

TECHNICAL DATA, TERMS AND CONDITIONS

HPS Replacement Starters.....	232
Lamp Selection	233
Fuse Ratings	234-239
Luminaire Classification Systems.....	240
Floodlighting Applications.	241
Floodlighting Calculations.....	242
Roadway Lighting Calculations.....	243
Terms & Conditions	244-245
Index	246-247

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1-800-754-0463

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www.americanelectriclighting.com

Technical Data

H P S R E P L A C E M E N T S T A R T E R S

Catalog Number	Description
IGN 3L 36 OB 50/150	3 Lead 3/16" Terminal Open Board 55V
IGN 3L 36 OB 200/400	3 Lead 3/16" Terminal Open Board 100V
IGN 3L 14 OP 50/150	3 Lead 1/4" Terminal Open Plug 55V
IGN 3L 14 OP 200/400	3 Lead 1/4" Terminal Open Plug 100V
IGN 3L 14 EC 50/150	3 Lead 1/4" Terminal Encapsulated 55V
IGN 3L 14 EC 200/400	3 Lead 1/4" Terminal Encapsulated 100V
IGN 2L 36 OB 50/150	2 Lead 3/16" Terminal Open Board 55V
IGN 2L 36 OB 200/400	2 Lead 3/16" Terminal Open Board 100V
IGN 2L 14 OP 50/150	2 Lead 1/4" Terminal Open Plug 55V
IGN 2L 14 OP 200/400	2 Lead 1/4" Terminal Open Plug 100V
IGN 2L 14 EC 50/150	2 Lead 1/4" Terminal Encapsulated 55V
IGN 2L 14 EC 200/400	2 Lead 1/4" Terminal Encapsulated 100V
IGN 2L 36 OB DUAL 50/400	2 Lead 3/16" Terminal Open Board Dual 55/100V ¹
IGN 2L 14 OP DUAL 50/400	2 Lead 1/4" Terminal Open Plug Dual 55/100V ¹
IGN 2L 14 EC DUAL 50/400	2 Lead 1/4" Terminal Encapsulated Dual 55/100V ¹
IGN 2L 14 EC DUAL UNI	2 Lead 1/4" Terminal Encapsulated Dual Universal
IGN 2L 14 OP DUAL UNI	2 Lead 1/4" Terminal Open Plug Dual Universal

Notes:

- 1 Ships as 55V, converts to 100V by removing jump wire.

LAMP SELECTION

Lamp Comparison

	Quartz Incandescent	Low Pressure Sodium	Metal Halide	High Pressure Sodium
Efficiency	Poor 20 LPW	Best 183 LPW	Good 90 LPW	Better 105 LPW
Mean Life	Low 2K Hrs	Medium 18K Hrs	High 12K Hrs	High 24K Hrs
Lumen Maintenance	High 97%	High 100%(+9)	Medium 80%	High 90%
Color	Best	Very Poor Monochrome	Good	Fair
System C.U.	Good	Fair	Good	Good
Hot Restart	Instant	1 Minute	15 Minutes	1 Minute
Warm-Up	Instant	10 Minutes	10 Minutes*	5 Minutes
System Cost	Lowest	High	High	High

*Pulse Start MH

Recommended Minimum Mounting Heights for Various Lamps

High Pressure Sodium Lamp	Metal Halide Lamp	Minimum Mounting Height (Ft)
50W		8.0
70W		12.0
100W		15.0
150W	175W	18.0
200W		20.0
250W		25.0
310W	400W	30.0
400W		35.0
1000W	1000W	40.0

Maintenance Factors

If maintained footcandle level is desired, multiply the area coverage per fixture by the maintenance factor.

Maintenance factor is determined by multiplying the lamp lumen depreciation factor (LLD) by the luminaire dirt depreciation factor (LDD). The lamp lumen depreciation factor is usually the mean lumen value of the lamp. The luminaire dirt depreciation factor range is described in the Illuminating Engineering Society Handbook. A .9 dirt factor is commonly used.

Typical Lamp Types

with Watts and Initial Lamp Lumens

Lamp Type	Watts	Initial Lumens	Mean Lumens	Avg. Life
High Pressure Sodium	35	2250	2025	24000
	50	4000	3600	24000
	70	6300	5500	24000
	100	9500	8000	24000
	150	16000	13800	24000
	200	22000	19800	24000
	250	29000	26100	24000
	310	37000	32300	24000
	400	50000	45000	24000
	1000	130000	120700	24000
Metal Halide (Horizontal)	175	12800	9300	7500
	250	20000	14100	7500
	400	32000	20500	15000
	400 (BT28)	32000	20500	15000
	1000	107800	86000	12000
	1500	153000	127400	3000
Pulse Start Metal Halide (Horizontal)	175	16000	112000	150000
	250	23800	16600	15000
	320	32000	21000	15000
	350	37000	28000	20000
	400	41000	32800	20000
1000	120000	96000	20000	

Technical Data

FUSE RATINGS / ENERGY CONSUMPTION

Nominal Lamp Wattage (watts)	Ballast Circuit	Supply Voltage (volts)	Input Watts (watts)	Current (amps)	# of Fuses	Fuse Rating (Amps)	Annual Energy Consumption (\$)¹
07S	RN	120	86	2.10	1	8	\$37.67
07S	RH	120	86	1.30	1	3	\$37.67
07S	XN	208	91	1.53	2	5	\$39.86
07S	XN	240	91	1.35	2	3	\$39.86
07S	XN	277	91	1.17	1	3	\$39.86
07S	XH	208	91	0.85	2	3	\$39.86
07S	XH	240	91	0.75	2	2	\$39.86
07S	XH	277	91	0.65	1	2	\$39.86
07S	CA	120	95	0.90	1	3	\$41.61
07S	CA	208	95	0.53	2	2	\$41.61
07S	CA	240	95	0.48	2	2	\$41.61
07S	CA	277	95	0.43	1	2	\$41.61
07S	CA	480	95	0.23	2	2	\$41.61
07S	CT	120	95	0.86	1	3	\$41.61
07S	CT	208	95	0.50	2	2	\$41.61
07S	CT	240	95	0.43	2	2	\$41.61
07S	MR	120	103	0.90	1	3	\$45.11
07S	MR	240	103	0.45	2	2	\$45.11
07S	MR	480	103	0.23	2	2	\$45.11
10S	RN	120	115	3.05	1	10	\$50.37
10S	RH	120	115	1.80	1	5	\$50.37
10S	XN	208	130	2.25	2	10	\$56.94
10S	XN	240	130	1.98	2	5	\$56.94
10S	XN	277	130	1.53	1	5	\$56.94
10S	XH	208	130	1.25	2	3	\$56.94
10S	XH	240	130	1.10	2	3	\$56.94
10S	XH	277	130	0.85	1	3	\$56.94
10S	CA	120	138	1.18	1	3	\$60.44
10S	CA	208	138	0.70	2	3	\$60.44
10S	CA	240	138	0.60	2	2	\$60.44
10S	CA	277	138	0.50	1	2	\$60.44
10S	CA	347	138	0.40	1	2	\$60.44
10S	CA	480	138	0.29	2	2	\$60.44
10S	CT	120	130	1.22	1	3	\$56.94
10S	CT	208	130	0.70	2	2	\$56.94
10S	CT	240	130	0.61	2	2	\$56.94
10S	CT	277	130	0.52	1	2	\$56.94
10S	MR	120	138	1.20	1	3	\$60.44
10S	MR	240	138	0.60	2	2	\$60.44
10S	MR	480	138	0.30	2	2	\$60.44
15S	RN	120	170	4.50	1	15	\$74.46

Notes

1 Based on \$.10/KWH; 12 months operation

FUSE RATINGS / ENERGY CONSUMPTION

Nominal Lamp Wattage (watts)	Ballast Circuit	Supply Voltage (volts)	Input Watts (watts)	Current (amps)	# of Fuses	Fuse Rating (Amps)	Annual Energy Consumption (\$)¹
15S	RH	120	170	2.35	1	8	\$74.46
15S	XN	208	188	2.88	2	10	\$82.34
15S	XN	240	188	2.52	2	10	\$82.34
15S	XN	277	188	2.25	1	8	\$82.34
15S	XH	208	188	1.60	2	5	\$82.34
15S	XH	240	188	1.40	2	5	\$82.34
15S	XH	277	188	1.25	1	5	\$82.34
15S	CA	120	190	1.65	1	5	\$83.22
15S	CA	208	190	0.95	2	3	\$83.22
15S	CA	240	190	0.82	2	3	\$83.22
15S	CA	277	190	0.72	1	3	\$83.22
15S	CA	480	188	0.42	2	2	\$82.34
15S	CT	120	190	1.76	1	5	\$83.22
15S	CT	208	190	1.01	2	3	\$83.22
15S	CT	240	190	0.88	2	3	\$83.22
15S	CT	277	190	0.76	1	3	\$83.22
15S	MR	120	196	1.70	1	5	\$85.85
15S	MR	240	196	0.90	2	3	\$85.85
15S	MR	480	196	0.40	2	2	\$85.85
17M	CA	120	213	1.80	1	5	\$93.29
17M	CA	208	213	1.10	2	3	\$93.29
17M	CA	240	213	0.90	2	3	\$93.29
17M	CA	277	213	0.78	1	2	\$93.29
17M	CA	347	213	0.62	1	2	\$93.29
17M	CA	480	213	0.51	2	2	\$93.29
17M	SC	120	208	1.80	1	5	\$91.10
17M	SC	208	208	1.05	2	3	\$91.10
17M	SC	240	208	0.90	2	3	\$91.10
17M	SC	277	208	0.80	1	3	\$91.10
17M	SC	347	208	0.65	1	3	\$91.10
17M	SC	480	206	0.45	2	2	\$90.23
20S	XN	120	240	6.27	1	20	\$105.12
20S	XH	120	240	3.48	1	10	\$105.12
20S	RN	240	218	2.80	2	10	\$95.48
20S	RH	240	218	1.56	2	5	\$95.48
20S	CA	120	240	2.22	1	10	\$105.12
20S	CA	208	240	1.28	2	5	\$105.12
20S	CA	240	240	1.11	2	5	\$105.12
20S	CA	277	240	0.96	1	3	\$105.12
20S	CA	347	240	0.77	1	3	\$105.12
20S	CA	480	240	0.56	2	2	\$105.12

Notes:

1 Based on \$.10/KWH; 12 months operation

Technical Data

FUSE RATINGS / ENERGY CONSUMPTION

Nominal Lamp Wattage (watts)	Ballast Circuit	Supply Voltage (volts)	Input Watts (watts)	Current (amps)	# of Fuses	Fuse Rating (Amps)	Annual Energy Consumption (\$)¹
20S	CT	120	235	2.10	1	10	\$102.93
20S	CT	208	235	1.21	2	3	\$102.93
20S	CT	240	235	1.05	2	3	\$102.93
20S	CT	277	235	0.91	1	3	\$102.93
20S	CT	480	235	0.52	2	2	\$102.93
20S	MR	120	255	2.20	1	10	\$111.69
20S	MR	240	255	1.10	2	3	\$111.69
20S	MR	480	255	0.55	2	2	\$111.69
20M	SC	120	232	2.00	1	5	\$101.62
20M	SC	208	232	1.20	2	3	\$101.62
20M	SC	240	232	1.00	2	3	\$101.62
20M	SC	277	232	0.85	1	3	\$101.62
20M	SC	347	232	0.70	1	2	\$101.62
20M	SC	480	232	0.50	2	2	\$101.62
25S	XN	120	287	8.73	1	22	\$125.71
25S	XH	120	287	4.85	1	15	\$125.71
25S	RN	240	282	4.00	2	10	\$123.52
25S	RH	240	282	2.22	2	10	\$123.52
25S	CA	120	295	2.50	1	10	\$129.21
25S	CA	208	295	1.50	2	5	\$129.21
25S	CA	240	295	1.30	2	5	\$129.21
25S	CA	277	295	1.10	1	5	\$129.21
25S	CA	347	295	0.93	1	3	\$129.21
25S	CA	480	310	0.63	2	2	\$135.78
25S	CT	120	300	2.75	1	10	\$131.40
25S	CT	208	300	1.60	2	5	\$131.40
25S	CT	240	300	1.38	2	5	\$131.40
25S	CT	277	300	1.19	1	5	\$131.40
25S	CT	347	300	0.92	1	3	\$131.40
25S	CT	480	300	0.69	2	2	\$131.40
25S	MR	120	310	2.80	1	10	\$135.78
25S	MR	240	310	1.40	2	5	\$135.78
25S	MR	480	310	0.70	2	2	\$135.78
25M	CA	120	298	2.50	1	10	\$130.52
25M	CA	208	298	1.45	2	5	\$130.52
25M	CA	240	298	1.25	2	5	\$130.52
25M	CA	277	298	1.10	1	5	\$130.52
25M	CA	347	295	0.90	1	3	\$129.21
25M	CA	480	295	0.63	2	2	\$129.21
25M	CT	120	295	2.66	1	10	\$129.21
25M	CT	240	295	1.54	2	5	\$129.21

Notes:

1 Based on \$.10/KWH; 12 months operation

FUSE RATINGS / ENERGY CONSUMPTION

Nominal Lamp Wattage (watts)	Ballast Circuit	Supply Voltage (volts)	Input Watts (watts)	Current (amps)	# of Fuses	Fuse Rating (Amps)	Annual Energy Consumption (\$)¹
25M	CT	480	295	1.33	2	5	\$129.21
25M	SC	120	291	2.50	1	10	\$127.46
25M	SC	208	291	1.45	2	5	\$127.46
25M	SC	240	291	1.25	2	5	\$127.46
25M	SC	277	291	1.10	1	5	\$127.46
31S	CA	120	365	3.37	1	10	\$159.87
31S	CA	208	365	1.94	2	5	\$159.87
31S	CA	240	365	1.68	2	5	\$159.87
31S	CA	277	365	1.45	1	5	\$159.87
31S	CA	480	365	0.84	2	3	\$159.87
31S	MR	120	380	3.30	1	10	\$166.44
31S	MR	240	380	1.65	2	5	\$166.44
31S	MR	480	380	0.83	2	3	\$166.44
32M	SC	120	368	3.25	1	10	\$161.18
32M	SC	208	368	1.90	2	5	\$161.18
32M	SC	240	368	1.65	2	5	\$161.18
32M	SC	277	368	1.40	1	5	\$161.18
32M	SC	347	368	1.10	1	5	\$161.18
32M	SC	480	368	0.80	2	2	\$161.18
40S	RN	208	440	5.20	2	15	\$192.72
40S	RH	208	440	2.89	2	10	\$192.72
40S	RN	240	440	6.00	2	15	\$192.72
40S	RH	240	440	3.33	2	10	\$192.72
40S	XN	120	463	6.70	1	20	\$202.79
40S	XH	120	463	3.72	1	10	\$202.79
40S	CA	120	464	3.80	1	10	\$203.23
40S	CA	208	464	2.20	2	10	\$203.23
40S	CA	240	464	1.90	2	5	\$203.23
40S	CA	277	464	1.70	1	5	\$203.23
40S	CA	347	464	1.32	1	5	\$203.23
40S	CA	480	464	0.97	2	3	\$203.23
40S	CT	120	465	4.20	1	15	\$203.67
40S	CT	208	465	2.40	2	10	\$203.67
40S	CT	240	465	2.10	2	10	\$203.67
40S	CT	277	465	1.82	1	5	\$203.67
40S	CT	347	465	1.45	1	5	\$203.67
40S	CT	480	465	1.05	2	5	\$203.67
40S	MR	120	490	4.20	1	15	\$214.62
40S	MR	240	490	2.10	2	10	\$214.62
40S	MR	480	490	1.05	2	5	\$214.62
40M	CA	120	458	4.00	1	10	\$200.60

Notes:

1 Based on \$.10/KWH; 12 months operation

Technical Data

FUSE RATINGS / ENERGY CONSUMPTION

Nominal Lamp Wattage (watts)	Ballast Circuit	Supply Voltage (volts)	Input Watts (watts)	Current (amps)	# of Fuses	Fuse Rating (Amps)	Annual Energy Consumption (\$) ¹
40M	CA	208	458	2.30	2	10	\$200.60
40M	CA	240	458	2.00	2	5	\$200.60
40M	CA	277	458	1.75	1	5	\$200.60
40M	CA	347	460	1.40	1	5	\$201.48
40M	CA	480	462	1.00	2	3	\$202.36
40M	CT	120	465	4.00	1	10	\$203.67
40M	CT	208	465	2.31	2	10	\$203.67
40M	CT	240	465	2.00	2	5	\$203.67
40M	CT	277	465	0.87	1	3	\$203.67
40M	CT	347	462	1.35	1	5	\$202.36
40M	CT	480	465	1.00	2	3	\$203.67
40M	SC	120	452	3.80	1	10	\$197.98
40M	SC	208	452	2.20	2	10	\$197.98
40M	SC	240	452	1.90	2	5	\$197.98
40M	SC	277	452	1.65	1	5	\$197.98
75S	CA	120	840	6.75	1	20	\$367.92
75S	CA	208	840	4.00	2	10	\$367.92
75S	CA	240	840	3.50	2	10	\$367.92
75M	CA	820	120	6.90	1	20	\$52.56
75M	CA	820	208	3.85	2	10	\$91.10
75M	CA	820	240	3.45	2	10	\$105.12
75M	CA	820	277	3.00	1	10	\$121.33
75M	SC	120	812	7.00	1	20	\$355.66
75M	SC	208	812	4.00	2	10	\$355.66
75M	SC	240	812	3.50	2	10	\$355.66
X1S	CA	120	1100	9.50	1	30	\$481.80
X1S	CA	208	1100	5.50	2	15	\$481.80
X1S	CA	240	1100	4.75	2	15	\$481.80
X1S	CA	277	1100	4.15	1	15	\$481.80
X1S	CA	347	1100	3.30	1	10	\$481.80
X1S	CA	480	1100	2.30	2	10	\$481.80
X1M	CA	120	1070	9.00	1	30	\$156.22 ²
X1M	CA	208	1070	5.20	2	15	\$156.22 ²
X1M	CA	240	1070	4.50	2	15	\$156.22 ²
X1M	CA	277	1070	3.90	1	10	\$156.22 ²
X1M	CA	347	1070	3.20	1	10	\$156.22 ²
X1M	CA	480	1080	2.25	2	10	\$157.68 ²
X1M	SC	120	1080	9.00	1	30	\$157.68 ²
X1M	SC	208	1080	5.20	2	15	\$157.68 ²
X1M	SC	240	1080	4.50	2	15	\$157.68 ²
X1M	SC	277	1080	3.90	1	10	\$157.68 ²

Notes:

- 1 Based on \$.10/KWH; 12 months operation
- 2 Based on \$.10/KWH; 4 months operation

FUSE RATINGS / ENERGY CONSUMPTION

Nominal Lamp Wattage (watts)	Ballast Circuit	Supply Voltage (volts)	Input Watts (watts)	Current (amps)	# of Fuses	Fuse Rating (Amps)	Annual Energy Consumption (\$)¹
X1M	SC	347	1080	3.20	1	10	\$157.68²
X1M	SC	480	1070	2.25	2	10	\$156.22²
X5M	CA	120	1605	13.50	1	N/A	\$234.33²
X5M	CA	208	1605	7.80	2	20	\$234.33²
X5M	CA	240	1605	6.75	2	20	\$234.33²
X5M	CA	277	1605	5.58	1	15	\$234.33²
X5M	CA	347	1615	4.80	1	15	\$235.79²
X5M	CA	480	1625	3.40	2	10	\$237.25²

Notes:

- 1 Based on \$.10/KWH; 12 months operation
- 2 Based on \$.10/KWH; 4 months operation

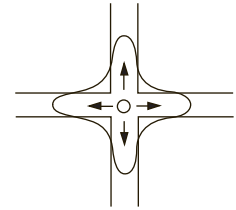
Technical Data

LUMINAIRE CLASSIFICATION SYSTEMS

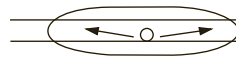
WIDTH CLASSIFICATION	Mounted at Pavement	Normally Used for:
Type I	Center	Roadways up to 2 times the mounting height in width
Type II	Edge	Up to 1 times the mounting height for one side mounting Up to 2 times the mounting height for both side mounting
Type III	Edge	Up to 1.5 times the mounting height for one side mounting Up to 3 times the mounting height for both side mounting
Type IV	Edge	Up to 2 times the mounting height for one side mounting Up to 4 times the mounting height for both side mounting
Type V	Center	Up to 4 times the mounting height in total width
SPACING CLASSIFICATION	Definition	Normally Used for:
S	Short	Spacings up to 4 times the mounting height
M	Medium	Spacings up to 5 times mounting height
L	Long	Spacings up to 5 times mounting height
GLARE CONTROL CLASSIFICATION	Definition	Normally Used for:
FCO	Full-Cutoff	Strict control of light above 80 Vertical Zero emission above 90 Vertical
CO	Cutoff	Strict control of light above 80 Vertical 2.5% emission above 90 Vertical
SCO	Semi-Cutoff	Medium control of light above 80 Vertical
NCO	Non-Cutoff	No control requirements above 80 Vertical



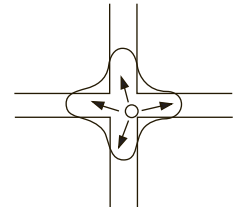
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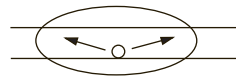
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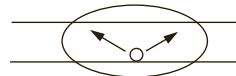
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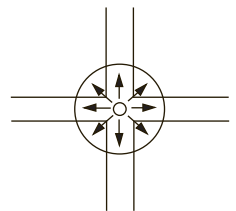
TYPE II - 4 Way



TYPE III



TYPE IV



TYPE V

FLOODLIGHTING APPLICATIONS

IES Classifications

The IES beam spreads indicate the angular ranges (horizontally and vertically) through which the intensity of the floodlight is greater than 10% of its maximum intensity. This angular range is referred to as the 'Field Angle'.

For example:

Asymmetrical beam spread
 138° (H) x 119° (V)
 HORIZONTAL VERTICAL
 = IES 7 X 6

IES Beamspread Classification		
Field Angle Degrees	IES Type	Beam Description
10° up to 18°	1	Very Narrow
18° up to 29°	2	Narrow
29° up to 46°	3	Medium Narrow
46° up to 70°	4	Medium
70° up to 100°	5	Medium Wide
100° up to 130°	6	Wide
130° and up	7	Very Wide

The IES classification was formerly referred to as NEMA Type.

The following outdoor design tips provide general guidelines for lighting design. These guidelines may not apply to all applications.

GROUND-MOUNTED FLOODLIGHTS

Ground-mounted floodlights are used to light building facades, signs and flagpoles.

Facade Lighting

When lighting building facades with ground-mounted floodlights, three factors are considered: setback, spacing and aiming.

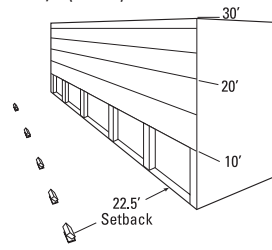
Facade Lighting Considerations:
 1. Setback
 2. Spacing
 3. Aiming

Setback

The recommended setback is three-fourth the building height. If a building is 30 feet tall, the recommended setback is 22.5 feet from the building. Locating the floodlight closer to the building will sacrifice uniformity; setting it farther back will result in a loss of efficiency.

$$\text{Setback distance} = \frac{3}{4} \times \text{building height}$$

$$\frac{3}{4} (30 \text{ ft.}) = 22.5 \text{ ft.}$$

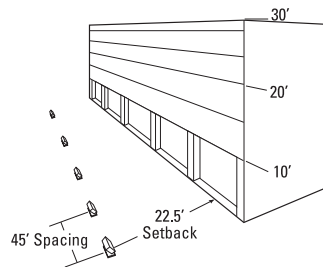


Spacing

The rule of thumb for spacing floodlights is not to exceed two times the setback distance. If the setback is 22.5 feet, the floodlights should not be placed more than 45 feet apart.

$$\text{Spacing} = 2 \times \text{setback distance}$$

$$22.5 \text{ ft.} \times 2 = 45 \text{ ft. apart}$$

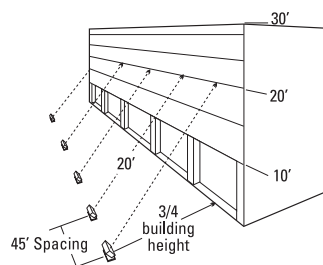


Aiming

The floodlight should be aimed at least two-thirds the height of the building. For example, if a building is 30 feet high, the recommended aiming point is approximately 20 feet high. After installation is complete, aiming can be adjusted to produce the best appearance. Mounting a full or upper visor to the floodlight can reduce unwanted spill light.

$$\text{Aiming point} = \frac{2}{3} \times \text{building height}$$

$$\frac{2}{3} (30 \text{ ft.}) = 20 \text{ ft. high}$$



Sign Lighting

When lighting a sign with ground-mounted floodlights, there are three considerations: setback, spacing and aiming.

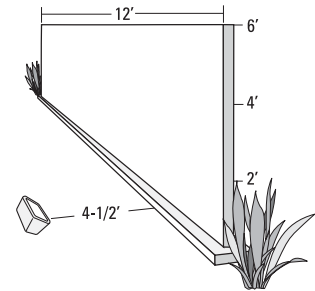
Sign Lighting Considerations:
 1. Setback
 2. Spacing
 3. Aiming

Setback

When using ground-mounted floodlights to light a sign, the recommended setback is a distance equal to three-fourth the sign height. For example, the setback distance for a 12-foot by 6-foot sign would be 4.5 feet. Locating the floodlight closer will sacrifice uniformity while setting it farther back will result in a loss of efficiency.

$$\text{Setback distance} = \frac{3}{4} \times \text{sign height}$$

$$\frac{3}{4} (6 \text{ ft.}) = 4.5 \text{ ft.}$$

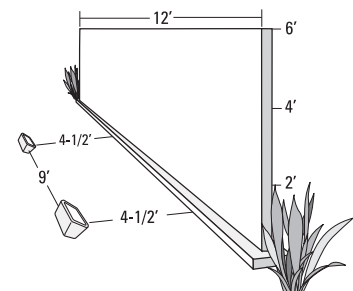


Spacing

The rule of thumb for spacing floodlights is not to exceed two times the setback distance. If the setback is 4.5 feet, the floodlights should not be placed more than 9 feet apart.

$$\text{Spacing} = 2 \times \text{setback distance}$$

$$4.5 \text{ ft.} \times 2 = 9 \text{ ft. apart}$$

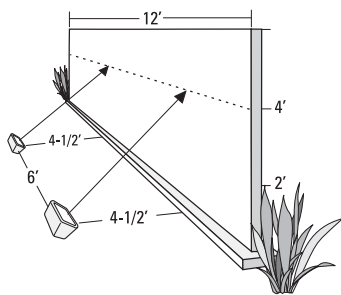


FLOODLIGHTING CALCULATIONS

Aiming

The floodlight should be aimed at least two-thirds up the sign. For example, if a sign is six feet tall, then the floodlight will be aimed approximately four feet high. After installation is completed, aiming can be adjusted to produce the best appearance. Mounting a full or upper visor to the floodlight can reduce unwanted glare.

Aiming point = $\frac{2}{3}$ x sign height
 $\frac{2}{3}$ (6 ft.) = 4 ft. high



Flag Lighting

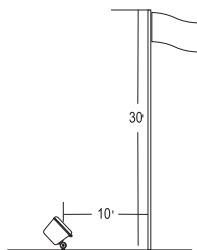
Ground-mounted floodlights also can be used to light flags. Setback, spacing and aiming must all be considered.

- Flag Lighting Considerations:**
1. Setback
 2. Spacing
 3. Aiming

Setback

The recommended setback for lighting a flag is one-third times the pole height. If the pole is 30 feet tall, the floodlight should be set back a distance of 10 feet away from the pole.

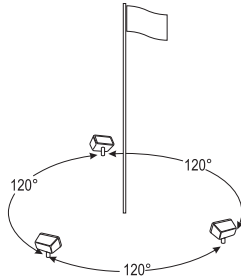
Setback distance = $\frac{1}{3}$ x pole height
 $\frac{1}{3}$ (30 ft.) = 10 ft.



Spacing

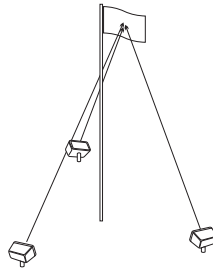
Ideally, three floodlights are recommended to light a flag. The floodlights should be placed approximately 120° apart.

3 floodlights spaced 120° apart



Aiming

The recommended aiming point for each floodlight is the center of the flag or the top of the pole. *Mounting a full or upper visor to the floodlight can reduce unwanted spill light.*



POLE-MOUNTED FLOODLIGHTS

General Area Lighting

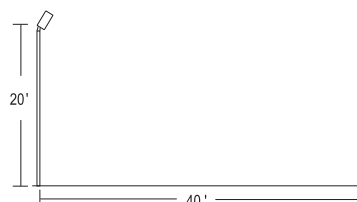
Pole-mounted floodlights are commonly used for general area lighting applications such as parking lots and storage yards. Mounting height, spacing, vertical aiming and horizontal aiming should be considered.

- General Lighting Considerations:**
1. Mtg. Height
 2. Spacing
 3. Vertical aiming
 4. Horizontal aiming

Mounting Height

The recommended mounting height is one half the distance across the area to be lighted. If the area to be lighted is 40 feet across, the lowest recommended mounting height is 20 feet.

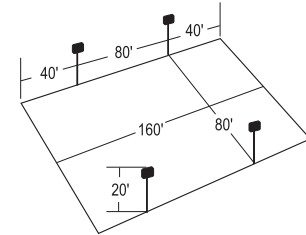
Mounting height = $\frac{1}{2}$ distance to be lighted
 $\frac{1}{2}$ (40ft.) = 20 ft.



Spacing

When more than one pole is added, pole placement is a concern. The "4 times" rule of thumb for spacing indicates that a pole should be placed four times the mounting height from the adjacent poles. If a flood is mounted on a 20-foot pole, space the poles 80 feet apart.

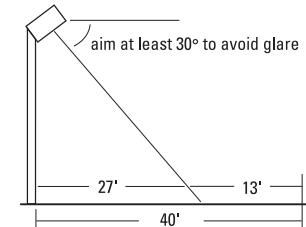
Pole spacing = 4 x mounting height
 4 (20-ft. pole) = 80 feet between poles



Vertical Aiming

A single floodlight uses the two-thirds rule of thumb for vertical aiming. The fixture is aimed $\frac{2}{3}$ of the distance across the area to be lighted and at least 30° below horizontal. If the area to be lighted is 40 feet across, the recommended aiming point is 27 feet.

Aiming point = $\frac{2}{3}$ across distance to be lighted
 $\frac{2}{3}$ (40 ft.) = 27 ft. aiming point

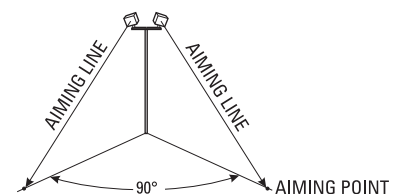


Additionally, to minimize glare, the recommended aiming point distance should never exceed twice the mounting height. If a pole is 20 feet high, the vertical aiming point should not exceed 40 feet out.

2 (20 ft. mtg. ht.) = 40 ft.

Horizontal Aiming

When an additional floodlight is added to a single pole, horizontal aiming also must be considered. First, each floodlight should be vertically aimed according to the two-thirds rule. As long as the floodlight has a horizontal NEMA 6 or 7 beamspread, the floodlights can be aimed up to 90° apart.



ROADWAY LIGHTING CALCULATIONS

American Electric Lighting offers an extensive line of luminaires for your roadway lighting applications. The calculations which follow will help you to determine the type, quantity and placement of these luminaires. You will need data from the Photometric Test Report for the luminaire(s) being considered. Contact your American Electric Lighting representative for these reports. A sample report is provided for your use in the following calculations.

Calculations

$$\text{Average Maintained Footcandles} = \frac{\text{Initial Lamp Lumens} \times \text{Coefficient of Utilization} \times \text{Light Loss Factor}}{\text{Pole Spacing} \times \text{Road Width}}$$

$$\text{Pole Spacing} = \frac{\text{Initial Lamp Lumens} \times \text{Coefficient of Utilization} \times \text{Light Loss Factor}}{\text{Average Maintained Footcandles} \times \text{Road Width}}$$

$$\text{Initial Lamp Lumens} = \frac{\text{Averaged Maintained Footcandles} \times \text{Pole Spacing} \times \text{Road Width}}{\text{Coefficient Utilization} \times \text{Light Loss Factor}}$$

SAMPLE CALCULATIONS

A roadway is to be lighted to a level of 1fc (Average Maintained Footcandles). The roadway is 45 feet wide and the poles are 30 feet high, therefore, the mounting height ratio is 1.5

The Photometric Test Report provides: Initial Lamp Lumens = 14,000. Coefficient of Utilization (at 1.5MHR) = 43% for the 175W MH lamp used in an American Electric Lighting LUXMASTER LUMINAIRE.

The Light Loss Factor provided in the preceding charts for the 175W MH lamp is 0.70. Initial Lamp Lumens are also provided in this chart.

$$\text{Pole Spacing} = \frac{14,000 \text{ (ILL)} \times .43 \text{ (CU)} \times .70 \text{ (LLF)}}{1 \text{ (AMF)} \times 45 \text{ (RW)}} = 94 \text{ Feet (PS)}$$

If Pole Spacing is known, then Average Maintained Footcandles can be calculated:

$$\text{Average Maintained Footcandles} = \frac{14,000 \text{ (ILL)} \times .43 \text{ (CU)} \times .70 \text{ (LLF)}}{94 \text{ (PS)} \times 45 \text{ (RW)}} = .996 \text{ (AMF)}$$

Or Initial Lamp Lumens can be calculated:

$$\text{Initial Lamp Lumens} = \frac{1 \text{ (AMF)} \times 94 \text{ (PS)} \times 45 \text{ (RW)}}{.43 \text{ (CU)} \times .70 \text{ (LLF)}} = 14,000 \text{ (ILL)}$$

Other application data may be determined by similar calculations. Contact your local American Electric Lighting representative for assistance.

AMF - Average Maintained Footcandles
 CU - Coefficient of Utilization
 ILL - Initial Lamp Lumens
 MHR - Mounting Height Ratio
 LLF - Light Loss Factor
 PS - Pole Spacing
 RW - Road Width

TERMS AND CONDITIONS OF SALE

For Shipments Within the United States*

Effective August 25, 2008

TERMS:

The words we, our and us shall refer to American Electric Lighting ("AEL"), a division of Acuity Brands Lighting, Inc. and the words *purchaser, you and your*, shall refer to the person or entity purchasing products under this Agreement.

PAYMENT TERMS:

A 1% cash discount will be allowed on invoices paid in full by the 10th of the month following the month of billing. All payments made after the 10th are due on a net basis to the 25th (1% 10th prox, net 25th prox).

FREIGHT ALLOWANCE:

Shipments are F.O.B. our plants, distribution centers or field warehouses as follows:

- All factory orders having a distributor price of \$3,000 or more for one consignee for one release qualify for freight allowed.
- Warehouse orders of stock items having a distributor price of \$3,000 or more for one consignee for one release qualify for freight allowed.
- All orders having a distributor price of less than \$3,000 will be assessed freight and handling charges.
- Anchor bolts are included with American Electric Lighting poles. Pre-shipped anchor bolts having a distributor price of less than \$3,000 will be assessed freight and handling charges.

We reserve the right to route all orders that qualify for freight allowance at our discretion. AEL will ship in the manner selected by the purchaser provided that the purchaser assumes all additional transportation costs.

DELIVERY:

AEL shall not be liable for any delay or default in delivering products for any reason beyond the reasonable control of AEL, including, but not limited to, armed conflict or economic dislocation resulting therefrom; embargoes; shortages of labor, raw materials, fuels, energy, production facilities or transportation; labor difficulties, civil disorders of any kind; action of civil or military authorities (including priorities and allocations); fires, floods, and accidents. No liability shall be incurred by AEL by reason of its not filling any order or portion thereof due to any of these or similar circumstances.

TRANSPORTATION CLAIMS:

AEL's equipment is tested for mechanical defects prior to shipping. AEL's packaging is regularly inspected by transportation authorities who assume responsibility for both apparent and concealed damages sustained by improper handling. Title passes to purchaser upon delivery by AEL to the carrier, and all claims for damages or shortages in transit shall be made by the purchaser to the delivering carrier. AEL will be glad to assist when called upon, provided notification is given in writing within 15 business days of receipt of shipment.

PACKAGING:

AEL reserves the right to alter the quantities of any order so as to conform to standard packaging.

PRICES:

Prices are subject to change without notice. In the event of price increases, all orders on hand will be filled at the lower prices provided that such orders are released for shipping prior to the effective date of the price increase. If the orders are not released for shipment prior to the effective date of the price increase, the orders will be billed at the prices in effect at the time of shipment. Special quoted orders which cannot be released for shipping prior to the price increase effective date may be subject to an increase in price. Minimum billing is \$100 net excluding orders for replacement parts only. Orders for parts totaling less than \$15 will be billed \$15 lump sum. Prices do not include lamps unless so specified.

RETURN MERCHANDISE:

No merchandise may be returned without prior written authorization from AEL factories. Requests to return merchandise must be made with AEL's agents for transmittal to the factory within four (4) months from date of shipment by AEL. All returns must be shipped prepaid to the location designated on the return authorization. Credit will be issued based on the original invoice price, or price in effect at time of return, whichever is lower, less a restocking charge of 25% (minimum) of the purchase price (to partially defray our cost of handling), less reconditioning and replacing costs if necessary, and less the freight expense of the original shipment. The reconditioning charge will be determined by the amount of repairs, refinishing or reconditioning required to restore the merchandise to saleable condition. All non-stocking, special, custom-made, outdated, or modified versions of normal factory stocking items are not returnable. Authorization will not be granted when the value of all items to be returned is less than \$100. Returns from any one order will be limited to not more than 10% of the total order value.

SERVICE AREA LIMITATION:

AEL reserves the right to refuse to make quotations, accept orders or make shipments to points of destination outside of the regular or assigned selling and service area of the distributor.

GUARANTEE:

AEL warrants all equipment to be free from defect in manufacturing, under normal and proper storage, installation, and use, for a period of one (1) year. In addition we provide a six (6) year warranty on the factory installed electrical system (which consists of the ballast, ignitor, capacitor, lamp socket, terminal board, PEC receptacle, and wiring) inside AEL products. AEL's guarantee liability extends only to the repair or replacement of the defective part, at AEL's option, and no labor charges for correction of the defect by repair or replacement will be honored by AEL unless prior written authority has been granted by AEL's Customer Service Department.

THE FOREGOING GUARANTEE TERMS ARE EXCLUSIVE AND IN LIEU OF ALL OTHER GUARANTEES. AEL MAKES NO REPRESENTATIONS OR WARRANTIES EXCEPT AS EXPRESSLY SET FORTH IN THESE TERMS AND CONDITIONS, AND AEL EXPRESSLY DISCLAIMS ALL OTHER REPRESENTATIONS AND WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. NO DISTRIBUTOR OR SUPPLIER OF AEL HAS THE AUTHORITY TO MODIFY OR AMEND THIS GUARANTEE.

LIMITATION OF LIABILITY:

The foregoing guarantee provides the purchaser's sole and exclusive remedy relating to AEL's products. The total liability of AEL on any and all claims of any kind, whether in contract, warranty, tort (including negligence), strict liability or otherwise, arising out of or in connection with, or resulting from, AEL's performance or breach of the foregoing limited warranty or from AEL's sale, delivery, repair, or replacement of any products, or the furnishing of any services, shall in no event exceed the purchase price allocable to the specific product which gives rise to the claim, and any and all such liability shall terminate upon the expiration of the limited warranty set forth above. IN NO EVENT SHALL AEL BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTAL, CONSEQUENTIAL, OR PUNITIVE DAMAGES, EVEN IF INFORMED OF THE POSSIBILITY OF SUCH DAMAGES, WHETHER AS THE RESULT OF BREACH OF CONTRACT, WARRANTY, TORT (INCLUDING NEGLIGENCE), STRICT LIABILITY, OR ANY OTHER THEORY.

CANCELLATION CHARGES:

Orders for stocking items may be cancelled prior to shipping without charge. All other orders may not be cancelled unless AEL is reimbursed for all work already performed and for all special materials purchased by AEL. If an order is cancelled after shipment or if delivery is refused at the delivery destination, all warehousing, delivery and return costs will be charged to the purchaser.

GENERAL:

Possession of a price sheet does not entitle you to purchase any merchandise. Specifications are subject to change without notice. Consult factory for verification. The compliance of AEL's product to individual project specifications and the approval for their use is not warranted by AEL.

ACCEPTANCE:

Acceptance of orders can be made only at AEL's plants, distribution centers or field warehouses for warehouse orders on the basis of these terms and conditions of sale. Acceptance of orders is limited to the terms and conditions hereof. AEL hereby objects to any additional or different terms offered by the purchaser in its sales order or any other document of purchaser. Such additional or different terms shall not become a part of any order without the express written consent of AEL.

ENTIRE AGREEMENT:

Except as expressly agreed in writing signed by AEL, the terms and conditions stated above shall constitute the entire sales agreement between AEL and the purchaser. Any contrary or additional terms or conditions submitted by the purchaser (other than the description of the products being ordered and the requested quantities, shipping date, and shipping location contained in purchaser's purchase order) shall be deemed to be of no force or effect and are hereby rejected. Purchaser's submission of a purchase order shall indicate purchaser's acknowledgment of and agreement with these Terms and Conditions.

American Electric Lighting reserves the right to change these Terms and Conditions of Sale without notice.

* For shipments outside the United States, contact factory for applicable Terms and Conditions of Sale.

TERMS AND CONDITIONS OF SALE

For Shipments Within Canada*

Effective August 25, 2008

TERMS:

The words we, our and us shall refer to American Electric Lighting Canada ("AEL"), a division of Acuity Brands Lighting, Inc. and the words purchaser, you and your, shall refer to the person or entity purchasing products under this Agreement.

PAYMENT TERMS:

Payment terms are 2% -10 or Net 30 days. 2%-10 days means that all invoices dated from the first to the 15th of the month are payable on the 25th of the same month. All invoices from the 15th to the 30th of the month are payable on the 10th of the following month. Alternatively, all invoices are due Net 30 days following invoice date.

FREIGHT ALLOWANCE:

Shipments are F.O.B. our plants, Lachine, Quebec, and St. Hyacinthe, Quebec, and our Canadian field warehouses.

- Warehouse or factory orders must equal \$3,000 U.S. or more for shipment to one consignee for one release to qualify for freight allowance.
- All orders having a distributor price of less than \$3,000 U.S. will be assessed freight and handling charges.
- Special shipping requirements by the purchaser that cause additional shipping expenses above the normal shipping expenses will be charged to the purchaser.

DELIVERY:

AEL shall not be liable for any delay or default in delivering products for any reason beyond the reasonable control of AEL, including, but not limited to, armed conflict or economic dislocation resulting therefrom; embargoes; shortages of labor, raw materials, fuels, energy, production facilities or transportation; labor difficulties, civil disorders of any kind; action of civil or military authorities (including priorities and allocations); fires, floods, and accidents. No liability shall be incurred by AEL by reason of its not filling any order or portion thereof due to any of these or similar circumstances.

TRANSPORTATION CLAIMS:

Our equipment is tested for mechanical defects prior to shipping. Our packaging is regularly inspected by transportation authorities who assume responsibility for both apparent and concealed damages sustained by improper handling. Title passes to purchaser upon delivery by AEL to the carrier, and all claims for damages or shortages in transit shall be made by the purchaser to the delivering carrier. AEL will be glad to assist when called upon, provided notification is given in writing within 15 business days of receipt of shipment.

PACKAGING:

AEL reserves the right to alter quantities of any order so as to conform to standard packaging.

PRICES:

Prices are subject to change without notice. In the event of price increases, all orders on hand will be filled at the lower prices provided that such orders are released for shipping prior to the effective date of the price increase. If the orders are not released for shipment prior to the effective date of the price increase, the orders will be billed at the prices in effect at the time of the shipment. Special quoted orders which cannot be released for shipping prior to the price increase effective date may be subject to an increase in price. Minimum billing is \$100 net excluding orders for replacement parts only. Orders for parts totaling less than \$50 will automatically be billed \$50 lump sum. Prices do not include lamps unless so specified. Prices exclude all taxes.

RETURN MERCHANDISE:

No merchandise may be returned without prior written authorization from AEL factories. Requests to return merchandise must be made with our agents for transmittal to the factory within four (4) months from date of shipment by us. All returns must be shipped prepaid to the location designated on the return authorization. Credit will be issued based on the original invoice price, or price in effect at time of return, whichever is lower, less a restocking charge of 25% (minimum) of the purchase price (to partially defray our cost of handling), less reconditioning and replacing costs if necessary, and less the freight expense of the original shipment. The reconditioning charge will be determined by the amount of repairs, refinishing or reconditioning required to restore the merchandise to a saleable condition. All non-stocking, special, custom-made, outdated, or modified versions of normal factory stocking items are not returnable. Authorization will not be granted when the value of all items to be returned is less than \$100. Returns from any one order will be limited to not more than 10% of the total order value.

DROP SHIPMENTS:

AEL reserves the right to refuse to make direct shipments to points of destination outside of the regular or assigned selling and service area of the distributor.

GUARANTEE:

AEL warrants all equipment to be free from defect in manufacturing, under normal and proper storage, installation, and use, for a period of one (1) year. In addition, AEL provides a six (6) year warranty on the factory installed electrical system (which consists of the ballast, ignitor, capacitor, lamp socket, terminal board, PEC receptacle, and wiring) inside AEL products. AEL's guarantee liability extends only to the repair or replacement of the defective part, at AEL's option, and no labor charges for correction of the defect by repair or replacement will be honored by AEL unless prior written authority has been granted by AEL's Customer Service Department.

THE FOREGOING GUARANTEE TERMS ARE EXCLUSIVE AND IN LIEU OF ALL OTHER GUARANTEES. AEL MAKES NO REPRESENTATIONS OR WARRANTIES EXCEPT AS EXPRESSLY SET FORTH IN THESE TERMS AND CONDITIONS, AND AEL EXPRESSLY DISCLAIMS ALL OTHER REPRESENTATIONS AND WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. NO DISTRIBUTOR OR SUPPLIER OF AEL HAS THE AUTHORITY TO MODIFY OR AMEND THIS GUARANTEE.

LIMITATION OF LIABILITY:

The foregoing guarantee provides the purchaser's sole and exclusive remedy relating to AEL's products. The total liability of AEL on any and all claims of any kind, whether in contract, warranty, tort (including negligence), strict liability or otherwise, arising out of or in connection with, or resulting from, AEL's performance or breach of the foregoing limited warranty or from AEL's sale, delivery, repair, or replacement of any products, or the furnishing of any services, shall in no event exceed the purchase price allocable to the specific product which gives rise to the claim, and any and all such liability shall terminate upon the expiration of the limited warranty set forth above. IN NO EVENT SHALL AEL BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTAL, CONSEQUENTIAL, OR PUNITIVE DAMAGES, EVEN IF INFORMED OF THE POSSIBILITY OF SUCH DAMAGES, WHETHER AS THE RESULT OF BREACH OF CONTRACT, WARRANTY, TORT (INCLUDING NEGLIGENCE), STRICT LIABILITY, OR ANY OTHER THEORY.

CANCELLATION CHARGES:

Orders for stocking items may be cancelled prior to shipping without charge. All other orders may not be cancelled unless AEL is reimbursed for all work already performed and for all special materials purchased by AEL. If an order is cancelled after shipment or if delivery is refused at the delivery destination, all warehousing, delivery, and return costs will be charged to the purchaser.

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Possession of a price sheet does not entitle you to purchase any merchandise. Specifications are subject to change without notice. Consult factory for verification. The compliance of AEL's product to individual project specifications and the approval for their use is not warranted by AEL.

ACCEPTANCE:

Acceptance of orders can be made only at AEL's plants, distribution centers or field warehouses for warehouse orders on the basis of these terms and conditions of sale. Acceptance of orders is limited to the terms and conditions hereof. AEL hereby objects to any additional or different terms offered by the purchaser in its sales order or any other document of purchaser. Such additional or different terms shall not become a part of any order without the express written consent of AEL.

ENTIRE AGREEMENT:

Except as expressly agreed in writing signed by AEL, the terms and conditions stated above shall constitute the entire sales agreement between AEL and the purchaser. Any contrary or additional terms or conditions submitted by the purchaser (other than the description of the products being ordered and the requested quantities, shipping date, and shipping location contained in purchaser's purchase order) shall be deemed to be of no force or effect and are hereby rejected. Purchaser's submission of a purchase order shall indicate purchaser's acknowledgment of and agreement with these Terms and Conditions.

American Electric Lighting Canada reserves the right to change these Terms and Conditions of Sale without notice.

*For shipments outside Canada, contact factory for applicable Terms and Conditions of Sale.

Index

ACP Series	154	DP1704	176
AMAC / SMAC / Arms for Concrete Poles	224	DPN Series	183
AMAW / SMAW / Arms for Wood Poles	222	DUX Series	180
ANSI Color Chart	186	DX Series	179
ASA	122	Decorative Poles	90
AVL	134	Chadsworth Series	90
AVL-BIA	132	New Albany Series	92
Accessories		Statesboro Series	94
Area	144	Waycross Series	96
Floodlighting	168	Weatherproof Receptacles	98
Photocontrol	186	DuraStar® Series 20	14
Roadway	50	DuraStar® Series 30	16
Security	118	Dusk To Dawn Series DTD	114
Aluminum Mounting Brackets	203	Energy Saver Series CES	160
American Revolution Deluxe Series	62	Georgian Series GRP	66
American Revolution Series 247	64	Heavy-Duty Wallpack 882	46
AmeriSport™ Series ASP	164	InterState™ II 775	38
Bainbridge Series 870	68	LPS Roadway - SRX	40
Ballast Matrices	52	LPS Roadway - SP2	42
Area	148	Lexington	82
Decorative	100	LuxMaster® Luminaire Series 53	136
Floodlighting	173	LuxMaster® Luminaire Series 153	138
Roadway	52	LuxMaster® Classic Series LM	142
Security	119	LuxMaster® Classic Series LS	140
Branson	84	Marietta Series	70
Contempo Series 245	86	Multi-Mount™ 285	36
Corvus™ CVM Series	10	NEMA Head 11	108
Corvus™ CVL Series	12	NEMA Head Package Series 11 PKG	110
Cresthill Classic	74	PEM	126
Cresthill Sphere	76	PES	124
Cresthill Centennial	78	Photocontrol Recommendation Chart	186
Cresthill Glass	80	Pole Options	202
D7790 Series	181		
DBE Series	184		
DD Series	182		
DE Series	178		
DP Series	177		

Pole Technical Data		Shorting and Open Caps	185
Florida Wind Rating	190	SignLite 875	48
General Information	191	Steel Mounting Brackets	204
Illustrated Samples	188	Sportlighting Series SPF	166
Wind Map	189	Sumter Series	72
Quartz Flood Series 570	162	Technical Data	
Quartz Flood Series 474	163	Floodlighting Applications	241
RSA	192	Floodlighting Calculations	242
RTA	193	Fuse Ratings	234-239
RSAH	194	HPS Replacement Starters	232
RSS	197	Lamp Selection	233
RTS	198	Luminaire Classification Systems	240
RTAU	216	Roadway Lighting Calculations	243
RTF	205	Terms & Conditions	244-245
RTFDB	206	Traditional Concrete Pole Arms	229
RTSU	220	Traditional Wood Pole Arms	228
Roadway 115	18	TwistPack Series TWT	88
Roadway 115 Cutoff	20	UltraFlood™ Series 75	156
Roadway 125	26	UltraFlood™ Series 77	158
Roadway 125 Cutoff	28	Underpass 581/681	44
Roadway 315	22	VLR	130
Roadway 315 Cutoff	24	VMR	128
Roadway 325	30	Valiant	60
Roadway 325 Cutoff	32		
Roadway 327	34		
SMAWL / Arms for Wall Mount	226		
SPRTC	209		
SPRTS	213		
SSA	195		
SSAH	196		
SSF	207		
SSS	199		
STC	208		
STS	200		
STSH	201		
Series 11 "L" Package	112		
Series 165	116		

NOTES