

Signify Classified - Internal
Cooper Lighting Solutions Photometric Lab
1121 Highway 74 South
Peachtree City, GA 30269



Scaled data based on original data using
LM-79-2019 Approved Method: Electrical and Photometric Measurements of Solid-
State Lighting Products

Test Report Prepared for

Cooper Lighting Solutions

Brand: McGRAW-EDISON

Report Number: P631141

Luminaire Tested: GWS-SA1F-727-U-5NQ-W-GRSBK

Issue Date: 1/10/2023

Test Information

Test Method: LM-79-2019
Report Number: P631141
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-8)
Test Lab: COOPER LIGHTING SOLUTIONS
Issue Date: 1/10/2023
Manufacturer: COOPER LIGHTING SOLUTIONS
Product Line: McGRAW-EDISON
Catalog Number: GWS-SA1F-727-U-5NQ-W-GRSBK
Description: GALLEON WALL SLIM LUMINAIRE. (1) LIGHTSQUARES WITH 16 LEDS EACH AND TYPE V NARROW OPTICS W/ FACTORY INSTALLED GLARE SHIELD, BK
Light Source: (16) 2700K CCT, 70 CRI LEDS
Ballast/Driver: -

Summary

Lumens per Lamp: N/A
Luminaire Lumens: 4957.9 lumens
Efficiency: N/A
Efficacy: 73.8 lumens/watt
Luminous Opening: Rectangular (W 0.5' x L: 0.5' x H: 0')
IES Classification: Type V - Short
BUG Rating: B2 - U0 - G0

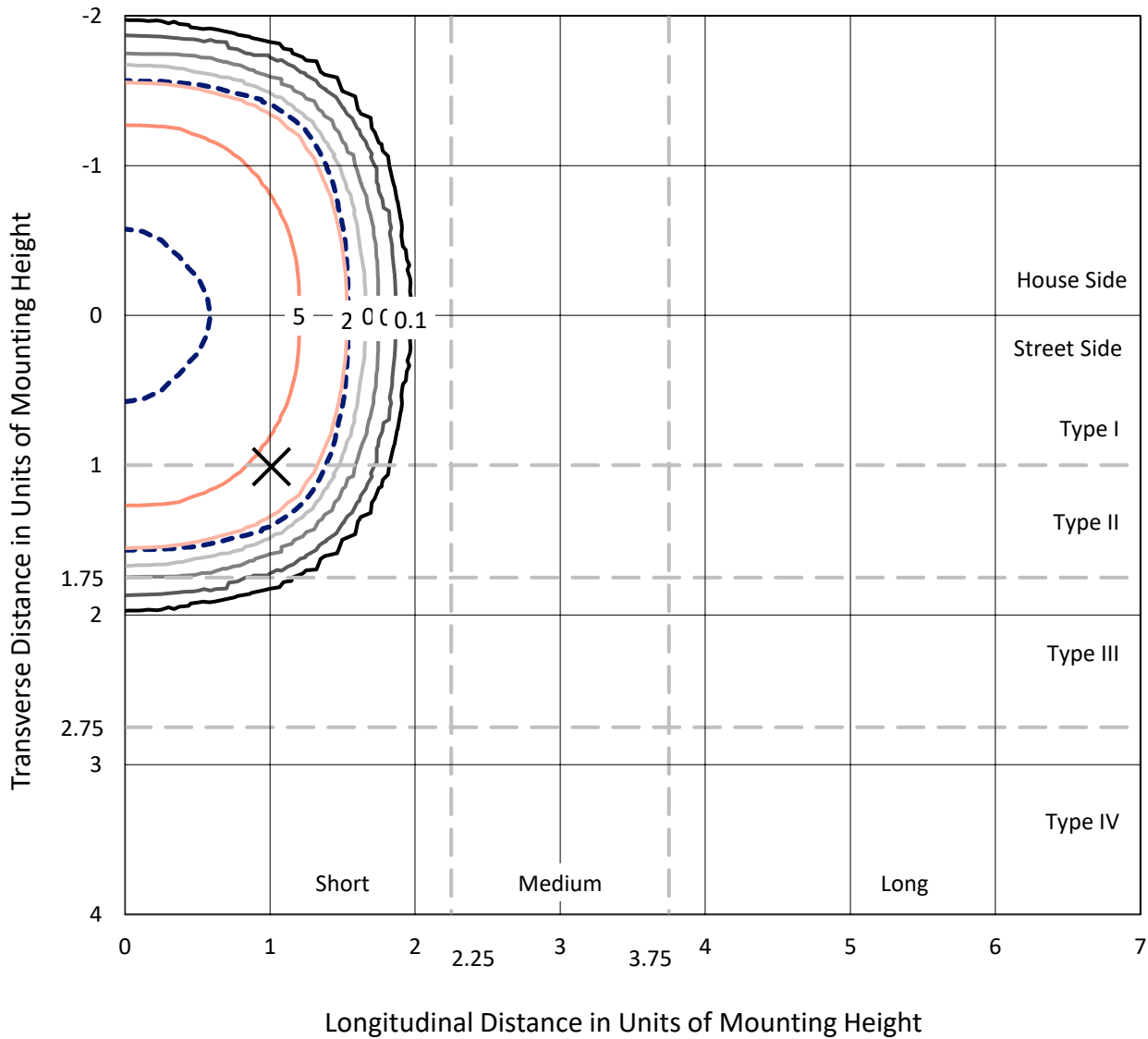
Input Watts (W): 67.2
Input Voltage (V): 120
Input Current (Ain): NR
Voltage Rise (V): NR
Power Factor: NR
Total Harmonic Distortion (THDi): NR
Frequency (hertz): 0
Stabilization Time: NR
Operation Time: NR
Ambient Temperature (°C): NR
Test Distance: 28.75 FT



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Iso-Footcandle Lines of Horizontal Illumination

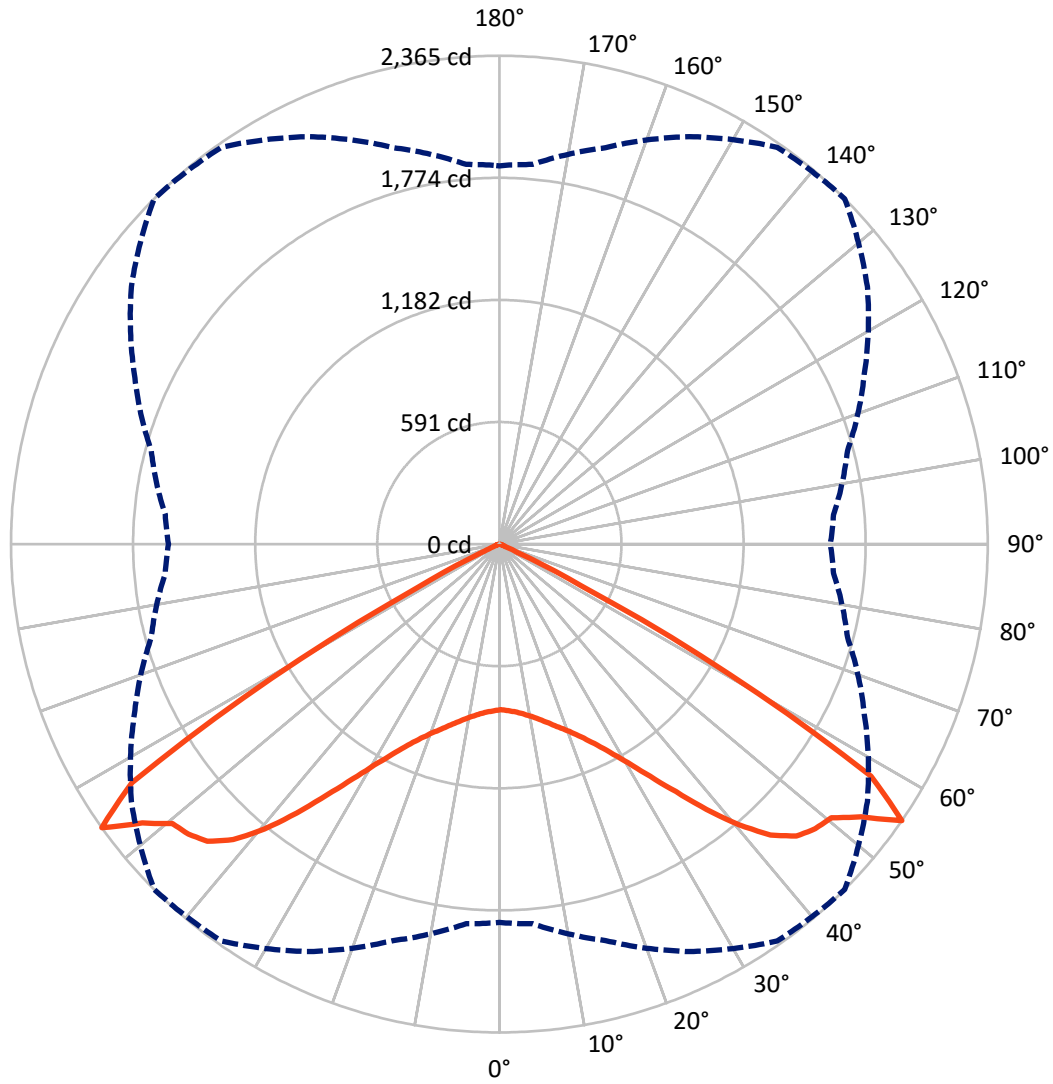
✕ Max cd
 - - - 1/2 Max cd



Based on 10 foot mounting height. Maximum calculated value = 8.1 fc
 Type V - Short - N/A

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Luminous Intensity Polar Plot



— Vertical Plane Through 45-Deg Lateral - - - Horizontal Cone Through 55-Deg Vertical

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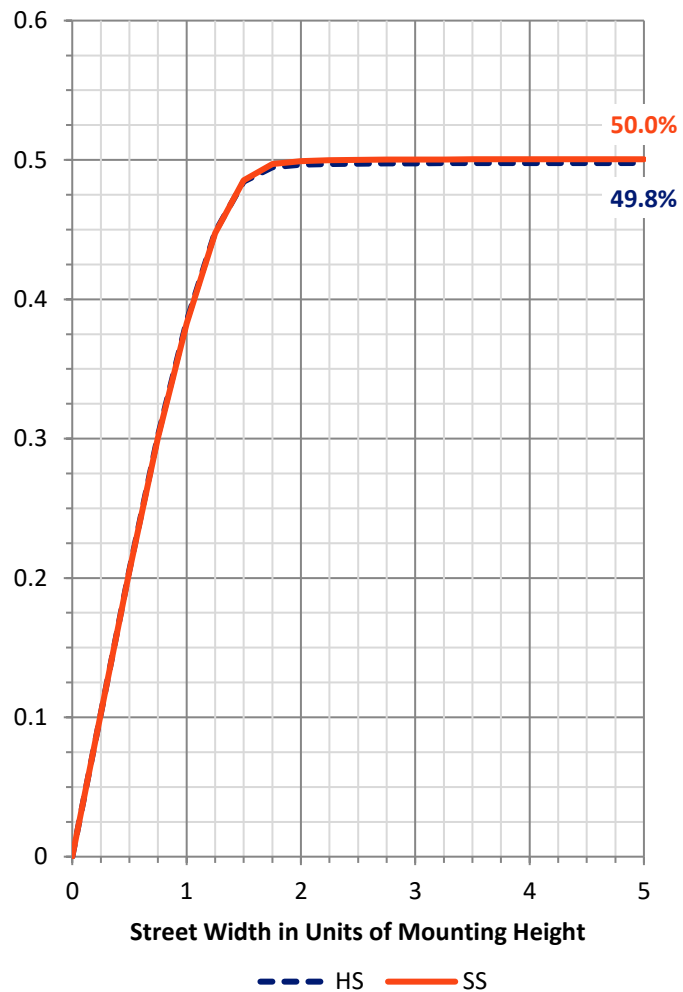
FLUX DISTRIBUTION:

		Downward	Upward	Total
House Side	Lumens	2478.9	0.0	2478.9
	% Fixture	50.0	0.0	50.0
Street Side	Lumens	2478.9	0.0	2478.9
	% Fixture	50.0	0.0	50.0
Total	Lumens	4957.9	0.0	4957.9
	% Fixture	100.0	0.0	100.0

ZONAL LUMENS:

Zone	Lumens	% Fixture
0°-10°	78.5	1.6
10°-20°	254.6	5.1
20°-30°	493.0	9.9
30°-40°	883.3	17.8
40°-50°	1480.9	29.9
50°-60°	1585.3	32.0
60°-70°	174.2	3.5
70°-80°	7.7	0.2
80°-90°	0.4	0.0
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°	4957.9	100.0
0°-180°	4957.9	100.0

Coefficient of Utilization



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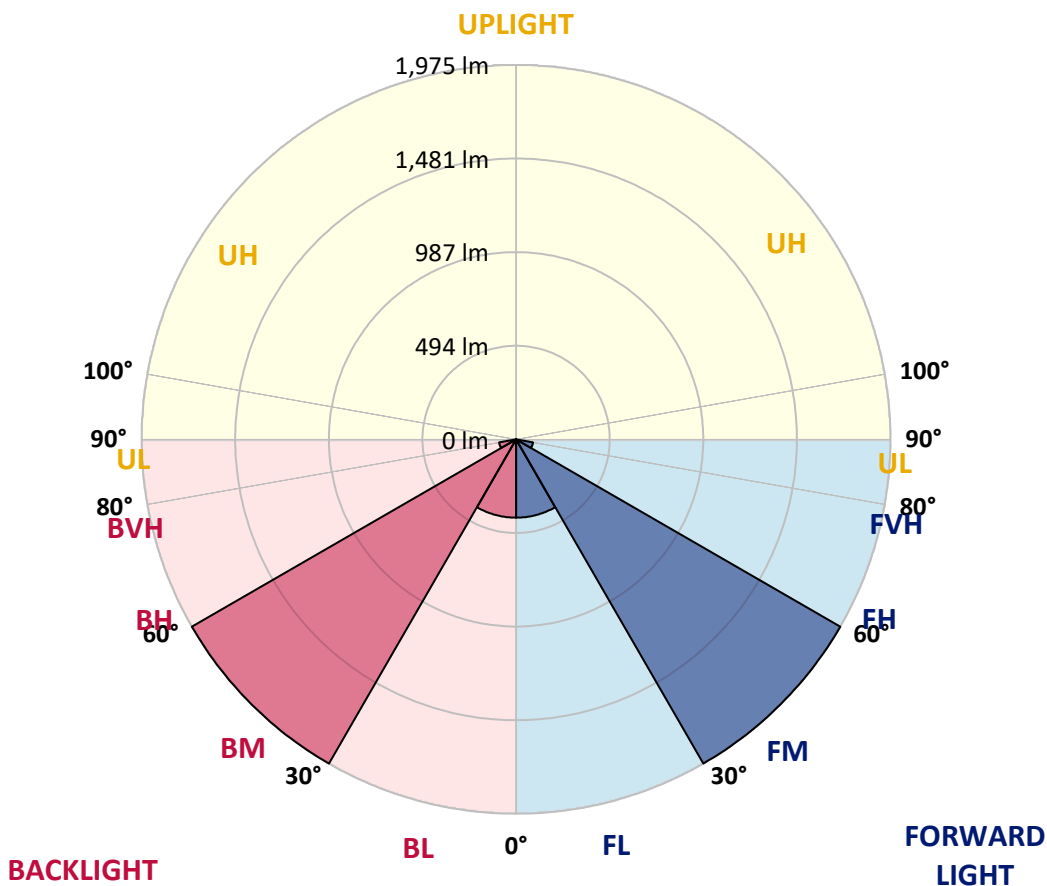
CATALOG NUMBER: GWS-SA1F-727-U-5NQ-W-GRSBK

LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

Zone	Lumens	% Fixture	Zone Rating/Lumen Limit		
			B	U	G
FL (0°-30°)	413.1	8.3			
FM (30°-60°)	1974.8	39.8			
FH (60°-80°)	90.9	1.8			G0/660
FVH (80°-90°)	0.2	0.0			G0/10
BL (0°-30°)	413.1	8.3	B1/500		
BM (30°-60°)	1974.8	39.8	B2/2500		
BH (60°-80°)	90.9	1.8	B0/110		G0/660
BVH (80°-90°)	0.2	0.0			G0/10
UL (90°-100°)	0.0	0.0		U0/0	
UH (100°-180°)	0.0	0.0		U0/0	

BUG Rating: B2-U0-G0

Type V Short





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CATALOG NUMBER: GWS-SA1F-727-U-5NQ-W-GRSBK

CANDELA DISTRIBUTION (FULL):

	0°	5°	15°	25°	35°	45°	55°	65°	75°	85°	90°
0°	801.6	801.6	801.6	801.6	801.6	801.6	801.6	801.6	801.6	801.6	801.6
2.5°	800.1	800.1	802.1	803.6	803.6	807.7	806.1	804.6	804.6	802.6	806.6
5°	811.7	811.2	813.2	814.2	812.2	816.2	813.7	812.2	811.2	809.2	813.2
7.5°	824.3	824.8	825.3	827.4	826.3	830.4	828.4	825.3	824.3	821.3	825.3
10°	839.5	839.5	840.5	843.0	843.5	848.6	846.6	843.0	840.0	837.0	841.0
12.5°	858.7	859.2	860.7	864.2	866.2	871.8	868.8	861.7	857.2	853.6	858.2
15°	886.5	885.9	888.0	893.0	895.5	899.6	895.0	885.4	879.9	875.8	878.9
17.5°	916.8	916.8	917.8	922.8	926.4	932.4	926.9	915.2	910.2	904.6	907.7
20°	950.1	951.6	952.6	956.2	962.2	968.3	963.7	952.1	946.6	939.5	943.0
22.5°	994.0	992.5	993.0	999.1	1007.7	1013.7	1010.2	996.6	987.0	981.4	983.4
25°	1043.0	1042.5	1044.0	1053.1	1062.7	1069.3	1064.2	1046.6	1037.0	1027.4	1031.4
27.5°	1103.1	1103.6	1104.7	1115.8	1130.9	1140.5	1127.9	1110.2	1097.1	1084.5	1087.5
30°	1174.4	1173.4	1176.4	1191.5	1213.8	1228.9	1214.3	1189.5	1170.8	1158.7	1160.2
32.5°	1250.1	1251.1	1259.2	1283.5	1312.8	1339.5	1309.7	1276.9	1252.7	1229.9	1233.0
35°	1332.0	1334.5	1352.7	1388.5	1436.5	1472.4	1431.0	1376.9	1342.6	1313.3	1314.3
37.5°	1428.4	1434.5	1459.7	1513.3	1582.0	1630.0	1569.4	1497.6	1453.2	1416.8	1414.3
40°	1555.2	1562.3	1596.6	1660.3	1743.6	1787.6	1717.3	1643.6	1588.5	1549.1	1543.1
42.5°	1700.7	1709.8	1747.1	1812.3	1895.6	1925.4	1856.8	1794.6	1745.1	1698.7	1696.6
45°	1864.8	1869.9	1900.2	1950.2	2010.3	2017.4	1965.9	1931.5	1881.5	1838.1	1834.5
47.5°	2018.9	2023.9	2044.7	2070.4	2084.6	2059.3	2050.2	2035.1	1970.4	1916.9	1905.7
50°	2136.1	2140.1	2165.9	2176.0	2136.6	2083.0	2100.7	2068.4	1998.2	1938.1	1920.9
52.5°	2128.0	2138.1	2204.3	2261.8	2237.1	2193.7	2146.2	2076.5	1967.4	1885.0	1863.8
55°	1832.0	1845.6	1987.6	2177.0	2346.2	2364.9	2175.0	1950.2	1745.1	1624.4	1602.7
57.5°	1177.4	1180.9	1354.2	1619.9	2001.2	2121.4	1803.7	1470.4	1215.3	1082.4	1073.3
60°	432.9	425.8	556.6	776.8	1152.6	1279.9	1061.7	743.5	530.4	436.4	428.8
62.5°	104.1	105.1	130.3	195.5	361.7	447.5	353.6	197.5	125.8	105.6	104.6
65°	52.5	51.5	52.0	56.1	77.3	92.4	75.8	53.5	51.5	52.0	51.5
67.5°	33.8	33.3	34.3	34.9	34.3	32.3	31.8	32.8	32.8	33.3	32.3
70°	20.7	20.2	21.2	22.7	21.7	19.2	20.2	21.2	20.2	19.7	19.7
72.5°	11.1	11.1	12.1	13.1	12.1	11.1	11.1	11.6	11.1	11.1	11.1
75°	5.1	5.1	5.6	6.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1
77.5°	1.5	1.5	2.0	2.0	1.5	1.5	1.5	1.5	2.0	2.0	2.0
80°	0.5	1.0	1.0	0.5	0.5	0.5	0.5	0.5	1.0	1.0	1.0
82.5°	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
85°	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.5	0.5	0.5	0.5
87.5°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.5	0.5
90°	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Signify Classified - Internal
Cooper Lighting Solutions Photometric Lab
1121 Highway 74 South
Peachtree City, GA 30269



LM-79-2008: Approved Method: Electrical and Photometric Measurements of Solid-
State Lighting Products

Report Prepared for

Cooper Lighting Solutions

McGRAW-EDISON

Report Number: SP1-1908-441-1-R4

Test Date: 08/20/2019

Luminaire Tested: SA1C-727-U-5WQ

Test Information

Test Method: LM-79-2008
 Report Number: SP1-1908-441-1-R4
 Test Lab: COOPER LIGHTING SOLUTIONS
 Photometer: SP1 - 76IN SPHERE
 Measurement Geometry: 4π
 Issue Date: 10/28/2024
 Manufacturer: COOPER LIGHTING SOLUTIONS
 Product Line: McGRAW-EDISON
 Catalog Number: **SA1C-727-U-5WQ**
 Description: McGRAW EDISON ROADWAY AND AREA LUMINAIRE

THIS IS A REVISION OF SP1-1908-441-1-R3. TO UPDATE THE CATALOG NUMBER.TESTED IN
 SITU. (1) 70 CRI, 2700K, 1050MA LIGHTSQUARE WITH 16 LEDS AND TYPE V WIDE OPTICS.

Spectral Parameters

CCT (K): 2741
 CIE u': 0.2605
 CIE v': 0.5272
 Duv: 0.0005
 CIE x: 0.4573
 CIE y: 0.4113
 CIE z: 0.1313
 Peak Wavelength (nm): 602
 Dominant Wavelength (nm): 583
 Purity: 61.2
 Rf: 69.9
 Rg: 98.3

CRI (Ra):	71.5		
R1:	69.2	R9:	-16.1
R2:	79.4	R10:	51.4
R3:	87.8	R11:	63.1
R4:	69.4	R12:	42.0
R5:	66.4	R13:	70.2
R6:	69.8	R14:	92.4
R7:	79.8		
R8:	50.1		



Test Conditions

Stabilization Time: 56M
 Operation Time: 12H
 Room Temperature (°C) / RH%: 25.3./42%
 Sphere Temperature (°C): 25.7

REPORT NUMBER: SP1-1908-441-1-R4

Measurement and Test Equipment			
Instrument	Identification Number	Calibration Date	Calibration Due Date
Photometer	IN0058	6/28/2019	12/28/2019
Power Meter	IN0071	12/5/2018	12/5/2019
AC Power Source	IN0063	12/5/2018	12/5/2019
DC Power Source	IN0208	12/5/2018	12/5/2019
Sphere Thermometer	IN0085	12/5/2018	12/5/2019
Room Thermometer	IN0046	12/5/2018	12/5/2019

REPORT NUMBER: SP1-1908-441-1-R4

CIE 1931 Chromaticity Diagram



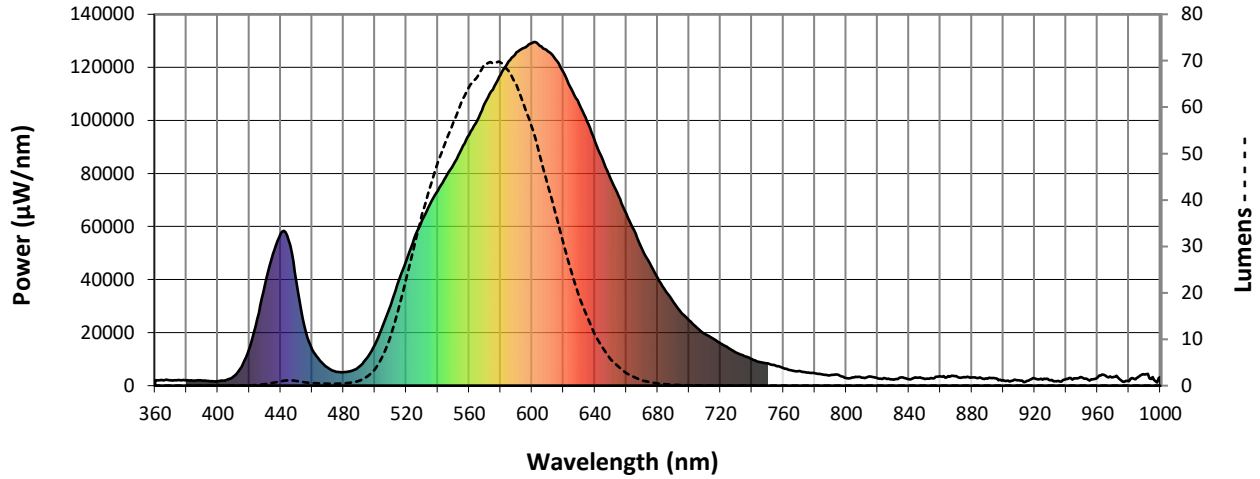
CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles



Point lies inside the ANSI 2700K 4-step quadrangle

REPORT NUMBER: SP1-1908-441-1-R4

Photopic Flux vs. Wavelength



Photopic Lumens: 6211.7

λ (nm)	Power ($\mu\text{W}/\text{nm}$)	Lumens (ϕ/nm)	λ (nm)	Power ($\mu\text{W}/\text{nm}$)	Lumens (ϕ/nm)	λ (nm)	Power ($\mu\text{W}/\text{nm}$)	Lumens (ϕ/nm)	λ (nm)	Power ($\mu\text{W}/\text{nm}$)	Lumens (ϕ/nm)	λ (nm)	Power ($\mu\text{W}/\text{nm}$)	Lumens (ϕ/nm)
360	2044	0.0	490	7179	1.0	620	118034	30.7	750	8362	0.0	880	3128	0.0
365	2016	0.0	495	10476	1.9	625	111884	24.7	755	7635	0.0	885	3110	0.0
370	2020	0.0	500	15549	3.4	630	106119	19.2	760	6582	0.0	890	2632	0.0
375	2137	0.0	505	22477	6.3	635	99706	15.0	765	5777	0.0	895	2709	0.0
380	2046	0.0	510	30417	10.4	640	92142	11.0	770	5474	0.0	900	2016	0.0
385	1925	0.0	515	39274	16.3	645	84987	8.2	775	4977	0.0	905	1748	0.0
390	1893	0.0	520	47282	22.9	650	78016	5.7	780	4723	0.0	910	2046	0.0
395	1695	0.0	525	55413	29.7	655	71541	4.1	785	4219	0.0	915	1844	0.0
400	1633	0.0	530	62377	36.7	660	64863	2.7	790	3969	0.0	920	2734	0.0
405	2065	0.0	535	68520	42.5	665	58485	1.9	795	4122	0.0	925	2307	0.0
410	3449	0.0	540	73435	47.8	670	51641	1.1	800	2864	0.0	930	2039	0.0
415	7117	0.0	545	78677	52.4	675	46030	0.8	805	3151	0.0	935	1784	0.0
420	13992	0.0	550	83331	56.6	680	40590	0.5	810	3022	0.0	940	2464	0.0
425	25176	0.1	555	89120	60.9	685	35691	0.3	815	3471	0.0	945	2794	0.0
430	38151	0.3	560	94613	64.3	690	31631	0.2	820	2749	0.0	950	3090	0.0
435	49673	0.6	565	99818	66.4	695	27437	0.1	825	2729	0.0	955	1866	0.0
440	57273	0.9	570	106526	69.3	700	24589	0.1	830	2282	0.0	960	3110	0.0
445	54802	1.1	575	111610	69.4	705	21832	0.0	835	3140	0.0	965	3880	0.0
450	39184	1.0	580	117163	69.6	710	19500	0.0	840	2365	0.0	970	3243	0.0
455	22506	0.8	585	122201	67.9	715	17870	0.0	845	3024	0.0	975	2014	0.0
460	13692	0.6	590	125662	65.0	720	15924	0.0	850	2510	0.0	980	1688	0.0
465	9446	0.5	595	127415	60.4	725	14268	0.0	855	2739	0.0	985	2827	0.0
470	6698	0.4	600	129155	55.7	730	12438	0.0	860	3515	0.0	990	4172	0.0
475	5328	0.4	605	128057	49.6	735	11255	0.0	865	3600	0.0	995	3177	0.0
480	5081	0.5	610	126031	43.3	740	9951	0.0	870	3609	0.0	1000	3241	0.0
485	5579	0.7	615	123059	37.1	745	8870	0.0	875	3208	0.0			

REPORT NUMBER: SP1-1908-441-1-R4

Scotopic Flux vs. Wavelength



Scotopic Lumens: 6474.3

S/P: 1.04

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	2044	0.0	490	7179	6.0	620	118034	0.1	750	8362	0.0	880	3128	0.0
365	2016	0.0	495	10476	8.6	625	111884	0.1	755	7635	0.0	885	3110	0.0
370	2020	0.0	500	15549	12.5	630	106119	0.0	760	6582	0.0	890	2632	0.0
375	2137	0.0	505	22477	17.3	635	99706	0.0	765	5777	0.0	895	2709	0.0
380	2046	0.0	510	30417	21.8	640	92142	0.0	770	5474	0.0	900	2016	0.0
385	1925	0.0	515	39274	25.7	645	84987	0.0	775	4977	0.0	905	1748	0.0
390	1893	0.0	520	47282	27.5	650	78016	0.0	780	4723	0.0	910	2046	0.0
395	1695	0.0	525	55413	28.1	655	71541	0.0	785	4219	0.0	915	1844	0.0
400	1633	0.0	530	62377	27.0	660	64863	0.0	790	3969	0.0	920	2734	0.0
405	2065	0.0	535	68520	24.7	665	58485	0.0	795	4122	0.0	925	2307	0.0
410	3449	0.1	540	73435	21.5	670	51641	0.0	800	2864	0.0	930	2039	0.0
415	7117	0.5	545	78677	18.3	675	46030	0.0	805	3151	0.0	935	1784	0.0
420	13992	1.6	550	83331	15.0	680	40590	0.0	810	3022	0.0	940	2464	0.0
425	25176	3.9	555	89120	12.0	685	35691	0.0	815	3471	0.0	945	2794	0.0
430	38151	8.1	560	94613	9.3	690	31631	0.0	820	2749	0.0	950	3090	0.0
435	49673	13.3	565	99818	7.0	695	27437	0.0	825	2729	0.0	955	1866	0.0
440	57273	19.1	570	106526	5.2	700	24589	0.0	830	2282	0.0	960	3110	0.0
445	54802	21.6	575	111610	3.7	705	21832	0.0	835	3140	0.0	965	3880	0.0
450	39184	18.1	580	117163	2.6	710	19500	0.0	840	2365	0.0	970	3243	0.0
455	22506	11.8	585	122201	1.8	715	17870	0.0	845	3024	0.0	975	2014	0.0
460	13692	8.1	590	125662	1.2	720	15924	0.0	850	2510	0.0	980	1688	0.0
465	9446	6.2	595	127415	0.8	725	14268	0.0	855	2739	0.0	985	2827	0.0
470	6698	4.8	600	129155	0.5	730	12438	0.0	860	3515	0.0	990	4172	0.0
475	5328	4.1	605	128057	0.4	735	11255	0.0	865	3600	0.0	995	3177	0.0
480	5081	4.1	610	126031	0.2	740	9951	0.0	870	3609	0.0	1000	3241	0.0
485	5579	4.6	615	123059	0.1	745	8870	0.0	875	3208	0.0			

REPORT NUMBER: SP1-1908-441-1-R4

Melanopic Flux vs. Wavelength



Melanopic Lumens: 2145.7 M/P: 0.35

λ (nm)	Power ($\mu\text{W}/\text{nm}$)	Lumens (ϕ/nm)	λ (nm)	Power ($\mu\text{W}/\text{nm}$)	Lumens (ϕ/nm)	λ (nm)	Power ($\mu\text{W}/\text{nm}$)	Lumens (ϕ/nm)	λ (nm)	Power ($\mu\text{W}/\text{nm}$)	Lumens (ϕ/nm)	λ (nm)	Power ($\mu\text{W}/\text{nm}$)	Lumens (ϕ/nm)
360	2044	0.0	490	7179	11.1	620	118034	1.5	750	8362	0.0	880	3128	0.0
365	2016	0.0	495	10476	16.9	625	111884	0.9	755	7635	0.0	885	3110	0.0
370	2020	0.0	500	15549	26.0	630	106119	0.6	760	6582	0.0	890	2632	0.0
375	2137	0.0	505	22477	38.2	635	99706	0.4	765	5777	0.0	895	2709	0.0
380	2046	0.0	510	30417	51.6	640	92142	0.2	770	5474	0.0	900	2016	0.0
385	1925	0.0	515	39274	65.1	645	84987	0.1	775	4977	0.0	905	1748	0.0
390	1893	0.0	520	47282	75.2	650	78016	0.1	780	4723	0.0	910	2046	0.0
395	1695	0.0	525	55413	82.9	655	71541	0.1	785	4219	0.0	915	1844	0.0
400	1633	0.0	530	62377	86.0	660	64863	0.0	790	3969	0.0	920	2734	0.0
405	2065	0.1	535	68520	85.4	665	58485	0.0	795	4122	0.0	925	2307	0.0
410	3449	0.2	540	73435	81.1	670	51641	0.0	800	2864	0.0	930	2039	0.0
415	7117	0.7	545	78677	75.4	675	46030	0.0	805	3151	0.0	935	1784	0.0
420	13992	2.3	550	83331	68.1	680	40590	0.0	810	3022	0.0	940	2464	0.0
425	25176	6.2	555	89120	60.9	685	35691	0.0	815	3471	0.0	945	2794	0.0
430	38151	13.0	560	94613	52.9	690	31631	0.0	820	2749	0.0	950	3090	0.0
435	49673	22.2	565	99818	44.8	695	27437	0.0	825	2729	0.0	955	1866	0.0
440	57273	32.0	570	106526	37.6	700	24589	0.0	830	2282	0.0	960	3110	0.0
445	54802	36.7	575	111610	30.4	705	21832	0.0	835	3140	0.0	965	3880	0.0
450	39184	30.4	580	117163	24.1	710	19500	0.0	840	2365	0.0	970	3243	0.0
455	22506	19.7	585	122201	18.7	715	17870	0.0	845	3024	0.0	975	2014	0.0
460	13692	13.2	590	125662	14.0	720	15924	0.0	850	2510	0.0	980	1688	0.0
465	9446	10.0	595	127415	10.2	725	14268	0.0	855	2739	0.0	985	2827	0.0
470	6698	7.7	600	129155	7.3	730	12438	0.0	860	3515	0.0	990	4172	0.0
475	5328	6.7	605	128057	5.0	735	11255	0.0	865	3600	0.0	995	3177	0.0
480	5081	6.9	610	126031	3.4	740	9951	0.0	870	3609	0.0	1000	3241	0.0
485	5579	8.1	615	123059	2.3	745	8870	0.0	875	3208	0.0			

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Summary

$R_f = 69.9$
 $R_g = 98.3$
 $CIE R_a = 71.5$
 $R_g = -16.1$



Color Vector Graphics



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

CES01 = 86	CES26 = 54	CES51 = 77	CES76 = 48
CES02 = 63	CES27 = 74	CES52 = 80	CES77 = 75
CES03 = 31	CES28 = 80	CES53 = 66	CES78 = 56
CES04 = 71	CES29 = 44	CES54 = 77	CES79 = 81
CES05 = 50	CES30 = 46	CES55 = 74	CES80 = 80
CES06 = 52	CES31 = 50	CES56 = 63	CES81 = 73
CES07 = 42	CES32 = 49	CES57 = 60	CES82 = 91
CES08 = 41	CES33 = 53	CES58 = 63	CES83 = 84
CES09 = 29	CES34 = 66	CES59 = 85	CES84 = 90
CES10 = 77	CES35 = 82	CES60 = 89	CES85 = 87
CES11 = 60	CES36 = 78	CES61 = 85	CES86 = 65
CES12 = 66	CES37 = 75	CES62 = 69	CES87 = 78
CES13 = 43	CES38 = 53	CES63 = 68	CES88 = 73
CES14 = 74	CES39 = 91	CES64 = 68	CES89 = 68
CES15 = 71	CES40 = 85	CES65 = 65	CES90 = 68
CES16 = 48	CES41 = 76	CES66 = 62	CES91 = 91
CES17 = 50	CES42 = 76	CES67 = 60	CES92 = 71
CES18 = 57	CES43 = 65	CES68 = 68	CES93 = 82
CES19 = 73	CES44 = 98	CES69 = 77	CES94 = 57
CES20 = 67	CES45 = 75	CES70 = 60	CES95 = 78
CES21 = 88	CES46 = 70	CES71 = 57	CES96 = 80
CES22 = 80	CES47 = 63	CES72 = 86	CES97 = 79
CES23 = 92	CES48 = 51	CES73 = 52	CES98 = 71
CES24 = 91	CES49 = 68	CES74 = 90	CES99 = 64
CES25 = 73	CES50 = 77	CES75 = 58	



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Color Rendition by Hue-Angle Bin



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Measure Comparisons



(END OF REPORT)