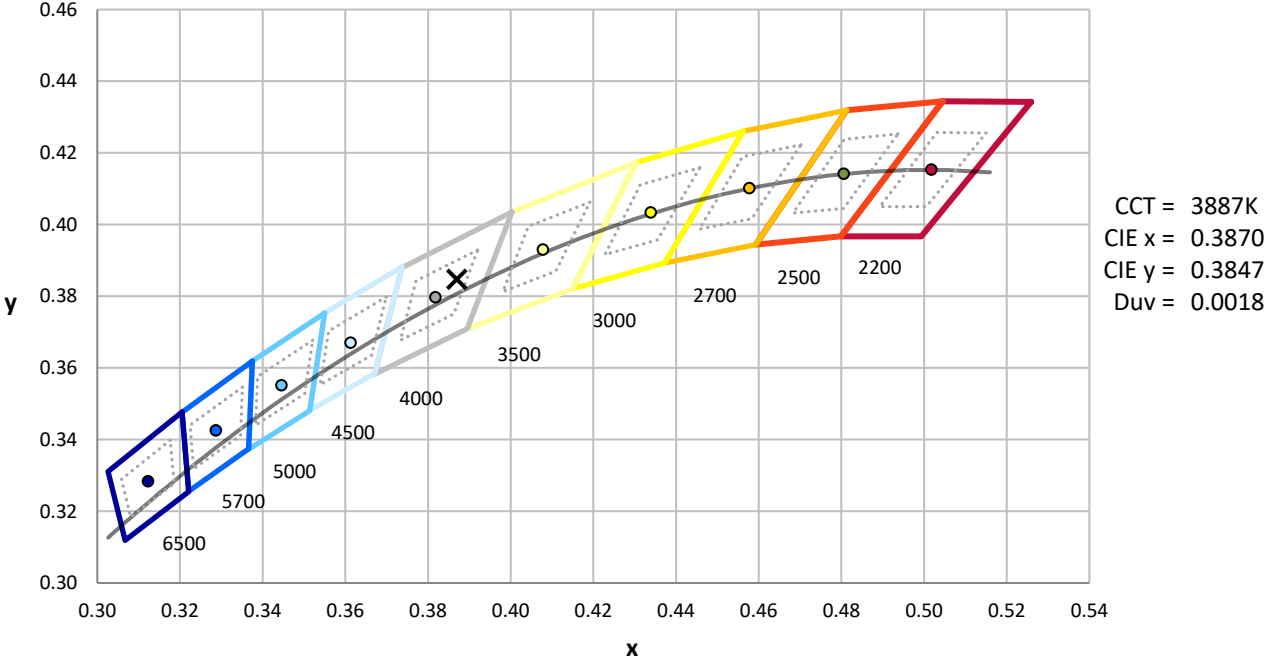
Measurement and Test Equipment			
Instrument	Identification Number	Calibration Date	Calibration Due Date
Photometer	IN0058	6/18/2024	12/18/2024
Power Meter	INXT2011004	2/8/2024	2/8/2025
AC Power Source	IN0063	10/24/2023	10/24/2024
DC Power Source	IN0208	10/24/2023	10/24/2024
Sphere Thermometer	IN0085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

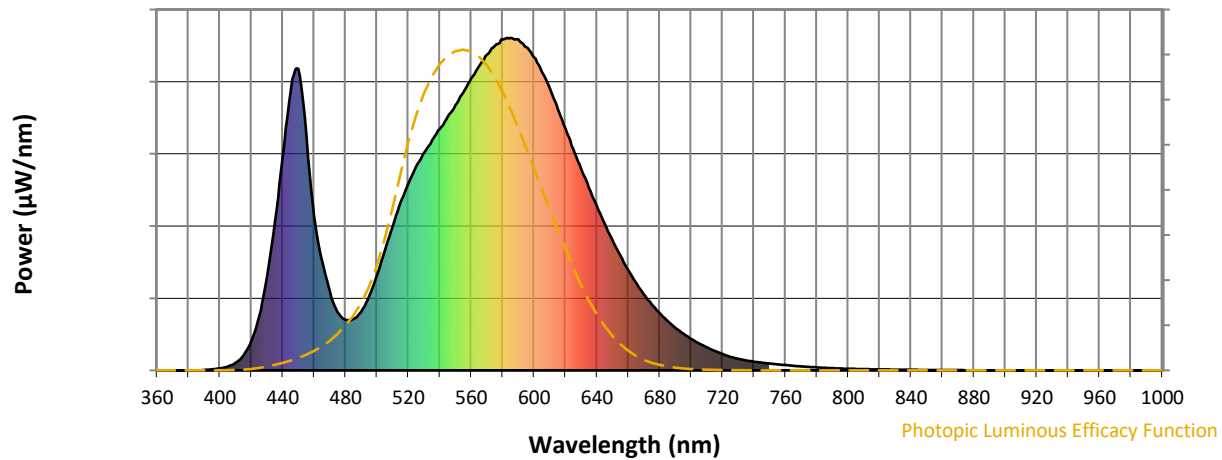


CCT = 3887K
 CIE x = 0.3870
 CIE y = 0.3847
 Duv = 0.0018

Point lies inside the ANSI 4000K 4-step quadrangle

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Photopic Flux vs. Wavelength

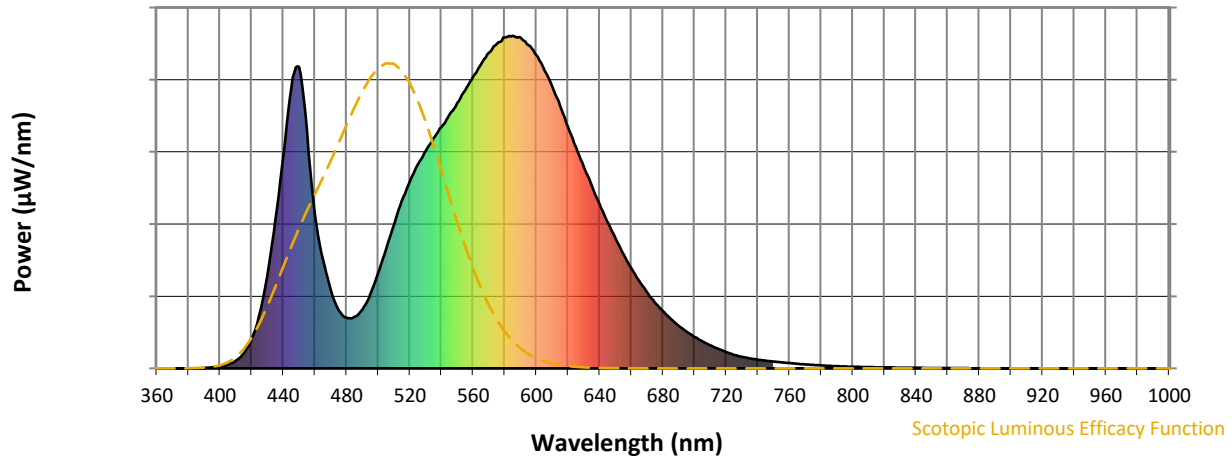


Photopic Lumens: NR

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	177	NR	620	727	NR	750	21	NR	880	0	NR
365	0	NR	495	222	NR	625	666	NR	755	18	NR	885	0	NR
370	0	NR	500	286	NR	630	606	NR	760	16	NR	890	0	NR
375	0	NR	505	359	NR	635	549	NR	765	14	NR	895	0	NR
380	0	NR	510	433	NR	640	493	NR	770	12	NR	900	0	NR
385	0	NR	515	505	NR	645	440	NR	775	10	NR	905	0	NR
390	1	NR	520	562	NR	650	390	NR	780	9	NR	910	0	NR
395	3	NR	525	613	NR	655	344	NR	785	8	NR	915	0	NR
400	6	NR	530	654	NR	660	301	NR	790	7	NR	920	0	NR
405	11	NR	535	692	NR	665	263	NR	795	6	NR	925	0	NR
410	23	NR	540	726	NR	670	228	NR	800	5	NR	930	0	NR
415	45	NR	545	763	NR	675	198	NR	805	4	NR	935	0	NR
420	88	NR	550	798	NR	680	172	NR	810	4	NR	940	0	NR
425	164	NR	555	837	NR	685	148	NR	815	3	NR	945	0	NR
430	281	NR	560	878	NR	690	128	NR	820	3	NR	950	0	NR
435	447	NR	565	915	NR	695	110	NR	825	2	NR	955	0	NR
440	642	NR	570	948	NR	700	95	NR	830	2	NR	960	0	NR
445	838	NR	575	976	NR	705	81	NR	835	2	NR	965	0	NR
450	907	NR	580	995	NR	710	69	NR	840	2	NR	970	0	NR
455	710	NR	585	1000	NR	715	58	NR	845	1	NR	975	0	NR
460	465	NR	590	995	NR	720	49	NR	850	1	NR	980	0	NR
465	330	NR	595	972	NR	725	41	NR	855	1	NR	985	0	NR
470	236	NR	600	941	NR	730	35	NR	860	1	NR	990	0	NR
475	174	NR	605	898	NR	735	30	NR	865	1	NR	995	0	NR
480	152	NR	610	848	NR	740	26	NR	870	1	NR	1000	0	NR
485	155	NR	615	788	NR	745	23	NR	875	0	NR			

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Scotopic Flux vs. Wavelength



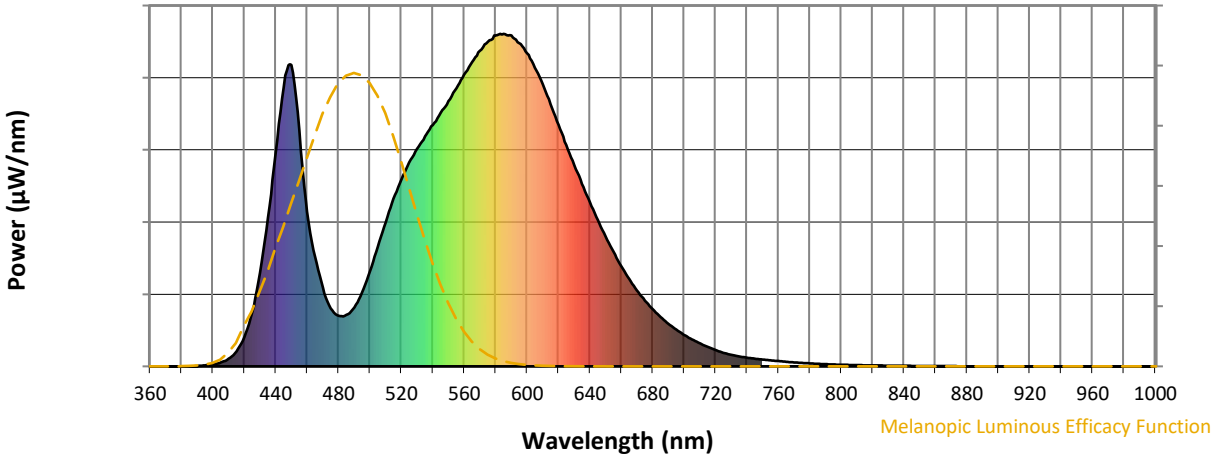
Scotopic Lumens: NR

S/P: 1.49

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	177	NR	620	727	NR	750	21	NR	880	0	NR
365	0	NR	495	222	NR	625	666	NR	755	18	NR	885	0	NR
370	0	NR	500	286	NR	630	606	NR	760	16	NR	890	0	NR
375	0	NR	505	359	NR	635	549	NR	765	14	NR	895	0	NR
380	0	NR	510	433	NR	640	493	NR	770	12	NR	900	0	NR
385	0	NR	515	505	NR	645	440	NR	775	10	NR	905	0	NR
390	1	NR	520	562	NR	650	390	NR	780	9	NR	910	0	NR
395	3	NR	525	613	NR	655	344	NR	785	8	NR	915	0	NR
400	6	NR	530	654	NR	660	301	NR	790	7	NR	920	0	NR
405	11	NR	535	692	NR	665	263	NR	795	6	NR	925	0	NR
410	23	NR	540	726	NR	670	228	NR	800	5	NR	930	0	NR
415	45	NR	545	763	NR	675	198	NR	805	4	NR	935	0	NR
420	88	NR	550	798	NR	680	172	NR	810	4	NR	940	0	NR
425	164	NR	555	837	NR	685	148	NR	815	3	NR	945	0	NR
430	281	NR	560	878	NR	690	128	NR	820	3	NR	950	0	NR
435	447	NR	565	915	NR	695	110	NR	825	2	NR	955	0	NR
440	642	NR	570	948	NR	700	95	NR	830	2	NR	960	0	NR
445	838	NR	575	976	NR	705	81	NR	835	2	NR	965	0	NR
450	907	NR	580	995	NR	710	69	NR	840	2	NR	970	0	NR
455	710	NR	585	1000	NR	715	58	NR	845	1	NR	975	0	NR
460	465	NR	590	995	NR	720	49	NR	850	1	NR	980	0	NR
465	330	NR	595	972	NR	725	41	NR	855	1	NR	985	0	NR
470	236	NR	600	941	NR	730	35	NR	860	1	NR	990	0	NR
475	174	NR	605	898	NR	735	30	NR	865	1	NR	995	0	NR
480	152	NR	610	848	NR	740	26	NR	870	1	NR	1000	0	NR
485	155	NR	615	788	NR	745	23	NR	875	0	NR			

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Melanopic Flux vs. Wavelength



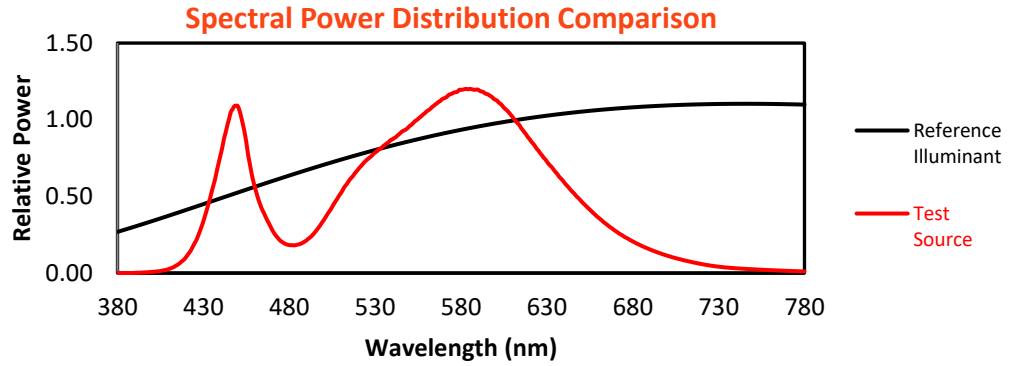
Melanopic Lumens: NR

M/P: 2.89

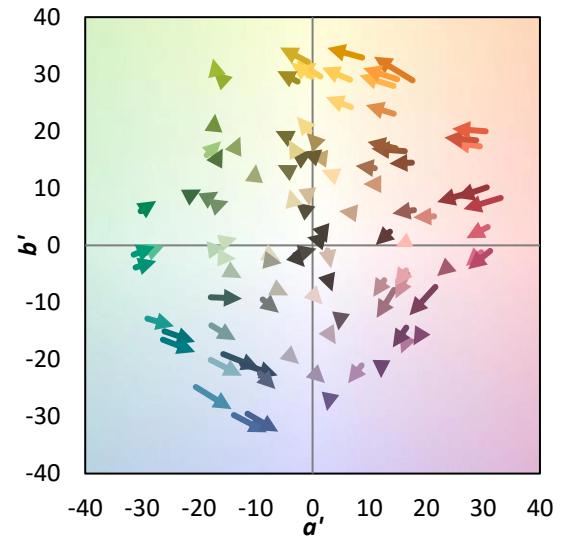
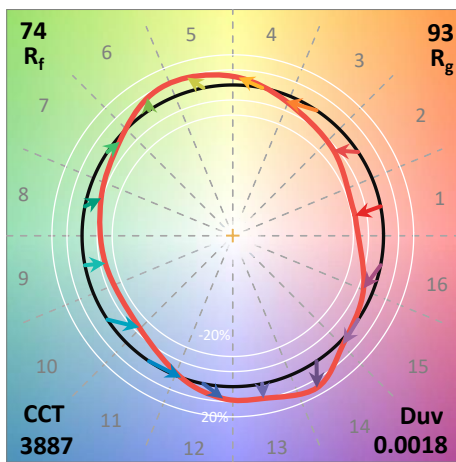
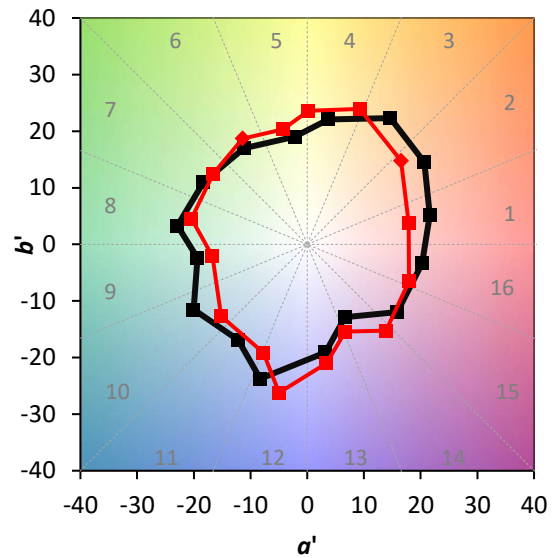
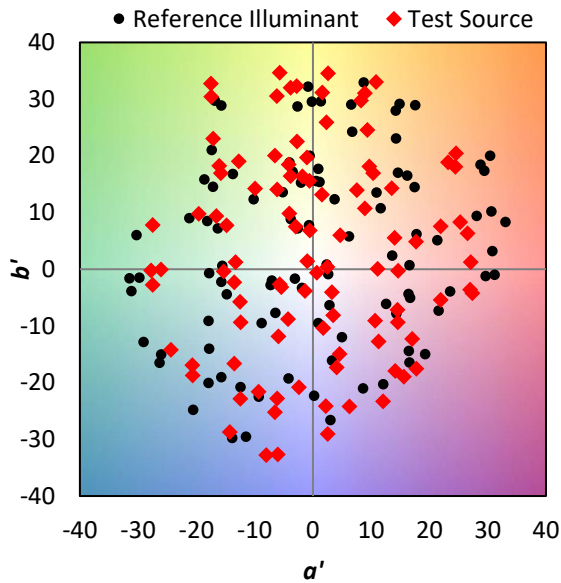
λ (nm)	Power W [^] /nm	Lumens (φ/nm)	λ (nm)	Power W [^] /nm	Lumens (φ/nm)	λ (nm)	Power W [^] /nm	Lumens (φ/nm)	λ (nm)	Power W [^] /nm	Lumens (φ/nm)	λ (nm)	Power W [^] /nm	Lumens (φ/nm)
360	0	NR	490	177	NR	620	727	NR	750	21	NR	880	0	NR
365	0	NR	495	222	NR	625	666	NR	755	18	NR	885	0	NR
370	0	NR	500	286	NR	630	606	NR	760	16	NR	890	0	NR
375	0	NR	505	359	NR	635	549	NR	765	14	NR	895	0	NR
380	0	NR	510	433	NR	640	493	NR	770	12	NR	900	0	NR
385	0	NR	515	505	NR	645	440	NR	775	10	NR	905	0	NR
390	1	NR	520	562	NR	650	390	NR	780	9	NR	910	0	NR
395	3	NR	525	613	NR	655	344	NR	785	8	NR	915	0	NR
400	6	NR	530	654	NR	660	301	NR	790	7	NR	920	0	NR
405	11	NR	535	692	NR	665	263	NR	795	6	NR	925	0	NR
410	23	NR	540	726	NR	670	228	NR	800	5	NR	930	0	NR
415	45	NR	545	763	NR	675	198	NR	805	4	NR	935	0	NR
420	88	NR	550	798	NR	680	172	NR	810	4	NR	940	0	NR
425	164	NR	555	837	NR	685	148	NR	815	3	NR	945	0	NR
430	281	NR	560	878	NR	690	128	NR	820	3	NR	950	0	NR
435	447	NR	565	915	NR	695	110	NR	825	2	NR	955	0	NR
440	642	NR	570	948	NR	700	95	NR	830	2	NR	960	0	NR
445	838	NR	575	976	NR	705	81	NR	835	2	NR	965	0	NR
450	907	NR	580	995	NR	710	69	NR	840	2	NR	970	0	NR
455	710	NR	585	1000	NR	715	58	NR	845	1	NR	975	0	NR
460	465	NR	590	995	NR	720	49	NR	850	1	NR	980	0	NR
465	330	NR	595	972	NR	725	41	NR	855	1	NR	985	0	NR
470	236	NR	600	941	NR	730	35	NR	860	1	NR	990	0	NR
475	174	NR	605	898	NR	735	30	NR	865	1	NR	995	0	NR
480	152	NR	610	848	NR	740	26	NR	870	1	NR	1000	0	NR
485	155	NR	615	788	NR	745	23	NR	875	0	NR			

Summary

$R_f = 74.5$
 $R_g = 93.5$
 CIE $R_a = 71.4$
 $R_g = -36.8$

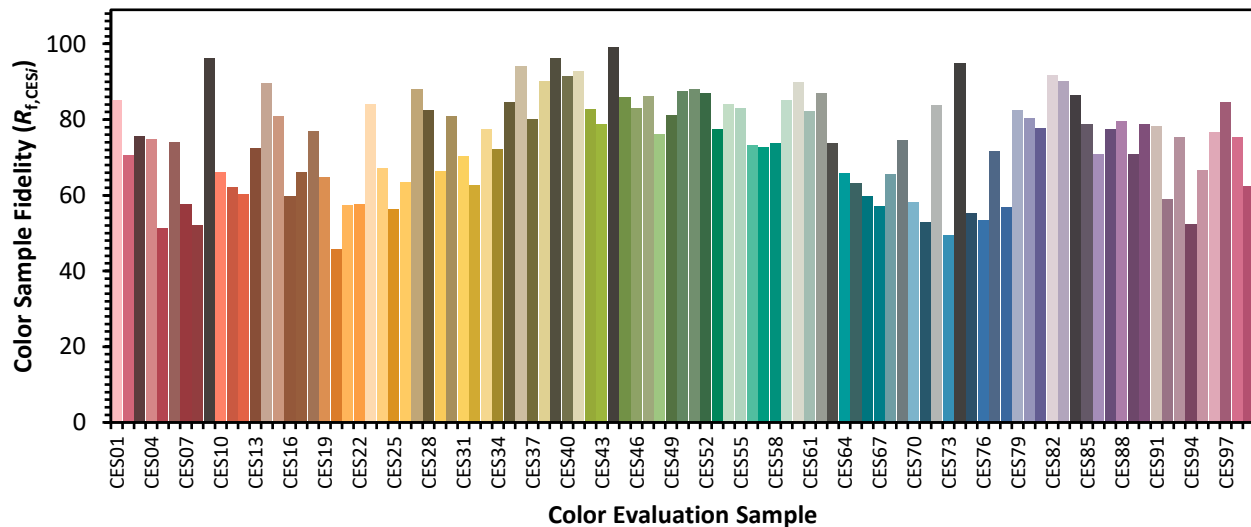


Color Vector Graphics

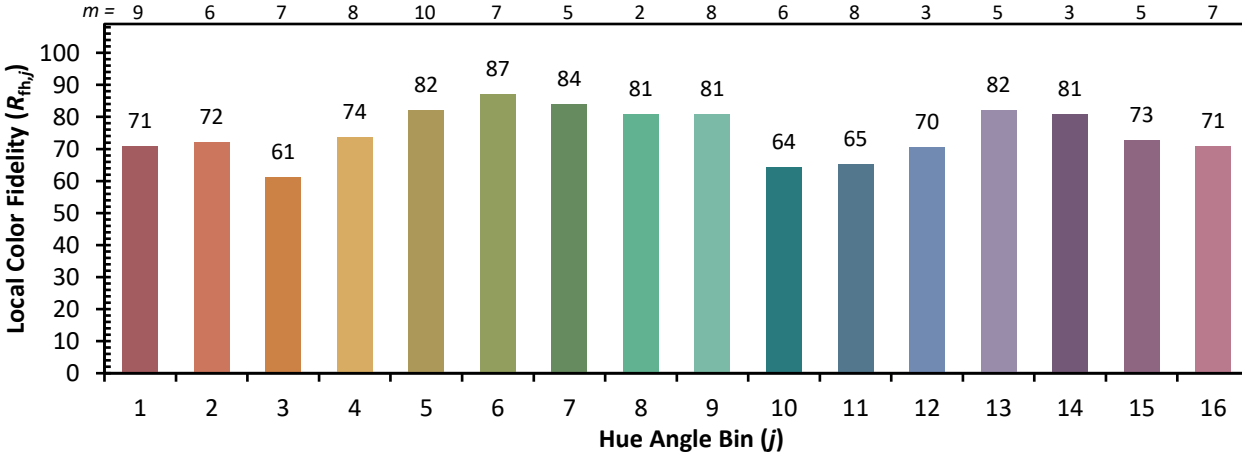
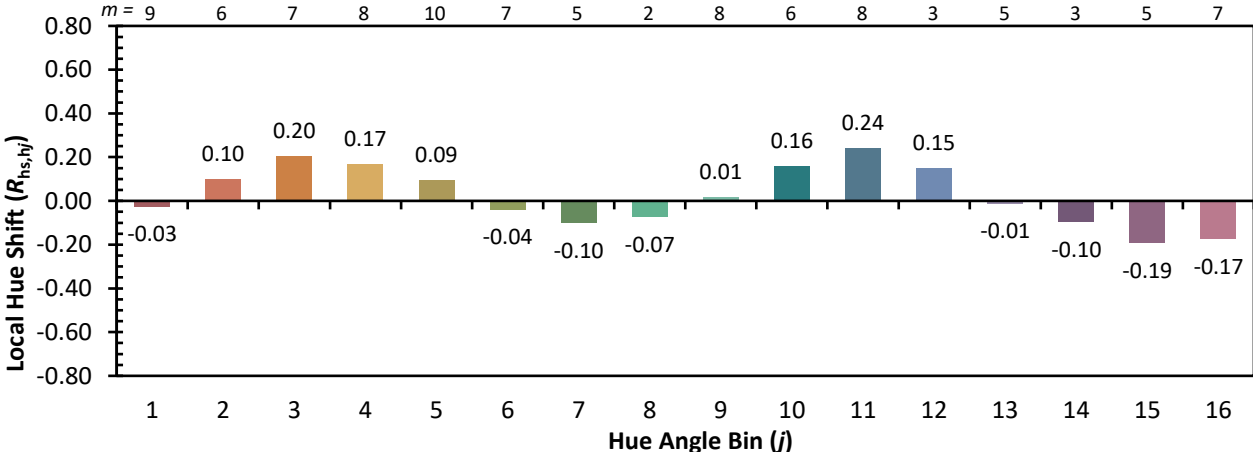
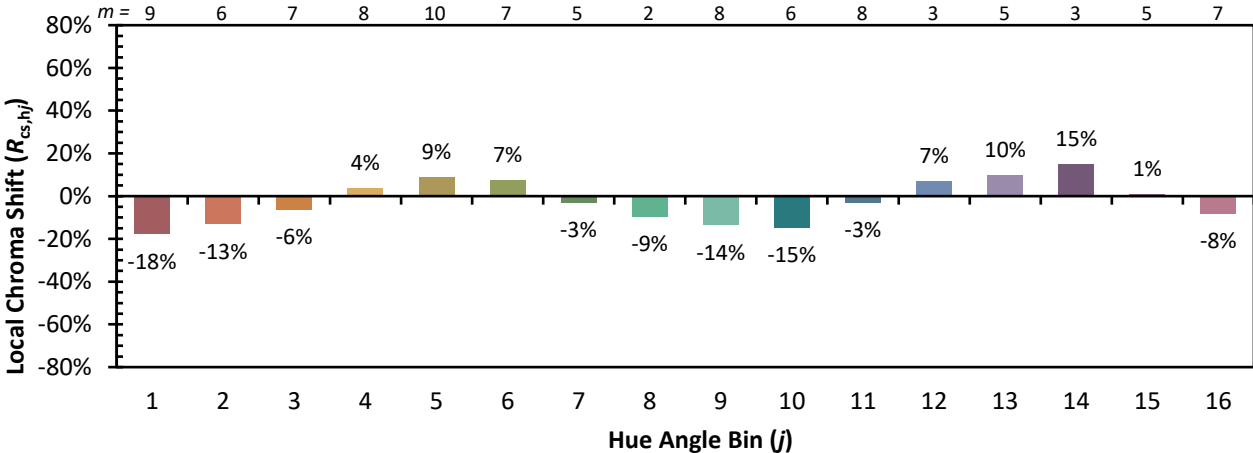


Individual Sample Fidelity Index ($R_{f,i}$)

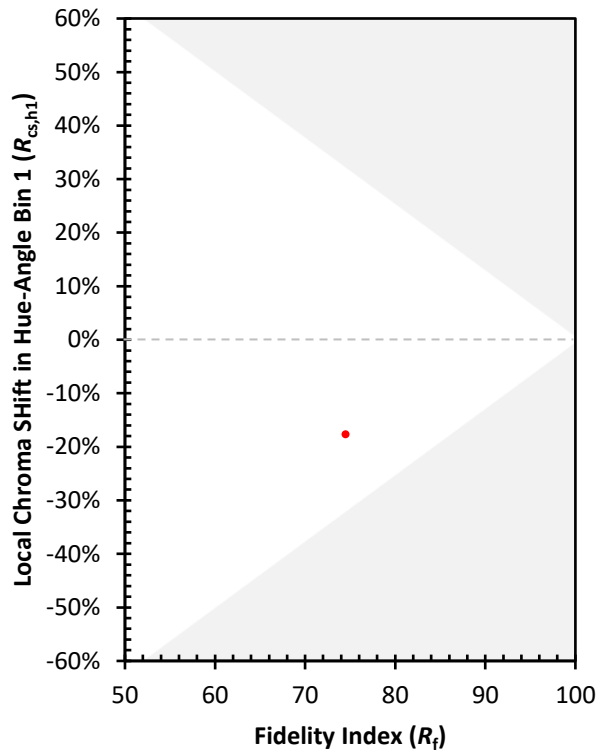
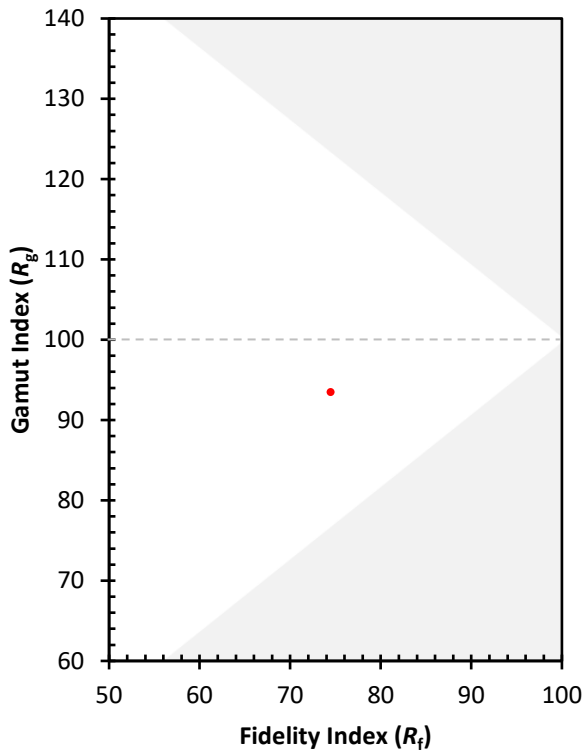
CES01 = 85	CES26 = 63	CES51 = 88	CES76 = 54
CES02 = 61	CES27 = 88	CES52 = 87	CES77 = 72
CES03 = 30	CES28 = 82	CES53 = 77	CES78 = 57
CES04 = 70	CES29 = 66	CES54 = 84	CES79 = 83
CES05 = 47	CES30 = 81	CES55 = 83	CES80 = 80
CES06 = 50	CES31 = 70	CES56 = 73	CES81 = 78
CES07 = 40	CES32 = 63	CES57 = 73	CES82 = 92
CES08 = 39	CES33 = 77	CES58 = 74	CES83 = 90
CES09 = 29	CES34 = 72	CES59 = 85	CES84 = 87
CES10 = 74	CES35 = 85	CES60 = 90	CES85 = 79
CES11 = 57	CES36 = 94	CES61 = 82	CES86 = 71
CES12 = 63	CES37 = 80	CES62 = 87	CES87 = 77
CES13 = 42	CES38 = 90	CES63 = 74	CES88 = 80
CES14 = 74	CES39 = 96	CES64 = 66	CES89 = 71
CES15 = 71	CES40 = 92	CES65 = 63	CES90 = 79
CES16 = 46	CES41 = 93	CES66 = 60	CES91 = 78
CES17 = 49	CES42 = 83	CES67 = 57	CES92 = 59
CES18 = 56	CES43 = 79	CES68 = 65	CES93 = 75
CES19 = 72	CES44 = 99	CES69 = 74	CES94 = 52
CES20 = 65	CES45 = 86	CES70 = 58	CES95 = 67
CES21 = 86	CES46 = 83	CES71 = 53	CES96 = 77
CES22 = 78	CES47 = 86	CES72 = 84	CES97 = 85
CES23 = 92	CES48 = 76	CES73 = 49	CES98 = 75
CES24 = 91	CES49 = 81	CES74 = 95	CES99 = 62
CES25 = 72	CES50 = 88	CES75 = 55	



Color Rendition by Hue-Angle Bin



Measure Comparisons



(END OF REPORT)