

## Nominal Range

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The nominal range or effective intensity of a lantern comes from the following calculation known as Allard's Law documented in IALA Recommendations E-122 (2001) and E-200-2 (2008):

$$I_e = \frac{E \times D^2}{0.05^V}$$

$I_e$	=	effective intensity (cd)
$E$	=	threshold of detection (lux)
$D$	=	nominal range (m)
$V$	=	visibility (m)

Threshold of detection is 0.0000002 lux for a lantern at night-time with no background light.

Visibility is a function of atmospheric transmissivity. Typically, transmissivity (T) = 0.74 and V = 18520 m (10 NM). At equatorial latitudes and clear skies, T = 0.85 and V = 34262 m (18.5 NM).

## Effective Intensity

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The effective intensity of a flashing lantern comes from the following calculation known as Schmidt-Clausen or Blondel-Rey documented in IALA Recommendations E-122 (2001) and E-200-4 (2008). This method is valid for the rectangular, non-fluctuating flash profiles below the flicker fusion frequency (60 Hz) used by Carmanah lanterns.

$$I_e = \frac{I_p \times F}{C + F}$$

$I_e$	=	effective intensity (cd)
$I_p$	=	peak intensity (cd)
$C$	=	visual time constant (s)
$F$	=	flash duration (s)

The visual time constant is 0.2 s for a lantern at night-time.

# RANGE AND INTENSITY CALCULATIONS



NIGHT TIME RANGE AND INTENSITIES					
RANGE (NM)	EFFECTIVE INTENSITY (cd)		RANGE (NM)	EFFECTIVE INTENSITY (cd)	
	T = 0.74	T = 0.85		T = 0.74	T = 0.85
0.5	0.2	0.2	3.8	31	18
0.6	0.3	0.3	3.9	34	20
0.7	0.4	0.4	4.0	37	21
0.8	0.6	0.5	4.1	40	22
0.9	0.7	0.6	4.2	43	24
1.0	0.9	0.8	4.3	46	26
1.1	1.2	1.0	4.4	50	27
1.2	1.4	1.2	4.5	54	29
1.3	1.7	1.4	4.6	58	31
1.4	2.0	1.7	4.7	62	33
1.5	2.4	2.0	4.8	67	34
1.6	2.8	2.3	4.9	72	37
1.7	3.3	2.6	5.0	77	39
1.8	3.8	3.0	5.1	83	41
1.9	4.4	3.4	5.2	89	43
2.0	5.0	3.8	5.3	95	46
2.1	5.7	4.3	5.4	102	48
2.2	6.4	4.7	5.5	109	51
2.3	7.3	5.3	5.6	116	53
2.4	8.1	5.8	5.7	124	56
2.5	9.1	6.4	5.8	132	59
2.6	10	7.1	5.9	141	62
2.7	11	7.8	6.0	150	65
2.8	12	8.5	6.1	160	69
2.9	14	9.2	6.2	171	72
3.0	15	10	6.3	181	76
3.1	17	11	6.4	193	80
3.2	18	12	6.5	205	83
3.3	20	13	6.6	218	87
3.4	22	14	6.7	232	91
3.5	24	15	6.8	246	96
3.6	26	16	6.9	261	100
3.7	29	17	7.0	277	105