

Increased safety «e» electrical equipment

Definition

Method of protection applicable to electrical equipment such as light fittings, sockets, switches, etc, which consists of preventing the occurrence of any accidental ignition. The construction principles for increased safety “e” equipment are as follows :

- Use of high-quality insulation materials
- Specially dimensioned air line leakage distance and creepage distance
- Electrical connection which cannot become loose
- Minimum IP54 weatherproof protection of the enclosure
- Respect of the temperature classes
- Conformity of cable entries
- Labelling.

Use

All increased safety «e» equipment is designed such that it does not cause arcs or excessive temperatures capable of likely to ignite an explosive atmosphere. It is therefore suitable for all gas groups (A, B and C). These groups do not appear on the equipment labelling.

Temperature class

For increased safety «e» equipment, the temperature to be taken into account is that of the hottest point of the equipment as a whole, and not the external temperature. There are six temperatures classes: T1, T2, T3, T4, T5, T6 (see “Marking”).

Marking

The marking of increased safety « e » equipment must bear information stipulated by the 94/9 CE ATEX Directive for Europe and IEC 60079-0 for the rest of the world.

Examples for this information are :

II2G EEx e II T6

II

Surface industry

2

Equipment category 2 corresponding to zone 1

G

Gas

EEx

Equipment designed to operate in an explosive atmosphere.

(Products certified ATEX are marked EEx and marked Ex for the products certified IEC).

e

This letter refers to the increased safety protection mode .

II

This is the electrical equipment group according to its destination.

There are two groups :

Group I

- Electrical equipment intended for underground work in mines with explosive atmospheres

Group II

- Electrical equipment intended for surface work with explosive atmospheres

Type FLP		096540
Noisy le sec - FRANCE		2 x 36 W
CE 0081 Ex II 2 D - T = 85°C	IP 66/67 - IK10	230 V 50 Hz - 0.45 A
LCIE 02 ATEX 6067	- 20°C ≤ Ta > 55°C	N° 0312345

Example : marking for a product conforming to European Directive 94/9/CE, compulsory starting from July 1st, 2003.

T6

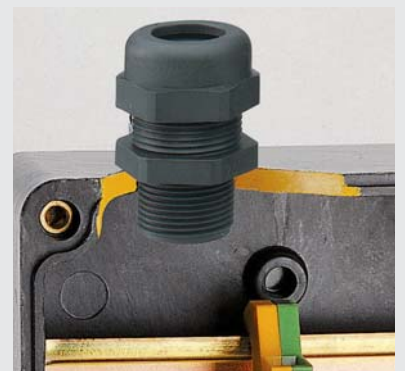
It is the temperature class of the equipment. It indicates the maximum temperature during operation (while respecting a safety margin in the event of an accident involving the air-conditioning or ventilation).

There are six temperature classes in this table :

Temperature class	Maximum temperature
T1	+ 450 °C
T2	+ 300 °C
T3	+ 200 °C
T4	+ 135 °C
T5	+ 100 °C
T6	+ 85 °C

Cable entries

These are created by screwing the cable gland directly onto the enclosure or, for untapped holes, by fixing with a locknut. Holes which are not used for cable entries must be blanked using the appropriate blanking plugs.



Cable entry by screwing directly onto enclosure.

Weatherproof seal

The equipment has a protection index of at least IP 54 ; it is therefore important to ensure that the weatherproof seal is in good condition when the product is installed.

Defective seals must be systematically replaced.



Weatherproof seal

Connection terminals

Each certificate of conformity indicates the type of terminals to be used in each type of junction box.

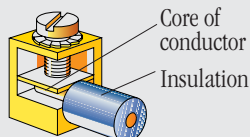
The connection must be performed according to current regulations and any additional instructions in the product documentation, such as :

- maximum current density
- maximum connection capacity

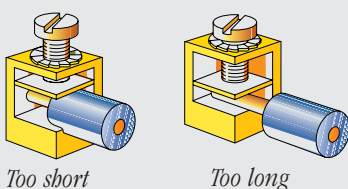
Stripping and connection

The conductors should only be stripped back to the edge of the metal part of the terminal connection, to ensure correct insulation.

Correct stripping

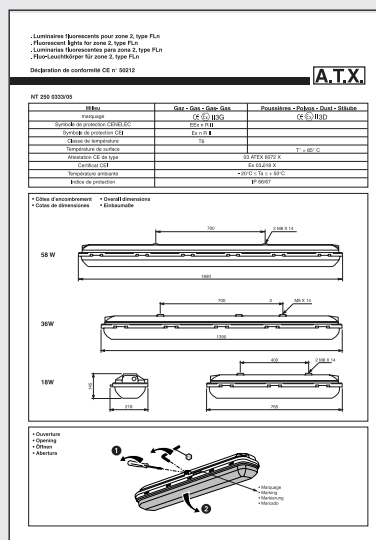


Incorrect stripping



Maintenance

Extract from article 4 in the december 20, 1988 order, modified by the jannary 10, 1992 order « Interval between inspections is fixed at one year in rooms and work positions at which there are risks of degradation fire or explosion, etc... »



Technical data : "e" luminaire

Appliances marked « ed » or « de »

Certain appliances such as power sockets, switches, etc, whose design creates arcs and sparks in normal operation, cannot be produced with protection mode "e" only.

Protection modes therefore have to be combined. "d" and "e" technologies are the most commonly used.

1) The part where the electric arc is produced is enclosed in a small flameproof chamber.

2) The connection terminals are "e" increased safety.

3) The assembly is mounted in an "e" increased safety enclosure and has a certificate of conformity with CENELEC standards (EN50 014/18/19).

4) Appliances marked "ed" or "de" demonstrate the subdivision of gases (A, B, or C) which is linked to the "d" part of the equipment.

ATX advice

- Always read the installation and user's instructions provided with the equipment before starting installation work.
- Always use ATX original spare parts for repair work, in order to keep the equipment in good working condition and to maintain the protection mode.
- For a good maintenance, keep the technical data sheets and the EC declarations of conformity.