

2. Circuit breaker

Maximum number of LED luminaires per circuit breaker rating

- The new lighting technologies with electronic interfaces (ballasts, drivers) cause a high transient inrush current at power up that can trip the circuit breaker. These phenomena are particularly increased with LED lighting.
 - For LED lamps, one important criteria is to select Circuit Breaker rating and curve to avoid this tripping at power up. This is the purpose of the table below.
- Then the current limitation of the controlling device (iCT, iCT+, iTL, iTL+, Reflex) will be considered (see > p. 28)

Circuit breaker rating		10 A				16 A				20 A			
Unit power of the luminaire (W)	Curve	B	C	D	B, C, D with iCT+ or iTL+ up to 16A	B	C	D	B, C, D with iCT+ or iTL+ up to 16A	B	C	D	B, C, D with iCT+
10		15	30	45	207	22	44	66	331	31	63	94	331
30		11	23	34	69	17	34	51	110	24	49	73	110
50		8	17	25	41	12	25	37	66	17	35	52	66
75		5	11	16	27	7	15	22	44	10	21	31	44
150		2	5	7	13	3	7	10	22	4	9	13	22
200		2	4	6	10	3	6	9	16	3	7	10	16
250		1	3	4	8	2	4	6	13	2	5	7	13
400		-	1	1	5	1	2	3	8	1	3	4	8

Circuit breaker rating		25 A			32 A			40 A			63 A		
Unit power of the luminaire (W)	Curve	B	C	D	B	C	D	B	C	D	B	C	D
10		35	71	106	45	90	135	54	108	162	73	146	219
30		27	55	82	34	69	103	41	83	124	56	113	169
50		20	40	60	25	50	75	30	61	91	41	83	124
75		12	24	36	15	30	45	18	37	55	25	50	75
150		5	11	16	7	15	22	8	17	25	11	23	34
200		5	10	15	6	12	18	7	14	21	10	20	30
250		3	7	10	4	9	13	5	11	16	7	15	22
400		2	4	6	2	5	7	3	7	10	4	9	13

Figure 19. Maximum number of lamps according to the circuit breaker rating and curve, for LED lamps at 40°C, 230 V AC, Cos φ = 0.95



According to the control device used, the transient current surge may:

- require the circuit breaker to be derated according to the number of luminaires / circuit breaker rating coordination curves, when using standard control devices: CT, TL (electromechanical control device),
- be reduced by the use of the following technologies:
 - softStart: using a command integrated in the driver or a dimmer switch,
 - controlled contactor (iTL+, iCT+) (closes when the voltage passes through "0", derating is related to the Cos φ of the lighting circuit).

These technologies allow circuit breakers without derating related to the technology of the lamps to be used.

Example:

$$\text{Circuit rated power} = 230 \text{ V AC} \times \text{Circuit breaker rating} \times \text{Cos } \phi.$$

B

