

What Is ATEX Directive 94/9/EC?

The ATEX Directive 94/9/EC is a directive adopted by the European Union (EU) to facilitate free trade in the EU by aligning the technical and legal requirements in the member states for products intended for use in potentially explosive atmospheres. CENELEC design standards are still used. All products placed on the market or put into service in the EU for use in potentially explosive atmospheres must comply with the ATEX directive.

Products Covered by the ATEX Directive

This directive covers "Equipment" and "Protective Systems" which may be used in potentially explosive atmospheres created by the presence of flammable gases vapors, mists or dust. "Equipment" is any item which contains or constitutes a potential ignition source and which requires special measures to be incorporated in its design and/or its installation in order to prevent the ignition source from initiating an explosion in the surrounding atmospheres. Also included in the term "equipment" are safety or control devices installed outside of the hazardous area but having an explosion protection function. A wide range of products comes within the definition of equipment, including electric motors, compressors, diesel engines, lighting fittings, control and communication devices and monitoring and detection equipment. "Protective Systems" are items which prevent an explosion that has been initiated from spreading or causing damage. They included flame arrestors, quenching systems, pressure relief panels and fast-acting shut-off valves.

The directive excludes the following types of products:Medical devices

- Products for use in the presence of explosives
- Products for domestic use
- Personal protective equipment
- Sea-going vessels and mobile off-shore units
- Means of transport, except vehicles for use in potentially explosive atmospheres
- Military equipment

New Product Classification Equipment Groups and Categories

The ATEX Directive, in Annex I, defines two Equipment Groups which are subdivided into five Equipment Categories.

Note: In order to determine the appropriate Conformity Assessment Procedure, the manufacturer must first come to a decision based on the intended use, as to which Equipment Group and Equipment Category the product belongs.

Equipment Groups and Categories:

Equipment Group I

- Equipment Category M1
- Equipment Category M2

Equipment Group II

- Equipment Category 1
- Equipment Category 2
- Equipment Category 3

What Are Equipment Groups?

The two Equipment Groups defined in Annex I are based mining and non-mining applications.

- Equipment Group I - comprises of equipment intended for use in the underground parts of mines, and to those parts of surface installation of such mines, likely to become endangered by fire damp and/or combustible dust.
- Equipment Group II - comprises of equipment intended for use in other places likely to become endangered by explosive atmospheres.

What Are Equipment Categories?

The Equipment Categories Defined in Annex I are based on the level of precautions required according to the likelihood of the presence of an explosive atmosphere. Since higher levels of precaution are more expensive to achieve, classification of equipment into categories enables precautions to be taken that are appropriate to the risk.

The five Equipment Categories are:

- Category M1 & M2 for mining applications.
- Category 1, 2, & 3 for non-mining applications.

Equipment Category M1:

Category M1 comprises of equipment which is:

Intended for use in mines endangered by fire damp and/or coal dust Required to remain functional, even in the event of rare incidents relating to equipment, with an explosive atmosphere present, and is characterized by the means of protection such that:

- Either, in the event of failure of one means of protection, at least an independent second means provides the requisite level of protection
- Or the requisite level of protection is assured in the event of faults occurring independently of each other

Equipment Category M2:

Category M2 comprises of equipment which is:

- Intended for use in mines endangered by fire damp and/or coal dust. Required to be de-energized in the event of an explosive atmosphere.
- The means of protection relating to equipment in this category assure the requisite level of protection during normal operation and also in the case of more severe operating conditions, in particular those arising from rough handling and changing environmental conditions.

Note:

For Conformity Assessment, Category M2 is sub-divided into:

- Electrical equipment and internal combustion engines.
- Non-electrical equipment

Equipment Category 1:

Category 1 comprises of equipment which is:

- Intended for use in areas which an explosive atmosphere is continuously present or for long periods of time

- Equipment in this category must ensure the requisite level of protection, even in the event of rare incidents relating to equipment, and is characterized by means of protection such that:
- Either, in the event of failure of one means of protection, at least an independent second means provides the requisite level of protection
- Or the requisite level of protection is assured in the event of two faults occurring independently of each other

Equipment Category 2:

Category 2 comprises of equipment which is:

- Intended for use in areas which an explosive atmosphere is likely to occur.
- The means of protection relating to equipment in this category ensure the requisite level of protection, even in the event of frequent occurring disturbances or equipment faults which normally have to be taken into account.

Note:

for Conformity Assessment, Category 2 is sub-divided into:

- Electrical equipment and internal combustion engines.
- Non-electrical equipment.

Equipment Category 3:

Category 3 comprises of equipment which is:

- Intended for use in areas which an explosive atmosphere is unlikely to occur or only to occur infrequently or for short period of time
- Equipment in this category ensures the requisite level of protection during normal operation

The New Conformity Mark

Under the Old Directive, the "Epsilon X" symbol indicated conformity with CENELEC requirements. This symbol was allowed to be applied to products which were considered to be final assemblies, NOT empty enclosures or component parts such as terminal blocks, operators, breather drains, etc.

Under the New Directive, the "Epsilon X" symbol will move into the marking string and be used to indicate explosion protection. The "CE" mark will now indicate conformity to the ATEX Directive. This mark can only be applied to final assemblies and not to empty enclosures or component parts.

What Must I Do to Comply With the ATEX Directive 94/9/EC?

- For products that meet the scope of the ATEX Directive, you must ensure that they comply with the Essential Requirements specified in Annex II of the ATEX Directive.
- To ensure that your products comply with the ATEX Directive, you need to follow the applicable Conformity Assessment Procedure(s). (These procedures may involve the participation of a notified body.)

What Are the Essential Requirements?

The Essential Requirements listed in Annex II relate to features of equipment and protective systems that are necessary in order to prevent explosions or to control the effects of incipient explosions.

The Essential Requirements fall into three groups:

1. Common Requirements

2. Requirements for Equipment
3. Requirements for Protective Systems

Common Requirements

1. General Requirements
 - Principle of integrated explosion safety
 - Special checking and maintenance conditions
 - Surrounding area conditions
 - Marking
 - Instructions
2. Selection of Materials
 - Materials that could trigger explosions
 - Adverse reactions between materials
 - Resistance to service conditions
 - Safe operation throughout foreseeable life
 - Prevention of leaks
 - Dust deposits
 - Additional means of protection
 - Safe opening
 - Protection against other hazards
 - Overloading of equipment
 - Flameproof enclosure systems
3. Potential Ignition Sources
 - Hazards from different ignition sources
 - Static electricity
 - Stray electric and leakage currents
 - Overheating
 - Pressure compensation operations
4. Hazards Arising From External Effects
 - Safe operation under specified operating conditions
 - Resistance to mechanical and thermal stresses and aggressive substances
5. Requirements in Respect of Safety Devices
 - Safety function independent of measurement or control function
 - Detection of failure - fail safe
 - Direct actuation of control device
 - Equipment and/or protective systems made safe
 - Restart lockouts
 - Control and display units
 - Devices with measuring function for explosion protection
 - Risks arising from software
6. Integration of Safety Requirements Relating to the System
 - Manual override
 - Dispersion of accumulated energy
 - Power failure
 - Connections and interface
 - Warning devices

Requirements for Equipment

Within each Equipment Category the requirements cover:

- Prevention of ignition sources from becoming active
- Control surface temperatures
- Safe opening
- Prevention of dust ingress and egress

The Requirements for Protective Systems cover:

1. **General Requirements**
 - Dimensioning to reduce effects of explosion to a safe level
 - Positioning to prevent explosions from spreading
 - Power failure
 - Resistance to outside interference
2. **Planning and Design**
 - Characteristics of materials
 - Shockwave resistance
 - Pressure-withstand of accessories
 - Account take of pressure in peripheral equipment and pipework
 - Pressure relief systems
 - Explosion suppression systems
 - Explosion decoupling systems
 - Integration into safety systems

What Are the Conformity Assessment Procedures?

The ATEX Directive specifies a number of Conformity Assessment Procedures and the circumstances when they must be used. The procedures are:

- EC type examination
- Quality assurance
- Verification modules
- Internal control of production

EC Type Examination

EC Type Examination is a process carried out by a notified body to verify that a product type is in conformity with the relevant essential requirements. The process is specified in Annex III of the directive. The notified body will examine the technical file supplied by the manufacturer and conduct such inspections and tests as may be required to show that the product type complies with the requirements stated by the manufacturer. The notified body may advise on applicable requirements but it is ultimately for the manufacturer to decide the intended use of the product. The EC Type Examination process culminates in a certificate issued by the notified body, attesting that the type as defined in the technical file complies with the directive.

Quality Assurance Modules

There are two Quality Assurance Modules specified in the ATEX directive:

- Production Quality Assurance - which applies to Equipment Categories 1 and M1 and to protective systems, and which is specified in Annex IV of the directive.
- Product Quality Assurance - which applies to electrical equipment and internal combustion engines only, in Equipment Categories 2 and M2, and which is specified in Annex VII of the directive.

Both of these modules require the manufacturer to have a defined and documented system for controlling the conformity of products to the requirements of the directive as defined in the technical file accompanying the EC type Examination Certificate(s) for the product type(s). The system must be assessed by a notified body and be subject to periodic audit by the body. In addition the body may pay unannounced visits to the manufacturer and may carry out inspection and/or testing of products to check conformity with the certified type.

There are three Verification Modules specified in the ATEX Directive.

- Product Verification - specified in Annex V of the directive, which applies to Equipment Categories 1 and M1 and to the protective systems.
- Conformity to Type - specified in Annex VI of the directive, which applies to electrical equipment and internal combustion engines in Equipment Categories 2 and M2.

- Unit Verification - specified in Annex IX of the directive which may be applied at the option of the manufacturer as an alternative to any other conformity assessment modules.

Although they differ in their specific requirements, the Verification Modules all require each item produced to be inspected and tested for conformity with the requirements of the directive. The Product Verification and Unit Verification processes are carried out by the notified body, while the Conformity to Type is carried out by the manufacturer under the responsibility of a notified body. In all cases the manufacturer is required to draw up a Declaration of Conformity in the format defined in Annex X of the directive.

Internal Control of Production

- Internal Control of Production applies to equipment in Category 2 and M2 which is not electrical equipment nor internal combustion engines and to equipment Category 3. It is specified in Annex VIII of the directive.
- Internal Control of Production is a process whereby the manufacturer, on his own responsibility, carries out the necessary work to ascertain that product which he places on the market comply with the requirements of the directive.

Additional CE Marking Directives

There are three other directives that must be looked at during your product evaluation. If your product falls within the scope of these three directives, all directives have to be applied in parallel to fulfill the special requirements of each directive.

- Low Voltage Directive 73/23/EEC
- Electromagnetic Compatibility Directive 89/336/EEC
- Machinery Directive 98/37/EC

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