



EPL: EQUIPMENT PROTECTION LEVEL

As we have seen time after time, hazardous areas for the presence of potentially explosive substances are divided into zones.

As reference to gases, vapors or mists, the relevant areas are classified in Zone 0, 1 or 2. The reference standard is the IEC / EN 60079-10-1.

As reference to dust, the relevant areas are classified in Zone 20, 21 or 22. The reference standard is the IEC / EN 60079-10-2.

As we know, an explosion occurs when an ignition source is in contact with the explosive atmosphere.

This situation must be absolutely avoided.

In the most dangerous areas, in which the risk of explosion is caused by the presence of explosive gas or dust for long periods of time during the year, the equipment installed must have very high levels of protection. In the less dangerous areas, as the Zone 2 for gas and the Zone 22 for dust, you can use equipment with lower levels of protection.

THE CHOICE OF AN EQUIPMENT

The choice of an appropriate equipment has a key role in designing a system installed in hazardous areas.

Some of the most important points are the following:

- Functionality of the device
- Suitability for all environmental and operating conditions provided
- Requirements of explosion protection.

In order to meet those requirements, a new level of equipment protection was introduced at IEC level called the "Equipment Protection Level" whose acronym is EPL.

CATEGORIES OF EQUIPMENT IN ACCORDANCE WITH THE DIRECTIVE 94/9/EC

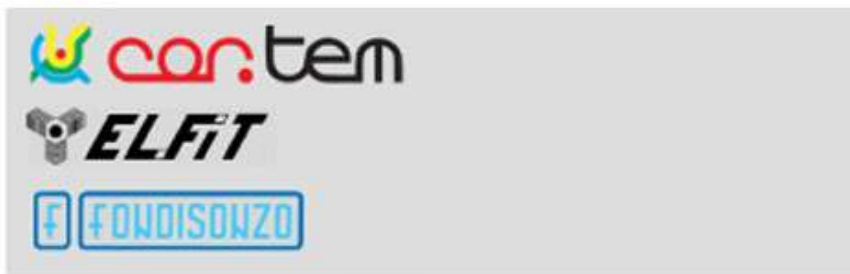
In the past, before the introduction of the ATEX Directive 94/9/EC, the protection method was the only compulsory requirement for the use of equipment in each respective area.

For example, the use of a device in Zone 0 was possible only if it met the level of intrinsic safety "Ex ia" in Zone 1 could be used, for example, the type of protection "Ex d" or "Ex e".

With the introduction of the ATEX Directive 94/9/EC, the focus moved from the technical requirements of the equipment, identified by the way of protection, to the installation area. In practice, different equipment, apart from the type of protection, are classified into three categories for gases and others three for dusts, which correspond to the area in which they can be installed.

For maximum clarity, have a look at the following table:

ATEX category	Substances	Protection Level	Zone
1G	Gas	Very high	Zone 0
2G	Gas	High	Zone 1
3G	Gas	Normal	Zone 2
1D	Dusts	Very high	Zone 20
2D	Dusts	High	Zone 21
3D	Dusts	Normal	Zone 22



The following table can be used to connect the ways of protection:

Zone	ATEX category	Appropriate way of protection
Zone 0	1G	“Ex ia” – “Ex ma”
Zone 1	1G - 2G	“Ex d” – “Ex e” – “Ex i” – “Ex m” – “Ex p” – “Ex o” – “Ex q”
Zone 2	1G – 2G - 3G	“Ex d” – “Ex e” – “Ex i” – “Ex m” – “Ex p” – “Ex o” – “Ex q” – “Ex n”
Zone 20	1D	pD – mD – tD – iaD - ibD
Zone 21	1D - 2D	pD – mD – tD – iaD - ibD
Zone 22	1D – 2D - 3D	pD – mD – tD – iaD - ibD

EN 60079-14 standard of March 2010 introduced a method for risk assessment that considers the equipment levels of protection (EPL).

These EPL were introduced to allow an alternative approach to the methods currently used for the selection of Ex equipment.

As we have seen above, the traditional approach assigns the appropriate types of protection for specific areas using statistical data, based on how is most likely or frequent an explosive atmosphere.

EPL indicates the risk of ignition intrinsic to the equipment, independently from the type of protection adopted.

It was recognized that it's advantageous to identify and mark all the products based on their intrinsic risk of ignition.

This should make easier the equipment selection.

This method is an alternative and not a substitute of the traditional one and so far has created some difficulty in understanding.

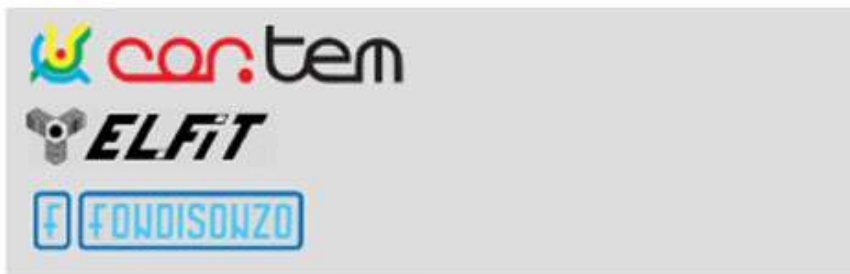
In the following table, you can see the comparison between EPL and ATEX Category:

Zone	ATEX category	Way of protection	EPL
0	1G	“Ex ia” – “Ex ma”	Ga
1	2G	“Ex d” – “Ex e” – “Ex i” – “Ex m” – “Ex p” – “Ex o” – “Ex q”	Gb
2	3G	“Ex d” – “Ex e” – “Ex i” – “Ex m” – “Ex p” – “Ex o” – “Ex q” – “Ex n”	Gc
20	1D	pD – mD – tD – iaD - ibD	Da
21	2D	pD – mD – tD – iaD - ibD	Db
22	3D	pD – mD – tD – iaD - ibD	Dc

The letters "G" and "D" of ATEX category determine whether the equipment can be used in areas containing hazardous gases or dusts. In the classification of EPL, 1, 2 and 3 categories have been replaced by the letters a, b, c.

The use of letters instead of numbers is more logic to non-European producers and users.

For example, for many years is applied a distinction between the levels of protection and intrinsically safety “ia” and “ib”. The additional letters describe the fault conditions for which the device is safe.



The meaning of these markings is as follows:

GASES

EPL Ga: Equipment for explosive atmospheres due to the presence of gas, with a level of protection 'very high', which is not a source of ignition in normal operation, or in case of expected failure or when subjected to a rare failure.

EPL Gb: Equipment for use in explosive atmospheres due to the presence of gas, with a 'high' level of protection that is not the source of ignition in normal operation or when subject to expected malfunctions, although not on a regular basis.

EPL Gc: Equipment for use in explosive atmospheres due to the presence of gas, with a level of protection 'increased' that is not a source of ignition in normal operation. It has some additional security measures in order to ensure that it remains a source of ignition not active in case of expected events on a regular basis (for example, the failure of a lamp).

DUSTS

EPL Da: Equipment for explosive atmospheres due to the presence of combustible dust, which has a level of protection 'very high', and does not constitute a source of ignition in normal operation or when subject to rare failures.

EPL Db: Equipment for explosive atmospheres due to the presence of combustible dust, which has a level of protection 'high'. It does not constitute a source of ignition in normal operation or when subject to expected failures, although not on a regular basis.

EPL Dc: Equipment for explosive atmospheres due to the presence of dust, with a level of protection 'increased', which is not a source of ignition in normal operation. It may have additional protections in order to ensure that it remains inactive as a source of ignition in the case of regular and waited failure.

Below is an example of marking including ATEX requirements, those of European and International standards and the EPL:



- 1) Atex Category: suitable for Zone 1
- 2) Way of protection "Ex e" according to IEC/EN 60079-7 standard
- 3) Protection level Gb: suitable for Zone 1