
ATEX Directive 94/9/EC – General Explanation Excerpt

The determination if an equipment falls within ATEX is rather complex and cannot always be answered without a review of all design feature a product might offer. Having said that, please take our excuse for not being too detailed.

It should be noted that directive 94/9/EC provides for the first time Essential Health and Safety Requirements for non-electrical equipment intended for use in potentially explosive atmospheres and equipment intended for use in environments which are potentially explosive due to dust hazards and protective systems and for devices intended for use outside explosive atmospheres which are required for or contribute to the safe functioning of equipment or protective systems with respect to risks of explosion. This is an increase in scope compared to existing national regulations.

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** (see note 1 below);
- 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.

It is important to note, that products **are not covered by directive 94/9/EC27** 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**.

Note 1:) 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.

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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,
- ionizing radiation,
- hot surfaces,
- flames and hot gases,
- mechanically generated sparks,
- optical radiation,
- chemical flame initiation (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.)
- 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.

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

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;