

Industry News

Explosive atmospheres

In Europe, explosion protection is governed by the European directive on preventing ignition risks due to explosive atmospheres (ATEX = ATmosphère EXplosive). But what does this mean in detail?

The directive currently covers two directives, the ATEX 94/9/EC product directive and the ATEX 1999/92/EC workplace directive. It applies in all European Union member states and to all machines and equipment that are, or have been on the market there. Conveyor and power transmission belts are not electrical components in the traditional sense and the EU standard states that they are “non-electrical devices”. Conveyor belts per se are not dangerous. A hazard does not occur until they interact with associated parts of the machinery. When belts run over rollers or slider beds, static electricity can be generated and ignite when discharged. Friction heat, produced when the belts accelerate, can also lead to ignition. Sparks or high temperatures in an explosive atmosphere then cause the explosion.

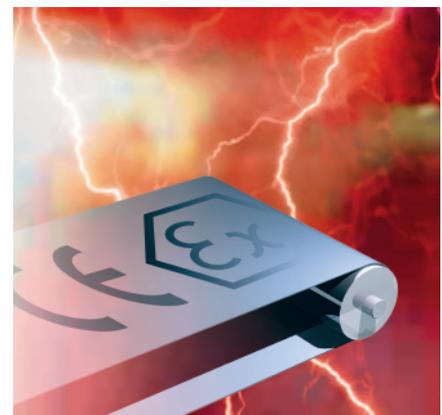
Explosive atmospheres can occur whenever combustible materials, like dusts,

gases, liquids or their vapours are mixed with oxygen, or if dusts deposit themselves on hot surfaces. There is a considerable risk if solvents or disinfectants (e.g. alcohol) are used in the production processes because these substances are volatile and combustible. Some of the combustible dusts which often occur during food manufacture are for example from grain, sugar, baking flour and fish meal, but also substances like vitamin C. Even something as apparently harmless as lactose can explode in certain conditions. ATEX compliance must be guaranteed everywhere where these types of dust occur as waste products, or as end products in significant quantities.

In all hazardous areas, devices may only be used that are protected in such a way that no sparks or high temperatures can occur. Depending on hazard frequency, explosive atmospheres are divided into various categories or zones (see table).

Furthermore, the temperature category for dusts and the explosion group for gases have to be defined and stated.

The food industry also has processes that are affected by ATEX. For example grinding



grain. Explosive dust-air mixtures can occur in mills and cause major malfunctions. Another example is conveying flour in bucket conveyors. Affected are also stirrers and blenders in the food industry, in manufacturing pharmaceutical products and the chemical industry.

When loading and unloading vehicles that carry grain and during storage, explosive dust-air mixtures can occur. An explosive atmosphere (zone 20) is also constantly inside silos filled with grain. Outside the silo and in the filling tube, this condition only occasionally occurs, for example when filling or emptying (zone 21). Zone 21 is encompassed by zone 22, where hazardous dust-air mixtures only occur if a rare error is made. The ATEX directive is a purely European directive and therefore not compulsory for the North American region. Explosion protection regulations there are

Forbo Siegling can provide an ATEX manufacturer's declaration for ATEX categories 2 and 3.

A marking on the belt (see graphic below) shows all the details of permitted usage and authorisation for usage:

Category	Ex-zone	Ex-hazard	Conveyor belt requirements
1G (=gas) 1D (=dust)	Zone 0 Zone 20	Ex-hazard for long periods Guideline: More than 1000 hours/year	Conductive from top to bottom and on the two outside edges Manufacturer's declaration and declaration of compliance
2G 2D	Zone 1 Zone 21	Occasional ex-hazard Guideline: More than 10 – 1000 hours/year	Conductive from top to bottom and on the two outside edges Manufacturer's declaration and declaration of compliance
3G 3D	Zone 2 Zone 22	Ex-hazard seldom Guideline: Fewer than 10 hours/year	Antistatic finish Manufacturer's declaration

created, depending on the technical area, by different organisations. In the US, the National Electrical Code (NEC) and in Canada the Canadian Electrical Code (CEC) have drawn up the most extensive rules. Throughout America there is just one classification of the explosive atmospheres HazLoc (= Hazardous Location System) which is very close to the ATEX classification. However, converting an ATEX declaration

of compliance to the HazLoc system is prohibited. The North American explosion protection regulations only apply to electrical devices, similarly to Europe before ATEX existed.

The American regulations govern non-electrical devices, such as for example conveyor and power transmission belts, if they are used in certain applications like mining.

If enquiries are made about using conveyor belts in North America in areas with an obvious explosion risk, we recommend explicitly asking about the regulations they need to comply with. Selecting a belt with an ATEX declaration is always a good idea, but irrelevant in legal terms in North America.

