

IN WHICH CASES DOES DIRECTIVE 94/9/EC APPLY ?

The manufacturer, his authorized representative or the person who first places a product on the EU market or puts a product into service in the EU market has to decide whether it is covered by the directive 94/9/EC and, if so, apply its provisions. The manufacturer (in the broadest sense of the directive) must therefore make an ATEX analysis on the basis of directive 94/9/EC.

4.1 ATEX Analysis

4.1.1 Is the specific explosive atmosphere covered by directive 94/9/EC ?

Directive 94/9/EC is a directive following the “New Approach” and therefore is intended to enable the free movement of goods within the Community. This is achieved by harmonization of legal safety requirements, following a risk-related approach. Its objective is also to eliminate or at least minimize the risks resulting from the use of certain products **in or in relation to** a potentially explosive atmosphere. This means that the probability of occurrence of an explosive atmosphere has to be looked at not only once and from a static point of view but all operational conditions, which may result from the processing course, have to be taken into account as well.

An **explosive atmosphere** for the purposes of directive 94/9/EC is defined as a mixture

- i) of **flammable substances** in the form of gases, vapors, mists or dusts;
- ii) with **air**;
- iii) under **atmospheric conditions**²⁶;
- iv) in which, after ignition, the combustion spreads to the entire unburned mixture (It has to be noted that in the presence of dust not always the whole quantity of dust is consumed by the combustion).

An atmosphere, which could become explosive due to local and/or operational conditions, is called a **potentially explosive atmosphere**. It is only this kind of potentially explosive atmosphere which products falling under the directive 94/9/EC are designed for (see as well chapter 4.3 ‘Risk Assessment’).

It is important to note, that products **are not covered by directive 94/9/EC**²⁷ where they are intended for use in or in relation to atmospheres which might potentially be explosive, but one or more of the **defining elements i) to iv) above are not present**.

4.1.2 Which kinds of products are covered by directive 94/9/EC ?

To be within the scope of the directive, a product has to be:

- a) **equipment**, as defined in Article 1.3.(a); or
- b) a **protective system**, as defined in Article 1.3.(b); or
- c) a **component**, as defined in Article 1.3.(c); or
- d) a **safety, controlling or regulating device** as defined in Article 1.2.

²⁶ The directive 94/9/EC does not define atmospheric conditions. However, a surrounding temperature range of –20°C to 60°C and a range of pressure between 0.8 bar and 1.1 bar may be appropriate as a basis for design and intended use of products. This does not preclude that products may be specifically designed and assessed for operation occasionally outside these conditions. It should be noted that electrical products are normally designed and tested for use in the ambient temperature range –20°C to 40°C in conformity with the standard EN 50014. Products designed for use outside of this range will require additional marking to be added and further testing as appropriate.

²⁷ Examples for such atmospheres could be: Mixtures which are explosive without air (e.g. H₂ mixed with Cl₂), mixtures of flammable substances with other oxidants than air, pressure and/or temperature conditions outside the atmospheric range, etc.

a) Equipment

Equipment is only considered to be within the scope of the directive if it is intended (either in whole or in part) to be used in a potentially explosive atmosphere; the fact that an intended potentially explosive atmosphere might be present inside the equipment is not relevant, but with the following possible exceptions:

If a product containing an intended potentially explosive atmosphere, for example a vessel, itself contains equipment with an autonomous function as defined in the directive, then the latter equipment is in effect in a potentially explosive atmosphere, albeit one which is contained by the vessel, and is therefore subject to the directive.

If equipment containing a potentially explosive atmosphere can, due to its construction, operation etc. create a potentially explosive atmosphere, which wholly or partially surrounds it, then such equipment is in effect in a potentially explosive atmosphere, and is therefore subject to the directive. Another defining element of equipment in the sense of the directive is that it has to have its own

potential source of ignition. Potential sources of ignition could be: Electric sparks, arcs and flashes, electrostatic discharges,

electromagnetic waves, ionising radiation, hot surfaces, flames and hot gases, mechanically generated sparks, optical radiation, chemical flame initiation²⁸, compression. In some cases a product may only contain a potentially explosive atmosphere which is deliberately ignited. It is clearly not the intention that these fall under the scope of directive 94/9/EC unless other

relevant hazards are identified. Equipment can be said to have its own potential source of ignition, if, when operated as intended

(including malfunctions, etc. to an extent depending on its category - see Annex I of the directive) in an explosive atmosphere, it is capable of igniting the explosive atmosphere unless specific safety measures are taken. Therefore, equipment must ensure the required level of protection.

To ensure this required level of protection various techniques could be applied, e.g.: intrinsic safety, pressurization, increased safety, etc.²⁹

Account needs to be taken of the specific exclusion at Article 1 (4) of the directive 94/9/EC of equipment where explosion hazards result exclusively from the presence of explosive substances or unstable chemical substances.

²⁹ For more examples see also the list of standards in Annex 6

These considerations lead to the following table:

Table 2: When is directive 94/9/EC applicable?

Situation	Analysis			Result
	Equipment with own potential source of ignition	Equipment to be used in or in relation to potentially explosive atmospheres	Equipment where an intended internal explosive atmosphere is present	
A	YES	YES	YES	YES
B	NO	YES	YES	NO ^{a)b)}
C	YES	NO	YES	NO ^{a)b)}
D	YES	YES	NO	YES
E	NO	NO	YES	NO ^{a)b)}
F	YES	NO	NO	NO ^{b)}
G	NO	YES	NO	NO ^{b)}
H	NO	NO	NO	NO ^{b)}

A) but YES for products inside the internal potentially explosive atmosphere. Moreover it has to be considered that the equipment as a whole has to be capable of functioning in conformity with the operational parameters established by the manufacturer and ensuring the required level of protection according to Annex II, item 1.0.1 (Principles of integrated explosion safety). Also YES for non-electrical (mechanical) equipment where an intended explosive atmosphere is inside the equipment (e.g. fans, ventilators, blowers or compressors providing ignitable mixtures) and a potential source of ignition has to be assumed.

b) but YES for devices according to Article 1.2 of the directive, see below.

b) Protective system

From its intended function it is obvious that a protective system will always, at least partially, be installed and used in a potentially explosive atmosphere. Because a protective system has the function to eliminate or reduce the dangerous effects of an explosion (a safety function) it is subject to the directive regardless as to whether it has its own potential source of ignition or not. In this first case it would have to comply with the specific EHSRs for equipment as well.

According to Article 1.3.(b) protective systems are placed on the market separately for use as autonomous systems³⁰. Consequently their conformity with the relevant EHSRs of Annex II has to be assessed according to Article 8(2) and they have to be marked according to Article 10(2). Of course 'protective systems' may also be placed on the market as an integral part of equipment.

Technically speaking these remain 'protective systems' because of their function, but are not considered as protective systems in the sense of the directive regarding conformity assessment and marking. In such cases their conformity is assessed in the course of the conformity assessment of the equipment they are integrated into, using the procedures foreseen in Article 8 according to the Group

and Category of that equipment. They are not separately marked. It is, however, important to note that the specific EHSRs of Annex II.3 also apply for integrated 'protective systems'. ³⁰See Corrigenda to the English language version of directive 94/9/EC (OJ L 21, 26.1.2000).

c) Components

The two defining elements for components in Article 1.3.(c) are that they:

- are **essential to the safe functioning** of equipment and protective systems (otherwise they would not need to be subject to the directive); but,

- with **no autonomous function** (see 3.8) (otherwise they would have to be regarded either as equipment, protective system or as device according to Article 1.2).

This definition covers a vast range of parts commonly used in engineering including gauges, brakes, tanks, heating elements, hasps, carriages, counterweights, reels, cramps, connecting elements, levers, buckles, turning elements, etc.

According to Article 8.3 the conformity of components has to be assessed by means of the same procedures as the equipment, protective systems or devices according to Article 1(2) into which they are to be integrated.

For example, drive-belts, bearings, Zener diodes, etc. are not usually placed on the market with the explicit intention to be incorporated into equipment, protective systems or devices according to Article 1.2 but for general engineering purposes. Their conformity (i.e. their suitability for the intended purpose as regards safety of the product they are integrated into) has to be assessed in the course of the conformity assessment of the integral product.

If components are to be placed on the market with the explicit intention of incorporation into equipment, protective systems or devices according to Article 1.2, (as e.g. explosion proof terminal blocks, flameproof enclosures, etc.) they shall be assessed separately according to Article 8.3 and accompanied by a written attestation of conformity as referred to in Article 8.3. Otherwise Member states can prohibit, restrict or impede their placing on the market (Article 4.2) and cannot presume their conformity (Article 5.1).

d) Safety, controlling or regulating devices as defined in Article 1.2.

The two main issues of Article 1.2 are:

- i) that **safety devices, controlling devices and regulating devices**, if they contribute to or are required for the safe functioning of equipment or protective systems with respect to the risks of explosion are **subject to the directive**;
- ii) that devices are covered **even if** they are situated **outside the potentially explosive atmosphere**.

For such devices, the essential requirements shall only apply so far as they are necessary for the **safe and reliable** functioning and operation of those devices with respect to the risk of explosion (ANNEX II, Preliminary observation B)

The **definition** in i) leads to the following consequences:

1. Devices other than safety, controlling and regulating devices are not covered. (However, a device of any kind, contributing to or required for the safe functioning, could be considered a safety device);
2. **All devices**, including safety, controlling and regulating devices, **neither contributing to nor required** for the safe functioning with **respect to the explosion risk are not covered**; 3. Even **safety, controlling and regulating devices** contributing to or required for the safe functioning but **with respect to risks other than the explosion risk are not covered**;

Examples of devices falling under Article 1.2:

- A power supply feeding an intrinsically safe (Ex i) measurement system used for monitoring process parameters;
- A pump, pressure regulating device, backup storage device, etc. ensuring sufficient pressure and flow for feeding a hydraulically actuated safety system (with respect to the explosion risk);
- Overload protective devices for electric motors of type of protection EEx e 'Increased Safety';
- Controller units in a safe area, for an environmental monitoring system consisting of gas detectors distributed in a potentially explosive area, to provide executive actions if dangerous levels of gas are detected;
- Controller units for sensors temperature, pressure, flow, etc, located in a safe area, for providing information used in the control of electrical apparatus, used in production or servicing operations in a potentially explosive area.

Examples of **devices not falling under Article 1.2:**

- Switchgear, numeric controllers, etc. not related to any safety functions (with respect to the explosion risk); because of 2) above;

Item ii) states that devices, as defined above, are subject to the directive, even when outside the potentially explosive atmosphere.

For safety and economic reasons it will be preferable in most cases to install such devices in a nonhazardous area. However, sometimes it might be necessary to place such devices within a potentially explosive atmosphere. In such cases, although the directive does not explicitly say so, these devices can also be designated as equipment.

Two situations can be identified:

- If the device has its own potential source of ignition then, in addition to the requirements resulting from Article 1.2, the requirements for equipment will apply;
- If the device does not have its own potential source of ignition then the device will not be regarded as equipment but of course the requirements resulting from Article 1.2 will still apply.