

0.8.1 GENERAL INFORMATION

The abbreviation ATEX (**AT**mosphere **EX**plosive) refers to two European Union directives on the risk of explosion in different areas.

The first ATEX directive (2014/34/EU) (ATEX 95) regards the requirements for equipment intended to use in areas at risk of explosion. The second ATEX Directive (99/92/EC) (Atex 137) concerns the minimum safety and health requirements that areas at risk of explosion must satisfy.

These directives, which came into force from July 1, 2003, harmonize and align the different laws of the Member States relating to safety rules and equipment to use in potentially explosive areas. In particular, the ATEX (2014/34/EU) identifies different groups and areas of risk, defining the technical/ construction features of the equipment suitable for operating in these groups/areas.

The new ATEX Directive 2014/34/EU, entered into force from 20 April 2016, is the alignment result of the previous Directive ATEX 94/9/EC for the "New Legislative Framework" (NLF), in particular with Decision 768/2008/EC, and with regard to provisions of the Treaty on the functioning of the EU (TFEU), after the Lisbon Treaty.

The new Directive appears quite different to the Directive it will replace but other than rewording, reformatting, reordering and clarifications, the actual changes and the impact on manufacturers is relatively slight.

The main changes are as follows:

- **Terminology changes, clarifications and additions**

As with the other Directives which have been aligned with the NLF, a number of terms have been changed and even some new terms have been introduced

- **Scope**

The types of products which are covered by the directive remains the same, however the scope has been modified to make it clear that components intended to be incorporated into equipment and protective systems, do fall within the scope of the ATEX Directive.

- **Obligations of Economic Operators**

The Directive now specifically details the obligations of Manufacturers, Authorised Representatives, Importers and Distributors.

- **Essential health and safety requirements**

The requirements of manufacturers contained within the Annex II of the Directive, concerning the Essential health and safety requirements remain largely the same as the previous Directive. The only potentially significant difference is contained within clause 1.5 which contains requirements with respect to safety-related-devices. The clause now states that the 'fail-safe principle' should be applied in general, as opposed to just the electrical circuits, as was the previous requirement. In reality the majority of manufactures have already been applying the fail-safe principle to all systems in their products where necessary as determined through the use of Ignition Hazard Assessment and Harmonised Standards.

- **Assessment modules**

The assessment modules have been aligned with the NLF and Decision 768/2008/EC.

- **EU Declaration of Conformity**

The EC Declaration of Conformity is now referred to as an EU Declaration of Conformity and should now include more detailed information.

- **Other changes**

There are a number of other differences between the current and new ATEX Directives, but these generally will only affect the operation of notified bodies and member states and will not require manufacturers and other economic operators to make changes in order for them to be accommodated.

0.8.2 CORRESPONDENCE BETWEEN RISK AREAS AND TYPES OF EQUIPMENT

Zone 0 / 20 Danger constant

Permanent presence of explosive gases (**G**): Zone 0

Permanent presence of explosive gases and / or combustible dust (D) zone 20.

Zone 1 / 21 Potential danger

Occasional presence of explosive gases (**G**): zone 1

Occasional presence of explosive gases and/or combustible dust (D): Zone 21, during normal operation.

Zone 2 / 22 Danger lower

Improbable or only for a short time the presence of explosive gases (**G**): Zone 2

Improbable or only for a short time the presence of explosive gases and/or combustible dust (**D**) zone 22.

0.8.3 MAIN DIFFERENCES BETWEEN AREAS WITH DUST AND GAS

A potentially explosive atmosphere is composed of a mixture of air and flammable substances in the form of gases, vapors, mists or dusts in which, after ignition, combustion spreads to the entire unburned mixture. The main difference between a gas and a dusty atmosphere is the mass per unit volume; that of gas and vapor is about 1000 times smaller than that of powders.

Furthermore, the gases disperse into the air for convection and diffusion to form a homogeneous atmosphere. The powders are much heavier than air and settle more or less quickly.

The powder to be flammable should generally have a particle size less than 0.3 mm and a concentration greater than 50 g/m³.

0.8.4 CONSTRUCTION

All equipments intended for use in areas classified at risk of explosion must be designed and constructed in accordance with ATEX Directive 2014/34/EU and according to European standards EN 1127-1 (explosion prevention and protection) and EN 13464-1 (non-electrical equipment for potentially explosive atmospheres).

For example, the hydropneumatic accumulator from the perspective of the ATEX directive is a non-electrical appliance. However, all its components must be analyzed according to the procedures for assessing the compliance to the directive. In addition, the EN 13463-1 defines all the specific requirements of the materials admitted, impact tests, etc.

0.8.5 CLASSES OF TEMPERATURE IN THE ATMOSPHERE WITH GAS

Equipment suitable to operate in a potentially explosive gas atmosphere, have a further specification according to the maximum surface temperature reachable during the operation, which must be less than the ignition temperature of the explosive mixture.

The maximum surface temperature is the highest temperature reached during operation in normal conditions, at any point on the surface of the equipment.

Maximum values of surface temperature according to its class:

class **T1** ≤ 450 °C

class **T2** ≤ 300 °C

class **T3** ≤ 200 °C

class **T4** ≤ 135 °C

class **T5** ≤ 100 °C

class **T6** ≤ 85 °C

Of course, an equipment with the temperature class T4, for example, can also be used in areas with required temperature class T1, T2, T3.

0.8.6 SURFACE TEMPERATURE IN ATMOSPHERES WITH DUST FUEL

In atmospheres with combustible dust, can stir up:

dust layer

dust cloud

In general, the ignition temperatures of dust in the form of a cloud and in the form of a layer are different, so you must calculate the highest temperature between the two, called reference temperature, and use the equipment with surface temperatures lower than the reference.

T_{cloud} = 2/3 T_{cl} (T_{cl} = ignition temperature of dust)

T_{layer} = T_{5mm} - 75 °C (T_{5mm} = ignition temperature of a 5 mm layer of dust)

T_{reference} = the minor between T_{cloud} e T_{layer}

0.8.7 MARKING ATEX

The CE marking shows certainty that the equipment has been constructed in accordance with the basic requirements and evaluation procedures applicable in the European Union.

The devices, systems and components shall bear the specific marking concerning the explosion protection (symbol "Ex enclosed within a hexagon), already in use before the ATEX directive in compliance with the previous directives concerning explosive atmosphere.

This mark will be followed by the symbol of the group and category and, with regard to group II, the letter "G" (concerning explosive atmospheres caused by gases, vapors and mists) and/or the letter "D" (concerning explosive atmospheres caused by dust).

Example of marking:



II 2 GDc T4

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II = material destined for surface plants (not mine)

2 = high protection for zone 1

G = occasional presence of explosive gases

D = dust atmosphere

c = constructional safety

T4 = 135 °C maximum surface temperature

0.8.4 DOCUMENTATION

Each product must be accompanied by:

- EC declaration of conformity

- operating and maintenance

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