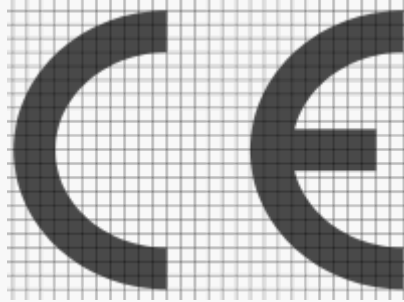


# ATEX DIRECTIVE IN EU SAFETY DIRECTIVES, WHAT DOES THIS MEAN FOR MY COMPANY PROTECTION & SAFETY NEEDS?

The ATEX directive consists of two EU directives describing what equipment and work environment is allowed in an environment with an explosive atmosphere

## Contents

### Directives



The CE mark which should be attached to EU certified equipment



Mark for ATEX certified electrical equipment for explosive atmospheres.

As of July 2003, organizations in EU must follow the directives to protect employees from explosion risk in areas with an explosive atmosphere.

There are two ATEX directives (one for the manufacturer and one for the user of the equipment):

- the ATEX 95 *equipment* directive 94/9/EC, Equipment and protective systems intended for use in potentially explosive atmospheres;
- the ATEX 137 *workplace* directive 99/92/EC, Minimum requirements for improving the safety and health protection of workers potentially at risk from explosive atmospheres.

Employers must classify areas where hazardous explosive atmospheres may occur into zones. The classification given to a particular zone, and its size and location, depends on the likelihood of an explosive atmosphere occurring and its persistence if it does.

Areas classified into zones (0, 1, 2 for gas-vapor-mist and 20, 21, 22 for dust) must be protected from effective sources of ignition. Equipment and protective systems intended to be used in zoned areas must meet the requirements of the directive. Zone 0 and 20 require Category 1 marked equipment, zone 1 and 21 require Category 2 marked equipment and zone 2 and 22 require Category 3 marked equipment. Zone 0 and 20 are the zones with the highest risk of an explosive atmosphere being present.

Equipment in use before July 2003 is allowed to be used indefinitely provided a risk assessment shows it is safe to do so.

The aim of directive 94/9/EC is to allow the free trade of 'ATEX' equipment and protective systems within the EU by removing the need for separate testing and documentation for each member state.

The regulations apply to all equipment intended for use in explosive atmospheres, whether electrical or mechanical, including protective systems. There are two categories of equipment 'I' for mining and 'II' for surface industries. Manufacturers who apply its provisions and affix the CE marking and the Ex marking are able to sell their equipment anywhere within the European union without any further requirements with respect to the risks covered being applied. The directive covers a large range of equipment, potentially including equipment used on fixed offshore platforms, in petrochemical plants, mines, flour mills and other areas where a potentially explosive atmosphere may be present.

In very broad terms, there are three preconditions for the directive to apply: the equipment a) must have its own effective source of ignition; b) be intended for use in a potentially explosive atmosphere (air mixtures); and c) be under normal atmospheric conditions.

The directive also covers components essential for the safe use and safety devices directly contributing to the safe use of the equipment in scope. These latter devices may be outside the potentially explosive environment.

Manufacturers/suppliers (or importers, if the manufacturers are outside the EU) must ensure that their products meet essential health and safety requirements and undergo appropriate conformity procedures. This usually involves testing and certification by a 'third-party' certification body (known as a Notified Body e.g. Sira, Intertek, Baseefa, Lloyd's, BAM, TUV) but manufacturers/suppliers can 'self-certify' Category 3 equipment (technical dossier including drawings, hazard analysis and users manual in the local language) and Category 2 non-electrical equipment but for Category 2 the technical dossier must be lodged with a notified body. Once certified, the equipment is marked by the 'CE' (meaning it complies with ATEX and all other relevant directives) and 'Ex' symbol to identify it as approved under the ATEX directive. The technical dossier must be kept for a period of 10 years.

Certification ensures that the equipment or protective system is fit for its intended purpose and that adequate information is supplied with it to ensure that it can be used safely. There are four ATEX classification to ensure that a specific piece of equipment or protective system is appropriate and can be safely used in a particular application: 1. Industrial or Mining Application; 2. Equipment Category; 3. Atmosphere; and 4. Temperature.

The ATEX as an EU directive finds its US equivalent under the HAZLOC standard. This standard given by the Occupational Safety and Health Administration defines and classifies hazardous locations such as explosive atmospheres.

## Technical definitions

What is an explosive atmosphere?

In DSEAR, an explosive atmosphere is defined as a mixture of dangerous substances with air, under atmospheric conditions, in the form of gases, vapours, mist or dust in which, after ignition has occurred, combustion spreads to the entire unburned mixture.

Atmospheric conditions are commonly referred to as ambient temperatures and pressures. That is to say temperatures of  $-20^{\circ}\text{C}$  to  $40^{\circ}\text{C}$  and pressures of 0.8 to 1.1 bar.

## Zone classification

European and IEC Classification	Definition of zone or division	North American Classification
Zone 0 (gases / Vapors)	An area in which an explosive mixture is continuously present or present for long periods	Class I Division 1 (gases)
Zone 1 (gases / Vapors)	An area in which an explosive mixture is likely to occur in normal operation	Class I Division 1 (gases)
Zone 2 (gases / Vapors)	An area in which an explosive mixture is not likely to occur in normal operation and if it occurs it will exist only for a short time.	Class I Division 2 (gases)
Zone 20 (dusts)	An area in which an explosive mixture is continuously present or present for long periods	Class II Division 1 (dusts)
Zone 21 (dusts)	An area in which an explosive mixture is likely to occur in normal operation	Class II Division 1 (dusts)
Zone 22 (dusts)	An area in which an explosive mixture is not likely to occur in normal operation and if it occurs it will exist only for a short time.	Class II Division 2 (dusts)

Effective ignition source

Effective ignition source is a term defined in the European ATEX directive as an event which, in combination with sufficient oxygen and fuel in gas, mist, vapor or dust form, can cause an explosion. Methane, hydrogen or coal dust are examples of possible fuels.

Effective ignition sources are:

- **Lightning strikes.**
- **Open flames.** This varies from a lit cigarette to welding activity.
- **Mechanically generated impact sparks.** For example, a hammer blow on a rusty steel surface compared to a hammer blow on a flint stone. The speed and impact angle (between surface and hammer) are important; a 90 degree blow on a surface is relatively harmless.
- **Mechanically generated friction sparks.** The combination of materials and speed determine the effectiveness of the ignition source. For example 4.5 m/s steel-steel friction with a force greater than 2 kN is an effective ignition source. The combination of aluminium and rust is also notoriously dangerous. More than one red hot spark is often necessary in order to have an effective ignition source.
- **Electric sparks.** For example a bad electrical connection or a faulty pressure transmitter. The electric energy content of the spark determines the effectiveness of the ignition source.
- **High surface temperature.** This can be the result of milling, grinding, rubbing, mechanical friction in a stuffing box or bearing, or a hot liquid pumped into a vessel. For example the tip of a lathe cutting tool can easily be 600 Celsius (1100 °F); a high pressure steam pipe may be above the autoignition temperature of some fuel/air mixtures.
- **Electrostatic discharge.** Static electricity can be generated by air sliding over a wing, or a non-conductive liquid flowing through a filter screen.
- **Radiation.**
- **Adiabatic compression.** Air is pumped into a vessel and the vessel surface heats up.