



Spectra Lux

2750 Sabourin, Saint-Laurent (Quebec) H4S 1M2 Canada  
Tel.: (514) 332-0082 Fax: (514) 332-3590 [www.spectralux.ca](http://www.spectralux.ca)



Lab Code: 200899-0

## Moving Mirror Goniophotometer Test Report

**Standard(s):** IES LM-79:2019, ANSI C82.2:2002, ANSI C82.77-10:2021

**Customer** Studio d'Armes Inc. , 148 Watchorn, Morin-Heights, Quebec, Canada, J0R1H0

General Information		Lamp Details: CY5816		Driver Details: CY2778	
<b>DUT Lab ID</b>	SRIS 3189-1	<b>Seasoning</b>	0 Hour	<b>Type</b>	LED Power Supply
<b>Lamp Type</b>	LED/SSL	<b>Test Product</b>	RA-LI-C-CTGO-40K-120V	<b>Manufacturer</b>	ERP
<b>Current Mode</b>	AC	<b>Manufacturer</b>	N.K.	<b>Catalog No.</b>	PSB40W-1400-27
<b>Test Report</b>	S2402131-R1	<b>Lamp Catalog No.</b>	Mixed Color LEDs	<b>Maximum Power</b>	40 W
<b>Test Date</b>	13 February 2024	<b>Drive Current</b>	1000 mA	<b>Input Voltage</b>	120.00 V
<b>Report Date</b>	16 February 2024	<b>Nominal Color</b>	4000 K	<b>Operating Frequency</b>	60 Hz
<b>Ambient</b>	24.8 °C	<b>Burning Position</b>	Vertical Base Up & Down	<b>Input Power</b>	29.69 W

### Luminaire Data

General Information		Optics		Aperture (feet)	
<b>Manufacturer</b>	Studio d'Armes Inc.	<b>Chip</b>	Up & Down LEDs Module	<b>X</b>	-0.1667
<b>Name</b>	RA Line Long	<b>Housing</b>	(2) Cylindrical Holders	<b>Y</b>	5.9167
<b>Catalog No.</b>	RA-LI-C-CTGO-40K-120V	<b>Lens</b>	Clear Cylindrical Borosilicate Tube	<b>Z</b>	-0.1667

Stabilization Time: 1 hour 15 minutes

**Approved Signatory: Chrisnel Blot**

**Signature:**



## Luminaire Test Method

Precise installation and alignment of the luminaire to the rotation axis of the photometer is governed by a servomotor controlled via a microcontroller. A laser is used to validate the luminaire positioning. Before photometric measurements are taken, luminaire is operated long enough to reach stabilization and temperature equilibrium.

All movement commands issued to the photometer axes are mediated by the software to ensure the motion is within the limits of operation. The photometric detector used is a silicon detector corrected to closely match the spectral luminous efficiency photopic curve with a quality index less than 1.5%. Proper shielding is incorporated to the photometric test bench such that only the light from the unit under test is measured.

Luminous intensity measurements are performed at a distance great enough so that the inverse-square law applies. During each measurement the computer records the luminous intensity associated to the corresponding angles of radiation, as well as input electrical operational parameters and temperature measurements. Candela values are reported in IES format as per LM-63.

Equipment, reference standards are traceable to National Institute of Standards and Technology (NIST) and National Research Council of Canada (NRC).





## Spectra Lux

2750 Sabourin, Saint-Laurent (Quebec) H4S 1M2 Canada  
Tel.: (514) 332-0082 Fax: (514) 332-3590 [www.spectralux.ca](http://www.spectralux.ca)



### Electrical Equipment

Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due Date
Power Supply	Inventfine	CHP-500	GZBXD010148	N.P.C.R.	N.P.C.R.
Input Power Meter	Yokogawa	WT210	27E116584	2023/09/05	2024/09/05
Output Power Meter	N/A	N/A	N/A	N.P.C.R.	N.P.C.R.

### Photometric Equipment

Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due Date
Photometer	N/A	N/A	N/A	N.P.C.R.	N.P.C.R.
Photodetector	INPHORA	IPR-PDET 19	110803	2023/09/05	2024/09/05

### Environment Equipment

Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due Date
Temperature Humidity Sensor	Omega	HH311	120504176	2023/09/05	2024/09/05

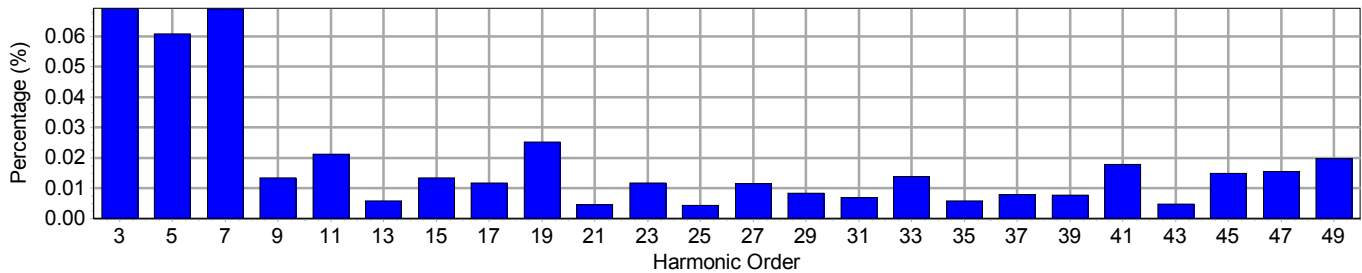


## Electrical Measurements

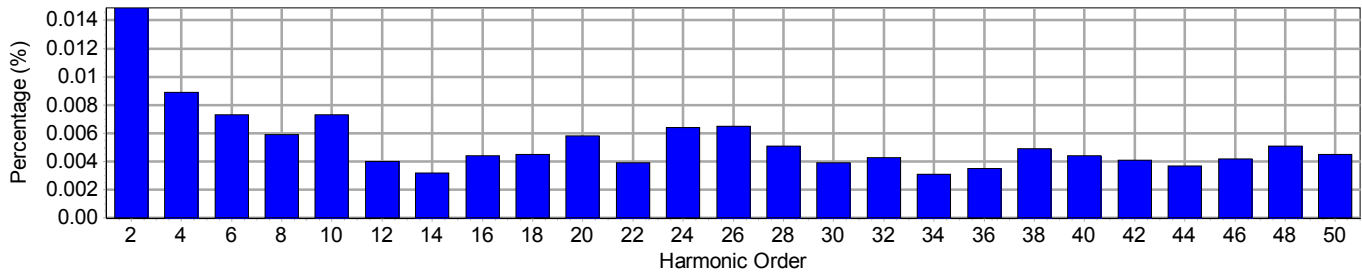
### Input

Frequency	60 Hz	Active Power	29.69 W	THDV [ANSI]	0.13 %
Voltage	120.1 V(rms)	Apparent Power	30.41 VA	THDA [ANSI]	17.08 %
Current	0.2533 A(rms)	Power Factor	0.976	Max. Harmonic At	3rd order

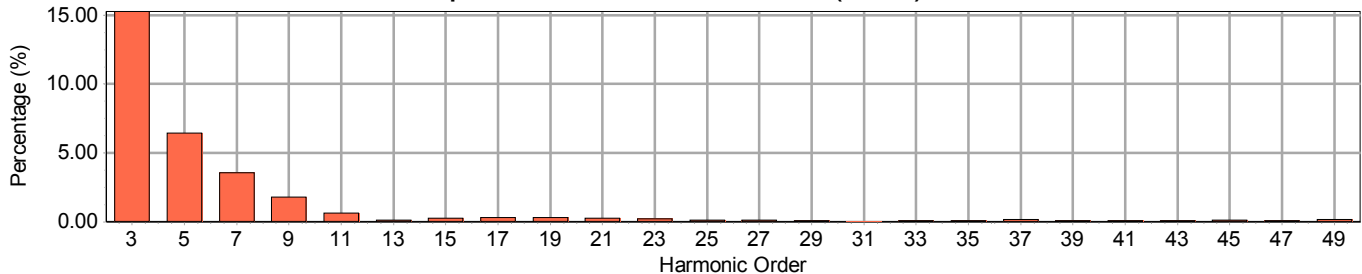
### Input Voltage Harmonics (Odd)



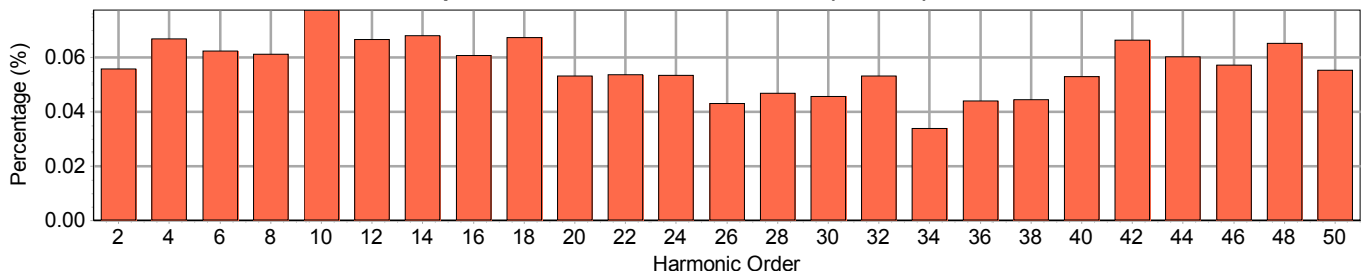
### Input Voltage Harmonics (Even)



### Input Current Harmonics (Odd)



### Input Current Harmonics (Even)





# Spectra Lux

2750 Sabourin, Saint-Laurent (Quebec) H4S 1M2 Canada  
Tel.: (514) 332-0082 Fax: (514) 332-3590 [www.spectralux.ca](http://www.spectralux.ca)



Lab Code: 200899-0



## Harmonic Measurements

Odd Harmonics				Even Harmonics			
Harmonic Order	Frequency (HZ)	Voltage Harmonics (%)	Current Harmonics (%)	Harmonic Order	Frequency (HZ)	Voltage Harmonics (%)	Current Harmonics (%)
1	60	100.000	100.000	2	120	0.015	0.056
3	180	0.069	15.286	4	240	0.009	0.067
5	300	0.061	6.427	6	360	0.007	0.063
7	420	0.069	3.565	8	480	0.006	0.061
9	540	0.013	1.772	10	600	0.007	0.078
11	660	0.021	0.638	12	720	0.004	0.067
13	780	0.006	0.118	14	840	0.003	0.068
15	900	0.013	0.234	16	960	0.004	0.061
17	1020	0.012	0.316	18	1080	0.005	0.067
19	1140	0.025	0.316	20	1200	0.006	0.053
21	1260	0.005	0.264	22	1320	0.004	0.054
23	1380	0.012	0.201	24	1440	0.006	0.054
25	1500	0.004	0.122	26	1560	0.007	0.043
27	1620	0.012	0.132	28	1680	0.005	0.047
29	1740	0.008	0.061	30	1800	0.004	0.046
31	1860	0.007	0.041	32	1920	0.004	0.053
33	1980	0.014	0.047	34	2040	0.003	0.034
35	2100	0.006	0.074	36	2160	0.004	0.044
37	2220	0.008	0.146	38	2280	0.005	0.044
39	2340	0.008	0.089	40	2400	0.004	0.053
41	2460	0.018	0.054	42	2520	0.004	0.066
43	2580	0.005	0.077	44	2640	0.004	0.060
45	2700	0.015	0.094	46	2760	0.004	0.057
47	2820	0.016	0.049	48	2880	0.005	0.065
49	2940	0.020	0.173	50	3000	0.005	0.055



# Spectra Lux

2750 Sabourin, Saint-Laurent (Quebec) H4S 1M2 Canada  
Tel.: (514) 332-0082 Fax: (514) 332-3590 [www.spectralux.ca](http://www.spectralux.ca)



## Photometric Report: S2402131-R1

Prepared for: Studio d'Armes Inc. · Test Date: 13 February 2024

Luminaire: RA Line Long · Lumcat: RA-LI-C-CTGO-40K-120V

### Coefficients of Utilization - Zonal Cavity Method

RCR	RC	0.9				0.8				0.7				0.5			0.1			0
	RW	0.7	0.5	0.3	0.1	0.7	0.5	0.3	0.1	0.7	0.5	0.3	0.1	0.5	0.3	0.1	0.5	0.3	0.1	0
0		116	116	116	116	107	107	107	107	99	99	99	99	83	83	83	56	56	56	50
1		103	96	90	85	94	89	83	79	86	81	77	73	68	65	61	44	42	41	35
2		92	82	74	66	85	76	68	62	77	69	63	57	58	53	48	37	34	32	27
3		84	71	61	54	77	65	57	50	70	60	53	46	50	44	39	32	29	26	21
4		76	62	52	45	70	57	48	41	63	53	45	38	44	38	33	28	24	21	18
5		70	55	45	37	64	51	42	35	58	47	39	32	39	32	28	25	21	18	15
6		64	49	39	32	58	45	36	30	53	42	34	28	35	28	24	22	19	16	13
7		59	44	34	28	54	41	32	26	49	37	30	24	31	25	21	20	17	14	11
8		54	40	30	24	50	37	28	23	46	34	26	21	28	22	18	19	15	12	10
9		51	36	27	21	46	33	25	20	42	31	24	19	26	20	16	17	13	11	9
10		47	33	24	19	43	30	23	18	40	28	21	17	24	18	14	16	12	10	8

### Zonal Lumen Summary

Zone	Lumens	% Lamp	% Luminaire
0 - 10	12	0.95	0.95
10 - 20	36	2.78	2.78
20 - 30	57	4.42	4.42
30 - 40	74	5.77	5.77
40 - 50	86	6.76	6.76
50 - 60	94	7.32	7.32
60 - 70	95	7.46	7.46
70 - 80	94	7.32	7.32
80 - 90	92	7.21	7.21
90 - 120	281	21.99	21.99
90 - 130	375	29.31	29.31
90 - 150	535	41.85	41.85
90 - 180	640	50.00	50.00
0 - 180	1280	100.00	100.00

### Average Luminance (Cd/m<sup>2</sup>)

Angle	0 Degree	45 Degree	90 Degree
45.0	500	545	586
55.0	514	640	717
65.0	498	827	974
75.0	407	1309	1604
85.0	226	3877	4820

Luminaire Luminous Flux: 1280

Measured Input Power: 29.69 W

Total Luminaire Efficiency: N/A

Luminaire Luminous Efficacy: 43.1 lm/W

Luminaire Spacing Criterion (0 Degree): 1.3758

Luminaire Spacing Criterion (90 Degree): 1.4606

Category: Up and Down

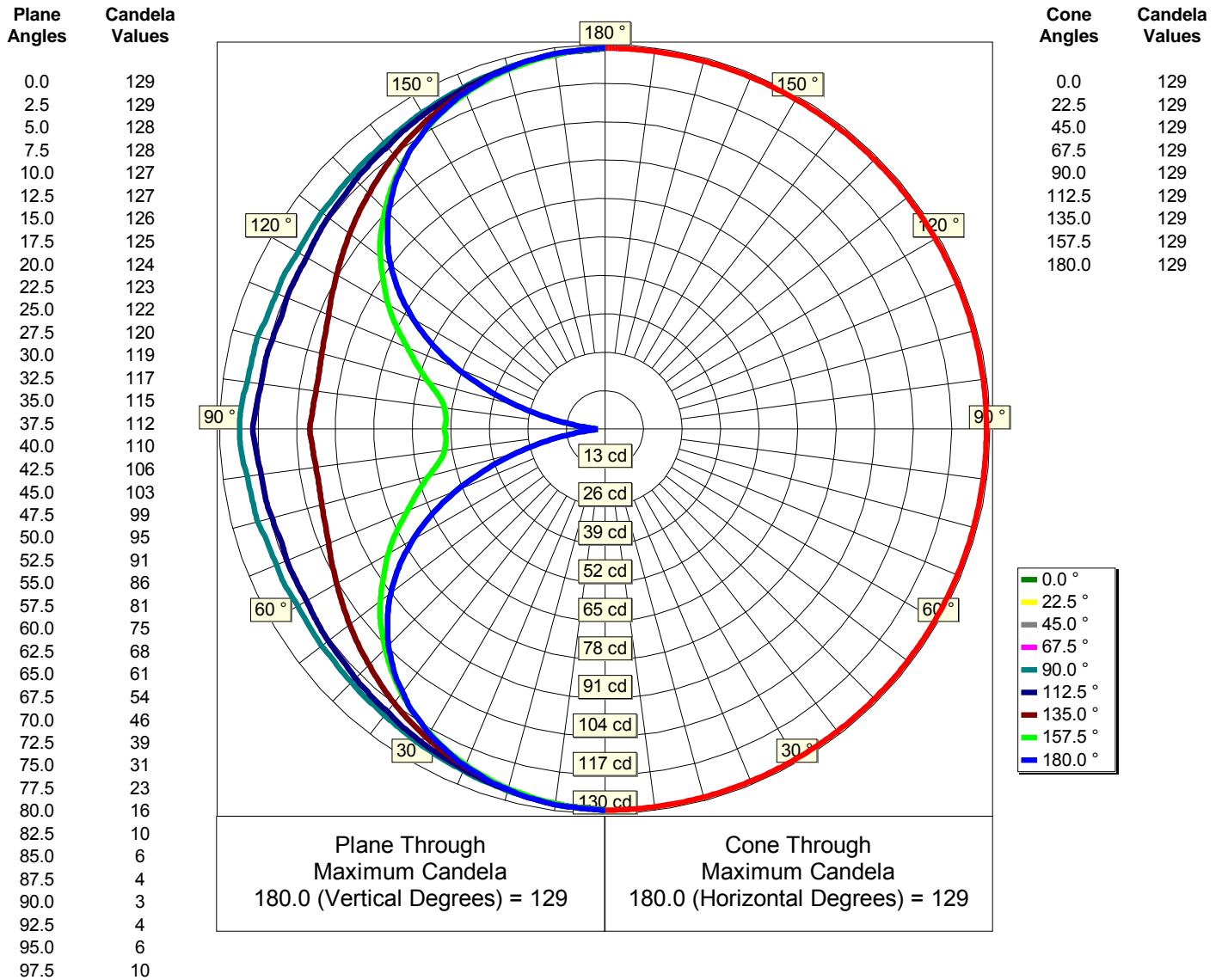


## Photometric Report: S2402131-R1

Prepared for: Studio d'Armes Inc. · Test Date: 13 February 2024

Luminaire: RA Line Long · Lumcat: RA-LI-C-CTGO-40K-120V

### Luminous Intensity - Polar Curve for each Plane(1)





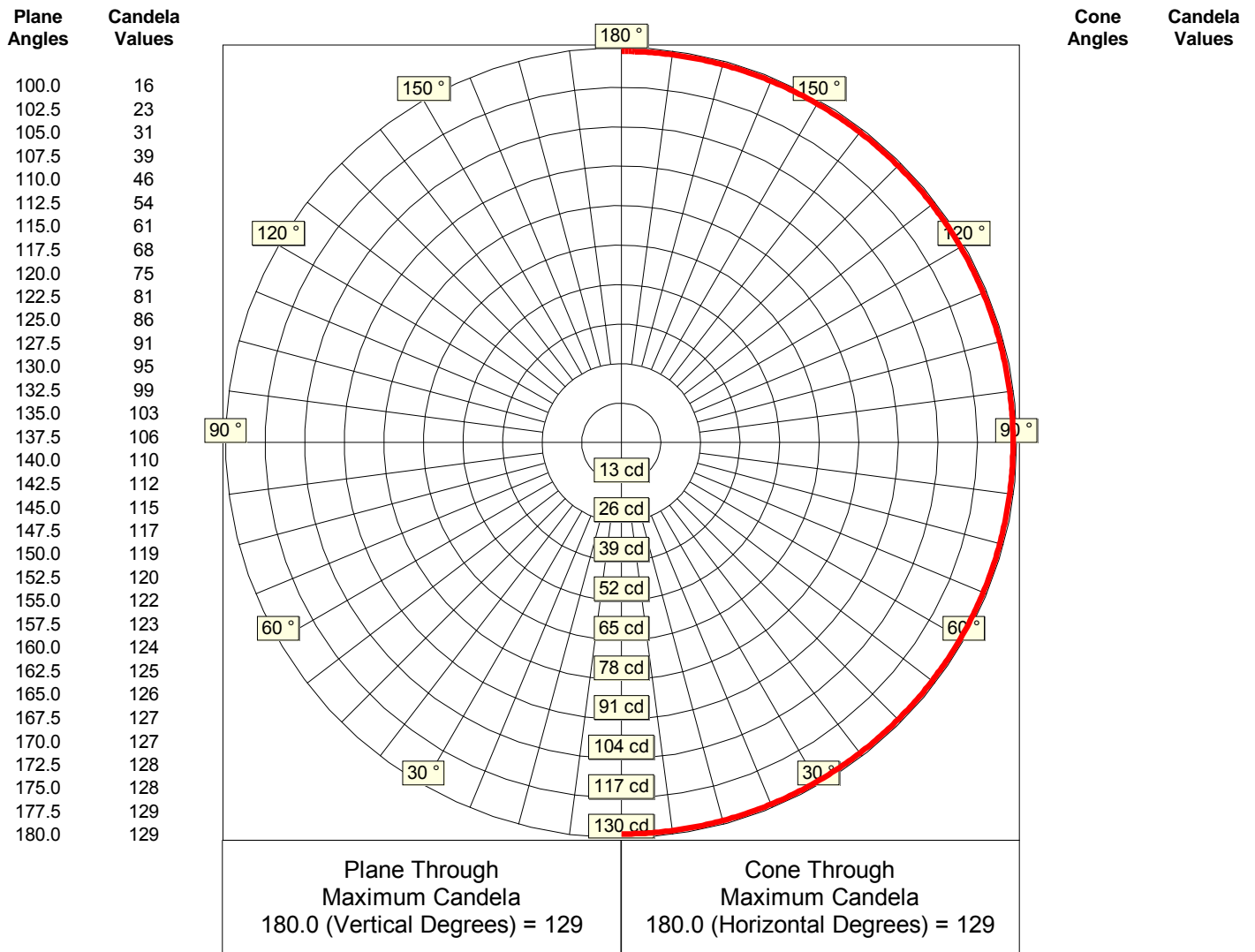


## Photometric Report: S2402131-R1

Prepared for: Studio d'Armes Inc. · Test Date: 13 February 2024

Luminaire: RA Line Long · Lumcat: RA-LI-C-CTGO-40K-120V

### Luminous Intensity - Polar Curve for each Plane(2)







# Spectra Lux

2750 Sabourin, Saint-Laurent (Quebec) H4S 1M2 Canada  
Tel.: (514) 332-0082 Fax: (514) 332-3590 [www.spectralux.ca](http://www.spectralux.ca)



## IES File Headers

IESNA:LM-63:2019  
[ISSUEDATE] 13 February 2024  
[TESTLAB] Spectra Lux  
[TEST] S2402131-R1  
[MANUFAC] Studio d'Armes Inc.  
[LUMCAT] RA-LI-C-CTGO-40K-120V  
[LUMINAIRE] RA Line Long  
[LAMP] Clusters of Mixed Color LEDs c/w ERP Driver PSB40W-1400-27 @ 120.00V  
[\_BURNING] Vertical Base Up & Down (1,280 Luminaire Lumens)  
[\_OPTICS] Up & Down LEDs Module  
[\_LENS] Clear Cylindrical Borosilicate Tube  
[\_HOUSING] (2) Cylindrical Holders  
[\_NOMINAL COLOR] 4000 K  
[\_DRIVE CURRENT] 1000 mA

## Candela Table

### Lateral Angles

	0.0	22.5	45.0	67.5	90.0	112.5	135.0	157.5	180.0
V e r t i c a l	0.0	129	129	129	129	129	129	129	129
	2.5	129	128	128	128	128	128	128	129
	5.0	128	128	128	128	128	128	128	128
	7.5	128	128	128	128	128	128	128	128
	10.0	127	127	127	127	127	127	127	127
	12.5	127	126	127	127	127	127	126	127
	15.0	126	126	126	126	127	126	126	126
	17.5	125	125	125	126	126	125	125	125
	20.0	124	124	124	125	125	124	124	124
	22.5	123	123	123	125	125	123	123	123
	25.0	122	121	123	124	124	123	121	122
	27.5	120	120	121	123	123	121	120	120
	30.0	119	118	120	123	124	120	118	119
	32.5	117	117	119	122	123	119	117	117
	35.0	115	115	118	121	122	118	115	115
	37.5	112	113	117	120	122	117	113	112
	40.0	110	110	115	120	122	115	110	110
	42.5	106	108	114	120	121	114	108	106
	45.0	103	105	113	119	121	113	105	103
A n g l e s	47.5	99	102	111	118	121	111	102	99
	50.0	95	99	110	118	120	110	99	95
	52.5	91	95	108	118	120	108	95	91
	55.0	86	92	107	117	120	107	92	86
	57.5	81	88	106	117	120	106	88	81
	60.0	75	84	104	116	120	104	84	75
	62.5	68	80	103	116	120	103	80	68
	65.0	61	76	102	116	120	102	76	61
	67.5	54	72	101	116	120	101	72	54
	70.0	46	68	100	116	120	100	68	46
	72.5	39	65	99	116	120	99	65	39
	75.0	31	62	99	116	121	99	62	31
	77.5	23	58	98	117	121	98	58	23
	80.0	16	56	98	117	121	98	56	16
	82.5	10	55	98	117	122	98	55	10
	85.0	6	54	99	118	123	99	54	6
	87.5	4	54	99	118	123	99	54	4
	90.0	3	54	100	119	123	100	54	3



# Spectra Lux

2750 Sabourin, Saint-Laurent (Quebec) H4S 1M2 Canada  
Tel.: (514) 332-0082 Fax: (514) 332-3590 [www.spectralux.ca](http://www.spectralux.ca)



## Lateral Angles

	0.0	22.5	45.0	67.5	90.0	112.5	135.0	157.5	180.0	
V e r t i c a l	92.5	4	54	99	118	123	118	99	54	4
	95.0	6	54	99	118	123	118	99	54	6
	97.5	10	55	98	117	122	117	98	55	10
	100.0	16	56	98	117	121	117	98	56	16
	102.5	23	58	98	117	121	117	98	58	23
	105.0	31	62	99	116	121	116	99	62	31
	107.5	39	65	99	116	120	116	99	65	39
	110.0	46	68	100	116	120	116	100	68	46
	112.5	54	72	101	116	120	116	101	72	54
	115.0	61	76	102	116	120	116	102	76	61
	117.5	68	80	103	116	120	116	103	80	68
	120.0	75	84	104	116	120	116	104	84	75
	122.5	81	88	106	117	120	117	106	88	81
	125.0	86	92	107	117	120	117	107	92	86
	127.5	91	95	108	118	120	118	108	95	91
	130.0	95	99	110	118	120	118	110	99	95
	132.5	99	102	111	118	121	118	111	102	99
	A n g l e s	135.0	103	105	113	119	121	119	113	105
137.5		106	108	114	120	121	120	114	108	106
140.0		110	110	115	120	122	120	115	110	110
142.5		112	113	117	120	122	120	117	113	112
145.0		115	115	118	121	122	121	118	115	115
147.5		117	117	119	122	123	122	119	117	117
150.0		119	118	120	123	124	123	120	118	119
152.5		120	120	121	123	124	123	121	120	120
155.0		122	121	123	124	125	124	123	121	122
157.5		123	123	123	125	125	125	123	123	123
160.0		124	124	124	125	126	125	124	124	124
162.5		125	125	125	126	126	126	125	125	125
165.0		126	126	126	126	127	126	126	126	126
167.5		127	126	127	127	127	127	127	126	127
170.0		127	127	127	127	128	127	127	127	127
172.5		128	128	128	128	128	128	128	128	128
175.0		128	128	128	128	128	128	128	128	128
177.5		129	128	128	128	128	128	128	128	129
180.0	129	129	129	129	129	129	129	129	129	